**SUMMARY**

Guideline questions

**Children (5-11 years) and Youth (12-17 years)**
- What is the relationship between physical activity and 7 health indicators (high blood cholesterol, depression, injury, bone mineral density, high blood pressure, overweight and obesity, metabolic syndrome) in school aged children and youth (5-17 years)?
- How much (volume) of physical activity is needed for minimal and optimal health benefits in school-aged children and youth (i.e., does this increase in a dose-response manner)?
- What types of activity are needed to produce health benefits?
- What is the appropriate physical activity intensity?
- Do the effects of physical activity on health in school-aged children and youth vary by sex and/or age?

**Adults (18-64 years)**
- What is the relationship between physical activity and 8 health indicators (premature all-cause mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes, osteoporosis) in adults (18-64 years)?
- Does this relationship increase in a dose-response manner (and if so, what is the nature of the curve)?
- Does current evidence support existing Canadian Physical Activity Guidelines?

**Older Adults (≥65 years)**
- What is the relationship between physical activity and functional independence (i.e. functional limitations, disability, or loss of independence) and cognitive function in older adults (≥65 years)?
- What are the types, volumes, and intensities of physical activity related to higher functional status?
- Is there a dose-response relationship between total physical activity or intensity of physical activity the related functional outcomes?
Target Population
The following guidelines are relevant to all apparently healthy individuals over the age of 5 years irrespective of gender, race, ethnicity or socio-economic status. Specifically, target populations are as follows:

<table>
<thead>
<tr>
<th>Children and Youth</th>
<th>Adults</th>
<th>Older Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>School-aged children and youth between 5 and 17 years of age.</td>
<td>Previously healthy (i.e. asymptomatic) adults without an established chronic disease between 18 and 64 years of age.</td>
<td>Asymptomatic community dwelling (i.e. not living in a nursing home or long term care facility) older adults between 65 and 85 years of age with ‘minimal’ initial impairment or functional inability.</td>
</tr>
</tbody>
</table>

Methods
For each systematic review, the following general steps occurred. Please see the individual systematic reviews for specific details.


Using a-priori inclusion and exclusion criteria, authors identified potentially relevant citations by title and abstract, and retrieved full-text articles for detailed review. Authors assessed all included articles for risk of bias and qualitatively synthesized and interpreted the results. Systematic review findings were presented, discussed, and interpreted at an international consensus symposium. The results and interpretation of the systematic review were further reviewed by the Canadian Society for Exercise Physiology (CSEP) Physical Activity Measurement and Guideline project (PAMG) Steering Committee for edits and comments. The final systematic reviews were approved by the CSEP PAMG Steering Committee and examined and accepted through international peer-review before publication.

Results from the systematic reviews were used to inform the development of new physical activity guidelines. The draft guidelines were developed through consensus meetings with key informants, the CSEP PAMG, ParticipACTION, and the Public Health Agency of Canada (PHAC). Draft guidelines were then sent out for external review (via online and in-person consultation) to hundreds of stakeholders and health professionals. A final consensus meeting was convened to incorporate comments from stakeholder consultations. Final approval was obtained from the CSEP PAMG steering committee and the PHAC.

Key Evidence
Key evidence to inform these guidelines comes from 3 systematic reviews relating to physical activity and health in (1) children and youth, (2) adults, and (3) older adults. These reviews were published along with 4 other supportive papers as a special thematic series in International Journal of Behavioral Nutrition and Physical Activity (IJBNPA) to inform the development of the new Canadian Physical Activity Guidelines.

Children (5-11 years) and Youth (12-17 years)
Authors examined the relationship between physical activity (and fitness) and 7 health indicators (high blood cholesterol, depression, injury, bone mineral density, high blood pressure, overweight and obesity, metabolic syndrome). A total of 86 articles met the inclusion criteria. The majority of included studies were observational in nature. Observational studies showed a clear dose-response relationship between increased levels of physical activity and associated health benefits. Experimental studies showed that high-risk children and youth (e.g. obese youngsters) are able to achieve some improvements in their health with even modest amounts of
activity. Aerobic activities had the greatest associated health benefits. There was insufficient evidence to support recommendations for different demographic sub-groups (i.e. different guidelines for different gender, age or ethnic groups). Future work should use standardized direct measures for assessing and analyzing levels of physical activity.

**Adults (18-64 years)**
Authors critically appraised the strength of the relationship between physical activity and 8 specific health outcomes (premature all-cause mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes, osteoporosis). The review identified 254 articles that met the inclusion criteria (the majority being prospective cohort design). A modified Downs and Black checklist was used to assess risk of bias, consisting of 15 items and a maximum score of 15. Across outcomes, the mean Downs and Black scores ranged from 11-13. Current literature supports a clear dose response relationship between increased levels of physical activity and decreased risk for disease. Physical activity should include a combination of moderate and vigorous intensity activities and incorporate resistance activities that tax the musculoskeletal system.

**Older Adults (≥ 65 years)**
Review authors examined the relationship between physical activity and i) functional abilities and independence and ii) cognitive function through prospective cohort studies and exercise training interventions. A total of 66 studies met the inclusion criteria for functional independence and a further 34 studies were included for cognitive function. Risk of bias was assessed for each study design. Prospective cohort studies scored 8-12 out of 12; randomized controlled studies scored 17-19 out of 24; non-randomized controlled studies scored 14-17 out of 23. Increased aerobic physical activity was associated with reduced risk of functional limitations, disability and loss of independence in older age. Exercise training interventions showed improvements in physiology and functional measures. Minimally effective and optimal amounts of activity are difficult to determine but it appears that there is a threshold of at least moderate-intensity activity and higher levels and vigorous physical activity confer further benefit. Thus, there appears to be a dose-response for intensity of activity and volume.

**GUIDELINE RECOMMENDATIONS**

**Children (5-11 years) and Youth (12-17 years)**
These guidelines are relevant to all apparently healthy children (5-11 years) and youth (12-17 years), irrespective of gender, race, ethnicity or socio-economic status of the family. Children and youth are encouraged to participate in a variety of physical activities that support their natural development and are enjoyable and safe.

For health benefits, children aged 5-11 years and youth aged 12-17 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. This should include:
- Vigorous-intensity activities at least 3 days per week.
- Activities that strengthen muscle and bone at least 3 days per week.

More daily physical activity provides greater health benefits.

**Adults (18-64 years)**
These guidelines are relevant to all apparently healthy adults aged 18-64 years, irrespective of gender, race, ethnicity or socio-economic status. Adults are encouraged to participate in a variety of physical activities that are enjoyable and safe.

- To achieve health benefits, adults aged 18-64 years should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.
- More physical activity provides greater health benefits.

Older Adults (≥ 65 years)
These guidelines are relevant to all apparently healthy adults aged 65 years and older, irrespective of gender, race, ethnicity or socio-economic status. Older adults are encouraged to participate in a variety of physical activities that are enjoyable and safe.

- To achieve health benefits and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.
- Those with poor mobility should perform physical activities to enhance balance and prevent falls.
- More physical activity provides greater health benefits.

CHANGES FROM PREVIOUS GUIDELINES
Children and Youth

Inclusion of all school-aged children and youth. The new guidelines focus on a wider age group for the pediatric population. Whereas the previous guidelines focused on children (6-9 years) and youth (10-14 years), the new guidelines have expanded to capture all school-aged children and youth (5-17 years). The change in age groups also reflects the availability of the best evidence which is often focused in the school setting.

Recommendation for 60 minutes of moderate- to vigorous-intensity physical activity per day. The most current evidence available shows a clear dose-response relationship between moderate- to vigorous-intensity physical activity and increased health benefits. The greatest reductions in health risks occur with an average of 60 minutes of moderate- to vigorous-intensity physical activity per day. Whereas the previous guidelines recommended that children and youth should “increase time currently spent on physical activity, starting with 30 minutes more per day” and progress over 5 months to 90 minutes more per day, data from the systematic review did not support this recommendation. Therefore, new guidelines have changed to reflect new evidence.

Emerging recommendations for sedentary behaviours. The final change from previous guidelines is the omission of recommendations for time spent engaging in sedentary behaviours. Work to provide Canadian guidelines specifically for sedentary behaviour for school aged children and youth (5-17 years) was completed concurrently with, and following a similar process to, the physical activity guidelines. The clinical practice guideline development report for sedentary behaviours is available here:
http://www.csep.ca/english/view.asp?x=881

Adults
Revised age range (18 to 64 years). The new adult guidelines include a wider population by age. Whereas the previous guidelines focused on adults 20-55 years of age, the new guidelines included those from 18 to 64 years. This change was made to reflect the best available evidence and to harmonize guidelines with other countries and organizations.

Recommendation for 150 minutes of moderate-to-vigorous intensity aerobic physical activity per week. Evidence clearly supports the dose-response relationship between increased physical activity and health benefits, but it is unclear if this activity needs to be done daily, or every other day for maximum effect. While
previous guidelines recommended “60 minutes of physical activity everyday to stay healthy and improve your health”, we updated the guideline recommendations to reflect current evidence. The change from a daily reference to a weekly reference reflects the aggregated evidence more precisely. Recommendation for weekly physical activity also carries the inherent advantage of being flexible, allowing a variety of individual approaches to meet the recommendation. Authors stress that additional physical activity is associated with increased health benefits.

Older Adults

Revision of age range (≥65 years). The new guidelines for older adults include people ≥65 years of age to reflect the best available evidence, whereas previous guidelines focused on those ≥55 years of age.

Recommendation for 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week. As with the adult literature, evidence clearly supports the dose-response relationship between increased physical activity and health benefits in older adults and also benefits related to functional independence. The new recommendations emphasize physical activities that are at minimum, moderate intensity, with greater benefit and less volume required when vigorous intensity activities are incorporated. The moderate- to vigorous-intensity is supported by the studies of older adults with “functional” outcomes. For the important functional outcomes related to fitness, physical activity sessions 3 or more times a week are effective without a requirement of daily activity. While previous guidelines recommended “60 minutes of physical activity everyday to stay healthy and improve your health”, we updated the guideline recommendations to reflect current evidence. Recommendation for weekly physical activity also carries the inherent advantage of being flexible, allowing a variety of individual approaches to meet the recommendation. Authors stress that additional physical activity is associated with increased health benefits.

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Disclaimer

Care has been taken in the preparation of information contained in this document. Nonetheless, any person seeking to apply or consult these guidelines is expected to use independent judgment, or if they are not qualified to do so, to seek the advice of a qualified medical professional. The Canadian Society for Exercise Physiology makes no warranties of any kind with respect to these guidelines and takes no responsibility for their application in any way. The Canadian Society for Exercise Physiology and the Public Health Agency of Canada funded these guidelines. The views of the funding agencies had no influence on the content or recommendations included in this document.

References from International Journal of Behavioral Nutrition and Physical Activity

Systematic reviews:


**Supportive papers:**


GUIDELINE QUESTIONS

Children (5-11 years) and Youth (12-17 years)
- What is the relationship between physical activity and 7 health indicators (high blood cholesterol, depression, injury, bone mineral density, high blood pressure, overweight and obesity, metabolic syndrome) in school aged children and youth (5-17 years)?
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- What is the appropriate physical activity intensity?
- Do the effects of physical activity on health in school-aged children and youth vary by sex and/or age?

Adults (18-64 years)
- What is the relationship between physical activity and 8 health indicators (premature all-cause mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes, osteoporosis) in adults (18-64 years)
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- What are the types, volumes, and intensities of physical activity related to higher functional status?
- Is there a dose-response of total activity or physical activity intensity related to the outcomes?

INTRODUCTION
Over the past several decades, the physical activity and fitness of Canadians has decreased and overweight/obesity and their associated co-morbidities have steadily increased (Colley et al. 2011a; Colley et al. 2011b; Shields et al. 2010; Tremblay et al. 2011). Engaging in regular physical activity is widely accepted as an effective preventative measure for a variety of health risks across all age, gender, ethnic and socioeconomic subgroups (Janssen and LeBlanc 2010; Warburton et al. 2010; Paterson and Warburton 2010; Physical Activity Guidelines Advisory Committee 2008; World Health Organization 2010; Warburton et al. 2007; Paterson et al. 2007; Janussen 2007; Timmons et al. 2007; Martin Ginis and Hicks 2007; Young and Katzmarzyk 2007). Since 1995, the Canadian Society for Exercise Physiology (CSEP) and the Public Health Agency of Canada (PHAC) have worked together on the development of Canadian Physical Activity Guidelines to promote healthy active living in the Canadian population. This began with the publication of the Canadian Physical Activity Guide for Adults (20-55 years of age) in 1998 (Health Canada and the Canadian Society for Exercise Physiology 1998), Older Adults (>55 years of age) in 1999 (Health Canada and the Canadian Society for Exercise Physiology 1999), Children (6-9 years or age) in 2002 (Health Canada and the Canadian Society for Exercise Physiology 2002b), and Youth (10-14 years of age) in 2002 (Health Canada and the Canadian Society for Exercise Physiology 2002a). These guides have been the PHAC’s most requested resource (Tremblay et al. 2007).

This report outlines the steps taken to arrive at the final “new” Canadian Physical Activity Guidelines for Children (5-11 years) and Youth (12-17 years), Adults (18-64 years), and Older Adults (≥65 years). These guidelines are presented by the Canadian Society for Exercise Physiology (CSEP) and made available to all Canadians. The following guidelines were informed by a rigorous scientific process, and are based on systematic reviews of the scientific evidence. The CSEP Physical Activity and Measurement and Guidelines
(PAMG) project Steering Committee has worked to make this process as rigorous and as transparent as possible.

The process to create new Canadian Physical Activity Guidelines started with a Think Tank in 2006 to outline the steps needed to inform new activity guidelines. The Think Tank brought together experts in the field of exercise physiology, the psychosocial aspects of physical activity, social marketing, epidemiology and physical activity guide development. From the initial Think Tank meetings, the PAMG project has included a total of 21 peer reviewed publications, including 5 systematic reviews, to document the guideline development process thus far. Members of the working groups, their role and their respective affiliations can be found in Appendix A.

BACKGROUND

The meetings held in 2006 highlighted some key knowledge gaps in the previous physical activity guidelines; therefore in 2007, a series of 14 papers focused on current evidence on physical activity and health were commissioned by CSEP, with funding support from the PHAC to help inform new physical activity guidelines for Canadians. These foundation papers were to help inform new Canadian Physical Activity Guidelines and were published jointly in *Applied Physiology Nutrition and Metabolism (APNM)* and the *Canadian Journal of Public Health (CJPH)* (Brawley and Latimer 2007; Cameron et al. 2007; Esliger and Tremblay 2007; Janssen 2007; Katzmarzyk and Tremblay 2007; Martin Ginis and Hicks 2007; Paterson et al. 2007; Timmons et al. 2007; Sharratt and Hearst 2007; Tremblay et al. 2007a, 2007b, 2007c; Warburton et al. 2007; Young and Katzmarzyk 2007). From this, an expert working group noted that these reviews did not follow the rigorous, systematic process needed to make clinical practice guidelines in the form of new public health recommendations.

Two research methodology consultants were engaged to advise the PAMG Steering Committee on best practices for conducting the systematic reviews and developing clinical practice guidelines. Based on advice provided, the PAMG Steering Committee decided to use the Appraisal of Guidelines for Research Evaluation (AGREE) II instrument as a framework to guide the project (see references below). AGREE II is an internationally accepted standard for guideline development that ensures scientific rigor and transparency throughout the process. A series of systematic reviews were commissioned to examine the relationship between physical activity health in school-aged children and youth (5-17 years of age), adults (18-64 years of age), and older adults (≥65 years of age). Two additional systematic reviews examined approaches for constructing the messages accompanying the Physical Activity Guidelines (Latimer et al. 2010) and mediators of physical activity behaviour change (Rhodes and Pfaeffli 2010). Findings from draft versions of all systematic reviews were presented, discussed and interpreted at an International Consensus Symposium in Kananaskis in January 2009 (found [here: http://www.csep.ca/cmfiles/PAMGpdfs/2009PAMGConfSummaryPublic.pdf](http://www.csep.ca/cmfiles/PAMGpdfs/2009PAMGConfSummaryPublic.pdf)). After peer-review, these reviews were published as a special thematic series in the *International Journal of Behavioural Nutrition and Physical Activity* in May 2010. A paper explaining the process behind the systematic reviews and PAMG project up until that point (Tremblay et al. 2010a), and an independent expert consensus and review paper (Kesäniemi et al. 2010) can be found in the same series.

Two additional systematic reviews examined the messaging of physical activity guidelines and mediators of physical activity behaviour change. The detailed process behind the systematic reviews and PAMG project up until that point can also be found in the same series (see reference below).

In September 2010, a consensus meeting was convened to develop the wording of the guidelines that would be presented to stakeholders for consultation. The wording for the guidelines was informed by the systematic reviews and presented for each age group in the form of a preamble to explain the guidelines, followed by the guidelines themselves.
METHODS

Guideline Development

Figure 1 outlines the process that the PAMG Steering Committee has undergone in the process of developing the new physical activity guidelines. Currently there are 21 peer reviewed publications that explain this process and the supporting information in great detail. These foundational documents were used to inform the development of the WHO Global Recommendations on Physical Activity for Health (World Health Organization 2010, found here: https://www.who.int/dietphysicalactivity/factsheet_recommendations/en/index.html) and the United Kingdom new physical activity guidelines (Bull et al. 2010). Details on the process to guide the initial set of reviews (i.e. in 2007) can be found in the review by Tremblay et al. (2007a). Process and evaluation details that guided the 2010 systematic reviews can be found in the paper by Tremblay et al. (2010). Details on the development of the AGREE II instrument can be found elsewhere (Brouwers et al. 2010a; Brouwers et al. 2010b; Brouwers 2010c). The AGREE II instrument can be found here: http://www.agreecollaboration.org/instrument/. The methodological quality of the systematic reviews was assessed by the systematic review expert using the AMSTAR (Assessment of Multiple SysTemAtic Reviews) tool. Briefly, the AMSTAR tool assesses the comprehensiveness and rigour of the systematic review and has been shown to have high validity for the evaluation of systematic reviews. Details on AMSTAR can be found elsewhere (Shea et al. 2007; 2009). Conclusions from the systematic reviews were assigned a level of evidence based on the quality of study which supported them (Table 1). The level of evidence was used to help develop appropriate wording for the proposed guidelines.

References for PAMG project process


References for AGREE documents


Fig 1. Timeline for updating Canadian Physical Activity Guidelines

Canadian Society for Exercise Physiology (CSEP)
Table 1. Criteria for assigning level of evidence

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>Randomized control trials without important limitations</td>
</tr>
<tr>
<td>Level 2</td>
<td>Randomized control trials with important limitations</td>
</tr>
<tr>
<td></td>
<td>Observational studies (non-randomized clinical trials or cohort studies) with overwhelming evidence</td>
</tr>
<tr>
<td>Level 3</td>
<td>Other observational studies (prospective cohort studies, case-control studies, case series)</td>
</tr>
<tr>
<td>Level 4</td>
<td>Inadequate or no data in population of interest</td>
</tr>
<tr>
<td></td>
<td>Anecdotal evidence or clinical experience</td>
</tr>
</tbody>
</table>

Adapted from: Lau et al. 2007

The following sections summarize the scientific evidence used to inform the “new” Canadian Physical Activity Guidelines. Please see the peer-review publications for further details.

**CHILDREN AND YOUTH**

*Reference*


**Questions to be addressed in the systematic review:**

- What is the relationship between physical activity and 7 health indicators (high blood cholesterol, depression, injury, bone mineral density, high blood pressure, overweight and obesity, metabolic syndrome) in school aged children and youth (5-17 years)?
- How much (volume) physical activity is needed for minimal and optimal health benefits in school-aged children and youth (i.e. does this increase in a dose-response manner)?
- What types of activity are needed to produce health benefits?
- What is the appropriate physical activity intensity?
- Do the effects of physical activity on health in school-aged children and youth vary by sex and/or age?

**Methods**

*Inclusion Criteria*

For observational studies, the outcomes must have been measured as dichotomous outcomes (i.e. yes or no) and presented as such. The study could measure physical activity directly or indirectly and fitness was used as a proxy measure of physical activity. Key health indicators included in this review were:

- High cholesterol, High blood pressure and Markers of metabolic syndrome* as markers of cardiometabolic risk
- Overweight/obesity as a measure of adiposity
- Low bone density as a measure of skeletal health
- Depression as a measure of mental health
- Injuries as a negative health outcome of physical activity

*definitions of metabolic syndrome vary considerably between different countries and organizations but generally include a composite measure of abdominal obesity, hypertension, triglycerides, insulin, HDL-and LDL-cholesterol, inflammatory markers.

**Literature Search Strategy**

Databases searched included:

- Ovid MEDLINE (1950-January 2008)
- Ovid Embase (1980-January 2008)
- Ovid CINAHL (1982-January 2008)
- Ovid psycINFO (1967-January 2008)
- Ovid All Evidence-Based Medicine Reviews (1991-January 2008)
- EBSCO SPORTDiscus (up to January 2008)
After removing duplicates, a total of 11,088 citations were retrieved from the 6 databases. After scanning titles and abstracts, full-text copies of 454 potentially relevant citations were retrieved. Of these, 86 citations met inclusion criteria and were included in the systematic review (Table 2). Several of these studies included results for 2 or more of the 7 relevant health outcomes. The majority of the evidence was taken from observational studies and limited the strength of recommendations that were made.

Results – See Table 2.

Summary
Dose-response relationships between physical activity and health were observed in several observational studies for several different health benefits. For some health outcomes, even modest increases in physical activity are associated with health improvements – especially in high risk children and youth. Activity should be at least moderate intensity and it should be recognized that vigorous intensity activities will provide additional benefits. Aerobic activities are associated with the greatest overall health benefits, except for increasing bone-strength in which case high impact, weight bearing activities are needed.

Children and youth 5-17 years of age should accumulate an average of at least 60 minutes per day and up to several hours of at least moderate intensity physical activity per day [Level 2]. Some of the health benefits can be achieved through an average of 30 minutes per day. There is strong and consistent evidence based on experimental studies for several health outcomes. Evidence from cross-sectional studies also show dose-response relationships between level of physical activity and many health outcomes. Finally, it is important to note that the recommendation is that children and youth accumulate an average of 60 minutes of moderate-to-vigorous-intensity physical activity per day. Therefore, from a surveillance perspective, children and youth who engage in >60 minutes of moderate- to vigorous-intensity physical activity on 6 out of 7 days of the week can still potentially meet the guidelines.

More vigorous intensity activities should be incorporated or added when possible, including activities that strengthen muscle and bone [Level 3]. The majority of observational studies have examined the relationship between moderate- to vigorous-intensity physical activity and health indicators. Moderate and vigorous activities seem to elicit similar health outcomes. These outcomes are not seen with light activity. There is some evidence to support the recommendation that vigorous-intensity activity provides benefits beyond those associated with moderate-intensity activity.

Aerobic activities should make up the majority of the physical activity. Muscle and bone strengthening activities should be incorporated on at least 3 days of the week [Level 2]. Many health outcomes seem to respond almost exclusively to aerobic activities. Bone health was most positively associated with resistance or high impact training at least 2-3 days of the week.

Currently, there is not enough evidence to support different recommendations for age/sex groups.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Initial screening</th>
<th>Included in the review</th>
<th>Study design</th>
<th>Summary of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>High blood cholesterol</td>
<td>437</td>
<td>9</td>
<td>Observational: 1 cross-sectional study &lt;br&gt;Experimental: 6 studies (4 randomized control trials, 2 non-randomized intervention studies)</td>
<td>Any dose-response relation between exercise and blood lipids in children and youth are unclear. &lt;br&gt;There is not enough evidence to make conclusions on the moderating effect of exercise on cholesterol in this population</td>
</tr>
<tr>
<td>Depression</td>
<td>1151</td>
<td>6</td>
<td>Observational: 3 (all cross-sectional) &lt;br&gt;Experimental: 3 (all randomized control trials)</td>
<td>All experimental studies included in the review observed significant improvements in at least one depressive symptom in response to a 8-12 week exercise program.</td>
</tr>
<tr>
<td>Injury</td>
<td>2505</td>
<td>3</td>
<td>Observational: 3 (all cross-sectional)</td>
<td>All studies included in the review reported higher rates of injury in physically active children and youth compared to inactive children. There was a clear dose-response relation between level of activity and risk of injury.</td>
</tr>
<tr>
<td>Bone mineral density</td>
<td>1181</td>
<td>11</td>
<td>Experimental: 11 (2 presented data on the same population and were included as 1 study)</td>
<td>Many studies looked at changes in bone mineral density as a continuous variable and not as a dichotomous variable. Some results showed that as little as 10 minutes of moderate- to high-impact activity performed at least 2 or 3 days per week can have a modest effect on bone mineral density.</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>1677</td>
<td>11</td>
<td>Observational: 3 (2 cross-sectional, 1 prospective cohort) &lt;br&gt;Experimental: 8 (4 randomized control trials)</td>
<td>Significant reductions in systolic blood pressure in response to aerobic exercise training. Effect of age on the relation remains unclear but it seems that exercise is beneficial in both sexes.</td>
</tr>
<tr>
<td>Overweight and obesity</td>
<td>5824</td>
<td>55</td>
<td>Observational: 31 (24 cross-sectional, 3 prospective cohort, 2 case-control, 1 mixed) &lt;br&gt;Experimental: 24 (17 randomized control trials)</td>
<td>The relation between physical activity, exercise and fitness and risk for overweight/obesity has been examined extensively. Moderate- to vigorous-intensity activity was a stronger predictor for overweight/obesity than when light activity was also included in the analysis. A dose response relation between overweight/obesity and physical activity exists but the nature of the curve (i.e linear or curvilinear) gives mixed results. No conclusions can be made on the potential moderating effects of age or sex on the level of association.</td>
</tr>
<tr>
<td>Metabolic syndrome</td>
<td>1677</td>
<td>16</td>
<td>Observational: 8 studies (7 cross-sectional, 1 prospective) &lt;br&gt;Experimental: 8 studies (5 randomized control studies)</td>
<td>The results for the relation between physical activity and increased risk for metabolic syndrome are mixed. Observational studies show a clear dose response relationship, although the nature (i.e. linear or curvilinear) is unclear. More research is needed to address dose-response effects and the effect of age or gender on outcome measure.</td>
</tr>
</tbody>
</table>

Total 11,088 86
Questions to be answered in the systematic review:
- What is the relationship between physical activity and 8 health indicators (premature all-cause mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes, osteoporosis) in adults (18-64 years)
- Does current evidence support existing Canadian Physical Activity Guidelines?

Methods

Inclusion Criteria
Any studies that evaluated the relationship between at least three different levels of physical activity and mortality or incidence of chronic disease were eligible for inclusion. Participants had to be healthy without an established chronic disease. Outcome measures included in the study were those that are thought to be reduced through habitual physical activity:
- Premature all-cause mortality
- Cardiovascular disease (excluding stroke)
- Stroke
- Hypertension
- Colon cancer
- Breast cancer
- Type 2 diabetes
- Osteoporosis

Literature Search Strategy
Databases searched included:
- Ovid MEDLINE (1950-March 2008)
- Ovid Embase (1980-March 2008)
- Ovid CINAHL (1982-March 2008)
- Scholars Portal PsycINFO (1840-March 2008)
- Cochrane Library (-March 2008)
- SPORTDiscus (-March 2008)

A separate search was conducted for each health outcome. To assess risk of bias, a modified Downs and Black tool was used. The most relevant components of the tool were used to create a modified checklist which consisted of 15 items with a maximum score of 15 points. Higher scores reflected superior quality of investigation. Across outcomes, the mean Downs and Black scores ranged from 11-13.

Results – See Table 3.
Table 3. Results for the primary prevention of health outcome (see systematic review for details)

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Initial screening</th>
<th>Included in the review</th>
<th>Search</th>
<th>Summary of evidence</th>
</tr>
</thead>
</table>
| Premature all-cause mortality  | 1,843             | 70                      | The review identified a total of 1,525,377 participants with a total of 111,125 reported cases of premature all-cause mortality. The mean Downs and Black score was 12 (range 10-14). | For a reduced risk for premature mortality, it is recommended that individuals should participate in 30 minutes or more of moderate to vigorous exercise on most days of the week. Greater health benefits appear to occur with higher volumes and/or intensities of activity. [Level 2]  

There was a mean 30% lower risk for all-cause mortality in the most active individuals. Furthermore, there was a clear dose-response relationship between even modest increases in physical activity and improved health. Some of the most compelling evidence examines the relationship between fitness and all-cause mortality. Those with high aerobic fitness have a risk reduction of about 45% for premature all-cause mortality when compared to their inactive peers. |
| Cardiovascular disease         | 8,138             | 49                      | The majority of studies were prospective cohort studies. There were a total of 726,474 participants with a total of 34,815 reported cases of cardiovascular disease. The mean Downs and Black score was 12 (range 9-14). | For a reduced risk for cardiovascular disease-related events and mortality, it is recommended that individuals participate in 30 min or more of moderate- to vigorous-intensity physical activity [Level 2]  

The risk for cardiovascular disease demonstrates a graded inverse dose-response relationship to physical activity and fitness with an average reduced risk of 33%. This risk reduction is increased when studies used direct measures of physical activity. |
| Stroke                         | 1,091             | 25                      | There were a total of 479,336 participants and 12,361 reported cases of stroke. The mean Downs and Black score was 13 (range 11-15). | For a reduced risk of stroke, it is recommended that individuals should participate in 30 minutes or more of moderate to vigorous exercise on most days of the week. Brisk walking appears to be protective against the development of stroke. It remains to be determined whether lower volumes of physical activity lead to a reduced risk for stroke. [Level 3]  

The most active individuals have a risk reduction of 25-30% for stroke. Although it did appear that a dose response relationship existed, it varied depending on type of stroke. It appears that current guidelines are sufficient for a reduced risk of stroke. |
| Hypertension                   | 6,167             | 12                      | There were a total of 112,636 participants with a total 11,441 reported cases of hypertension. The mean Downs and Black score was 11 (range 11-12). | For a reduced risk for hypertension, it is recommended that individuals should participate in 30 minutes or more of moderate to vigorous exercise on most days of the week. [Level 3]  

All studies reviewed showed a positive effects of physical activity on the risk for hypertension. Physical activity was associated with a 32% risk reduction for hypertension. This followed a clear dose-response curve. However, it is clear that the physical activity must be at least moderate to vigorous intensity to elicit a reduction in risk for hypertension. |
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Initial screening</th>
<th>Included in the review</th>
<th>Search</th>
<th>Summary of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site specific cancers</td>
<td></td>
<td></td>
<td>The included studies involved a total of 1,433,103 participants with a total of 17,959 reported cases of colon cancer. The studies were generally higher quality and had a mean Downs and Black score of 13 (range 11-15).</td>
<td>For a reduced risk for site specific cancers (such as colon and breast cancer), it is recommended that individuals should participate in 30 minutes or more of moderate to vigorous exercise on most days of the week. [Level 2]</td>
</tr>
<tr>
<td>Colon cancer</td>
<td>237</td>
<td>33</td>
<td>The included studies involved a total of 1,433,103 participants with a total of 17,959 reported cases of colon cancer. The studies were generally higher quality and had a mean Downs and Black score of 13 (range 11-15).</td>
<td>When comparing the most active (or fit) group to the least active (or fit) group, there was a reduced risk of 30% for colon cancer; however there was considerable variability in the results.</td>
</tr>
<tr>
<td>Breast cancer</td>
<td>525</td>
<td>43</td>
<td>The data providing information on a dose-response relationship was all observational in nature. The studies involved a total of 1,861,707 participants with a total of 80,247 cases of breast cancer. The articles were of high quality with a mean Downs and Black score of 13 (range 9-14).</td>
<td>There is compelling and consistent evidence to suggest that habitual physical activity is associated with a 20-30% reduced risk for breast cancer. The majority of articles also reveal a dose-response relationship for physical activity and reduced risk for breast cancer. The exact dose of physical activity needed is unclear.</td>
</tr>
<tr>
<td>Type 2 diabetes</td>
<td>3,041</td>
<td>20</td>
<td>The included studies involved 624,952 participants with a total of 19,325 cases of type 2 diabetes. The mean Downs and Black score was 13 (range 11-14).</td>
<td>For a reduced risk for type 2 diabetes, it is recommended that individuals should participate in 30 minutes or more of moderate to vigorous exercise on most days of the week.</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>2,411</td>
<td>2</td>
<td>The included studies had a total of 8,427 participants. The mean Downs and Black score was 11.</td>
<td>For a reduced risk of osteoporosis, it is recommended that individuals should participate in load bearing activities for 30 min or more on most days of the week. Preliminary evidence suggests that current Canadian physical activity guidelines are sufficient to maintain bone health. Although it is clear that physical activity is beneficial for bone health (i.e. increased bone mineral density and decreased bone loss), it is unclear if physical activity actually reduces the risk for osteoporosis. [Level 3]</td>
</tr>
</tbody>
</table>

Total: 23,453 254
Interpretive Summary

Adults (18-64 years) should engage in 150-180 minutes of moderate-intensity physical activity or 90 minutes of vigorous-intensity activity per week. Those who engage in the recommended amounts of physical activity have a 30% reduction in the risk of premature all-cause mortality, cardiovascular disease, stroke, hypertension, colon cancer, breast cancer and type 2 diabetes. In many cases, the dose-response relationship is linear with further health benefits associated with increases in physical activity. This activity can be broken into smaller bouts of at least 10 minutes long.

Adults should also engage in resistance training activities 2-4 days per week. Emerging evidence has demonstrated that increased musculoskeletal fitness can improve blood pressure, bone mineral density, mobility and functional independence, overall quality of life as well as reduce the risk for premature mortality and the risk of falls.

Finally, it is recommended that adults engage in flexibility activities 3-4 times per week. Incorporating activities that improve flexibility into habitual activity may improve mobility and functional independence as well as reduce the risk for falls.

The information presented in the systematic review is consistent with current Canadian Physical Activity Guidelines which appear to be sufficient to reduce the risk of developing the aforementioned diseases and conditions.

OLDER ADULTS

Reference

Questions to be answered in the systematic review:
- What is the relationship between physical activity and functional independence (i.e. functional limitations, disability, or loss of independence) and cognitive function in older adults (≥65 years)?
- What are the types, volumes, and intensities of physical activity related to higher functional status?
- Is there a dose-response of total activity or physical activity intensity related to the outcomes?

Methods
Inclusion Criteria
This review was restricted to published, English language work that looked at community dwelling people (>65 years) with “minimal” initial impairment or functional inability. Those who were initially very old (>85 years), considered ‘frail’, or living in nursing homes or long term care facilities were excluded. With the exception of arthritis, studies examining a specific disease were excluded. The literature focusing on outcomes of ‘falls’, anxiety, depression were excluded. Finally, studies examining persons with pre-existing dementia and/or Alzheimer’s were excluded from the review.

In addition to the information on physical activity with health-related outcomes this systematic review examined outcomes related to the maintenance of functional abilities, functional independence and cognitive function.

Literature Search Strategy
Databases searched included:
- Ovid MEDLINE (1950-March 2008)
- Ovid Embase (1980-March 2008)
- Ovid CINAHL (1982-March 2008)
- Scholars Portal PsycINFO (1840-March 2008)
- Cochrane Library (-March 2008)
- SPORTDiscus (-March 2008)

A separate search was conducted for functional independence and cognitive function. To assess risk of bias, a modified Downs and Black tool was used. The most relevant components of the tool were used for the type of study reviewed. For prospective cohort design the final checklist consisted of 12 items and a maximum of 12 points. For exercise training interventions, the final checklist was modified to 22 items with a total score of 23. For randomized control studies, the final checklist consisted of 23 items with a maximum score of 24. Higher scores reflected superior quality studies.

Results – See Table 4.

SUMMARY

Physical activity recommendations for older adults apply to apparently healthy, community dwelling (i.e. not in a nursing home or long term care facility) individuals. Following the recommendations can reduce the risk of chronic disease, premature mortality, loss of function and disability, and cognitive decline.

Older adults (≥65 years) should engage in at least 150 minutes of moderate-intensity or 90 minutes of vigorous-intensity physical activity per week (definition for older adult is provided below). This activity is to be completed in addition to the light-intensity activities of daily living. This activity can be broken into smaller bouts of at least 10 minutes duration. Regular aerobic physical activity has an inverse dose-response relationship with major chronic diseases such as coronary heart disease, type 2 diabetes, depression, some cancers, dementia, disability, and loss of function. Following these guidelines will decrease an individual’s relative risk for morbidity and mortality and loss of independence by 30-50%. Further benefits can be accrued with additional physical activity.

Older adults should also engage in resistance exercises on 2 days per week. This should involve major muscle groups and 8-12 repetitions at >60% 1 repetition maximum. Older adults should continue with activities of daily living that contribute to the maintenance of muscular strength. Engaging in resistance exercise can prevent sarcopenia and prevent some chronic diseases.

Finally, to maintain balance and prevent falls older adults, particularly those with poor mobility, should participate in activities that improve and maintain balance and flexibility. Increased balance can decrease the risk of falls and the subsequent morbidities. Activities that maintain or improve flexibility may help to maintain function and independence.
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Initial screening</th>
<th>Eligible for inclusion in review</th>
<th>Type of study</th>
<th>Summary of evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Functional independence</td>
<td>2,080</td>
<td>66</td>
<td>Prospective cohort studies: the studies included 83,740 participants from a variety of countries and regions. Median score on modified Downs and Black scale was 9/12 (range 9-12).</td>
<td>Prospective cohort studies show that more physically active older individuals have a 30 to 60% reduced risk of functional limitations and disability. It appears that this occurs with activity of at least moderate intensity and at levels of 150-180 min/week. (Level 3 or 4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exercise training programs (aerobic training and ‘combined’ programs): These studies included 1,938 participants from a variety of countries and regions. Median score on the modified Downs and Black was 21/24 for randomized controlled trials and 17.5/23 for non-randomized controlled trials.</td>
<td>Prospective studies show that long-term lifestyle physical activity as well as short term physical activity interventions (moderate intensity, 3 times/week) reduce the risk for functional impairment or limitation. (Level 3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Exercise training programs (resistance training programs): These studies included 845 participants from a variety of countries and regions. Median score on the modified Downs and Black was 17/24 for randomized controlled trials and 15/23 for non-randomized controlled trials.</td>
<td>Although resistance training may result in improvements in some functional tasks, there is insufficient information to say that resistance training will lead to reduced functional limitations or disabilities. (Level 3)</td>
</tr>
<tr>
<td>Cognitive function</td>
<td>824</td>
<td>34</td>
<td>The included studies involved 19,988 participants from a variety of countries (although ethnicity was not stated explicitly). The Downs and Black checklist was modified for different study designs. Results are as follows: Prospective and longitudinal median = 10/12 (range 8-11); randomized controlled trials median = 17.5/24 (range 15-19); non-randomized controlled trials median = 15/23 (range 14-17).</td>
<td>Habitual (i.e. long term) physical activity is associated with a decreased risk of dementia and Alzheimer’s disease. There is some evidence to suggest that physical activity can also result in improved cognitive function in healthy older adults. (Level 3)</td>
</tr>
<tr>
<td>Total</td>
<td>2,904</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DEVELOPMENT OF GUIDELINE RECOMMENDATIONS

The development of the new physical activity guideline recommendations occurred in three steps (described in detail below):

1. A consensus meeting was convened to draft guidelines based on the information presented in the final published systematic reviews.
2. Stakeholders were surveyed through online and in-person consultations for comments and concerns.
3. A second consensus meeting was convened to discuss changes to the draft guidelines and develop methods for dissemination to the general public.

Details on dissemination and messaging of the guidelines will be published during 2011. The PAMG project has been guided by the AGREE II framework and was assessed by a methodologist familiar with the AGREE II process. The final AGREE II report can be found in Appendix B.

At both consensus meetings (i.e. to create a draft of the guidelines and then to finalize the wording of the guidelines) participants were asked to declare if they had any conflict or competing interests that may influence the development of the physical activity guidelines. All participants were asked to respond to the following question: “Yes, as a guideline development committee member I would like to declare that I have competing interests (i.e. to give myself a business or professional advantage) that may have influenced the development of the new Canadian Physical Activity Guidelines for Children (5-11 years) and Youth (12-17 years), Adults (18-64 years), or Older Adults (≥65 years).” OR “No, I have no competing or conflicting interests to declare.”. One member of the guideline development committee wished to declare that they “received honorarium for methodological consultation” during the project. This honorarium came from CSEP and PHAC and did not have an influence on the development of the wording of the physical activity guidelines. No other members had any conflicts or competing interests to declare. Declarations of conflict or competing interests can be found in Appendix A under the participant lists.

1. CONSENSUS MEETING (Draft guidelines)

In September 2010, a consensus meeting was convened to discuss and debate the information presented in the systematic reviews and to draft recommendations for the new physical activity guidelines. A list of meeting participants can be found here in Appendix A. Work from groups in Australia, the US, the UK, and the WHO were also scanned to ensure harmonization of efforts.

Based on the evidence described in the systematic reviews above, the PAMG Steering Committee, review authors, key informants, and representatives from partner organizations (i.e., AHKC, CSEP, PHAC, and ParticipACTION) drafted the following guideline recommendations:

Children and Youth (5-17 years)

Preamble

These guidelines are relevant to all healthy children and youth aged 5-17 years, irrespective of gender, race, ethnicity or socio-economic status of the family. Children and youth are encouraged to participate in a variety of physical activities that support their natural development and are enjoyable and safe. Those with a disability or medical condition should meet these guidelines; however, they should consult their health care provider to understand the types and amounts of physical activity appropriate for them.

Children and youth should be physically active daily as part of play, games, sports, transportation, recreation, physical education, or planned exercise, in the context of family, school, volunteer and community activities. This should be above and beyond the physical activity accumulated in the course of routine daily non-recreational activities.
Adhering to these physical activity guidelines can improve cholesterol levels, blood pressure, body composition, bone density, cardiopulmonary and musculoskeletal fitness, and aspects of mental health. The potential benefits far exceed the potential risks associated with physical activity.

For those who are physically inactive, doing amounts below the recommended levels will bring some health benefits. For these children and youth, it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.

For guidance on decreasing sedentary behaviour please refer to Canada’s Sedentary Behaviour Guidelines for Children and Youth.

**Guidelines**  
**Preamble**  
These guidelines are relevant to all apparently healthy adults aged 18-64 years, irrespective of gender, race, ethnicity or socio-economic status. Adults are encouraged to participate in a variety of physical activities that are enjoyable and safe. Those who are pregnant, have a disability or medical condition should meet these guidelines; however, they should consult their health care provider to understand the types and amounts of physical activity appropriate for them.

Adults can meet these guidelines through sports, transportation, recreation, occupational demands or planned exercise, in the context of family, work, volunteer and community activities. This should be achieved above and beyond the incidental physical activity accumulated in the course of daily living.

Adhering to these physical activity guidelines can reduce the risk of premature death, coronary heart disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes and osteoporosis and improve fitness, body composition and indicators of mental health. The potential benefits far exceed the potential risks associated with physical activity.

For those who are physically inactive, doing amounts below the recommended levels will bring some health benefits. For these adults it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.

**Guidelines**  
**Preamble**  
These guidelines are relevant to all apparently healthy adults aged 65 years and older, irrespective of gender, race, ethnicity or socio-economic status. Older adults are encouraged to participate in a variety of physical
activities that are enjoyable and safe. Those with a disability or medical condition should meet these guidelines; however, they should consult their health care provider to understand the types and amounts of physical activity appropriate for them based on their exercise capacity and specific health risks or limitations.

Older adults can meet these guidelines through sports, transportation, recreation, occupational demands or planned exercise, in the context of family, work, volunteer and community activities. This should be achieved above and beyond the incidental physical activity accumulated in the course of daily living.

Adhering to these physical activity guidelines can reduce the risk of premature death and chronic disease and improve functional independence, bone health, fitness, mobility, cognitive function and indicators of mental health. The potential benefits far exceed the potential risks associated with physical activity.

For those who are physically inactive, doing amounts below the recommended levels will bring some health benefits. For these adults it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.

Guidelines
To achieve health benefits and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.
- Those with poor mobility should perform physical activities to enhance balance and prevent falls.
- More physical activity provides additional health benefits.

2. STAKEHOLDER PROCESS (External review)
Based on the evidence presented in the systematic reviews and the draft recommendations presented above, feedback was sought from a wide range of stakeholders. This included national and international content experts, health professionals, governmental and non-governmental organizations, teachers, and caregivers. This was done both online, and through a series of in-person consultations. Well over 1000 individuals provided feedback.

Methods for external guideline review
An online survey was sent out to stakeholders with interest in physical activity and health promotion. A list of organizations initially contacted by CSEP can be found in Appendix C. CSEP made efforts to contact each organization and determine the best individual to receive the survey. The initial stakeholders were encouraged to share the survey link with their peers and colleagues. The survey consisted of 14 questions about the wording and level of agreement for the proposed physical activity guidelines and their associated preamble for children and youth, adults, and older adults. Written comments were invited and respondents were told they would receive updated and refined guidelines when the survey process was completed. The results of the survey were reviewed by the CSEP PAMG Steering Committee and the PHAC.

At this same time, a series of 8 in-person consultation meetings were held across the country. These meetings were designed so that stakeholders, scientists and health professionals could discuss and debate the proposed physical activity guidelines. The in-person consultations were coordinated by the PHAC and lead by the Alder Group.
Stakeholder consultation process

A total of 558 individuals completed the online survey and 191 respondents provided additional written comments. The results from the survey can be found here: http://www.csep.ca/english/view.asp?x=879. Overall, the majority of respondents ‘completely agreed’ or ‘agreed’ with the proposed preamble and guideline for all age groups (90.2%, 88.7% and 89.7% for children and youth, adults, and older adults respectively).

The PHAC held 8 in person consultations with stakeholders, individuals from not-for profit and non-governmental organizations, and health professionals. After these meetings, PHAC sent out an online survey to determine how Canadians felt the information generated in the project thus far would be used (i.e. ideas for messaging of the guidelines, comments and/or concerns about the proposed guidelines). The meetings and consultations were run by an external group to facilitate the process and minimize bias. The reports generated from this process can be accessed by contacting the PHAC. The large majority of respondents felt comfortable with the process used to develop the new Physical Activity Guidelines, though many highlighted the need to further translate these technical guidelines into simple messages for dissemination and utilization by the public. The full and summary reports of this consultation are available from the PHAC.

There were some concerns identified by those participating in the consultation process. The majority of these concerns will be addressed in supplementary messages accompanying the guidelines. For more information on the development of recommendations for the content of these supplementary messages see elsewhere (a paper to be published during 20110).

The most obvious concern was the perception that the new guidelines decreased the recommended amount of physical activity for children and youth. The 2011 guidelines state “for health benefits, children aged 5-11 years and youth aged 12-17 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily”. The guidelines also state “more daily physical activity provides greater health benefits“. This is consistent with the evidence presented in the systematic review (Janssen and LeBlanc 2010). Further, recommendations from the Center for Disease Control (in the U.S) (Physical Activity Guidelines Advisory Committee 2008) the World Health Organization (World Health Organization 2010), and the U.K. (Bull et al. 2010) are similar.

The second concern was the different messaging strategies between children and youth, and adults and older adults (i.e. the volume of activity for children and youth is expressed in minutes per day whereas the guidelines for adults and older adults are expressed in minutes per week). The evidence to support these guidelines is different in children and youth, and adults and older adults. In children and youth, the evidence clearly supports the need for daily physical activity; however, in adults and older adults although the evidence clearly supports the dose-response relationship between increased physical activity and health benefits, it is unclear the number of days per week required for minimal or optimal effect. Recommendation for weekly physical activity also carries the inherent advantage of being flexible, allowing a variety of individual approaches to meet the recommendation.

3. Finalization of Guidelines
In November 2010, the PAMG Steering Committee re-convened to address the concerns and comments brought up through the stakeholder consultations and to adjust the guidelines accordingly. Table 5 outlines the draft guidelines, the concerns and comments by stakeholders and how they were addressed, and the final guidelines for each age group.
**Table 5. Final guidelines following consultation process**

<table>
<thead>
<tr>
<th>Draft Guideline Recommendations</th>
<th>Discussion and Comments from Stakeholders</th>
<th>Final Guideline Recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Children and Youth (5-17 years)</strong></td>
<td></td>
<td>For health benefits, children aged 5-11 years and youth aged 12-17 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. This should include:  - Vigorous-intensity activities at least 3 days per week.  - Activities that strengthen muscle and bone at least 3 days per week. <strong>More daily physical activity provides greater health benefits.</strong></td>
</tr>
<tr>
<td>For health promotion, children and youth aged 5-17 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily.  - Vigorous-intensity activities should be incorporated at least 3 days per week.  - Activities that strengthen muscle and bone should be incorporated at least 3 days per week.  - More daily physical activity provides additional health benefits.</td>
<td>- Proposed guideline is harmonized with WHO  - Stakeholders are concerned about language used. <strong>Response:</strong> This will be clarified through public health messaging.  - Discussion of “health promotion” (because it is truly health promotion for children) vs. health benefits (risk reduction, etc.) – Action – consult stakeholders. <strong>Response:</strong> The majority of stakeholders asked for consistency between age groups and thought “health benefits” was most appropriate.  - Title terminology – Canadian Pediatric Society, US guidelines use “adolescent” – action – will consult stakeholders. <strong>Response:</strong> The majority of stakeholders were most comfortable with “children (5-11 years) and youth (12-17 years)”  - Discussion around use of “should” vs. “must” – action – will consult stakeholders. <strong>Response:</strong> After consultation with stakeholders and consensus with experts, it was decided that “must” was too strong of a word.  - Noted that the recommendation does not include ‘bouts’ in guidelines (e.g. accrued in 10 minute intervals). <strong>Response:</strong> There is no evidence to support this statement in children and youth. Children and youth tend to have very sporadic movement patterns and it unlikely that high intensity activities will be sustained for any length of time. With the advent of direct measures for physical activity (i.e. accelerometers) we are able to obtain minute-by-minute activity counts. This work has showed that in the younger age groups, high intensity activity that is sustained for any length of time is associated with health benefits.</td>
<td><strong>Adults (18-64 years)</strong></td>
</tr>
<tr>
<td><strong>Adults (18-64 years)</strong></td>
<td></td>
<td>For health benefits, adults aged 18-64 years should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week. This should include:  - Vigorous-intensity activities at least 3 days per week.  - Activities that strengthen muscle and bone at least 3 days per week. <strong>More physical activity provides greater health benefits.</strong></td>
</tr>
<tr>
<td>To achieve health benefits, adults aged 18-84 years should accumulate at least 150 minutes of moderate- to vigorous-intensity physical activity per week, in bouts of 10 minutes or more.  - It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.  - More physical activity provides additional health benefits.</td>
<td>- Discussion re: use of “accumulate” —suggest focus group to ascertain stakeholder understanding. <strong>Response:</strong> Any concerns regarding language will be addressed in the messaging associated with the guidelines.  - Stakeholders concerned about difficult to interpret guidelines (i.e. 150 minutes per week instead of 30 minutes 5 days per week). <strong>Response:</strong> There is no evidence to suggest that there is an increase in adherence when guidelines are presented in different durations. Adherence to physical activity guidelines does not improve when they are presented as “150 minutes per week” vs “30 minutes 5 days per week”. Furthermore, there is no evidence to suggest that ‘spreading out’ physical activity over the course of a week is associated with additional health benefits.  - Discussion re: must vs. should. <strong>Response:</strong> After consultation with stakeholders and consensus with experts, it was decided that “must” was too strong of a word.</td>
<td><strong>Proposed guideline is harmonized with WHO</strong></td>
</tr>
</tbody>
</table>

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**Canadian Society for Exercise Physiology, January 2011**
<table>
<thead>
<tr>
<th>Draft Guideline Recommendations</th>
<th>Discussion and Comments from Stakeholders</th>
<th>Final Guideline Recommendations</th>
</tr>
</thead>
</table>
| • Clarification on what the science is – need 150 minutes of aerobic + 2 days of strengthening? Response: Many studies have both aerobic and strengthening. Some studies show additive effects. Strengthening alone can show health benefits  
• Stakeholder concerns regarding “above and beyond incidental physical activity”. Response: This is related to the setting of research studies which ask participants for ‘additional’ physical activity, the randomization adjusted for differences in baseline activity  
• Stakeholder concern about the expected behaviour change that is expected. Response: Behaviour change is only expected with appropriate messaging.  
• Stakeholder concern about purposeful wording differences between children and adults. Response: Wording has been modified to be as consistent as possible across age groups. | |
| Older adults (≥65 years) | To achieve health benefits and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.  
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.  
- Those with poor mobility should perform physical activities to enhance balance and prevent falls.  
- More physical activity provides additional health benefits.  
• Stakeholders would like to see further descriptions of age-appropriate physical activities (e.g. shovelling, raking leaves). Response: Descriptions of different activities will be included in the guides themselves through vignettes and examples.  
• There were similar concerns for this age group regarding the language used in the preamble and the guideline. Response: As with other age groups, this will be addressed in the messaging associated with the guidelines  
• Inclusion criteria for the systematic review is for those 65-85 years of age, guidelines are presented for those ≥65 years. Response: No studies were eliminated on the basis of subject average age >85 and no studies with mean age of <85 were eliminated on basis of the possibility of some subjects being above 85 as long as they were not considered ‘frail’ or ‘cognitively impaired’. | - To achieve health benefits and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.  
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.  
- Those with poor mobility should perform physical activities to enhance balance and prevent falls.  
- More physical activity provides greater health benefits. |
DISSEMINATION AND IMPLEMENTATION

The work to inform the development of these guidelines has been published in the peer-review literature (Brawley and Latimer 2007; Cameron et al. 2007; Esliger and Tremblay 2007; Janssen 2007; Katzmarzyk and Tremblay 2007; Martin Ginis and Hicks 2007; Paterson et al. 2007; Timmons et al. 2007; Sharrat and Hearst 2007; Tremblay et al. 2007a, 2007b, 2007c; Warburton et al. 2007; Young and Katzmarzyk 2007; Kesäniemi et al. 2010; Latimer et al. 2010; Janssen and LeBlanc 2010; Paterson and Warburton 2010; Rhodes and Pfaeffli 2010; Tremblay at al 2010; Warburton et al. 2010). Further, the methodological process, systematic reviews, and final recommendations have been and will be shared at scientific meetings and conferences and are posted on the CSEP website.

Partner organizations (e.g., CSEP, ParticipACTION, PHAC, Active Healthy Kids Canada) are working to disseminate and implement these guidelines within the general public. Public facing messages have been created through these partnership organizations and have been developed through a similarly rigorous process as used for the development of the guidelines. Further information on messaging strategies can be found in a paper to be published in 2011. Information on materials for messaging and disseminating the guidelines will be made available on the CSEP website (www.csep.ca). This information will be updated regularly to reflect feedback from stakeholders.

There are a variety of mechanisms that will be used for surveillance of adherence to the new guidelines. The primary Canadian studies that will be used and their affiliated organization are as follows:

- Canadian Health Measures Survey (CHMS, Statistics Canada)
- Canadian Community Health Survey (CCHS, Statistics Canada)
- National Longitudinal Survey of Children and Youth (NLSCY, Statistics Canada)
- Physical Activity Levels Among Youth (CANPLAY, Canadian Fitness and Lifestyle Research Institute)
- Physical Activity Monitor (PAM, Canadian Fitness and Lifestyle Research Institute)
- Health Behavior in School-aged Children Survey (HSBC, PHAC)

For example, the CHMS will directly measure (i.e. through accelerometry) the average amount of time Canadians participate in physical activity. This information will be used to determine the proportion of Canadians meeting the Physical Activity Guidelines. The CHMS will conducted in two year intervals and make the information publicly available in a timely manner. For recent, specific examples of CHMS surveillance activities see Colley et al. (2011a, 2011b). For further surveillance activities see Active Healthy Kids Canada Report Cards (Active Healthy Kids Canada 2005, 2006, 2007, 2008, 2009, 2010), and the Canadian Fitness and Lifestyle Research Institutes CANPLAY results (Craig et al. 2010). See each survey for specific examples of monitoring tools used and relevant operational definitions.


CSEP is working to produce a variety of online and hard copy resources to be made available to all Canadians. These resources will also be distributed to partner organizations so that they are further disseminated. These resources will be created over time and updated as feedback is received from stakeholders. The primary resource will be information sheets for all age groups (i.e. what the guidelines are, health benefits of achieving guidelines and examples of ways to meet the guidelines). Additional resources will be made available in a timely manner. The potential resources implications of implementing these guideline recommendations were beyond the scope of the PAMG project.
**FUTURE RESEARCH**

Areas for future research have been identified within the systematic reviews that informed the guideline development as well as through the stakeholder consultations. Many of these areas are specific to their respective age groups; however, four important gap areas exist for all age groups. The first is to develop physical activity guidelines for special populations (i.e. diseased or disabled). Work to complete physical activity guidelines for special populations is being developed, but is an important area for future work.

The second gap area is the absence of guidelines for time spent engaging in sedentary behaviour (e.g. sitting or watching television). Sedentary behaviours have important health consequences independent of moderate-to-vigorous intensity physical activity levels (Tremblay et al. 2010). However there are currently no evidence-based sedentary behaviour guidelines, not only in Canada, but in the world. This is evident with the absence of any recommendations for time spent engaging in sedentary behaviours in the new Canadian Physical Activity Guidelines. This was done purposefully and not to diminish the importance of limiting sedentary behaviours. This absence only highlights the need for work to be completed in this area. For school-aged children and youth, sedentary guidelines have been developed through a process completed in parallel with the physical activity guidelines described [here: http://www.csep.ca/english/view.asp?x=881](http://www.csep.ca/english/view.asp?x=881) (Tremblay et al. *in press.*)

The third gap area is related to the messaging strategies used to disseminate the new guidelines to the general public; finally, Tailored messaging, gain-frame messages, and self-efficacy change messages hold promise for the future (Latimer et al. 2010) but the general null findings of many behavioural interventions are of a timely concern and should be a focus for improvements in physical activity (Rhodes et al. 2010).

A final gap area that was identified throughout the PAMG project was the lack of standardized methods for physical activity research. More research is needed on structured, population based samples looking at direct and standardized measures of physical activity and age-specific health outcomes. Consideration needs to be taken when accounting for covariates such as age, gender, socioeconomic status and ethnicity. Standardizing direct measures of data collection would lead to huge advantages when comparing levels of physical activity across different time points and geographic areas.

The following sections speak to key research gaps in our knowledge on the relationship between physical activity and health in children and youth, adults, and older adults.

**Children and youth**

The first, and arguably the most important limitation associated with the guidelines for children and youth is the complete absence of guidelines for children under the age of 5 years. To date, no systematic evidence based guidelines exist for this age group, not only in Canada, but in the world. PHAC has proposed funding to resolve this gap and will be included with these guidelines as they emerge.

Authors were limited in their analysis and it was only possible to examine 7 health outcomes omitting several other outcomes that may be important in this age group (e.g. academic performance). Authors were also limited by methodological limitations of the current evidence. A great deal of the available evidence in young people is based on self-report data (e.g., questionnaires on physical activity). Young people have a difficult time accurately recalling their physical activity habits and self-report data not only introduces a variety of biases but also introduces high heterogeneity across studies (Adamo et al. 2009, LeBlanc and Janssen 2010).

Future work should focus on collecting direct measurements of physical activity through accelerometer measurements. Finally, authors were limited by the nature of the population that was examined. Children and youth have trouble recalling physical activity habits, sedentary behaviours, and dietary habits; parents have a great deal of control over their daily activities; and finally, most times researchers are looking at *predictors* of health outcomes later in life cannot rely on mortality statistics for information (such as with adults).
The systematic review authors as well as key informants involved in the PAMG project made several recommendations for future work. First, there is a need for higher quality randomized control trials in the pediatric population (i.e. larger and more diverse sample sizes, direct measures of physical activity, intent-to-treat analysis, reporting of adverse events). These larger studies should then be able to speak to the impact of various demographic variables. Finally, future research should focus on standardizing methods for data collection and analysis and work towards implementing direct (i.e. accelerometers) vs. indirect (i.e. questionnaires) measures of physical activity. Standardized methods for assessing physical activity will also allow researchers to look specifically at different intensities of activity and the associated benefits and/or risks.

**Adults**
A great deal of work has examined the relationship between physical activity and morbidity/mortality in adults. Authors noted that the biggest limitation in the current research is the variety of ways in which it’s presented. For example, early research generally controlled for few confounders (i.e. only for age), whereas current research often controls for many factors (i.e. age, sex, race, socio-economic status etc.). There are also discrepancies between the ways in which measurements have been taken. High heterogeneity makes it difficult to conduct meta-analysis within the review. Future work should work standardizing methods for measuring and assessing levels of physical activity and its relationship to various health outcomes. This should be completed.

There is also a clear need for guidelines that meet the unique needs of persons living with chronic conditions. This includes the prevention and long term maintenance of unfavourable body composition. Finally, future work should focus on the relationship between enhancing flexibility and skeletal fitness and co-morbidities across the lifespan. This work should be completed in large, diverse, international trials which can examine sub-group differences to determine if different guidelines are warranted (i.e., for different age, gender, or ethnic subgroups).

**Older Adults**
Review authors limited their search to apparently healthy, community-dwelling older adults and guidelines are thus limited to that population. Guidelines for frail older adults or those in nursing homes and or long-term care need to be developed. In such cases the role of physical activity in prevention of loss of function and delaying disability or compressing morbidity is important and there is literature on these aspects which should be reviewed. Guidelines for semi-dependent, dependent, frail or “old-old” may be part of initiatives to develop guidelines for those with various chronic diseases or other “rehabilitation” programs.

Further studies are needed to more precisely define the physical activity needed by older adults to benefit health and to maintain functional independence with designs that answer to the limitations listed above. Thus, studies require better assessment and definition of the physical activity nature, type, intensity and volume and what physical activity variables relate to which specific outcomes with a dose-response analysis. For example: is light intensity activity, as well as moderate and vigorous intensity, associated with better cognitive outcomes? Is vigorous activity required for certain physiological outcomes that predispose to prevention of certain disease processes? Which of intensity or volume of physical activity is critical to the dose-response for various outcomes?

Additionally, whereas prospective cohort studies have examined the relationship of physical activity with outcomes in the long-term, or the effects of life-long activity, for older adults the more immediate effects consequent to physical activity interventions (exercise programs) over a few weeks to months and the short-term outcomes are important; the concept ‘it is not too late to start’ appears to apply in that short-term exercise training can greatly improve function and maintain functional independence; however, there is a need for a longer-term follow-up of these initiatives to observe the degree to which the increased physical activity is maintained and the longer-term outcomes related to disability and or loss of independence. Exercise training
programs have been rather standardized in terms of their nature, components, type, intensity and volume and many have been multi-component interventions; there is need for future work to isolate the most beneficial components (e.g., strength or aerobic; need for flexibility or balance components).

**UPDATING THE GUIDELINES**
The PAMG Steering Committee realizes that updating the new guidelines is important and necessary to ensure that they remain true to the science that has informed them. Due to the immense amount of work required to update each systematic review, and the implications of new guidelines on public practice, it is not feasible to update the guidelines for all age groups at the same time. Therefore, the PAMG Steering Committee has proposed a cyclical update of the guidelines as follows:

<table>
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<tr>
<th>Year</th>
<th>Age group to be updated</th>
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<td>Young Children ages 0-4 (created)</td>
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<td>2014</td>
<td>Children and Youth</td>
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<td>2015</td>
<td>Adults</td>
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<td>2016</td>
<td>Older Adults</td>
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<td>Children and Youth</td>
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<td>2019</td>
<td>Adults</td>
</tr>
<tr>
<td>2020</td>
<td>Older Adults</td>
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This will allow each guideline to be updated in a timely fashion. However, if important evidence emerges in the interim between updates, authors will work to include it and the timeline for updates may change.

**FINAL GUIDELINES**

**CHILDREN (5-11 years) AND YOUTH (12-17 years)**

**Preamble**
These guidelines are relevant to all apparently healthy children (5-11 years) and youth (12-17 years), irrespective of gender, race, ethnicity or socio-economic status of the family. Children and youth are encouraged to participate in a variety of physical activities that support their natural development and are enjoyable and safe.

Children and youth should be physically active daily as part of play, games, sports, transportation, recreation, physical education, or planned exercise in the context of family, school and community (e.g. volunteer, employment) activities. This should be achieved above and beyond the incidental physical activities accumulated in the course of daily living.

Following these physical activity guidelines can improve cholesterol levels, blood pressure, body composition, bone density, cardiopulmonary and musculoskeletal fitness, and aspects of mental health. The potential benefits far exceed the potential risks associated with physical activity.

These guidelines may be appropriate for children and youth with a disability or medical condition; however, they should consult a health professional to understand the types and amounts of physical activity appropriate for them.

For those who are physically inactive, doing amounts below the recommended levels can provide some health benefits. For these children and youth, it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.
For guidance on decreasing sedentary behaviour please refer to the Canadian Sedentary Behaviour Guidelines for Children and Youth.

Guidelines
For health benefits, children aged 5-11 years and youth aged 12-17 years should accumulate at least 60 minutes of moderate- to vigorous-intensity physical activity daily. This should include:
- Vigorous-intensity activities at least 3 days per week.
- Activities that strengthen muscle and bone at least 3 days per week.

More daily physical activity provides greater health benefits.

ADULTS (18-64 years)
Preamble
These guidelines are relevant to all apparently healthy adults aged 18-64 years, irrespective of gender, race, ethnicity or socio-economic status. Adults are encouraged to participate in a variety of physical activities that are enjoyable and safe.

Adults can meet these guidelines through planned exercise sessions, transportation, recreation, sports or occupational demands, in the context of family, work, volunteer and community activities. This should be achieved above and beyond the incidental physical activities accumulated in the course of daily living.

Following these guidelines can reduce the risk of premature death, coronary heart disease, stroke, hypertension, colon cancer, breast cancer, type 2 diabetes and osteoporosis and improve fitness, body composition and indicators of mental health. The potential benefits far exceed the potential risks associated with physical activity.

These guidelines may be appropriate for those who are pregnant, have a disability or have a medical condition; however, they should consult a health professional to understand the types and amounts of physical activity appropriate for them.

For those who are physically inactive, doing amounts below the recommended levels can provide some health benefits. For these adults, it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.

Guidelines
- To achieve health benefits, adults aged 18-64 years should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.
- More physical activity provides greater health benefits.

OLDER ADULTS (≥65 years)
Preamble
These guidelines are relevant to all apparently healthy adults aged 65 years and older, irrespective of gender, race, ethnicity or socio-economic status. Older adults are encouraged to participate in a variety of physical activities that are enjoyable and safe.

Older adults can meet these guidelines through planned exercise sessions, transportation, recreation, sports or occupational demands in the context of family, work, volunteer and community activities. This should be achieved above and beyond the incidental physical activities accumulated in the course of daily living.
Following these guidelines can reduce the risk of chronic disease and premature death, maintain functional independence and mobility, as well as improve fitness, body composition, bone health, cognitive function and indicators of mental health. The potential benefits far exceed the potential risks associated with physical activity.

These guidelines may be appropriate for older adults with frailty, a disability or medical condition; however, they should consult a health professional to understand the types and amounts of physical activity appropriate for them based on their exercise capacity and specific health risks or limitations.

For those who are physically inactive, doing amounts below the recommended levels can provide some health benefits. For these adults, it is appropriate to start with smaller amounts of physical activity and gradually increase duration, frequency and intensity as a stepping stone to meeting the guidelines.

**Guideline**
- To achieve health benefits and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more.
- It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.
- Those with poor mobility should perform physical activities to enhance balance and prevent falls.
- More physical activity provides greater health benefits.
GLOSSARY
For a list of important definitions and explanations, please refer to the Canadian Physical Activity Guidelines Glossary of Terms at www.csep.ca/guidelines.

LIST OF ABBREVIATIONS
The following is a list of common abbreviations used throughout this document.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>AHKC</td>
<td>Active Healthy Kids Canada</td>
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<td>CAN PLAY</td>
<td>Physical Activity Levels Among Youth</td>
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<td>CCHS</td>
<td>Canadian Community Health Survey</td>
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<td>CFLRI</td>
<td>Canadian Fitness and Lifestyle Research Institute</td>
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<td>CHMS</td>
<td>Canadian Health Measures Survey</td>
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<td>CSEP</td>
<td>Canadian Society for Exercise Physiology</td>
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<td>HALO</td>
<td>Healthy Active Living and Obesity research group</td>
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<td>NLSCY</td>
<td>National Longitudinal Survey of Children and Youth</td>
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<td>PAM</td>
<td>Physical Activity Monitor</td>
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<td>PAMG</td>
<td>Physical Activity Measurement and Guidelines project</td>
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<td>PHAC</td>
<td>Public Health Agency of Canada</td>
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<td>WHO</td>
<td>World Health Organization</td>
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</table>

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Canadian Society for Exercise Physiology, January 2011


Department of Health and Human Services, Washington, DC, U.S.


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Tremblay MS, Shephard RJ, Brawley L. Research that informs Canada’s physical activity guides: and introduction. 2007b; 32:S1-S8.


Tremblay MS, Shields M, Laviolette M, Craig CL, Janssen I, Connor Gorber S. Fitness of Canadian children and youth: results from the 2007-2009 Canadian Health Measures Survey. Health Reports (Statistics Canada, Catalogue no. 82-003-XPE) 2010; 21(1)


APPENDIX A
Pre-conference think tank to advance the future of physical activity measurement and guidelines
November 2006, Halifax, Nova Scotia, Canada

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<tr>
<th>Panel Member</th>
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<th>Role</th>
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<tr>
<td>Mark Tremblay, Ph.D.</td>
<td>University of New Brunswick, Statistics Canada (Canada)</td>
<td>Chair, Speaker</td>
</tr>
<tr>
<td>David Bassett, Ph.D.</td>
<td>University of Tennessee (U.S.A.)</td>
<td>Speaker</td>
</tr>
<tr>
<td>John Spence, Ph.D.</td>
<td>University of Alberta (Canada)</td>
<td>Content Expert</td>
</tr>
<tr>
<td>William Hearst, M.P.E.</td>
<td>Consultant, Healthy Living Unit, Public Health Agency of Canada (Canada)</td>
<td>Steering Committee Member, Speaker</td>
</tr>
<tr>
<td>Audrey Giles, Ph.D.</td>
<td>University of Ottawa (Canada)</td>
<td>Delegate</td>
</tr>
<tr>
<td>Jennifer Copeland, Ph.D.</td>
<td>University of Lethbridge (Canada)</td>
<td>Delegate</td>
</tr>
<tr>
<td>Ian Janssen, Ph.D.</td>
<td>School of Kinesiology and Health Studies and Department of Community Health and Epidemiology, Queen’s University (Canada)</td>
<td>Content Expert (school-aged children and youth)</td>
</tr>
<tr>
<td>Peter Katzmarzyk, Ph.D.</td>
<td>School of Kinesiology and Health Studies, Queen’s University (Canada)</td>
<td>Content Expert, Steering Committee Member, Speaker</td>
</tr>
<tr>
<td>Randy Adams, M.B.A.</td>
<td>Physical Activity Unit, First Nations and Inuit Health Branch, Health Canada (Canada)</td>
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<tr>
<td>Kathleen Martin Ginis, Ph.D.</td>
<td>McMaster University (Canada)</td>
<td>Content Expert (disability)</td>
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<tr>
<td>Lucie Levesque, Ph.D.</td>
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<tr>
<td>Cora Craig, M.Sc.</td>
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<td>Steering Committee Member, Speaker</td>
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<td>Brian Timmons, Ph.D.</td>
<td>McMaster University (Canada)</td>
<td>Content Expert (pre-school children), Speaker</td>
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<tr>
<td>Mike Arthur</td>
<td>Nova Scotia Sport and Recreation (Canada)</td>
<td>Delegate</td>
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<tr>
<td>Ashlee McGuire, M.Sc.</td>
<td>University of British Columbia (Canada)</td>
<td>Steering Committee Member</td>
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<tr>
<td>Larry Brawley, Ph.D.</td>
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<td>Dale Esliger, M.Sc.</td>
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<td>Robert Malina, Ph.D.</td>
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<td>Russ Kisby</td>
<td>ParticipACTION (Canada)</td>
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<td>Joe Doiron</td>
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<tr>
<td>Darren Warburton, Ph.D.</td>
<td>School of Human Kinetics, University of British Columbia (Canada)</td>
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Steering committee on advancing the future of physical activity measurement and guidelines
December 2006, Ottawa, Canada

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<thead>
<tr>
<th>Panel Member</th>
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<th>Role</th>
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<tbody>
<tr>
<td>Mark Tremblay, Ph.D.</td>
<td>University of Saskatchewan (Canada)</td>
<td>Committee Chair</td>
</tr>
<tr>
<td>Dale Esliger, M.Sc.</td>
<td>University of Saskatchewan (Canada)</td>
<td>Project Manager</td>
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<td>Larry Brawley, Ph.D.</td>
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<td>Mark Tremblay, Ph.D.</td>
<td>Statistics Canada (Canada)</td>
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<tr>
<td>Roy Shephard, M.D., Ph.D.</td>
<td>Faculty of Physical Education and Health, University of Toronto (Canada)</td>
<td>Guest Editor-in-chief</td>
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<tr>
<td>William Hearst, M.P.E.</td>
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</tr>
<tr>
<td>Darren Warburton, Ph.D.</td>
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<td>Paper author (adults)</td>
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<tr>
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<td>Paper author (pre-school children)</td>
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<tr>
<td>Kathleen Martin-Ginis, Ph.D.</td>
<td>Department of Kinesiology, McMaster University (Canada)</td>
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<td>Audrey Hicks, Ph.D.</td>
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<td>Paper co-author (disability)</td>
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<td>Kue Young, Ph.D.</td>
<td>Department of Public Health Science, University of Toronto (Canada)</td>
<td>Paper author (Aboriginals)</td>
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<td>Peter Katzmarzyk, Ph.D.</td>
<td>School of Kinesiology and Health Studies, Queen’s University (Canada)</td>
<td>Paper author (limitations of Canadian physical activity data)</td>
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<td>Larry Brawley, Ph.D.</td>
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<td>Christine Cameron, M.Sc.</td>
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<td>Amy Latimer, Ph.D.</td>
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<td>Lori Zehr, MSc.</td>
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<td>Roxanne Poirier</td>
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Foundation Papers

*Applied Nutrition Physiology and Metabolism, 2007*

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<td>Physical activity for preschool children – how much and how?</td>
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<td>Ian Janssen, Ph.D.</td>
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<td>Patti-Jean Naylor, Ph.D.</td>
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<td></td>
<td>Karin Pfeiffer, Ph.D.</td>
<td>Department of Kinesiology, Michigan State University (U.S.A.)</td>
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<td>Considerations for the development of a physical activity guide for Canadians with physical disabilities</td>
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<td>Audrey Hicks, Ph.D.</td>
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<td>Physical activity of Aboriginal people in Canada</td>
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</table>
Canada’s physical activity guides: has their release had an impact?

Christine Cameron, M.Sc.  
Cora Craig, M.Sc.  
Fiona Bull, Ph.D.  
Adrian Bauman, M.D., Ph.D.

Physical activity guides for Canadians: messaging strategies, realistic expectations for change, and evaluation

Larry Brawley, Ph.D.  
Amy Latimer, Ph.D.

Limitations of Canada’s physical activity data: implications for monitoring trends

Peter Katzmarzyk, Ph.D.  
Mark Tremblay, Ph.D.

Physical activity and inactivity profiling: the next generation

Dale Esliger, M.Sc.  
Mark Tremblay, Ph.D.

Incidental movement, lifestyle-embedded activity and sleep: new frontiers in physical activity assessment

Mark Tremblay, Ph.D.  
Dale Esliger, M.Sc.  
Angelo Tremblay, Ph.D.  
Rachel Colley, Ph.D.

Physical activity guidelines and guides for Canadians: facts and future

Roy Shephard, M.D., Ph.D.  
Larry Brawley, Ph.D.  
Christine Cameron, M.Sc.  
Cora Craig, M.Sc.  
Mary Duggan, CAE  
Dale Esliger, M.Sc.  
William Hearst, M.P.E.  
Audrey Hicks, Ph.D.
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<td>Mark Tremblay, Ph.D.</td>
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</tr>
<tr>
<td>Antero Kesäniemi, Chair M.D., Ph.D.</td>
<td>Department of Internal Medicine, University of Oulu (Finland)</td>
<td>Expert Panel, Consensus Author</td>
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<tr>
<td>Bruce Reeder, M.D. MHSc, FRCPC</td>
<td>Department of Community Health and Epidemiology, College of Medicine, University of Saskatchewan</td>
<td>Expert Panel, Consensus Author</td>
</tr>
<tr>
<td>Chris Riddoch, Ph.D.</td>
<td>School for health, Bath University (U.K.)</td>
<td>Expert Panel, Consensus Author</td>
</tr>
<tr>
<td>Thorkild Sørenson, Dr. Med. Sci.</td>
<td>Professor of Clinical Epidemiology and Institute Director, Institute of Preventative Medicine, Copenhagen University Hospital (Denmark)</td>
<td>Expert Panel, Consensus Author</td>
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<tr>
<td>Steven Blair, Ph.D.</td>
<td>Department of Exercise Science, University of South Carolina, Columbia (U.S.A)</td>
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<tr>
<td>Ian Janssen, Ph.D.</td>
<td>School of Kinesiology and Health Studies and Department of Community Health and Epidemiology, Queen’s University (Canada)</td>
<td>Speaker (gap areas, youth, 15-19 years), Systematic Review Author</td>
</tr>
<tr>
<td>Darren Warburton, Ph.D.</td>
<td>School of Human Kinetics, University of British Columbia (Canada)</td>
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</table>
Ryan Rhodes, Ph.D.  
Behavioural Medicine Laboratory, Faculty of Education, University of Victoria (Canada)  
Systematic Review Author

Vanessa Candeias  
Department of Chronic Diseases and Health Promotion, World Health Organization (Switzerland)  
International Representative

Stuart Biddle, Ph.D.  
School of Sport and Exercise Sciences, Loughborough University (U.K.)  
International Representative

Richard Troiano, Ph.D.  
U.S. Department of Human Health Services (U.S.A.)  
International Representative

Trevor Shilton  
National Health Foundation of Australia (Australia)  
International Representative

Brian Timmons, Ph.D.  
Department of Pediatrics, Chedoke-McMaster (Canada)  
Speaker (gap areas, pre-school children, 0-5 years)

Michelle Mottola, Ph.D.  
School of Kinesiology, University of Western Ontario (Canada)  
Speaker (gap areas, pregnant women)

Kathleen Martin Ginis, Ph.D.  
Department of Kinesiology, McMaster University (Canada)  
Speaker (gap areas, disability)

Peter Katzmarzyk, Ph.D.  
Pennington Biomedical Research Center (U.S.A)  
Speaker (gap areas, aboriginals)

William Haskell, Ph.D.  
Stanford Prevention Research Center, Stanford University School of Medicine  
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James Stone, M.D., Ph.D., FRCPC  
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Content Expert

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Rod Dishman, Ph.D.  
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Content Expert

Van Hubbard, M.D., Ph.D.  
National Institutes of Health, Division of Nutrition Research Coordinator (U.S.A.)  
Content Expert

Michelle Kho, PT, MSc, Ph.D.(c)  
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Methodological Consultant, (clinical practice guidelines, AGREE), Process Paper Author

Andrea Tricco, Ph.D.(c) (telephone)  
University of Ottawa (Canada)  
Methodological Consultant (systematic reviews)

Christine Cameron, Ph.D.  
Canadian Fitness and Lifestyle Research Institute (Canada)  
Steering Committee
Canadian Physical Activity Guideline Development Papers

International Journal of Behavioural Nutrition and Physical Activity, 2010

<table>
<thead>
<tr>
<th>Paper</th>
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Systematic review of the health benefits of physical activity and fitness in school-aged children and youth

A systematic review of the evidence for Canada’s Physical Activity Guidelines for Adults

Physical activity and functional limitations in older adults: a systematic review related to Canada’s Physical Activity Guidelines

Mediators of physical activity behaviour change among adult non-clinical populations: a review update

A systematic review of three approaches for constructing physical activity messages: what messages work and what improvements are needed?

Physical Activity Guidelines for Canadians: Consensus Meeting

September 2010, Toronto, Ontario, Canada

<table>
<thead>
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<td>Francois Lagarde (telephone)</td>
<td>Social Marketing and Communications Consultant and Trainer (Canada)</td>
<td>Content Expert</td>
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<tr>
<td>Michelle Kho, Ph.D.</td>
<td>Department of Physical Medicine &amp; Rehabilitation, Johns Hopkins University (U.S.A)</td>
<td>AGREE II Consultant</td>
<td>Received honorarium for methodological consultation</td>
</tr>
<tr>
<td>Janet Fulton, Ph.D.</td>
<td>U.S. Center for Disease Control and Prevention (U.S.)</td>
<td>Invited Representative</td>
<td>No</td>
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<tr>
<td>Janice Harvey, M.D.</td>
<td>College of Family Physicians of Canada (Canada)</td>
<td>Invited Representative</td>
<td>(College of Family Physicians of Canada) No</td>
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<tr>
<td>Claire LeBlanc, M.D.</td>
<td>Canadian Paediatric Society, University of Alberta (Canada)</td>
<td>Invited Representative</td>
<td>(Canadian Paediatric Society) No</td>
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<tr>
<td>Bruno Jean</td>
<td>Public Health Agency of Canada (Canada)</td>
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<tr>
<td>Elio Antunes</td>
<td>Chief Operating Officer, ParticipACTION (Canada)</td>
<td>Steering Committee</td>
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<tr>
<td>Michelle Brownrigg, M.Sc.</td>
<td>Director, Physical Activity and Equity, Faculty of Physical Education and Health, University of Toronto (Canada)</td>
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<td>Lori Zehr, M.Sc..</td>
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**Final Physical Activity Guideline Development**

**November 2010, Ottawa, Ontario, Canada**
<table>
<thead>
<tr>
<th>Name</th>
<th>Position and Affiliation</th>
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## Appendix B

### AGREE II Reporting Grid – 2011 Canadian Physical Activity Guidelines

<table>
<thead>
<tr>
<th>AGREE II Item</th>
<th>Reporting Location for Physical Activities Guidelines</th>
<th>Internal AGREE II Score</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain 1. Scope and Purpose</strong></td>
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</tr>
<tr>
<td>1. The overall objective(s) of the guideline is (are) specifically described.</td>
<td>Clinical practice guideline development report – Introduction, Background</td>
<td>7</td>
<td>Describes health intent, expected outcomes, and guideline targets.</td>
</tr>
<tr>
<td></td>
<td>Clinical practice guideline paper - Background</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The health question(s) covered by the guideline is (are) specifically described.</td>
<td>Clinical practice guideline development report – Summary, Guidelines questions</td>
<td>7</td>
<td>Describes target population, intervention, outcomes, and health care setting.</td>
</tr>
<tr>
<td></td>
<td>Clinical practice guideline paper - Methods</td>
<td></td>
<td></td>
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<tr>
<td>3. The population (patients, public, etc.) to whom the guideline is meant to apply is specifically described.</td>
<td>Clinical practice guideline development report – Summary, Guideline preamble, Final guidelines, preamble</td>
<td>7</td>
<td>Describes, target population, gender, ages, clinical conditions</td>
</tr>
<tr>
<td></td>
<td>Clinical practice guideline paper – Results, preamble</td>
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<tr>
<td><strong>Domain 2. Stakeholder Involvement</strong></td>
<td></td>
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<tr>
<td>4. The guideline development group includes individuals from all the relevant professional groups.</td>
<td>Clinical practice guideline development report – Appendix A</td>
<td>7</td>
<td>International multidisciplinary group, including scientists, guideline developers, government, and methodologists; describes each person’s name, expertise, affiliation, location, and role</td>
</tr>
<tr>
<td></td>
<td>Process paper, Stakeholder Involvement description</td>
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<td></td>
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<tr>
<td></td>
<td>Process paper, Rigour of development description</td>
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<td></td>
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<tr>
<td></td>
<td>Process paper, Table 2</td>
<td></td>
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<tr>
<td>5. The views and preferences of the target population (patients, public, etc.) have been sought.</td>
<td>Clinical practice guideline development report – Table 5 – final guidelines following consultation process</td>
<td>7</td>
<td>Description of stakeholder consultation process (on-line surveys, in-person focus groups), information gathered, and how feedback informed final guideline recommendations</td>
</tr>
<tr>
<td></td>
<td>Clinical practice guideline paper - Methods</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Process paper, Stakeholder Involvement description</td>
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<tr>
<td><strong>Domain 3. Rigour of Development</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>6. The target users of the guideline are clearly defined.</td>
<td>Clinical practice guideline development report – Summary, Guideline preamble, Final guidelines, preamble</td>
<td>6</td>
<td>Describes the intended guideline audience, and describes how the guideline may be used by the target audience.</td>
</tr>
<tr>
<td></td>
<td>Clinical practice guideline paper – Results, preamble</td>
<td></td>
<td></td>
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<tr>
<td>7. Systematic methods were used to</td>
<td>Please see each of the</td>
<td>7</td>
<td>Each systematic review</td>
</tr>
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<td>Reporting Location for Physical Activities Guidelines</td>
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</tr>
<tr>
<td>search for evidence.</td>
<td>systematic reviews for information on this item</td>
<td></td>
<td>reports evidence sources, time periods, search terms, and search strategies.</td>
</tr>
<tr>
<td>8. The criteria for selecting the evidence are clearly described.</td>
<td>• Please see each of the systematic reviews for information on this item</td>
<td>7</td>
<td>Each systematic review reports inclusion (population, study design, comparisons, language, and context) and exclusion criteria.</td>
</tr>
<tr>
<td>9. The strengths and limitations of the body of evidence are clearly described.</td>
<td>• Clinical practice guideline development report – Discussion, Future research</td>
<td>7</td>
<td>Each systematic review reports study design, methodology limitations, relevance of outcomes, consistency and direction of results across studies, magnitude of benefit vs. harm (pending available data), and applicability</td>
</tr>
<tr>
<td>10. The methods for formulating the recommendations are clearly described.</td>
<td>• Clinical practice guideline development report – Summary, Development of Guideline Recommendations; Stakeholder process</td>
<td>7</td>
<td>Described development of guideline consensus recommendation process, results from stakeholder feedback, and final development of recommendations</td>
</tr>
<tr>
<td>11. The health benefits, side effects and risks have been considered in formulating the recommendations.</td>
<td>• Clinical practice guideline development report – Summary, Guideline preamble, Final guidelines, preamble</td>
<td>6</td>
<td>Reported supporting data and report of benefits. Where available, reported supporting data and report of harms/ side effects.</td>
</tr>
<tr>
<td>12. There is an explicit link between the recommendations and the supporting evidence.</td>
<td>• Clinical practice guideline development report – Methods – summary of evidence</td>
<td>7</td>
<td>Specific citations to systematic reviews and summary tables of evidence</td>
</tr>
<tr>
<td>13. The guideline has been externally reviewed by experts prior to its publication.</td>
<td>• Clinical practice guideline development report – Development of Guideline Recommendations, Stakeholder feedback; Appendix C</td>
<td>7</td>
<td>Description of external review purpose (feedback on draft recommendations), methods, invitees, information gathered,</td>
</tr>
<tr>
<td>AGREE II Item</td>
<td>Reporting Location for Physical Activities Guidelines</td>
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| 14. A procedure for updating the guideline is provided.                     | • Clinical practice guideline development report – Summary, Development of Guideline Recommendations  
• Clinical practice guideline paper – Methods                                                                                                                                            | 7                       | and how the information informed the guidelines. Described the guideline date, an explicit timeline for guideline updates, and mechanism for updates                                                                                                                                                                                                 |}
| **Domain 4. Clarity of Presentation**                                        |                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 15. The recommendations are specific and unambiguous.                       | • Clinical practice guideline development report – Summary, Table 5  
• Clinical practice guideline paper – Results  
• Process paper, Clarity of Presentation description                                                                                                                                     | 7                       | Explicitly states the recommended action, purpose of the recommended action, recommended population, and qualifying statements                                                                                                                                                                                                                     |}
| 16. The different options for management of the condition or health issue are clearly presented.                             | • Clinical practice guideline development report – Dissemination and implementation  
• Clinical practice guideline paper – Dissemination and implementation  
• Process paper, Clarity of Presentation description                                                                                                                                     | N/A                     | The physical activity guidelines focus on the use of physical activity for health outcomes.                                                                                                                                                                                                                                                               |}
| 17. Key recommendations are easily identifiable.                            | • Clinical practice guideline development report – Summary, Final Guidelines  
• Clinical practice guideline paper - Results                                                                                                                                                                                                        | 7                       | Specific recommendations are grouped together in the Summary, Final Guidelines, and Results sections.                                                                                                                                                                                                                                                   |}
| **Domain 5. Applicability**                                                  |                                                                                                                                                                                                                                                                                                                                                                                                  |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 18. The guideline describes facilitators and barriers to its application.   | • Clinical practice guideline development report – Dissemination and Implementation  
• Clinical practice guideline paper – Dissemination and Implementation  
• Process paper, Clarity of Presentation description                                                                                                                                     | 2                       | Description of potential barriers and facilitators to framing guideline recommendations, and messaging to improve guideline adherence in progress.                                                                                                                                                                                                      |}
| 19. The guideline provides advice and/or tools on how the recommendations can be put into practice.                         | • Clinical practice guideline development report – Summary; Dissemination and Implementation  
• Clinical practice guideline paper – Dissemination and Implementation  
• Process paper, Clarity of Presentation description                                                                                                                                     | 6                       | Description of dissemination efforts (conference presentations, linkage with ParticipACTION and PHAC, media campaigns), summary document, and                                                                                                                                                                                                          |}

As of January 6, 2011
<table>
<thead>
<tr>
<th>AGREE II Item</th>
<th>Reporting Location for Physical Activities Guidelines</th>
<th>Internal AGREE II Score</th>
<th>Rationale</th>
</tr>
</thead>
</table>
| 20. The potential resource implications of applying the recommendations have been considered. | • Clinical practice guideline development report – Dissemination and implementation  
• Process paper, Applicability description | 1 | plans for future tools.  
We do not discuss the potential resource implications of applying the recommendations. |
| 21. The guideline presents monitoring and/or auditing criteria. | • Clinical practice guideline development report – Surveillance  
• Clinical practice guideline paper - Surveillance  
• Process paper, Applicability description | 6 | Identifies data sources and links that monitor guideline concordance.  
Provides an example of how one of the data sources will monitor guideline concordance. |

**Domain 6. Editorial Independence**

| 22. The views of the funding body have not influenced the content of the guideline. | • Clinical practice guideline development report – Summary  
• Clinical practice guideline paper - Acknowledgements  
• Process paper, Editorial Independence description | 7 | Funding sources identified, and statement that the funding sources did not influence guideline content. |
| 23. Competing interests of guideline development group members have been recorded and addressed. | • Clinical practice guideline development report – Development of Guideline Recommendations, Appendix A  
• Process paper, Editorial Independence description  
• Consensus paper, Competing interests  
• Systematic reviews | 7 | Description of types and methods of data collection for competing interests. |

**Legend:**

- Clinical practice guideline development report = Canadian Physical Activity Guidelines
- Clinical Practice Guideline Development Report, *Canadian Society for Exercise Physiology*


- Systematic reviews:


APPENDIX C
List of organizations that were contacted for stakeholder consultation
Active Healthy Kids Canada
Active Living Alliance for Canadians with a Disability
Active Living Coalition for Older Adults
Alberta Centre for Active Living
Alberta Health Services
Alberta Recreation and Parks Association
Alzheimer Society of Canada
Arctic Health Research Network - Yukon
Asthma Society of Canada
Autism Society of Canada
BC Coalition of People with Disabilities
Be Fit For Life Centre, University of Calgary
Best Start
Boys and Girls Clubs - Alberta
Boys and Girls Clubs - Ontario
Boys and Girls Clubs of Canada
Canada Safety Council
Canadian Academy of Sport Medicine
Canadian Association for Community Living
Canadian Association for School Health
Canadian Association for the Advancement of Women in Sport and Physical Activity
Canadian Association of Cardiac Rehabilitation
Canadian Association of Family Resource Programs
Canadian Association of Gerontology
Canadian Association of Occupational Therapists
Canadian Association of Principals
Canadian Association of Retired Persons (CARP)
Canadian Association of Social Workers
Canadian Athletic Therapists Association
Canadian Cancer Society
Canadian Centre for Activity and Aging
Canadian Centre for Stress and Well-Being
Canadian Child Care Federation
Canadian Chiropractic Association
Canadian Diabetes Association
Canadian Ethnocultural Council
Canadian Fitness and Lifestyle Research Institute
Canadian Forces Personnel Support Agency
Canadian Healthcare Association
Canadian Home and School Federation
Canadian Home Care Association
Canadian Institute of Child Health
Canadian Institute of Planners
Canadian Intramural Recreation Association
Canadian Labour Congress
Canadian Medical Association
Canadian MedicAlert Foundation
Canadian Mental Health Association
Canadian Network for Leadership in Education and Early Learning & Care
Canadian Nurses Association
Canadian Organization for Rare Disorders
Canadian Orthopaedic Foundation
Canadian Paediatric Society
Canadian Parks and Recreation Association
Canadian Physiotherapy Association
Canadian Public Health Association
Canadian Red Cross
Canadian Senior Games Association
Canadian Sport Massage Therapist Association
Canadian Teachers Federation
Centre for Education and Research on Aging and Health
Children's Hospital of Eastern Ontario
Coalition for Active Living
College of Physicians and Surgeons of Ontario
Conseil communauté en santé du Manitoba
Conseil scolaire acadien provincial
Culture, Heritage, Tourism and Sport, Government of Manitoba
Dept of Tourism, Culture and Recreation - Government of Newfoundland and Labrador
Dept of Tourism, Parks and Recreation - Government of Alberta
Dept. of Community Services, Sport and Recreation Branch - Government of Yukon
Dept. of Culture, Language, Elders and Youth - Government of Nunavut
Dept. of Culture, Language, Elders and Youth - Government of Nunavut
Dept. of Education - Government of Newfoundland and Labrador
Dept. of Health and Community Services - Government of Newfoundland and Labrador
Dept. of Health and Wellness - Government of Prince Edward Island
Dept. of Health Promotion & Protection - Government of Nova Scotia
Dept. of Human Resources, Labour and Employment - Government of Newfoundland and Labrador
Dept. of Municipal and Community Affairs, Sport, Recreation, Youth and Volunteerism - Government of Northwest Territories
Dept. of Municipal and Community Affairs, Sport, Recreation, Youth and Volunteerism - Government of Northwest Territories
Dept. of Wellness, Culture and Sport, Government of New Brunswick
Dieticians of Canada
Doctors Nova Scotia
Early Childhood Development Intercultural Partnership
Eastern Health
Ever Active Schools (Alberta)
Faculty of Physical Education and Recreation - University of Alberta
First Nations Child and Family Caring Society
Focus on Fathers Program - Catholic Community Services of York Region
Fondation Lucie et André Chagnon
Girl Guides of Canada
Healthy Indoors Partnership
Healthy Start for Mom and Me
High Five Program, Parks and Recreation Ontario
Hospital for Sick Children
Industrial Accident Prevention Association
Institut Pacific
Institute of Musculoskeletal Health and Arthritis, Canadian Institutes of Health Research
Invest in Kids
IWK Health Centre
Joint Consortium for School Health
Lawson Health Research Institute
Lets Go Green Canada
March of Dimes
Mi'kmaw Kina'matnewey, Nova Scotia
Ministry of Children and Youth Services - Government of Ontario
Ministry of Education - Government of Ontario
Ministry of Health Promotion - Government of Ontario
Ministry of Tourism, Parks, Culture and Sport - Government of Saskatchewan
Moncton Headstart
National Aboriginal Diabetes Association
National Aboriginal Health Association
National Association of Federal Retirees
National Association of Friendship Centres
National Indian & Inuit Community Health Representatives Organization
National Pensioners and Senior Citizens Federation
New Brunswick Gymnastics Association
New Brunswick Lung Association
Older Adults Centres’ Association of Ontario
One Voice, The Canadian Seniors Network
Ontario Public Health Association
Osteoporosis Canada
Pan-Canadian Public Health Network
Parkgate Community Services
Parks and Recreation Ontario
ParticipACTION
Physical Activity Coordinator, Richmond County, Nova Scotia
Physical and Health Education Canada
Physical Literacy Wapiti Project - Saskatchewan
Psychologists Association of Alberta
Recreation and Parks Association of the Yukon
Recreation Connections Manitoba
Recreation Newfoundland and Labrador
Recreation Newfoundland and Labrador
Recreation Nova Scotia
Registered Nurses Association of Ontario
Reh-Fit Centre
Right to Play Canada
Road Scholar (Elderhostel Inc)
Royal College of Physicians and Surgeons of Canada
Safe Kids Canada
Saskatchewan Parks and Recreation Association
Saskatchewan Seniors Mechanism
Scouts Canada
SmartRisk
Society of Obstetricians and Gynaecologists of Canada
Special Olympics Canada
Stanton Territorial Health Authority
The Arthritis Society
The Canadian Association of Naturopathic Doctors
The Canadian Centre for Occupational Health & Safety
The Canadian National Institute for the Blind
The College of Family Physicians of Canada
The Federation of Canadian Municipalities
The Heart and Stroke Foundation of Canada
The Lung Association
The Royal Canadian Legion
The Salvation Army
UNICEF Canada
United Way of Canada
Victorian Order of Nurses for Canada
Yellowknife Family Centre
YMCA Canada
YMCA Fitness / YMCA Calgary
YMCA Ontario
YWCA Canada