S. Kahlmeier, P. Alpiger, B.W. Martin

Physical Activity and Health Unit, Institute of Social and Preventive Medicine, University of Zurich, Switzerland

National recommendations for health-enhancing physical activity: *the situation for Switzerland in 2011 and options for further developments*

Summary

National recommendations on physical activity for health are an important element of a comprehensive strategy to promote physical activity and sport. Switzerland has developed recommendations for adults in 1999 and for young people in 2006. International experts have recommended that in view of new global and international recommendations, countries in Europe should review their national recommendations. Therefore, five important international and illustrative national examples of recommendations for different age groups were analyzed with regard to implications for the Swiss situation. Overall, the Swiss recommendations for young people and adults are in line with recent evidence but some differences were found regarding specific aspects. Also, no recommendations for pre-school children or older adults exist. Options for updates and further developments of the current Swiss recommendations were developed. They form the basis of a national process lead by the Swiss Federal Office of Sport, which also includes a wide consultation with all relevant stakeholders.

Zusammenfassung

Nationale Bewegungsempfehlungen sind ein wichtiges Element einer umfassenden Bewegungs- und Sportförderungsstrategie. In der Schweiz wurden 1999 Empfehlungen für Erwachsene und 2006 für Kinder und Jugendliche entwickelt. Angesichts der neuen globalen und internationalen Bewegungsempfehlungen haben internationale Experten empfohlen, nationale Empfehlungen in Europa zu überprüfen. Deshalb wurden fünf wichtige internationale und illustrative nationale Beispiele von Bewegungsempfehlungen für verschiedene Altersgruppen im Hinblick auf die Schweizer Situation analysiert. Insgesamt entsprechen die Schweizer Empfehlungen weitgehend der neuesten Evidenz, aber bei spezifischen Aspekten wurden Unterschiede festgestellt. Zudem gibt es auch keine Empfehlungen für Kinder im Vorschulalter oder ältere Erwachsene. Basierend auf den Ergebnissen wurden Optionen für Aktualisierungen und Weiterentwicklungen der jetzigen Schweizer Empfehlungen entwickelt. Diese bilden die Basis für einen nationalen, vom Bundesamt für Sport geleiteten Prozess, welcher auch eine umfassende Konsultation aller relevanten Interessengruppen beinhaltet.

Schweizerische Zeitschrift für «Sportmedizin und Sporttraumatologie» 60 (3), 96–101, 2012

Introduction

The topics of sport, physical activity and health are gaining interest nationally as well as internationally. Evidence on the positive health effects of physical activity across a whole range of diseases as well as mortality is extensive [1, 2]. In 2009, the World Health Organization (WHO) demonstrated that physical inactivity is now the fourth-leading risk factor for premature mortality, causing about 6% of all deaths worldwide. In Europe alone, almost 1 million deaths per year were associated with physical inactivity, as well as a considerable burden of morbidity [3].

One important element of a comprehensive approach to the promotion of physical activity and sport are national recommendations for health-enhancing physical activity [4–6].

Swiss recommendations for health-enhancing physical activity and levels of physical activity

In 1999, national recommendations for adults were launched which are still in use [7, 8]. The minimal recommendation is to be physically active at least a 30 min daily (or at least on most days of the week) at moderate-level intensity (involving a slight increase in breathing, equivalent to brisk walking or cycling). Additional health benefits can be obtained through endurance training (20 min at least 3 times per week with high intensity) and through strength and flexibility training. Individuals reaching the minimal or the endurance recommendations are considered to be sufficiently active. Furthermore, the recommendations mention that physical activity also has positive effects for stress management, self esteem, social integration and in therapy and rehabilitation. The recommendations were represented graphically in the form of an activity pyramid [7, 8] *(Fig. 1)*.

In 2006, recommendations for children and youth were published [8, 9]. Adolescents should be physically active for at least 1 h per day as they near the end of school age. Younger children should be considerably more active. As for adults, activity bouts of at least 10 min duration can be added up to reach the minimum recommendation. At least 10 min several times a week should be devoted to activities for bone health, cardiovascular fitness, strength, flexibility and agility. For children and adolescents, it is also recommended to take short activity breaks if sedentary activities last longer than about 2 h. After testing several graphic representations of the recommendations with school classes, it was decided to use the physical activity disk *(Fig. 1)*.

The recommendations and graphs are presented in 2-page brochures, accompanied by a more extensive base document; all documents are available in German, French and English [8].

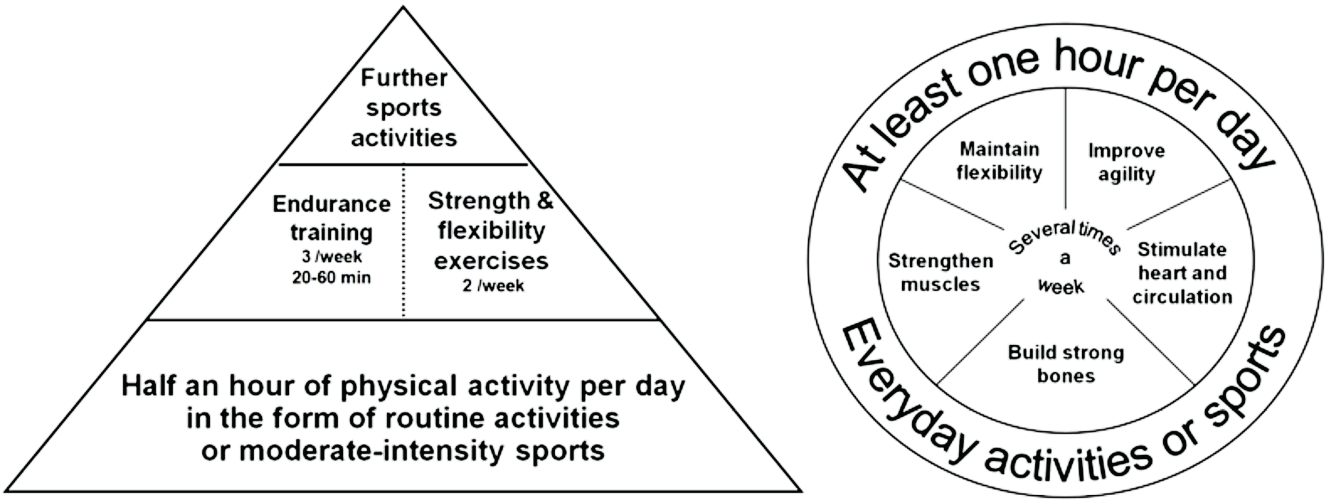

Figure 1: Current Swiss recommendations for health-enhancing physical activity in adults in form of the physical activity pyramid and for school-aged children and adolescents in form of the physical activity disk. The recommendations were issued in 1999 and in 2006 respectively by the Federal Offices of Sport and Physical Activity, by Health Promotion Switzerland and by the Network HEPA Switzerland.

Aims of the article

After an exhaustive collection and assessment of the scientific evidence on physical activity and health, recently WHO issued Global Recommendations on Physical Activity for Health [2]. International experts recommended, that in view of these new global recommendations, also countries in Europe should review their national recommendations with regard to compliance with the most recent scientific evidence [10]; a similar recommendation was made specifically for Switzerland [8].

This article aims at analyzing the most important international and selected illustrative national examples of recommendations for health-enhancing physical activity for different age groups with regard to implications for the Swiss situation. On this basis, the current Swiss recommendations will be assessed and options for updates and further developments will be presented.

Methods

Recommendations for health-enhancing physical activity were selected for analysis aiming to assess and discuss the current Swiss recommendations in the most comprehensive way. The following selection criteria were used.

- public health recommendations (i.e. neither recommendations on specific health problems such as cardiovascular diseases, diabetes or overweight nor on rehabilitation and therapy);
- comprehensive consideration of the most recent scientific evidence;
- systematic and documented development process; and
- publicly available by May 2011.

In addition, an example from a neighboring country which had gone through a similar process recently was sought to further inform the Swiss process.

The selected examples were systematically analyzed by age group according to the key aspects of recommendations (frequency, duration, intensity and total recommended duration of physical activity) and additional aspects, including minimum bouts of activity (i.e. whether a specific recommendation was made on the minimum duration of each bout of activity to count towards achieving the recommended total minimum duration), the recommended amount of physical activity for additional health benefits and recommendations on specific types of training (e.g. strength, flexibility), the reduction of sedentary activities (which is increasingly recognized as independent risk factor [11, 12]) and on overweight and obesity. The selected examples were also examined with regard to the use of graphical illustrations (such as a pyramid or disk) and other communication elements used for dissemination.

Subsequently, the analyzed examples were contrasted with the current Swiss recommendations to identify agreements and differences. Based on the results, options for possible amendments and further developments of the current Swiss recommendations for health-enhancing physical activity were developed.

Results

The following international and national recommendations were selected for analysis:

- the WHO's Global Recommendations on Physical Activity for Health [2];
- the recommendations of the American College of Sports Medicine (ACSM) and the American Heart Association (AHA) [13, 14];
- the national recommendations of Austria, as relevant example of a neighboring country [15];
- the national recommendations of Canada [16, 17]; and
- the national recommendations of the United States of America [18].

The recommendations had been developed in the following chronological order: The 2007 recommendations of the American College for Sports Medicine (ACSM) and the American Heart Association (AHA) [13, 14] were an update of the much publicized first American recommendations of the Centers for Disease Control and Prevention (CDC) and ACSM [19] published in 1995. The update was mainly based on an extensive review commissioned by the U.S. Department of Health [1]. The national recommendations of the United States of America published in 2008 [18] were developed by a committee commissioned by the Department of Health and Human Services, also based on the aforementioned review [1]. Their development process also included a consultation of other parts of the administration and of the general public [18]. The Global Recommendations on Physical Activity for Health of the WHO as the first truly international recommendations were published in 2010 after an extensive 3-year preparatory process [2]. They were based on the US review mentioned above, on additional reviews of the Chinese and Russian literature and on other previously published reviews (see p. 46ff in [2]). The Austrian recommendations of 2010 were developed by a working group commissioned by the Ministry of Health and the national Health Promotion Foundation [15]. The development was based on the American [1] and Canadian evidence reviews [20] as well as the Australian [21]

and Swiss [7–9] recommendations. The national recommendations of Canada published in 2011 [16] were also developed through a perennial process, lead by the Canadian Society for Exercise Physiology [22]. They were based on their own literature reviews [20] and altogether, over 1000 people participated in the development, including the interested public.

Table 1 shows the results of the analysis of recommendations on children and adolescents. The key minimum recommendations are quite similar across the analyzed examples, promoting at least 60 min of at least moderate-intensity physical activity per day. The WHO, the US and Canada specify that this should include vigorous-intensity activities, for which the US and Canada further specify a minimum frequency of at least 3 days per week. WHO and Canada also specify that more physical activity will provide additional health benefits. All selected examples recommend activities for muscle and bone health at least 3 times per week. Only Switzerland recommends minimum bouts of at least 10 min, while Austria and the US underline that in young people, no activity is too short to count. Switzerland and Austria also include recommendations to minimize the time spent sitting; Canada issues specific recommendations on this topic [17].

The results on the recommendations on adults in *Table 2* show that the WHO, the US and Austria give the same minimum recommendation. Canada's minimum recommendation is similar to these three, but not mentioning a specific way of combining moderate- and vigorous-intensity activities as the other three, instead recommending 150 min of moderate- to vigorous-intensity physical activity per week. Also, Canada is the only example not recommending to spread the minimum amount over several (or daily) sessions throughout the week.

The US also promote that some activity is better than none, considering that the current evidence does not suggest a minimum threshold of activity needs to be reached in order to achieve health benefits [1]. ACSM/AHA and Switzerland promote at least 30 min on 5 (or all) days of the week; a phrasing referring more directly to the first American recommendations [19, 23]; ACSM/AHA are also promoting 20 min of vigorous-intensity activity as an alternative way to reach the minimum recommended amount of physical activity.

	Minimum recommendations			**Further recommendations**		
	General recommendation	**Additional aspects**	**Bouts**	**Additional health benefits**	**Inactivity+**	**Overweight**
Switzerland [9]	Adolescents 1 h per day, younger children even longer with intensity equivalent to at least brisk walking or cycling	At least 10 min several times/week activities for bone health, muscle strength, cardiovascular health, flexibility and agility	At least 10 min		If sitting more than 120 min, activity breaks recommended	
WHO [2]	At least 60 min of moderate- to vigorous-intensity physical activity daily. Vigorous-intensity activities should be incorporated.	Activities for muscle strength and bone health at least 3 times per week		Amounts greater than 60 min daily will provide additional health benefits		
ACSM/ AHA*						
Austria [15]	60 min of at least moderate intensity physical activity daily	Activities for muscle strength and bone health at least 3 times per week, additional activities for coordination and flexibility	No activity too short not to count		If sitting more than 60 min, activity breaks recommended	
Canada [16, 17]	60 min of moderate- to vigorous-intensity physical activity daily, 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	Minimize the time spent sedentary each day, by limiting: – recreational screen time to no more than 2 h per day – sedentary (motorized) transport, extended sitting and time spent indoors throughout the day	
US Dept. of Health [18]	60 min or more of moderate- or vigorous-intensity, should include vigorous-intensity physical activity at least 3 days a week	Include muscle-strengthening and bone-strengthening physical activity at least 3 days of the week	Any episode physical activity, however brief, counts			Fatness can be reduced by regular physical activity of moderate to vigorous intensity 3 to 5 times a week, for 30 to 60 min§

* No recommendations exist for this age group.
\+ Except during sleep periods.
§ Part of the examples chapter, not of the main recommendations.

Table 1: Analysis of selected international and national recommendations for children and adolescents

	Minimum recommendations					Further recommendations			
	Moderate intensity	**Vigorous intensity**	**Combi-nation**	**Fre-quency**	**Bouts**	**Add. health benefits**	**Strength, balance etc.**	**Inactiv-ity**	**Overweight**
Switzerland [9]	30 min			Daily (or at least on most days of the week)	At least 10 min	Additional health effects with more activity. Targeted endurance training at least 3 days/week 20-60 min with high intensity	Strength training at least 2 days/week (8-15 repetitions), flexibility training, gymnastics and stretching exercises Particularly impor-tant for >50 year olds		
WHO [2]	150 min/ week	75 min/ week	yes	Through-out the week	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	Muscle-strengthen-ing activities on 2 or more days/week		
ACSM/AHA [13]	30 min on 5 days/ week	20 min on 3 days/ week	yes	On 5 or 3 days/ week	At least 10 min	Additional health effects with more activity	Muscle-strengthen-ing and endurance training on 2 or more days/week (8-12 repetitions) Load-bearing activi-ties		To prevent weight gain, some need to move more and watch their diet.
Austria [15]	150 min/ week	75 min/ week	yes	On most days	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	Muscle-strengthen-ing activities on 2 or more days/week		
Canada [16]	150 min/week				At least 10 min	Additional health effects with more activity.	Muscle-strengthen-ing activities on 2 or more days/week		
US Dept. of Health [18]	Some activity is better than none; for sub-stantial benefits 150 min/ week	75 min/ week	yes	Through-out the week	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	Muscle-strengthen-ing activities on 2 or more days/week	Avoid inactivity	Minimum rec-ommendations are first step to keep a healthy weight. Many will need more than that to maintain their weight§
§ Part of the examples chapter, not of the main recommendations.									

Table 2: Analysis of selected international and national recommendations for adults

Switzerland recommends such activities as a possibility for already active individuals to achieve additional health benefits. Beyond that, ACSM/AHA, Canada and Switzerland mention in general that additional health effects can be achieved with more exercise, while the WHO, the US and Austria quantify the recommended amount for additional health benefits with 300 min of moderate-intensity activities or their equivalent of vigorous-intensity activities. The recommendation on strength training was similar in all analyzed examples. In some cases there were also recommendations on flexibility training or load bearing activities to promote bone health (ACSM/AHA). The concept of bouts of at least 10 min duration was adopted by all analyzed examples for adults. In addition, the WHO as well as ACSM/AHA specified that the minimum recommendations are meant in addition to routine activities of daily living of light intensity (e.g. self care, cooking, casual walking or shopping). For adults, no specific recommendations on extended periods of sitting were given, except for the US recommending in general to avoid inactivity.

Switzerland currently has no separate recommendation for older adults. The other examples for over 65-year olds are summarized in *Table 3*. In all cases, the main recommendations were based on those for adults. All except the Canadian recommendations specify that individuals should be as active as possible, even if they did not reach the minimum recommended amount. The US recommendations also suggest explicitly to adapt the intensity of activities relative to the individual's level of fitness. In addition to strength-training, balance training is recommended for this age group in all examples; some recommend this only for those at risk of falls (ACSM/AHA, US) or in those with poor mobility (WHO, Canada).

None of the analyzed examples except for Switzerland uses a graphical representation such as a pyramid or disk. Canada had used a rainbow figure in their previous recommendations. The decision not to continue its use was on the one hand related to copyright properties of the earlier figure. On the other hand, it was felt the new recommendations did not lend themselves easily to a graphical representation, and lastly, continuing to use the same figure might have reduced the news value of the updated recommendations.

Discussion

Overall, the main Swiss recommendations for young people and adults are in line with the most recent evidence. The total recommended minimum amount of physical activity concurs, while the comparison with some of the other examples shows slight differences concerning the recommended frequency: along with Swit-

	Minimum recommendations					Further recommendations			
	Moderate intensity	**Vigorous intensity**	**Combi-nation**	**Fre-quency**	**Bouts**	**Add. health benefits**	**Strength, balance etc.**	**Inactivity**	**Over-weight**
Switzer-land *									
WHO [2]	150 min/week, or be as physi-cally active as abilities and conditions allow	75 min/ week	yes	Through-out the week	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	Muscle-strengthening activities on 2 or more days/week. Persons with poor mobility: activities to enhance balance and prevent falls on 3 or more days/ week.		
ACSM/AHA [14]	30 min on 5 days/week Positive health effects also from less activity	20 min on 3 days/ week	yes	On 5 or 3 days/ week	At least 10 min		Muscle-strengthening and endurance train-ing on 2 or more days/ week (8-12 repetitions) Flexibility training of 10 min on 2 days/week Balance training for those at risk of falls		
Austria [15]	150 min/week Be as active as condition allows	75 min/ week	yes	On most days of the week	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	On 2 or more days/ week strength training Balance training to reduce risk of falls		
Canada [16]	150 min/week				At least 10 min	Additional health effects with more activity.	Muscle-strengthening activities on 2 or more days/week Balance training for those with poor mobility		
US Dept. of Health [18]	Some activity is better than none Be as active as possible 150 min/week	75 min/ week	yes intensity should be adapted to fitness level	Through-out the week	At least 10 min	300 min moderate intensity/week, 150 min vigorous intensity/week, or combination	Muscle-strengthening activities on 2 or more days/week Balance training for those at risk of falls	Avoid inactivity	
* No recommendations exist for this age group.									

Table 3: Analysis of selected international and national recommendations for older adults

zerland only ACSM/AHA still recommend daily or at least 5 times 30 min per week for adults, while the WHO, the US, Austria and Canada now recommend a minimum weekly dose of physical activity, in almost all cases recommending to spread it throughout the week. The Swiss recommendations currently do not explicitly mention the possibility to combine moderate- and vigorous-intensity activities for adults, though there are endurance recommendations in addition to the minimum recommendations. Switzerland indicates that all activities of at least moderate intensity count towards the minimum recommendations. Some of the other examples specifically state that activities of daily living of light intensity do not. The Swiss recommendations for adults point out that doing more than the minimum recommended amount of physical activity will yield additional health benefits but do not quantify the recommended amount, as do the WHO, Austria and the US.

Minimum bouts of at least 10 min duration are in line with the documented effects of physical activity on cardiorespiratory fitness and biomarkers for cardiovascular disease [1]. However, the US and Austrian recommendations specifically point out that for children any episode of moderate- or vigorous-intensity physical activity, however brief, counts towards the recommendations. For practical reasons, the Swiss recommendations suggest to count all bouts of 10 min or more. The Swiss recommendations made for muscle strength both for young people and adults concur with the other analyzed examples. To recommend activity breaks for young people to intermit extended periods of sitting are current state of the art, but are further extended or specified in some of the other cases. None of the other examples uses a graphical representation for their recommendations.

Switzerland has not developed specific recommendations for older adults, as did all other analyzed examples, but has included certain aspects for this age group into the recommendations for adults.

In some countries, such as Australia, national recommendations for pre-school children have been issued [24]. However, no detailed information was available on the background information used. WHO has noted that in its view, further evidence was needed for the development of global recommendations in this age group [2].

Based on the analysis summarized in this article, options for updates and further developments of the current Swiss recommendations were derived and commented with pros and cons for each of them [25].

The main issues identified were:

- Should the current stratification of recommendations for children and adolescents of school age and adults be maintained, or should recommendations for other age groups such as pre-school children or older adults be developed?
- Within the existing recommendations for adults, should the following aspects be revised:
  - Explicit recommendation to avoid physical inactivity?
  - Explicit statement that daily activities of light intensity do not count toward the minimal recommendations?

- Quantification of minimum recommendations by 150 min per week or 30 min per day?
- Explicit statement of interchangeability of activities of moderate and vigorous intensity?
- Graphical representation of the recommendations?

- Within the existing recommendations for children and adolescents, should the following aspects be revised:
  - Minimal recommendations of 1 h towards the end of school age, considerably more earlier?
  - Only bouts of 10 min or more counting?
  - Mentioning of flexibility and agility in addition to bone health, muscle strength and cardiovascular fitness?
  - Graphical representation of the recommendations?

The presented options form the basis of a national process towards the revision of the Swiss recommendations for health-enhancing physical activity. This process is lead by the Swiss Federal Office of Sport and includes a wide consultation of stakeholders. It will aim to develop national recommendations that are consistent with the latest scientific evidence, can provide guidance for the development and evaluation of physical activity promotion efforts and can be used and adapted for communication purposes in different target groups.

Acknowledgements:

This work has been carried out through a project funded by the Swiss Federal Offices of Sport and of Public Health. We gratefully acknowledge input and comments by Urs Mäder and Nadja Mahler from the Swiss Federal Office of Sport.

Corresponding author:

Sonja Kahlmeier, Physical Activity and Health Unit, Institute of Social and Preventive Medicine, University of Zurich, Switzerland; E-Mail: sonja.kahlmeier@uzh.ch; Tel. +41 44 63 44 371

References

1 Physical Activity Guidelines Advisory Committee (2008): Physical Activity Guidelines Advisory Committee Report, U.S. Department of Health and Human Services: Washington, DC.
2 World Health Organization (2010): Global Recommendations on Physical Activity for Health. WHO, Geneva.
3 World Health Organization (2009): Global health risks: Mortality and burden of disease attributable to selected major risks. WHO, Geneva.
4 European Commission (2008): Physical Activity Guidelines: Recommended Policy Actions in Support of Health-Enhancing Physical Activity. Approved by the EU Working Group Sport & Health at its meeting on 25 September 2008. Confirmed by EU Member State Sport Ministers at their meeting in Biarritz on 27–28 November 2008, Brussels.
5 WHO Regional Office for Europe (2007): Steps to health. A European framework to promote physical activity for health. WHO Regional Office for Europe, Copenhagen.
6 World Health Organization (2007): A guide for population-based approaches to increasing levels of physical activity. Implemenation of the WHO Global Strategy on Diet, Physcial Activity and Health. World Health Organization, Geneva.
7 Bundesamt für Sport, Bundesamt für Gesundheit, Gesundheitsförderung Schweiz, Netzwerk HEPA Schweiz (1999): Gesundheitswirksame Bewegung (Empfehlungen), Bundesamt für Sport BASPO, Magglingen.
8 Martin B.W., Mäder U., Stamm H.P., Braun-Fahrländer C. (2009): Physical activity and health - what are the recommendations and where do we find the Swiss population? Schweiz. Z. Sportmed. Sporttraumatol. 57: 37–43.
9 Bundesamt für Sport, Bundesamt für Gesundheit, Gesundheitsförderung Schweiz, Netzwerk HEPA Schweiz (2006): Gesundheitswirksame Bewegung bei Kindern und Jugendlichen (Empfehlungen), Bundesamt für Sport BASPO, Magglingen.
10 Oja P., Bull F.C., Fogelholm M., Martin B.W. (2010): Physical activity recommendations for health: what should Europe do? BMC Public Health 10: 10.
11 Hamilton M., Healy G., Dunstan D., Zderic T., Owen N. (2008): Too little exercise and too much sitting: Inactivity physiology and the need for new recommendations on sedentary behavior. Current Cardiovascular Risk Reports 2: 292–298.
12 Proper K.I., Singh A.S., van Mechelen W., Chinapaw M.J. (2011): Sedentary behaviors and health outcomes among adults: a systematic review of prospective studies. Am. J. Prev. Med. 40: 174–182.
13 Haskell W.L., Lee I.M., Pate R.R., Powell K.E., Blair S.N., Franklin B.A., Macera C.A., Heath G.W., Thompson P.D., Bauman A. (2007): Physical activity and public health: updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. Med. Sci. Sports Exerc. 39: 1423–1434.
14 Nelson M.E., Rejeski W.J., Blair S.N., Duncan P.W., Judge J.O., King A.C., Macera C.A., Castaneda-Sceppa C. (2007): Physical activity and public health in older adults: recommendation from the American College of Sports Medicine and the American Heart Association. Med. Sci. Sports Exerc. 39: 1435–1445.
15 Titze S., Ring-Dimitriou S., Schober P.H., Halbwachs C., Samitz G., Miko H.C., Lercher P., Stein K.V., Gäbler C., Bauer R., Gollner E., Windhaber J., Bachl N., Dorner T.E., Arbeitsgruppe Körperliche Aktivität/Bewegung/Sport der Österreichischen Gesellschaft für Public Health (2010): Österreichische Empfehlungen für gesundheitswirksame Bewegung, Bundesministerium für Gesundheit, Gesundheit Österreich, Geschäftsbereich Fonds Gesundes Österreich (Hrsg.), Wien.
16 Tremblay M.S., Warburton D.E., Janssen I., Paterson D.H., Latimer A.E., Rhodes R.E., Kho M.E., Hicks A., Leblanc A.G., Zehr L., Murumets K., Duggan M. (2011): New canadian physical activity guidelines. Appl. Physiol. Nutr. Metab. 36: 36–46.
17 Canadian Society for Exercise Physiology (2011): Canadian Sedentary Behaviour Guidelines for children 5–11 years and for youth 12–17 years, Canadian Society for Exercise Physiology, no city.
18 U.S. Department of Health and Human Services (2008): 2008 Physical Activity Guidelines for Americans. Be Active, Healthy, and Happy! U.S. Department of Health and Human Services, Washington.
19 Pate R.R., Pratt M., Blair S.N., Haskell W.L., Macera C.A., Bouchard C., Buchner D., Ettinger W., Heath G.W., King A.C., et al. (1995): Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. J. Am. Med. Assoc. 273: 402–407.
20 Canadian Society for Exercise Physiology (2011): Canadian Physical Activity Guidelines. 2011 scientific statements, Canadian Society for Exercise Physiology.
21 Australian Government. Physical Activity. Physical Activity Guidelines. 01 October 2010 [cited 01 April 2011].
22 Tremblay M.S., Kho M.E., Tricco A.C., Duggan M. (2010): Process description and evaluation of Canadian Physical Activity Guidelines development. Int. J. Behav. Nutr. Physiol. Act. 7: 42.
23 U.S. Department of Health and Human Services (1996): Physical activity and health: a report of the Surgeon General. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, The President's Council on Physical Fitness and Sports, Atlanta.
24 National physical activity recommendations for children 0-5 years. Move and play every day, (2010): Australian Government Department of Health and Ageing.
25 Kahlmeier S., Alpiger P., Martin B.W. (2011): Schweizer Empfehlungen für gesundheitswirksame Bewegung: Grundlagen für die Weiterentwicklung. Im Auftrag des Bundesamtes für Sport und des Bundesamtes für Gesundheit, Institute for Social and Preventive Medicine of the University of Zurich, Switzerland: Zurich.