BMJ Open

Physical Activity Recommendations in European Union Countries: An update

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-034045
Article Type:	Original research
Date Submitted by the Author:	03-Sep-2019
Complete List of Authors:	Gelius, Peter; FAU, Department of Sport Science and Sport Tcymbal, Antonina; FAU, Department of Sport Science and Sport Abu-Omar, Karim ; FAU, Department of Sport Science and Sport Mendes, Romeu; Universidade do Porto Instituto de Saúde Pública Tribuzi Morais, Sara; Universidade do Porto, Faculdade de Desporto Whiting, Stephen; World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course Breda, Joao; World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course
Keywords:	Physical Activity, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, National recommendations

Physical Activity Recommendations in European Union Countries: An update

Peter Gelius[1], Antonina Tcymbal[1], Karim Abu-Omar[1], Romeu Mendes[2], Sara Tribuzi Morais[3], Stephen Whiting[4], & João Rodrigues da Silva Breda[4]

[1]FAU Erlangen-Nürnberg, Department of Sport Science and Sport

[2]Universidade de Porto, Instituto de Saúde Pública

[3]Universidade de Porto, Faculdade de Desporto

[4]World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course

Abstract

Objectives: We analyzed the information on current national physical activity recommendations in all EU Member States provided by governments in a joint EU/WHO survey on the implementation status of the EU Council Recommendation on Health-Enhancing Physical Activity across Sectors.

Design: Cross-sectional survey.

Participants: The representatives of the 28 EU Member State governments to the EU Physical Activity Focal Point Network.

Outcome measures: National recommendations on (a) minimum frequency, duration, intensity and lengths of bouts of physical activity, on (b) preventing inactivity or sedentary behavior, and (c) further recommendations for additional health benefits, obesity prevention, and specific types of activity.

Results: An official document could be located for 23 of the 28 EU Member States, while four are currently developing recommendations. For children and adolescents, most countries follow the 2010 WHO Global Recommendations for Physical Activity, but there are notable differences in the delimitation of age groups. 14 countries also followed WHO in their recommendations for adults, and 11 countries have additional advice on avoiding inactivity and sitting among adults. 18 Member States have recommendations for older adults, twelve of which follow WHO. Thirteen countries also address at least one special population (e.g. pregnant women, people with disabilities, and people with chronic diseases), but the level of detail varies substantially between countries.

Conclusions: The large majority of EU Member States either has physical activity recommendations in place or is in the process of developing them. There is a general tendency to use the WHO Global Recommendations as a basis, with the greatest variation observable for children and adolescents. Comparing results to a previous round of data collection shows that the number of EU countries with physical activity recommendations is increasing and that both special groups and sedentary behavior have become more important in recent years.

Strengths and limitations of this study:

- This study provides a complete overview of existing physical activity recommendations in EU Member States.
- It builds on information obtained directly from national governments using data gathered jointly by the European Commission and the WHO Regional Office for Europe.
- By comparing the data with an earlier survey using the same instrument, this study also allows for monitoring the progress made in this area of health promotion policy in recent years.
- Limitations include a restriction to documents published before April 2018, difficulties in identifying and obtaining all relevant documents, and the language barrier involved in analyzing data in 21 different languages.

Introduction

Global efforts to promote physical activity (PA) have intensified in recent years, culminating in key World Health Organization (WHO) publications such as the 2004 WHO Global Strategy on Diet, PA and Health [1], the PA Strategy for the WHO European Region 2016–2025 [2], and the 2018 Global Action Plan on PA [3]. Common advice found in all these documents is for Member States to develop their own national recommendations on how active their population should be in order to promote health and prevent disease, thus mirroring WHO's own Global Recommendations on PA for Health [4]. The European Union (EU) has also been increasingly active in the field, with efforts building upon the 2008 EU PA Guidelines [5] and the 2013 EU Council Recommendations for PA [6]. Like WHO, the EU encourages Member States to publish national PA recommendations for health.

While there is only limited evidence that such national recommendations can, by themselves, increase the share of individuals who meet sufficient levels of PA [7], the process of developing them may serve as a starting point for putting the topic of PA promotion on the national agenda [8].

Given both their political relevance and their potential to spark new policy, it is important to monitor whether national governments are making progress in developing national PA recommendations. Based on data collected in 2011, Kahlmeier et al.[9] provided an overview of existing national PA recommendations in the WHO European Region. They found that 21 out of the 53 nations in the entire Region and 16 out of the 28 EU Member States had such recommendations in place. Some years later, Breda et al.[10] analyzed data collected in 2015 by the European Commission and the WHO

Regional Office for Europe to monitor the progress of implementation of the Council Recommendation on HEPA across Sectors [6] and to produce the EU/WHO PA Country Factsheets for the EU Member States of the WHO European Region[11]. They noted that 19 of the 27 participating EU countries had reported national PA recommendations. However, a more detailed analysis of these recommendations was beyond the scope of this overview article.

As part of a regular update of this information [11], WHO and the EC collected new information on national PA recommendations in 2018. These data provide a unique opportunity not only to revise the overview of existing recommendations in the EU but also for a detailed comparison of target groups, age bracket definitions, and recommended amounts and types of PA across nations. This information may be useful both to further monitor the progress of recommendation development in the EU and as a potential source of inspiration for other countries in the WHO European Region.

Methods

Data collection

Information about national PA recommendations was obtained from the 2018 joint survey by the EC and WHO Europe, which employed a questionnaire covering all 23 indicators of the Council Recommendation on HEPA across Sectors. Indicator 1 is dedicated exclusively to national PA recommendations. Specific items included the development status of national PA recommendations (e.g. not planned, under development, formally adopted), the age brackets covered (children and adolescents, adults or older adults), special populations addressed (e.g. children < 5 years, frail

people or those aged ≥ 85 years, pregnant or breastfeeding women, people with disabilities or people with chronic diseases), and links to relevant documents [11].

The questionnaire was sent to the EU Physical Activity Focal Points in all 28 EU Member States in January 2018. Focal Points are PA experts officially nominated by their governments to support data collection who usually work in national ministries of health, ministries of sport, or related national agencies. They were asked to liaise with relevant national institutions and stakeholders to fill out the questionnaire within 3 months. All 28 Focal Points completed the questionnaire. WHO reviewed the responses to ensure data quality, obtained additional information and clarification where necessary, and prepared draft summaries. After a final review by the Member States, the collated information was published in the form of updated PA Country Factsheets [11].

Verification of information on national physical activity recommendation

For this article, we retrieved and reviewed the answers for Indicator 1 of the survey from the original dataset. We followed the links to national PA recommendations provided by countries and downloaded the official documents. In cases where the link was missing or broken, an additional search was conducted on the internet. Where this still yielded no results, fellow academics from the field of PA in the respective nations were contacted to in order to obtain the document. The contents of recommendations in languages other than English or German were translated online via Google Translate. Translations were verified against the original versions by expert native speakers to confirm their factual correctness.

Data analysis

The following information were extracted from national PA recommendation documents: (i) minimum recommendations on frequency, duration, intensity and lengths of bouts of PA, (ii) recommendations on preventing inactivity or sedentary behavior (e.g. prolonged sitting), and (iii) any further PA recommendations for additional health benefits, obesity prevention, or specific types of PA. We extracted these data for all age brackets (children, adults, older adults) and special population groups (e.g. people with health-related conditions) listed in the respective document. Individual country results were then compared with the WHO Global Recommendations on PA for Health [4] and recommendations from the other EU Member States.

Results

An official document outlining national PA recommendations could be located for 23 (82.1%) of the 28 EU Member States. For two countries, the official PA recommendations did not contain any specific information about minimum recommended PA levels. Four countries reported that they are in process of developing PA recommendations, and one country reported there are currently no plans to develop dedicated PA recommendations. Belgium has separate documents for the Flemish[12] and Walloon[13] regions, both of which were included into analysis. In total, 22 documents (21 national documents plus an additional one for Belgium), published between 2008 and 2018, were analyzed in greater detail (Table 1).

[Table 1 about here]

Children & Adolescents

Table 2 presents a detailed overview of existing PA recommendations for children and adolescents in EU Member States. For this target group, WHO recommends at least 60 minutes of moderate- to vigorous-intensity PA every day, adding that greater amounts will provide further health benefits [4].

Regarding duration and frequency of PA, all recommendations suggest the same minimum as WHO, i.e. 60 minutes per day. The two exceptions are Germany [14], which calls for at least 90 minutes, and Finland [15], which stipulates 90–120 minutes per day for children (7–12 years) and 60–90 minutes per day for adolescents (13–18 years). 11 countries mention that any amount exceeding minimum recommendations will provide additional health benefits. Lithuania suggests that, to achieve additional health benefits, "PA time must be longer than the minimum (60 minutes) and last for at least 1.5–2 hours (120 minutes) daily" [16]. Like WHO, 16 countries specify the intensity of recommended PA as moderate to vigorous.

As additional aspects, WHO emphasizes that most of the daily PA should be aerobic and that vigorous-intensity activities should be incorporated at least three times per week to strengthen muscle and bone [4]. Recommendations in 14 EU Member States mirror this, while Lithuania[16] advocates at least 2 times per week and Finland[15] proposes to do it every day. Germany mentions that, for children aged 6–11, "the large muscle groups should be subject to higher-intensity loading on two to three days a week in order to improve strength and endurance, taking into account respective developmental stages" [14]. Austria[17] and Denmark [18] additionally recommend to include activities to improve flexibility.

Belgium (Flanders)[12], Denmark[18], Finland[15] and Lithuania[16] specify that minimum bouts of PA should be at least 10 minutes, while France[19] suggests at least 5 minutes for children from 6–11 years. Minimum duration is part of WHO's recommendations for adults (see below) but not for children. Also transcending WHO recommendations, 15 national documents include sections on avoiding extended periods of inactivity and sitting among children and adolescents.

The results indicate notable differences in the handling of age subgroups among children and adolescents (see Figure 1): In 2019, WHO published dedicated PA recommendations for children under the age of 5 [20], but at the time of data collection, WHO recommendations only addressed children aged 5 to 17. Six countries used exactly the same age range. Others had already developed additional recommendations for children younger than 5 (9 countries), or they had extended the age range of their recommendations to this group (2 countries). Seven countries (Belgium (Flanders) [12], Finland [21], France [19], Germany[14], Latvia[22], Spain[23], the United Kingdom[24]) recommend for children under 5 to be active for at least 180 minutes per day. Denmark [25] calls for as much PA "as possible", while Greece[26] and Ireland[27] recommend the same amount as for older children, i.e. at least 60 minutes per day. In addition, 7 countries included 18 year-olds in their recommendations for adolescents, and 6 introduced multiple age brackets with specific recommendations.

[Table 2 about here]

[Figure 1 about here]

Adults

A comparison of the 21 national PA recommendations for adults (18–64 years) with the respective WHO recommendation is presented in Table 3. In general, WHO advises adults to engage in at least 150 minutes of moderate-intensity aerobic PA throughout the week, or at least 75 minutes of vigorous-intensity aerobic PA, or an equivalent combination of moderate- and vigorous-intensity PA. PA should be performed in bouts of at least 10 minutes. Additional benefits can be gained from increasing moderate PA to 300 minutes per week, by engaging in 150 minutes of vigorous PA, or through an equivalent combination of both.

For 14 nations, recommendations on minimum duration, intensity and frequency of PA are fully in line with WHO. Croatia[28], Denmark[29], France[19], Greece[26], Lithuania[16], Malta[38] and Belgium (Wallonia) [10] recommend 30 minutes of PA per day on 5 or more days per week, probably echoing older recommendations published jointly by the American College of Sports Medicine (ACSM) and the Centers for Disease Control and Prevention (CDC) in 1995 [30] and updated in 2007 [31]. Like WHO, 14 countries recommend to count only activities with a duration of at least 10 minutes, while France[19] and the Netherlands[32] suggest that bouts less than 10 minutes may also be counted. Seven countries mirror WHO's recommendations regarding additional health benefits, while 5 countries merely mention that health can be further improved by performing PA above the recommended minimum.

France[19], Ireland [27] and Lithuania[16] recommend increasing the PA to 60 minutes of moderate PA per day on at least 5 days per week, or to equivalent amount of vigorous PA in order to achieve additional health benefits.

An additional aspect of the WHO recommendations are muscle-strengthening activities involving major muscle groups, which should be performed on 2 or more days of the week [4]. Sixteen of the EU Member States also urge their citizens to do this. France diverges slightly by stipulating that strength training should be performed 1–2 times per week, with 1–2 days' recovery time in between, and stretching at least 2–3 times per week[19]. Denmark[29] recommends to also add activities that increase flexibility. In addition, Ireland[27], Malta[33] and the United Kingdom[24] have specific recommendations on reducing or maintaining body weight. Eleven countries also have additional recommendations on avoiding long periods of inactivity and sitting among adults.

[Table 3 about here]

Older adults

Eighteen EU Member states have national PA recommendations for older people that were available for analysis. The contents of these are shown in Table 4. WHO's basic recommendations for older adults (65+), which are identical to those for adults aged 18–64 (see above), have been directly adopted by twelve. In the 6 other cases, the original national recommendation for adults differs from that by WHO, but they also follow the practice of carrying over these recommendations to older people. All identified documents add that persons who cannot achieve minimum PA levels should be as physically active as their abilities and conditions allow.

WHO adds that older people should engage in muscle-strengthening involving major muscle groups on 2 or more days a week, and that those with poor mobility should

perform PA to enhance balance and prevent falls on 3 or more days per week. In general, all national documents also include these additional aspects. No country has specific recommendations for older adults on reducing or maintaining weight, but 11 add recommendations on avoiding long periods of inactivity and sitting.

[Table 4 about here]

Special groups

As illustrated in Table 5, thirteen countries also have national PA recommendations for at least one special population (e.g. frail people or those aged ≥ 85 years, pregnant or breastfeeding women, people with disabilities or people with chronic diseases). However, the level of detail of these recommendations varies significantly, as well as the publication format: Finland published recommendations for all special groups as separate documents, and Lithuania has a separate document for parents with small children. All other countries mentioned special groups in the general document with recommendations on PA. Twelve countries have recommendations for women during pregnancy and breastfeeding. Most of these suggest that healthy women during pregnancy and breastfeeding follow the same recommendations as for adults. Two countries (France[19], Lithuania[34]) have specific recommendations on duration, frequency or intensity of PA during pregnancy. In addition, Lithuania[34] also addresses parents with small children.

Special recommendations for disabled people are provided by 9 countries. These are mostly identical to the general recommendations but also include the reservation that they should be adapted to the level and structure of the disability and to physical

conditions. Finland [35] has specific recommendations for three types of disability: adults with a disease or disability that causes some difficulty in movement; adults who use an assistive device for walking; and adults who use wheelchairs. Sweden[36] also specifically mention that children and adolescences with disabilities should try to reach PA levels recommended for their age under the supervision of a health professional.

Nine countries (Austria[17], Denmark[37], Finland[35], France[19], Germany [14], Ireland[27], Latvia[22], Lithuania[16] and Sweden[38]) have separate recommendations for people with chronic diseases, generally encouraging them to be as active as is recommended for the general population of their age. Latvia[22] and Lithuania[16] additionally recommend to seek medical advice before starting to exercise. France[19] developed a special recommendation on PA for people with cancer[39].

Two countries (France[19] and Greece[26]) have recommendations for postmenopausal women, and 6 countries reported that they have special recommendations for very elderly adults (85+). However, no specific documents for this adult group could be identified in the context of this study.

[Table 5 about here]

Discussion

This article has collected and analyzed data on national PA recommendations for EU Member States. Such an endeavor naturally comes with a number of limitations and potential caveats. First, the analysis is limited to documents published before April 2018, and does not cover recommendations developed in several Member States since

then. Examples include Hungary [40], Italy [41], Malta [42], and the United Kingdom[43]. Moreover, the visibility of national PA recommendations varies significantly, making some documents more difficult to identify and retrieve than others. While some recommendations are high-profile documents that are easily found on search engines, advertised on dedicated websites, and sport an official-looking layout, some others are hard to identify as government documents and exist only on national-language websites. In this context, there is obviously a bias towards countries whose native language is English and those that have chosen to publish supplementary English language versions of their recommendations. We have attempted to overcome this problem by relying both upon fellow PA researchers in the respective countries, the expertise of the WHO Regional Office for Europe and, where necessary, direct inquiry with the national PA Focal Points to ensure that all existing documents were reliably identified and obtained for our analysis.

The language barrier is always one of the greatest potential issues in a cross-country comparison, esp. when 21 different languages are involved as in this case. We worked to solve this problem by using a combination of electronic translation and verification of our initial translations by native speakers with a thorough background in PA promotion. In our specific case, the issue was somewhat alleviated by the fact that most recommendations were rather concise and did not use complicated language.

All in all, we believe that our analysis, building on unique information obtained directly from national governments obtained by the European Commission and WHO, provides an excellent snapshot of existing PA recommendations in the EU, allowing us both to assess the current situation in the Union and the progress made in the last years.

Our results show that the large majority of EU Member States currently either have national PA recommendations in place or are in the process of developing them. In addition, there is a general tendency for Member States (13 out of 20) to build their recommendations on the 2010 WHO Global Recommendations [4]. A minority of 7 countries based their recommendations on other documents such as the slightly older ACSM/CDC recommendations [31]. Most of the countries (except for Austria, Finland and Ireland) published their national PA recommendations in the years after WHO global recommendations were released, but it may have taken a while for these new recommendations to be universally known.

Children and adolescents are arguably the age group with the greatest variation between countries, especially regarding the number and range of age brackets for which separate recommendations exist. At the time of data collection, WHO recommendations started at the age of 5, but 10 countries had already added information for younger age groups. This may underline the relevance of this group for national policy-making, but also the fact that PA needs diverge substantially along the continuum between very young children and teenagers, and the evidence base for different age sub-groups is constantly expanding.

Comparing our results to previous studies, we find that the number of countries in the European Union with national PA recommendations has clearly increased over time, from 16 in 2011 [9] via 19 in 2015 [10] to 23 in 2018. National PA recommendations for children and adults were available for 21 countries, which is almost twice as many as in 2011 (11 for children and 12 for adults [9]). This development is most clearly visible for

older adults: In 2011, only 5 documents were available for analysis [9]; by 2018, this number had increased to 18.

The analysis also showed that many countries have mentioned special population groups in their recommendations in recent years. More than half (12) of reviewed documents include recommendations for women during pregnancy and breastfeeding, and several countries (9) specified PA recommendations for people with chronic diseases. A few also (2) add recommendations for postmenopausal women. Special target groups seem to be a relatively new topic, as they do not appear in previous analyses of PA recommendations [9 10].

Finally, the number of countries which incorporated recommendations on avoiding prolonged periods of sitting or inactivity has also increased. In 2018, 13 countries had such recommendations for children, 11 for adults, and 10 for older adults. These figures had also been substantially lower in 2011, both for children and adolescents (4 countries) as well as for adults and older adults (UK only) [9].

By contrast, specific recommendations on reducing or maintaining body weight remain relatively uncommon and are only mentioned the current PA recommendations of 3 EU Member States.

Conclusion

This article has presented an overview of the current status of PA recommendations in EU Member States. It can be viewed in the context of efforts by the European Commission to monitor the progress of implementation of the Council Recommendation

on HEPA across Sectors and by WHO to build capacity for PA promotion in the European Region. It also helps highlight current developments in the field (e.g. further differentiation of age groups, needs of special populations, relevance of sedentary behavior and weight management) and the extent to which new research evidence is translated into policy development. Some of these new additions may also be reflected in the planned update to the 2010 WHO Global Recommendations, work on which is due to begin in the second half of 2019 [44].

Our findings may also help inspire policy development in other countries of the WHO European Region, who may, for example, look to EU countries with comparable population size, geography or PA culture in order to decide how to best adopt and adapt basic WHO recommendations to their own national situation. In this context, it may also be interesting to analyze in greater detail which processes, tools and stakeholders countries used to draw up their national recommendations. We are currently working on such a comparison based on data from 17 EU Member States.

From a scientific point of view, more research may be needed on the effectiveness of national PA recommendations, i.e. their direct impact on population-level PA behavior and the extent to which they guide (public) health professionals in their efforts to promote PA. A related question is to what extent national adaptations of basic WHO recommendations actually improve the effectiveness of PA promotion, and whether these effects justify the effort of developing country-specific recommendations.

The European Union Physical Activity Focal Points Network was instrumental both in collecting the data which this study is based and in fostering exchange between EU

Member States on how to improve and harmonize PA promotion for all citizens of the Union. This analysis is therefore also testimony of the utility of international collaboration in health promotion, both between EU Member States as well as between the European Commission and WHO.

Acknowledgements: We would like to thank the national representatives of the EU Physical Activity Focal Points Network for their support in collecting the data for this article. We would also like to thank Tuula Aira, Jacopo Cristini, Gregor Jurak, Susanna Kugelberg, Nemanja Lakicevic, Lorena Miranda, Paschalis-Odysseas Moysidis, Jana Pelclova, Julia Soquet, and Nina Vischer for verifying specific details in national PA recommendation documents that were published in languages not spoken by the authors.

Disclosure statement: The writing group takes sole responsibility for the content of this article and the content of this article reflects the views of the authors only. JB and SW are staff members of the WHO. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions or the stated policy of the World Health Organization.

Funding statement: This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests statement: The authors declare that they have no competing interests.

Contributors: PG, KAO and AT conceptualized the study. RM and STM developed the survey questionnaire and collected the survey data. JRB and SW supervised the survey. PG, AT and KAO analyzed the survey data. AT obtained and analyzed national recommendation documents. PG and KAO collected additional information from experts and Physical Activity Focal Points. PG drafted the manuscript. All authors participated in the revision of the article. All authors contributed to and have approved the final manuscript.

References

1. World Health Organisation. Global Strategy on Diet, Physical Activity and Health, 2004.
2. World Health Organisation. Physical activity strategy for the WHO European Region 2016-2025, 2015.
3. World Health Organisation. Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva, 2018.
4. World Health Organisation. Global Recommendations on Physical Activity for Health. Geneva, 2010.
5. European Commission. EU Physical Activity Guidelines. Recommended Policy Actions in Support of Health-Enhancing Physical Activity, 2008.
6. Council recommendation of 26 November 2013 on promoting health-enhancing physical activity across sectors. *Official Journal of the European Union* 2013;56:C 354/1 - /5.
7. Cameron C, Craig CL, Bull FC, et al. Canada's physical activity guides: has their release had an impact? *Canadian journal of public health = Revue canadienne de sante publique* 2007;98 Suppl 2:S161-9. [published Online First: 2008/01/25]
8. Rutten A, Abu-Omar K, Messing S, et al. How can the impact of national recommendations for physical activity be increased? Experiences from Germany. *Health research policy and systems* 2018;16(1):121. doi: 10.1186/s12961-018-0396-8 [published Online First: 2018/12/15]
9. Kahlmeier S, Wijnhoven TM, Alpiger P, et al. National physical activity recommendations: systematic overview and analysis of the situation in European countries. *BMC Public Health* 2015;15:133. doi: 10.1186/s12889-015-1412-3 [published Online First: 2015/04/17]

10. Breda J, Jakovljevic J, Rathmes G, et al. Promoting health-enhancing physical activity in Europe: Current state of surveillance, policy development and implementation. *Health Policy* 2018;122(5):519-27. doi: 10.1016/j.healthpol.2018.01.015 [published Online First: 2018/02/10]

11. World Health Organisation. Physical activity factsheets for the 28 European Union Member States of the WHO European Region. Copenhagen: WHO Regional Office for Europe 2018.

12. Vlaams Instituut Gezond Leven. Vlaamse gezondheidsaanbevelingen sedentair gedrag (lang stilzitten) en lichaamsbeweging [Flemish health recommendations on sedentary behaviour (long sitting) and physical activity]. Brussel: Vlaams Instituut Gezond Leven vzw 2017.

13. UKK Institute. Physical exercise during and after pregnancy 2009 [Available from: http://www.ukkinstituutti.fi/filebank/276-englanti.pdf accessed March 2019.

14. Rütten A, Pfeifer K, editors. *National recommendations for physical activity and physical activity promotion*. Erlangen: FAU University Press, 2016.

15. Recommendations for the physical activity of school-aged children. Helsinki: Ministry of education 2008.

16. Sveikatos mokymo ir ligų prevencijos centras. Fizinio aktyvumo rekomendacijos 3 amžiaus grupėms [Physical activity recommendations for 3 age groups] Vilnius: Lietuvos Respublikos sveikatos apsaugos ministerija (Ministry of Health Republic of Lithuania); [Available from: https://sam.lrv.lt/lt/veiklos-sritys/visuomenes-sveikatos-prieziura/mityba-ir-fizinis-aktyvumas-2/fizinis-aktyvumas-mytyba-ir-fizinis-aktyvumas/rekomendacijos accessed March 2019.

17. Titze S, Ring-Dimitriou S, Schober PH, et al. Österreichische Empfehlungen für gesundheitswirksame Bewegung [Austrian recommendations for health-enhancing physical activity]. Wien: Fonds Gesundes Österreich 2010.

18. Danish Health Authority. Recommendations for children and adolescents (5-17 years old) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-children-and-adolescents- accessed March 2019.

19. Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail,. Actualisation des repères du PNNS - Révisions des repères relatifs à l'activité physique et à la sédentarité [Revisions of benchmarks relating to physical activity and sedentary lifestyle]. Maisons-Alfort, 2016.

20. World Health Organisation. Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. Geneva: World Health Organisation 2019.

21. Finnish recommendations for physical activity in early childhood 2016. Joy, play and doing together.: Ministry of the Education and Culture, 2016.

22. 2011. évi CXC. törvény a nemzeti köznevelésről [Law on national public education]: Nemzeti Jogszabálytár; 2011 [accessed April 2019.

23. Ministerio de Sanidad, Servicios Sociales e Igualdad,. Actividad Física para la Salud y Reducción del Sedentarismo. Recomendaciones para la población [Physical activity for health and reduction of sedentary lifestyle. Recommendations for the population]. Madrid: Ministerio de sanidad, servicios sociales e igualdad centro de publicaciones 2015.

24. Department of Health, Physical Activity, Health Improvement and Protection. Start Active, Stay Active: A report on physical activity from the four home countries' Chief Medical Officers. London, 2011.

25. Danish Health Authority. Recommendations for physical activity children 1–4 years old Copenhagen2016 [Available from: https://www.sst.dk/en/health-and-lifestyle/~/media/038D1AD667D14453BB02E3AAD26F9033.ashx accessed March 2019.

26. The Institute of Preventive Medicine, Environmental and Occupational Health. Σωματική Δραστηριότητα, Συστάσεις [Physical activity recommendations] [Available from: http://www.diatrofikoiodigoi.gr/?Page=systaseis accessed March 2019.

27. Department of Health and Children, Health Service Executive. The National Guidelines on Physical Activity for Ireland, 2009.

28. Hrvatski zavod za javno zdravstvo. Živjeti zdravo: tjelesno zdravlje [Healthy Living: Physical Health]. Zagreb.

29. Danish Health Authority. Recommendations for adults (18-64 years old) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-adults accessed March 2019.

30. Pate RR, Pratt M, Blair S, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273(5):402-07.

31. Haskell WL, Lee IM, Pate RR, et al. 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* 2007;39(8):1423-34.

32. Health Council of the Netherlands. Physical activity guidelines 2017. The Hague: Health Council of the Netherlands 2017.

33. Superintendence of Public Health Ministry for Health, the Elderly and Community Care. A Healthy Weight for Life: A National Strategy for Malta 2012 - 2020. Msida: Superintendence of Public Health 2012.

34. Zabolotnaja T, Zumeras R, Rimdeikienė I, et al. Tėvų su kūdikiais mankštos rekomendacijos [Physical activity recommendations for parents with babies], 2017.

35. UKK Institute. Kolme soveltavaa liikuntapiirakkaa toimintakyvyn mukaan [Three suitable exercise pies according to persons movement ability] [Available from: http://www.ukkinstituutti.fi/liikuntapiirakka/soveltavat_liikuntapiirakat accessed March 2019.

36. Yrkesföreningar Fysisk Aktivitet. Hur mycket fysisk aktivitet behöver barn och ungdomar? [How much physical activity do children and young people need?]: Yrkesföreningar Fysisk Aktivitet; [Available from: http://www.fyss.se/rekommendationer-for-fysisk-aktivitet/for-barn-och-ungdomar/ accessed March 2019.

37. Danish Health Authority. Recommendations for older people (65 years old and older) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-older-people- accessed March 2019.

38. Yrkesföreningar för Fysisk Aktivitet. Rekommendationer om fysisk aktivitet för vuxna: Yrkesföreningar för Fysisk Aktivitet; 2011 [Available from: http://www.yfa.se/rekommendationer-for-fysisk-aktivitet/ accessed March 2019.

39. Istitut National du Cancer. Bénéfices de l'activité physique pendant et après cancer. Des connaissances scientifiques aux repères pratique [Benefits of physical

activity during and after cancer. From scientific knowledge to practical benchmarks]: Istitut National du Cancer 2017.

40. Magyar Diáksport Szövetség [The Hungarian Student Sport Association]. Hivatalosan is elstartolt a DO60 mozgalom a HIPE 2018 – nemzetközi testnevelési konferencián #társak #játék [The DO60 movement at HIPE 2018 - international bodybuilding conference is officially started #people #game] 2018 [Available from: http://www.mdsz.hu/hirek-hu/mdsz-hu-hu/2018/11/15/hivatalosan-is-elstartolt-a-do60-mozgalom-a-hipe-2018-nemzetkozi-testnevelesi-konferencian-tarsak-jatek/ accessed August 8 2019.
41. De Mei B, Cadeddu C, Luzi P, et al., editors. *Movimento, sport e salute: l'importanza delle politiche di promozione dell'attività fisica e le ricadute sulla collettività [Movement, sport and health: the importance of policies to promote physical activity and the effects on the community]*. Roma: Istituto Superiore di Sanità, 2018.
42. Palamentary secritariat for youth, sport and volontary organisations,. Aiming higher. An Overview of the National Strategy for Sport and Physical Activity in Malta 2019 [
43. Foster C. Overview of the 2019 Physical Activity. Guidelines and implementation plans 2018 [Available from: http://www.fuse.ac.uk/media/sites/researchwebsites/fuse/Overview%20of%20the%202019%20Physical%20Guidelines%20and%20implementation%20plans%20-%20Charlie%20Foster.pdf accessed August 2019.
44. World Health Organisation. Call for Expression of Interest to participate in the WHO Guideline Development Group for the updating of the 2010 Global Recommendations on Physical Activity in Youth, Adults and Older Adults

Genewa: World Health Organisation; 2019 [Available from: https://www.who.int/ncds/prevention/physical-activity/update-global-recommendations-physical-activity/en/ accessed April 2019.

45. Ministerstvo zdravotnictví. Zdraví 2020 Národní strategie ochrany a podpory zdraví a prevence nemocí. Akční plán č. 1: Podpora pohybové aktivity na období 2015-2020 [Health 2020 National strategy for the protection and promotion of Health and disease prevention. Action Plan 1: support for physical activity 2015-2020]: Ministerstvo zdravotnictví; 2015 [Available from: http://www.mzcr.cz/Admin/_upload/files/5/ak%C4%8Dn%C3%AD%20pl%C3%A1ny%20-%20p%C5%99%C3%ADlohy/AP%2001%20podpora%20pohybov%C3%A9%20aktivity.pdf accessed April 2019.

46. Danish Health Authority. Recommendations for pregnant women Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/pregnant-women accessed March 2019.

47. Danish Health Authority. Recommendations for physical activity infants younger than 1 year old Copenhagen2016 [Available from: https://www.sst.dk/en/health-and-lifestyle/~/media/4D712D1E17794FCCA10B18B3BE8CD0DD.ashx accessed March 2019.

48. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused lastele ja noortele [Recommendations for physical activity for children and young people] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/lastele-ja-noortele accessed March 2019.

49. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused täiskasvanutele [Recommendations for physical activity for adults] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/taiskasvanutele accessed March 2019.

50. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused eakatele [Recommendations for physical activity for the elderly] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/eakatele accessed March 2019.

51. Reduce sedentary time – get healthier! National recommendations to reduce sedentary time. Helsinki: Ministry of social affairs and Health,, Finland, 2015.

52. UKK Institute. Terveysliikunnan suositus yli 65-vuotiaille [Physical activity recommendations for people over 65 years] 2008 [Available from: http://www.ukkinstituutti.fi/filebank/2890-UKK-liikuntapiirakka-yli-65-v-tulostettava.pdf accessed March 2019.

53. UKK Institute. Physical Activity Pie 2009 [Available from: http://www.ukkinstituutti.fi/en/products-services/physical_activity_pie accessed March 2019.

54. Ministero della Salute. Informativa OMS: attività fisica [WHO information: physical activity], 2014.

55. Ernährung und Bewegung [Nutrition and physical activity]: Ministère de la Santé (Ministerium für Gesundheit) 2016.

56. Národný akčný plán pre podporu pohybovej aktivity na roky 2017 - 2020 [National Action Plan to Support Physical Activity for 2017-2020]. Bratislava, 2017.

57. Resolucija o nacionalnem programu o prehrani in telesni dejavnosti za zdravje 2015–2025 [Resolution on the national programme on nutrition and physical activity for health 2015-2025], 2015.

58. Department of Health and Social Care. Physical activity in pregnancy infographic London2017 [Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/622336/CMO_physical_activity__pregnant_women_infographic.jpg accessed August 2019.

Table 1. *National physical activity recommendations in EU Member States, by year and population group(s) covered*

Countries	Publication year			
	Children/ adolescents	Adults	Older adults	Special populations (see Table 5 for details)
Austria [17]	2010	2010	2010	2010
Belgium (Flanders) [12]	2017	2017	2017	2017
Belgium (Wallonia) [13]	n/a	n/a		
Bulgaria				
Croatia[28]	n/a	n/a		
Cyprus				
Czech Republic [45]	2015*	2015*	2015*	
Denmark [18 25 29 37 46 47]	2011, 2016	2011	2011	2011
Estonia [48-50]	2015	2015	2015	
Finland [13 15 21 35 51-53]	2008, 2016	2009	2008	2009, n/a
France [19 39]	2016	2016	2016	2016, 2017
Germany [14]	2016	2016	2016	2016
Greece [26]	n/a	n/a	n/a	n/a
Hungary [22]	2011**			
Ireland [27]	2009	2009	2009	2009
Italy [54]	2014	2014		
Latvia [22]	n/a	n/a	n/a	n/a
Lithuania [16 34]	n/a	n/a	n/a	2017, n/a
Luxembourg [55]	2016	2016	2016	
Malta [33]	2012	2012	2012	
Netherlands [32]	2017	2017	2017	
Poland				
Portugal				
Romania				
Slovakia [56]	2017	2017		
Slovenia [57]	2015	2015	2015	
Spain [23]	2015	2015	2015	2015
Sweden [36 38]	n/a	2011	2011	2011
United Kingdom [24 58]	2011	2011	2011	2011, 2017

n/a = year of publication is not available
** document does not include information about the duration, intensity and frequency of PA*
*** document does not include information about the duration, intensity and frequency of PA but about daily mandatory PE in elementary and secondary schools*

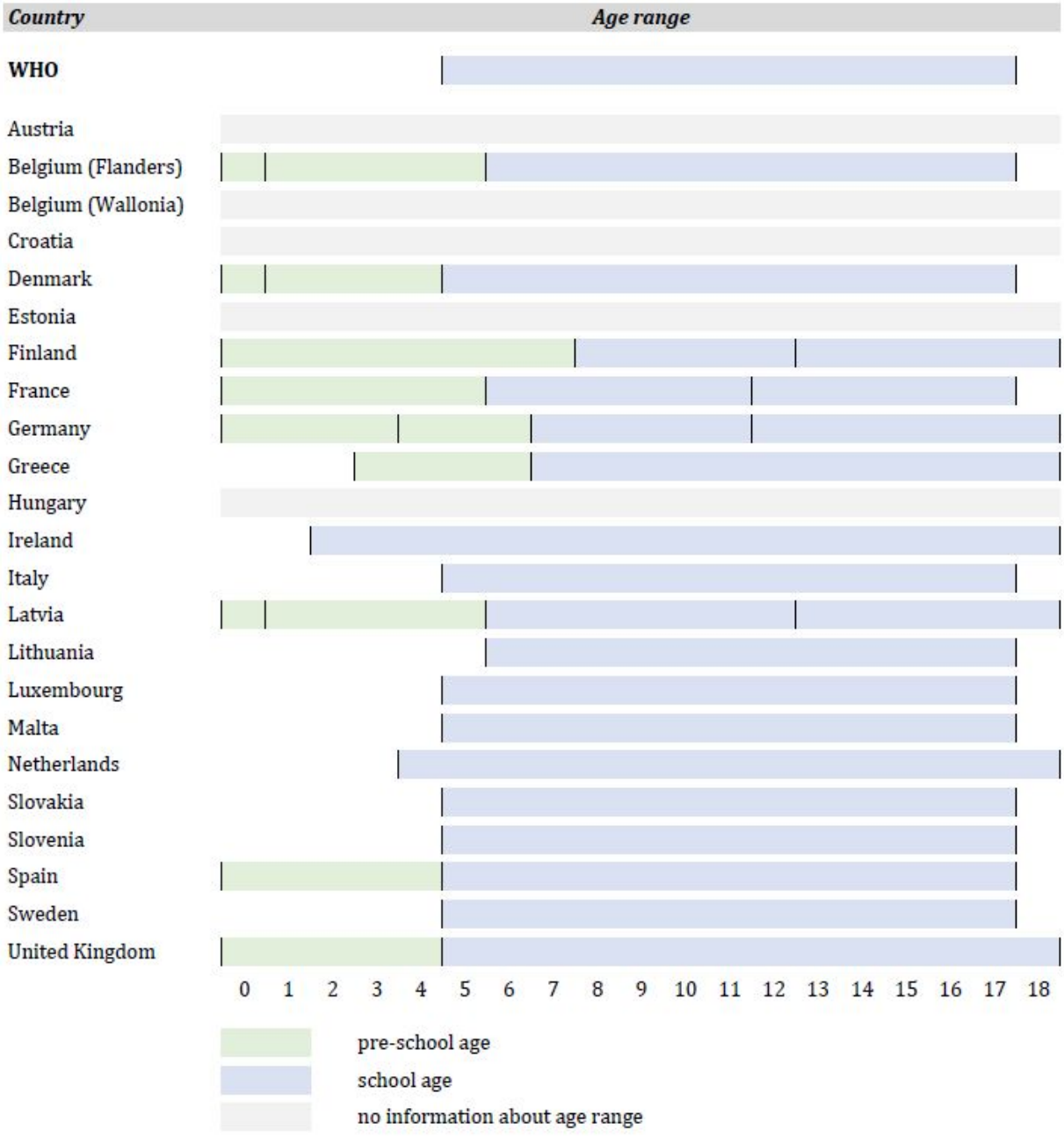


Figure 1. *Comparison of age ranges in national PA recommendations for children and adolescents. WHO: World Health Organization.*

Table 2. *National PA recommendations for children and adolescents in comparison to WHO recommendations*

Country	Age group	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
		Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	5–17	At least 60 minutes of moderate- to vigorous-intensity physical activity daily. PA beyond minimum duration has additional health benefits.		Most of the daily physical activity should be aerobic. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least 3 times per week		
Austria	n/s	√		√	Additional activities to improve coordination and flexibility are recommended	√
Belgium (Flanders)	<1		As much as possible, daily		Give freedom of movement in accordance with their physical possibilities in safe environment	√
	1–5		At least 180 minutes/day, any type of intensity		It is important for toddlers and preschoolers to encourage a variety of exercise activities, which also are tailored to their age and enjoyable.	√
	6–17	√	Minimum bouts – at least 10 minutes	√		√
Belgium (Wallonia)	n/s	√			n/s	
Croatia	n/s	√			n/s	
Denmark	<1		As much as possible, daily		Maximize floor-based tummy time for infants when they are awake. Ensure that infants are physically active in various ways during the day. Ensure that infants can move freely as much as possible.	
	1–4		As much as possible, daily		Ensure that children are physically active in various ways during the day. Ensure that children can move freely as much as possible.	√
	5–17	√	Minimum bouts – at least 10 minutes	√	Vigorous-intensity activities that strengthen muscle and bone should last at least 30 minutes. Additional activities to improve flexibility are recommended.	
Estonia	n/s	√		√		√
Finland	<8		At least 180 minutes/day 2 hours moderate PA and 1 hour vigorous PA		n/s	√
	7–12		At least 1.5–2 hours/day Minimum bouts – at least 10 minutes	√	Vigorous-intensity PA should be performed daily	√
	13–18		At least 1–1.5 hours/day Minimum bouts – at least 10 minutes	√	Vigorous-intensity PA should be performed daily	√
France	<5		At least 180 minutes/day Or 15 minutes/hour		PA should include various motor activities based on the development of basic motor skills. The playfulness of the proposed activities should be in priority.	√
	6–11	√	Minimum bouts – at least 5 minutes	√	Activities that strengthen muscle and bone should last at least 20 minutes (non-consecutive days)	√
	12–17	√			Activities that strengthen muscle and bone should last at least 20 minutes (non-consecutive days)	√

Table 2 continued.

Country	Age group	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
		Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
Germany	<3		As much as possible, daily		A safe environment must be ensured	√
	4–6		At least 180 minutes/day		n/s	√
	6–11		At least 90 minutes/day, moderate to vigorous intensity PA		The large muscle groups should be subject to higher-intensity loading on two to three days a week in order to improve strength and endurance, taking into account respective developmental stages.	√
	12–18		At least 90 minutes/day, moderate to vigorous intensity PA		n/s	√
Greece	3–6	√			Encourage a variety of activities within the week. These activities should be both enjoyable and safe.	√
	7–18	√			n/s	√
Ireland	2–18	√		√		
Italy	5–17	√			n/s	√
Latvia	<1		As much as possible, daily		Important to encourage to be active, developing child's muscles and motor skills	
	1–5		At least 180 minutes/day		n/s	√
	5–12	√		√		√
	12–18	√		√	Activities that strengthen muscle and bone should last at least 20 minutes	
Lithuania	6–17	√			Vigorous intensity PA should be performed at least 2times/week	√
Luxembourg	5–17	√		√		
Malta	5–17	√			n/s	
Netherlands	4–18	√		√		√
Slovakia	5–17	√			n/s	
Slovenia	5–17	√		√		
Spain	Not able to walk		Promote physical activity several times a day		PA in safe environments, particularly through ground games or super-vised activities in the water (swimming pools or at home bath time)	√
	<5, able to walk		At least 180 minutes/day, all levels of intensity		Carry out activities and games that develop basic motor skills in different environments (at home, in the park, in the swimming pool, etc.)	√
	5–17	√		√		√
Sweden	5–17	√		√		
United Kingdom	<5		At least 180 minutes/day		PA should be encouraged from birth, particularly through floor-based play and water-based activities in safe environments.	√
	5–18	√		√		√

n/s: not specified; WHO: World Health Organization; PA: physical activity

Table 3. *National PA recommendations for adults (18–64 years) in comparison to WHO recommendations*

Country	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
	Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	At least 150 minutes of moderate aerobic PA throughout the week, or 75 minutes of vigorous aerobic PA, or an equivalent combination of both. Bouts should be at least 10 minutes each. For additional health benefits, increase moderate PA to 300 minutes per week, or engage in 150 minutes of vigorous PA/an equivalent combination of both.		Muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.		
Austria	√		√		
Belgium (Flanders)		At least 150 minutes of moderate intensity PA per week should be performed 5 days and preferably all days of the week, at least 30 minutes per day. Or 75 minutes vigorous PA as best spread over e.g. 3 days of 25 minutes. Inactive adults over the age of 45 should consult a general practitioner before starting vigorous intensity PA.	√		√
Belgium (Wallonia)		At least 30 minutes/day			
Croatia		At least 30 minutes/day of moderate intensity PA		n/s	
Denmark		PA for at least 30 minutes per day. The activity should be of moderate to high intensity and extend beyond the usual short-term daily activities. If the 30 minutes are divided, each activity should last at least 10 minutes.	√	High intensity training should last at least 20 minutes. Incorporate activities that increase bone strength and flexibility.	
Estonia	√		√		√
Finland	√		√		√
France		At least 30 minutes/day at least 5 days per week moderate to vigorous intensity. Vigorous intensity PA is recommended in short-term (5–10 min) and repeated in the day (3–4 times).		Strength training is recommended 1–2 times a week, with 1–2 days recover in between each session. Stretching at least 2–3 times a week.	√
Germany	√		√		√
Greece		At least 30 minutes/day		n/s	√
Ireland	√		√		
Italy	√			n/s	
Latvia	√		√		
Lithuania		At least 30 minutes of moderate-intensity PA every day in bouts of at least 10 minutes. As an alternative, no less than 15 minutes of high-intensity PA daily, or an appropriate combination of moderate- and high-intensity PA.	√		
Luxembourg	√		√		
Malta		At least 30 minutes of moderate-intensity physical activity 5 days per week; or 20 minutes of vigorous-intensity physical activity 3 days per week; or an equivalent combination of moderate and vigorous-intensity PA.	√		
Netherlands	√	Minimum bouts of PA can be less than 10 minutes	√		√
Slovakia	√			n/s	
Slovenia	√		√		√
Spain	√		√		√
Sweden	√		√		√
United Kingdom	√		√		√

n/s: not specified; WHO: World Health Organization; PA: physical activity

Table 4. *National PA recommendations for older adults (65+ years) in comparison to WHO recommendations*

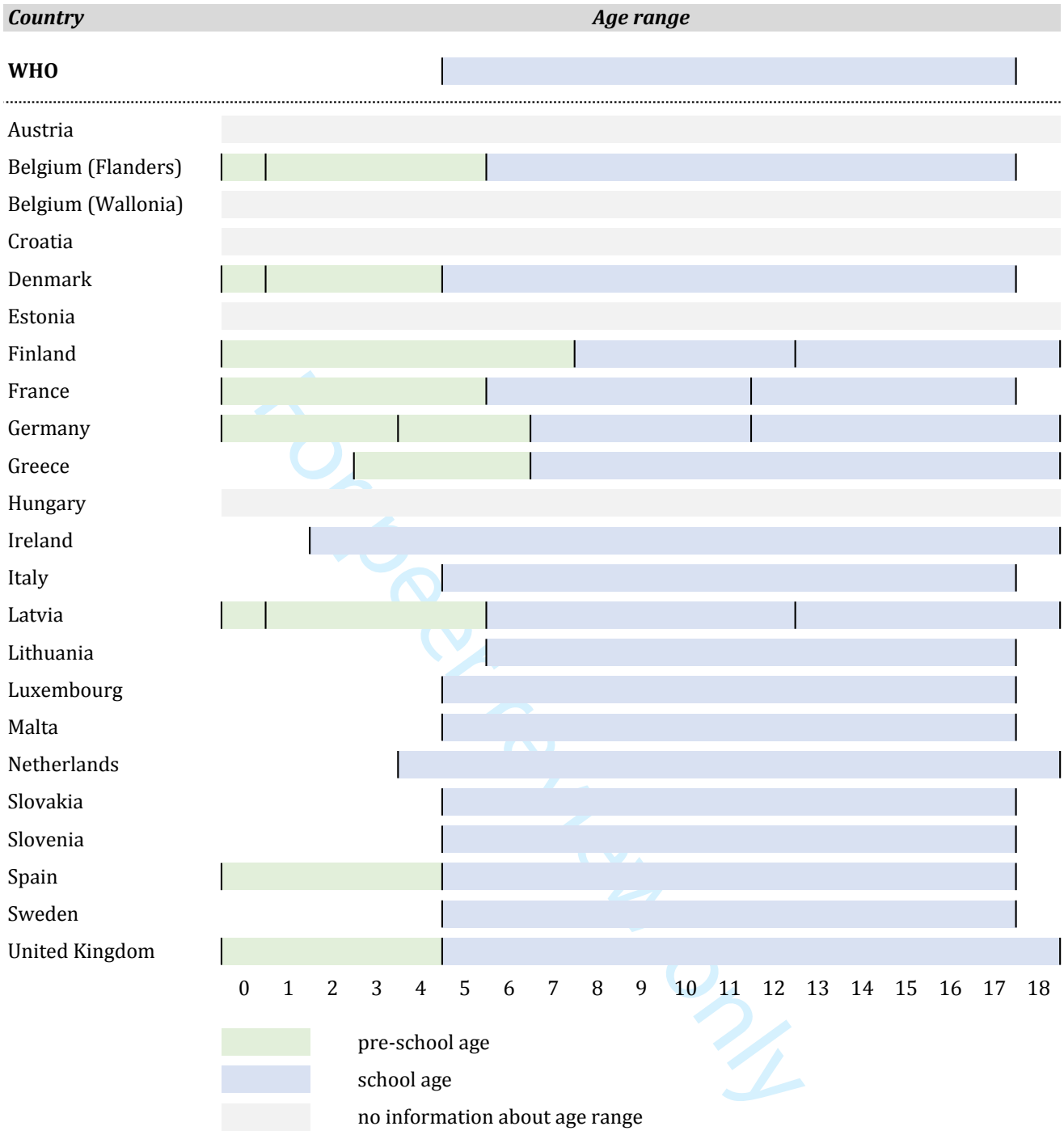
Country	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
	Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	150 minutes of moderate-intensity aerobic PA throughout the week, or at least 75 minutes of vigorous-intensity aerobic PA, or an equivalent combination of moderate- and vigorous-intensity PA. PA should be performed in bouts of at least 10 minutes. For additional health benefits, increase moderate PA to 300 minutes per week, or engage in 150 minutes of vigorous PA/an equivalent combination of both.		Muscle-strengthening involving major muscle groups on 2 or more days a week. Older adults with poor mobility should perform PA to enhance balance and prevent falls on 3 or more days per week.		
Austria	√		√		
Belgium (Flanders)	√		√		√
Denmark		PA for at least 30 minutes per day. PA should be moderate to high intensity and should extend beyond the usual short-term daily activities. If the 30 minutes is divided, each activity should last at least 10 minutes.		PA at least twice a week for at least 20 minutes to maintain/improve physical fitness and muscle and bone strength. Stretching exercises at least twice a week for at least 10 minutes to maintain/improve flexibility. Regular exercise to maintain/improve balance.	
Estonia	√		√	PA to enhance balance and coordination at least 2 twice a week.	√
Finland	√		√		√
France		At least 30 min of moderate PA per day, at least 5 times per week; or 15 min per day of high intensity PA, at least 5 times per week; or a combination of moderate and high intensity PA.	√	Activities to increase flexibility on 2 or more days a week.	√
Germany	√		√		√
Greece		At least 30 minutes/ day in bouts of at least 10 minutes duration.	√	Exercises for improving balance and coordination at least 2 times/week.	√
Ireland		At least 30 minutes on five day a week, or 150 minutes/week		Focus on aerobic activity, muscle-strengthening and balance (2-3 days/week).	
Latvia	√		√		
Lithuania		At least 30 minutes of moderate-intensity PA every day in bouts of at least 10 minutes duration. As an alternative it can be recommended to no less than 10-15 minutes of high-intensity PA daily (at least 75 minutes per week) or appropriate combination of moderate-and high-intensity PA.	√		√
Luxembourg	√		√		
Malta		At least 30 minutes of moderate-intensity PA on 5 days per week, or 20 minutes of vigorous-intensity PA on 3 days per week, or an equivalent combination of moderate and vigorous-intensity PA	√	Additional activities that promote improved strength, coordination and balance are recommended.	
Netherlands	√	Minimum bouts of PA can be less than 10 minutes	√		√
Slovenia	√		√		
Spain	√			Muscle strength and balance training at least 3 times/week	√
Sweden	√		√		√
United Kingdom	√		√	Older adults at risk of falls should do balance and co-ordination trainings on at least 2 days a week.	√

WHO: World Health Organization; PA: physical activity

Table 5. *National physical activity recommendations for special populations in EU Member States.*

Countries	Publication year				
	Parents with small children	Pregnant and breastfeeding women	Post-menopausal women	People with disabilities	People with chronic diseases
Austria		2010		2010	2010
Belgium (Flanders)		2017			
Denmark		2011		2011	2011
Finland		2016		n/a	n/a
France		2016	2016	2016	2016, 2017(cancer)
Germany		2016			2016
Greece		n/a	n/a		
Ireland				2009	2009
Latvia		n/a		n/a	n/a
Lithuania	2017	n/a		n/a	n/a
Spain		2015			
Sweden		2011		2011	2011
United Kingdom		2017		2011	

n/a = year of publication is not available



BMJ Open

Status and Contents of Physical Activity Recommendations in European Union Countries: A Systematic Comparative Analysis

Journal:	*BMJ Open*
Manuscript ID	bmjopen-2019-034045.R1
Article Type:	Original research
Date Submitted by the Author:	02-Dec-2019
Complete List of Authors:	Gelius, Peter; FAU, Department of Sport Science and Sport Tcymbal, Antonina; FAU, Department of Sport Science and Sport Abu-Omar, Karim ; FAU, Department of Sport Science and Sport Mendes, Romeu; Universidade do Porto, EPIUnit – Instituto de Saúde Pública Tribuzi Morais, Sara; Universidade do Porto, Faculdade de Desporto Whiting, Stephen; World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course ; Universidade do Porto, EPIUnit – Instituto de Saúde Pública Breda, Joao; World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course
Primary Subject Heading:	Public health
Secondary Subject Heading:	Health policy, Sports and exercise medicine
Keywords:	Physical Activity, PUBLIC HEALTH, Health policy < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, National recommendations

I, the Submitting Author has the right to grant and does grant on behalf of all authors of the Work (as defined in the below author licence), an exclusive licence and/or a non-exclusive licence for contributions from authors who are: i) UK Crown employees; ii) where BMJ has agreed a CC-BY licence shall apply, and/or iii) in accordance with the terms applicable for US Federal Government officers or employees acting as part of their official duties; on a worldwide, perpetual, irrevocable, royalty-free basis to BMJ Publishing Group Ltd ("BMJ") its licensees and where the relevant Journal is co-owned by BMJ to the co-owners of the Journal, to publish the Work in this journal and any other BMJ products and to exploit all rights, as set out in our licence.

The Submitting Author accepts and understands that any supply made under these terms is made by BMJ to the Submitting Author unless you are acting as an employee on behalf of your employer or a postgraduate student of an affiliated institution which is paying any applicable article publishing charge ("APC") for Open Access articles. Where the Submitting Author wishes to make the Work available on an Open Access basis (and intends to pay the relevant APC), the terms of reuse of such Open Access shall be governed by a Creative Commons licence – details of these licences and which Creative Commons licence will apply to this Work are set out in our licence referred to above.

Other than as permitted in any relevant BMJ Author's Self Archiving Policies, I confirm this Work has not been accepted for publication elsewhere, is not being considered for publication elsewhere and does not duplicate material already published. I confirm all authors consent to publication of this Work and authorise the granting of this licence.

Status and Contents of Physical Activity Recommendations in European Union Countries: A Systematic Comparative Analysis

Peter Gelius[1], Antonina Tcymbal[1], Karim Abu-Omar[1], Romeu Mendes[2], Sara Tribuzi Morais[3], Stephen Whiting[2, 4], & Joao Joaquim Breda[4]

[1]FAU Erlangen-Nürnberg, Department of Sport Science and Sport

[2]EPIUnit – Instituto de Saúde Pública, Universidade de Porto

[3]Universidade de Porto, Faculdade de Desporto

[4]World Health Organization Regional Office for Europe, Division of Noncommunicable Diseases and Promoting Health through the Life-course

Corresponding author:

Dr Peter Gelius, e-mail: peter.gelius@fau.de

Abstract

Objectives: We analyzed the information on current national physical activity recommendations in all EU Member States provided by governments in a joint EU/WHO survey on the implementation status of the EU Council Recommendation on Health-Enhancing Physical Activity across Sectors.

Design: Cross-sectional survey.

Participants: The representatives of the 28 EU Member State governments to the EU Physical Activity Focal Point Network.

Outcome measures: National recommendations on (a) minimum frequency, duration, intensity and lengths of bouts of physical activity, on (b) preventing inactivity or sedentary behavior, and (c) further recommendations for additional health benefits, obesity prevention, and specific types of activity.

Results: An official document could be located for 23 of the 28 EU Member States, while four are currently developing recommendations. For children and adolescents, most countries follow the 2010 WHO Global Recommendations for Physical Activity, but there are notable differences in the delimitation of age groups. 14 countries also followed WHO in their recommendations for adults, and 11 countries have additional advice on avoiding inactivity and sitting among adults. 18 Member States have recommendations for older adults, twelve of which follow WHO. Thirteen countries also address at least one special population (e.g. pregnant women, people with disabilities, and people with chronic diseases), but the level of detail varies substantially between countries.

Conclusions: The large majority of EU Member States either has physical activity recommendations in place or is in the process of developing them. There is a general tendency to use the WHO Global Recommendations as a basis, with the greatest variation observable for children and adolescents. Comparing results to a previous round of data collection shows that the number of EU countries with physical activity recommendations is increasing and that both special groups and sedentary behavior have become more important in recent years.

Strengths and limitations of this study:

- This is the first scientific analysis emanating from the 2018 round of data collection to monitor the implementation of the EU Council Recommendation on Promoting Health-Enhancing Physical Activity (HEPA) across Sectors.
- It builds on information obtained directly from national governments and gathered jointly by the European Commission and the WHO Regional Office for Europe.
- The instrument used for data collection is based on the WHO Health-Enhancing Physical Activity (HEPA Policy Audit Tool an is unique in providing comparable data for all 28 EU countries.
- By comparing the data with an earlier survey using the same instrument, this study also allows for monitoring the progress made in this area of health promotion policy in recent years.
- Limitations include a restriction to documents published before April 2018, difficulties in identifying and obtaining all relevant documents, and the language barrier involved in analyzing data in 21 different languages.

Introduction

Global efforts to promote physical activity (PA) have intensified in recent years, culminating in key World Health Organization (WHO) publications such as the 2004 WHO Global Strategy on Diet, PA and Health [1], the PA Strategy for the WHO European Region 2016–2025 [2], and the 2018 Global Action Plan on PA [3]. Common advice found in all these documents is for Member States to develop national recommendations on how active their population should be in order to promote health and prevent disease. WHO's 2010 Global Recommendations on PA for Health[4], which in turn draw extensively on the 2008 PA Guidelines for Americans[5] and earlier work by organizations in the United States such as Centers for Disease Control and Prevention (CDC) and American College of Sports Medicine (ACSM)[6], are often cited as a reference document for such recommendations. The European Union (EU) has also been increasingly active in the field, with efforts building upon the 2008 EU PA Guidelines[7] and the 2013 EU Council Recommendations for PA[8]. Like WHO, the EU encourages Member States to publish national PA recommendations for health.

While there is only limited evidence that such national recommendations can, by themselves, increase the share of individuals who reach sufficient levels of PA [9], the process of developing them may serve as a starting point for putting the topic of PA promotion on the national agenda [10]. Both academic publications on the subject[10 11] and actual guideline documents (including by WHO[4], the EU[12], and the US[5 13]) identify policy-makers and health promotion professionals as the main target audiences for national PA recommendations and emphasize that such guidelines may constitute a key information resource, guide national goal-setting and policy development, and serve as primary benchmarks for PA monitoring and surveillance initiatives.

Given both their political relevance and their potential to spark new policy, it is important to monitor whether national governments are making progress in developing national PA recommendations. Guideline publications and updates by countries such as the United States[5 13], Canada[14 15], and Australia[16 17] have received widespread attention. For the WHO European Region, Kahlmeier et al.[11] provided an overview of existing national PA recommendations based on data collected in 2011. They found that 21 out of the 53 nations in the entire Region and 16 out of the 28 EU Member States had such recommendations in place. Some years later, Breda et al.[18] analyzed data collected in 2015 by the European Commission (EC) and the WHO Regional Office for Europe to monitor the progress of implementation of the Council Recommendation on HEPA across Sectors [8] and to produce the EU/WHO PA Country Factsheets for the EU Member States of the WHO European Region[19]. They noted that 19 of the 27 participating EU countries had reported national PA recommendations. However, a more detailed analysis of these recommendations was beyond the scope of this overview article.

As part of a regular update of this information [19], WHO and the EC collected new information on national PA recommendations in 2018. These data provide a unique opportunity not only to revise the overview of existing recommendations in the EU but also for a detailed comparison of target groups, age bracket definitions, and recommended amounts and types of PA across nations. This information may be useful both to further monitor the progress of recommendation development in the EU and as a potential source of inspiration for other countries in the WHO European Region.

Methods

Data collection

Information about national PA recommendations was obtained from the 2018 joint survey by the EC and WHO Europe, which employed a questionnaire covering all 23 indicators of the Council Recommendation on HEPA across Sectors. Indicator 1 is dedicated exclusively to national PA recommendations. Specific items included the development status of national PA recommendations (e.g. not planned, under development, formally adopted), the age groups covered (children and adolescents, adults or older adults), special populations addressed (e.g. children < 5 years, frail people or those aged ≥ 85 years, pregnant or breastfeeding women, people with disabilities or people with chronic diseases), and links to relevant documents [19].

The questionnaire was sent to the EU Physical Activity Focal Points in all 28 EU Member States in January 2018. Focal Points are PA experts officially nominated by their governments to support data collection who usually work in national ministries of health, ministries of sport, or related national agencies. They were asked to liaise with relevant national institutions and stakeholders to fill out the questionnaire within 3 months. All 28 Focal Points completed the questionnaire. WHO reviewed the responses to ensure data quality, obtained additional information and clarification where necessary, and prepared draft summaries. After a final review by the Member States, the collated information was published in the form of updated PA Country Factsheets [19].

Verification of information on national physical activity recommendation

For this article, we retrieved and reviewed the answers for Indicator 1 of the survey from the original dataset. We followed the links to national PA recommendations

provided by countries and downloaded the official documents. In cases where the link was missing or broken, an additional search was conducted on the internet. Where this still yielded no results, fellow academics from the field of PA in the respective nations were contacted to in order to obtain the document. The contents of recommendations in languages other than English or German were translated online via Google Translate. Translations were verified against the original versions by expert native speakers to confirm their factual correctness.

Data analysis

The following information were extracted from national PA recommendation documents: (i) minimum recommendations on frequency, duration, intensity and lengths of bouts of PA, (ii) recommendations on preventing inactivity or sedentary behavior (e.g. prolonged sitting), and (iii) any further PA recommendations for additional health benefits, obesity prevention, or specific types of PA. We extracted these data for all age brackets (children, adults, older adults) and special population groups (e.g. people with health-related conditions) listed in the respective document. Individual country results were then compared with the WHO Global Recommendations on PA for Health[4] and recommendations from the other EU Member States.

Patient and Public Involvement

No patient involved.

Results

An official document outlining national PA recommendations could be located for 23 (82.1%) of the 28 EU Member States. For two countries, the official PA

recommendations did not contain any specific information about minimum recommended PA levels. Four countries reported that they are in process of developing PA recommendations, and one country reported there are currently no plans to develop dedicated PA recommendations. Belgium has separate documents for the Flemish[20] and Walloon[21] regions, both of which were included into analysis. In total, 22 documents (21 national documents plus an additional one for Belgium), published between 2008 and 2018, were analyzed in greater detail (Table 1).

Table 1. *National physical activity recommendations in EU Member States, by year and population group(s) covered*

Countries	Publication year			
	Children/ adolescents	Adults	Older adults	Special populations
Austria [22]	2010	2010	2010	2010
Belgium (Flanders) [20]	2017	2017	2017	2017
Belgium (Wallonia) [21]	n/a	n/a		
Bulgaria				
Croatia[23]	n/a	n/a		
Cyprus				
Czech Republic [24]	2015*	2015*	2015*	
Denmark [25-30]	2011, 2016	2011	2011	2011
Estonia [31-33]	2015	2015	2015	
Finland [34-40]	2008, 2016	2009	2008	2009, n/a
France [41 42]	2016	2016	2016	2016, 2017
Germany [43]	2016	2016	2016	2016
Greece [44]	2017	2017	2017	2017
Hungary [45]	2011**			
Ireland [46]	2009	2009	2009	2009
Italy [47]	2014	2014		
Latvia [45]	n/a	n/a	n/a	n/a
Lithuania [48 49]	n/a	n/a	n/a	2017, n/a
Luxembourg [50]	2016	2016	2016	
Malta [51]	2012	2012	2012	
Netherlands [52]	2017	2017	2017	
Poland				
Portugal				
Romania				
Slovakia [53]	2017	2017		
Slovenia [54]	2015	2015	2015	
Spain [55]	2015	2015	2015	2015

Sweden [56 57]	n/a	2011	2011	2011
United Kingdom [58 59]	2011	2011	2011	2011, 2017

n/a = year of publication is not available
** document does not include information about the duration, intensity and frequency of PA*
*** document does not include information about the duration, intensity and frequency of PA but about daily mandatory PE in elementary and secondary schools*

Children & Adolescents

Table 2 presents a detailed overview of existing PA recommendations for children and adolescents in EU Member States. For this target group, WHO recommends at least 60 minutes of moderate- to vigorous-intensity PA every day, adding that greater amounts will provide further health benefits [4].

Regarding duration and frequency of PA, all recommendations suggest the same minimum as WHO, i.e. 60 minutes per day. The two exceptions are Germany [43], which calls for at least 90 minutes, and Finland [34], which stipulates 90–120 minutes per day for children (7–12 years) and 60–90 minutes per day for adolescents (13–18 years). 11 countries mention that any amount exceeding minimum recommendations will provide additional health benefits. Lithuania suggests that, to achieve additional health benefits, "PA time must be longer than the minimum (60 minutes) and last for at least 1.5–2 hours (120 minutes) daily" [48]. Like WHO, 16 countries specify the intensity of recommended PA as moderate to vigorous.

As additional aspects, WHO emphasizes that most of the daily PA should be aerobic and that vigorous-intensity activities should be incorporated at least three times per week to strengthen muscle and bone [4]. Recommendations in 14 EU Member States mirror this, while Lithuania[48] advocates at least 2 times per week and Finland[34] proposes to do it every day. Germany mentions that, for children aged 6–11, "the large muscle groups should be subject to higher-intensity loading on two to three days a week in order to

improve strength and endurance, taking into account respective developmental stages" [43]. Austria[22] and Denmark [25] additionally recommend to include activities to improve flexibility.

Belgium (Flanders)[20], Denmark[25], Finland[34] and Lithuania[48] specify that minimum bouts of PA should be at least 10 minutes, while France[41] suggests at least 5 minutes for children from 6–11 years. Minimum duration is part of WHO's recommendations for adults (see below) but not for children. Also transcending WHO recommendations, 15 national documents include sections on avoiding extended periods of inactivity and sitting among children and adolescents.

The results indicate notable differences in the handling of age subgroups among children and adolescents (see Figure 1): In 2019, WHO published dedicated PA recommendations for children under the age of 5 [60], but at the time of data collection, WHO recommendations only addressed children aged 5 to 17. Six countries used exactly the same age range. Others had already developed additional recommendations for children younger than 5 (9 countries), or they had extended the age range of their recommendations to this group (2 countries). Seven countries (Belgium (Flanders) [20], Finland [36], France [41], Germany[43], Latvia[45], Spain[55], the United Kingdom[58]) recommend for children under 5 to be active for at least 180 minutes per day. Denmark [28] calls for as much PA "as possible", while Greece[44] and Ireland[46] recommend the same amount as for older children, i.e. at least 60 minutes per day. In addition, 7 countries included 18 year-olds in their recommendations for adolescents, and 6 introduced multiple age brackets with specific recommendations.

Table 2. *National PA recommendations for children and adolescents in comparison to WHO recommendations*

Country	Age group	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
		Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	5–17	At least 60 minutes of moderate- to vigorous-intensity physical activity daily. PA beyond minimum duration has additional health benefits.		Most of the daily physical activity should be aerobic. Vigorous-intensity activities should be incorporated, including those that strengthen muscle and bone, at least 3 times per week		
Austria	n/s	√		√	Additional activities to improve coordination and flexibility are recommended	√
Belgium (Flanders)	<1		As much as possible, daily		Give freedom of movement in accordance with their physical possibilities in safe environment	√
	1–5		At least 180 minutes/day, any type of intensity		It is important for toddlers and preschoolers to encourage a variety of exercise activities, which also are tailored to their age and enjoyable.	√
	6–17	√	Minimum bouts – at least 10 minutes	√		√
Belgium (Wallonia)	n/s	√			n/s	
Croatia	n/s	√			n/s	
Denmark	<1		As much as possible, daily		Maximize floor-based tummy time for infants when they are awake. Ensure that infants are physically active in various ways during the day. Ensure that infants can move freely as much as possible.	
	1–4		As much as possible, daily		Ensure that children are physically active in various ways during the day. Ensure that children can move freely as much as possible.	√
	5–17	√	Minimum bouts – at least 10 minutes	√	Vigorous-intensity activities that strengthen muscle and bone should last at least 30 minutes. Additional activities to improve flexibility are recommended.	
Estonia	n/s	√		√		√
Finland	<8		At least 180 minutes/day 2 hours of activities with different levels of intensity and 1 hour vigorous PA		Daily outdoor play should be ensured.	√
	7–12		At least 1.5–2 hours/day Minimum bouts – at least 10 minutes	√	Vigorous-intensity PA should be performed daily	√
	13–18		At least 1–1.5 hours/day Minimum bouts – at least 10 minutes	√	Vigorous-intensity PA should be performed daily	√
France	<5		At least 180 minutes/day Or 15 minutes/hour		PA should include various motor activities based on the development of basic motor skills. The playfulness of the proposed activities should be in priority.	√
	6–11	√	Minimum bouts – at least 5 minutes	√	Activities that strengthen muscle and bone should last at least 20 minutes (non-consecutive days)	√
	12–17	√			Activities that strengthen muscle and bone should last at least 20 minutes (non-consecutive days)	√

Table 2 continued.

Country	Age group	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
		Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
Germany	<3		As much as possible, daily		A safe environment must be ensured	√
	4–6		At least 180 minutes/day		n/s	√
	6–11		At least 90 minutes/day, moderate to vigorous intensity PA		The large muscle groups should be subject to higher-intensity loading on two to three days a week in order to improve strength and endurance, taking into account respective developmental stages.	√
	12–18		At least 90 minutes/day, moderate to vigorous intensity PA		n/s	√
Greece	3–6	√			Encourage a variety of activities within the week. These activities should be both enjoyable and safe.	√
	7–18	√			n/s	√
Ireland	2–18	√		√		
Italy	5–17	√			n/s	√
Latvia	<1		As much as possible, daily		Important to encourage to be active, developing child's muscles and motor skills	
	1–5		At least 180 minutes/day		n/s	√
	5–12	√		√		√
	12–18	√		√	Activities that strengthen muscle and bone should last at least 20 minutes	
Lithuania	6–17	√			Vigorous intensity PA should be performed at least 2times/week	√
Luxembourg	5–17	√		√		
Malta	5–17	√			n/s	
Netherlands	4–18	√		√		√
Slovakia	5–17	√			n/s	
Slovenia	5–17	√		√		
Spain	Not able to walk		Promote physical activity several times a day		PA in safe environments, particularly through ground games or super-vised activities in the water (swimming pools or at home bath time)	√
	<5, able to walk		At least 180 minutes/day, all levels of intensity		Carry out activities and games that develop basic motor skills in different environments (at home, in the park, in the swimming pool, etc.)	√
	5–17	√		√		√
Sweden	5–17	√		√		
United Kingdom	<5		At least 180 minutes/day		PA should be encouraged from birth, particularly through floor-based play and water-based activities in safe environments.	√
	5–18	√		√		√

n/s: not specified; WHO: World Health Organization; PA: physical activity

[Figure 1 about here]

Adults

A comparison of the 21 national PA recommendations for adults (18–64 years) with the respective WHO recommendation is presented in Table 3. In general, WHO advises adults to engage in at least 150 minutes of moderate-intensity aerobic PA throughout the week, or at least 75 minutes of vigorous-intensity aerobic PA, or an equivalent combination of moderate- and vigorous-intensity PA. PA should be performed in bouts of at least 10 minutes. Additional benefits can be gained from increasing moderate PA to 300 minutes per week, by engaging in 150 minutes of vigorous PA, or through an equivalent combination of both.

For 14 nations, recommendations on minimum duration, intensity and frequency of PA are fully in line with WHO. Croatia[23], Denmark[26], France[41], Greece[44], Lithuania[48], Malta[51] and Belgium (Wallonia)[21] recommend 30 minutes of PA per day on 5 or more days per week, probably echoing older recommendations published jointly by the American College of Sports Medicine (ACSM) and the Centers for Disease Control and Prevention (CDC) in 1995 [61] and updated in 2007 [62]. Like WHO, 14 countries recommend to count only activities with a duration of at least 10 minutes, while France[41] and the Netherlands[52] suggest that bouts less than 10 minutes may also be counted. Seven countries mirror WHO's recommendations regarding additional health benefits, while 5 countries merely mention that health can be further improved by performing PA above the recommended minimum.

France[41], Ireland [46] and Lithuania[48] recommend increasing the PA to 60 minutes of moderate PA per day on at least 5 days per week, or to equivalent amount of vigorous PA in order to achieve additional health benefits.

An additional aspect of the WHO recommendations are muscle-strengthening activities involving major muscle groups, which should be performed on 2 or more days of the week [4]. Sixteen of the EU Member States also urge their citizens to do this. France diverges slightly by stipulating that strength training should be performed 1–2 times per week, with 1–2 days' recovery time in between, and stretching at least 2–3 times per week[41]. Denmark[26] recommends to also add activities that increase flexibility. In addition, Ireland[46], Malta[51] and the United Kingdom[58] have specific recommendations on reducing or maintaining body weight. Eleven countries also have additional recommendations on avoiding long periods of inactivity and sitting among adults.

Table 3. *National PA recommendations for adults (18–64 years) in comparison to WHO recommendations*

Country	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
	Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	At least 150 minutes of moderate aerobic PA throughout the week, or 75 minutes of vigorous aerobic PA, or an equivalent combination of both. Bouts should be at least 10 minutes each. For additional health benefits, increase moderate PA to 300 minutes per week, or engage in 150 minutes of vigorous PA/an equivalent combination of both.		Muscle-strengthening activities should be done involving major muscle groups on 2 or more days a week.		
Austria	√		√		
Belgium (Flanders)		At least 150 minutes of moderate intensity PA per week should be performed 5 days and preferably all days of the week, at least 30 minutes per day. Or 75 minutes vigorous PA as best spread over e.g. 3 days of 25 minutes. Inactive adults over the age of 45 should consult a general practitioner before starting vigorous intensity PA.	√		√
Belgium (Wallonia)		At least 30 minutes/day			
Croatia		At least 30 minutes/day of moderate intensity PA		n/s	
Denmark		PA for at least 30 minutes per day. The activity should be of moderate to high intensity and extend beyond the usual short-term daily activities. If the 30 minutes are divided, each activity should last at least 10 minutes.	√	High intensity training should last at least 20 minutes. Incorporate activities that increase bone strength and flexibility.	
Estonia	√		√		√
Finland	√		√		√
France		At least 30 minutes/day at least 5 days per week moderate to vigorous intensity. Vigorous intensity PA is recommended in short-term (5–10 min) and repeated in the day (3–4 times).		Strength training is recommended 1–2 times a week, with 1–2 days recover in between each session. Stretching at least 2–3 times a week.	√
Germany	√		√		√
Greece		At least 30 minutes/day		n/s	√
Ireland	√		√		
Italy	√			n/s	
Latvia	√		√		
Lithuania		At least 30 minutes of moderate-intensity PA every day in bouts of at least 10 minutes. As an alternative, no less than 15 minutes of high-intensity PA daily, or an appropriate combination of moderate- and high-intensity PA.	√		
Luxembourg	√		√		
Malta		At least 30 minutes of moderate-intensity physical activity 5 days per week; or 20 minutes of vigorous-intensity physical activity 3 days per week; or an equivalent combination of moderate and vigorous-intensity PA.	√		
Netherlands	√	Minimum bouts of PA can be less than 10 minutes	√		√
Slovakia	√			n/s	
Slovenia	√		√		√
Spain	√		√		√
Sweden	√		√		√
United Kingdom	√		√		√

n/s: not specified; WHO: World Health Organization; PA: physical activity

Older adults

Eighteen EU Member states have national PA recommendations for older people that were available for analysis. The contents of these are shown in Table 4. WHO's basic recommendations for older adults (65+), which are identical to those for adults aged 18–64 (see above), have been directly adopted by twelve. In the 6 other cases, the original national recommendation for adults differs from that by WHO, but they also follow the practice of carrying over these recommendations to older people. All identified documents add that persons who cannot achieve minimum PA levels should be as physically active as their abilities and conditions allow.

WHO adds that older people should engage in muscle-strengthening involving major muscle groups on 2 or more days a week, and that those with poor mobility should perform PA to enhance balance and prevent falls on 3 or more days per week. In general, all national documents also include these additional aspects. No country has specific recommendations for older adults on reducing or maintaining weight, but 11 add recommendations on avoiding long periods of inactivity and sitting.

Table 4. *National PA recommendations for older adults (65+ years) in comparison to WHO recommendations*

Country	Minimum duration, intensity and frequency of PA		Additional aspects		Reducing sitting/ inactivity
	Same as WHO	Differences to WHO	Same as WHO	Differences to WHO	
WHO	150 minutes of moderate-intensity aerobic PA throughout the week, or at least 75 minutes of vigorous-intensity aerobic PA, or an equivalent combination of moderate- and vigorous-intensity PA. PA should be performed in bouts of at least 10 minutes. For additional health benefits, increase moderate PA to 300 minutes per week, or engage in 150 minutes of vigorous PA/an equivalent combination of both.		Muscle-strengthening involving major muscle groups on 2 or more days a week. Older adults with poor mobility should perform PA to enhance balance and prevent falls on 3 or more days per week.		
Austria	√		√		
Belgium (Flanders)	√		√		√
Denmark		PA for at least 30 minutes per day. PA should be moderate to high intensity and should extend beyond the usual short-term daily activities. If the 30 minutes is divided, each activity should last at least 10 minutes.		PA at least twice a week for at least 20 minutes to maintain/improve physical fitness and muscle and bone strength. Stretching exercises at least twice a week for at least 10 minutes to maintain/improve flexibility. Regular exercise to maintain/improve balance.	
Estonia	√		√	PA to enhance balance and coordination at least 2 twice a week.	√
Finland	√		√		√
France		At least 30 min of moderate PA per day, at least 5 times per week; or 15 min per day of high intensity PA, at least 5 times per week; or a combination of moderate and high intensity PA.	√	Activities to increase flexibility on 2 or more days a week.	√
Germany	√		√		√
Greece		At least 30 minutes/ day in bouts of at least 10 minutes duration.	√	Exercises for improving balance and coordination at least 2 times/week.	√
Ireland		At least 30 minutes on five day a week, or 150 minutes/week		Focus on aerobic activity, muscle-strengthening and balance (2-3 days/week).	
Latvia	√		√		
Lithuania		At least 30 minutes of moderate-intensity PA every day in bouts of at least 10 minutes duration. As an alternative it can be recommended to no less than 10-15 minutes of high-intensity PA daily (at least 75 minutes per week) or appropriate combination of moderate-and high-intensity PA.	√		√
Luxembourg	√		√		
Malta		At least 30 minutes of moderate-intensity PA on 5 days per week, or 20 minutes of vigorous-intensity PA on 3 days per week, or an equivalent combination of moderate and vigorous-intensity PA	√	Additional activities that promote improved strength, coordination and balance are recommended.	
Netherlands	√	Minimum bouts of PA can be less than 10 minutes	√		√
Slovenia	√		√		
Spain	√			Muscle strength and balance training at least 3 times/week	√
Sweden	√		√		√
United Kingdom	√		√	Older adults at risk of falls should do balance and co-ordination trainings on at least 2 days a week.	√

WHO: World Health Organization; PA: physical activity

Special groups

As illustrated in Table 5, thirteen countries also have national PA recommendations for at least one special population (e.g. frail people or those aged ≥ 85 years, pregnant or breastfeeding women, people with disabilities or people with chronic diseases). However, the level of detail of these recommendations varies significantly, as well as the publication format: Finland published recommendations for all special groups as separate documents, and Lithuania has a separate document for parents with small children. All other countries mentioned special groups in the general document with recommendations on PA. Twelve countries have recommendations for women during pregnancy and breastfeeding. Most of these suggest that healthy women during pregnancy and breastfeeding follow the same recommendations as for adults. Two countries (France[41], Lithuania[49]) have specific recommendations on duration, frequency or intensity of PA during pregnancy. In addition, Lithuania[49] also addresses parents with small children.

Special recommendations for disabled people are provided by 9 countries. These are mostly identical to the general recommendations but also include the reservation that they should be adapted to the level and structure of the disability and to physical conditions. Finland [37] has specific recommendations for three types of disability: adults with a disease or disability that causes some difficulty in movement; adults who use an assistive device for walking; and adults who use wheelchairs. Sweden[56] also specifically mention that children and adolescences with disabilities should try to reach PA levels recommended for their age under the supervision of a health professional.

Nine countries (Austria[22], Denmark[27], Finland[37], France[41], Germany [43], Ireland[46], Latvia[45], Lithuania[48] and Sweden[57]) have separate recommendations for people with chronic diseases, generally encouraging them to be as active as is recommended for the general population of their age. Latvia[45] and Lithuania[48] additionally recommend to seek medical advice before starting to exercise. France[41] developed a special recommendation on PA for people with cancer[42].

Two countries (France[41] and Greece[44]) have recommendations for postmenopausal women, and 6 countries reported that they have special recommendations for very elderly adults (85+). However, no specific documents for this adult group could be identified in the context of this study.

Table 5. *National physical activity recommendations for special populations in EU Member States.*

Countries	Publication year				
	Parents with small children	Pregnant and breastfeeding women	Post-menopausal women	People with disabilities	People with chronic diseases
Austria		2010		2010	2010
Belgium (Flanders)		2017			
Denmark		2011		2011	2011
Finland		2016		n/a	n/a
France		2016	2016	2016	2016, 2017(cancer)
Germany		2016			2016
Greece		2017	2017		
Ireland				2009	2009
Latvia		n/a		n/a	n/a
Lithuania	2017	n/a		n/a	n/a
Spain		2015			
Sweden		2011		2011	2011
United Kingdom		2017		2011	

n/a = year of publication is not available

Discussion

This article has collected and analyzed data on national PA recommendations for EU Member States. Such an endeavor naturally comes with a number of limitations and potential caveats. First, the analysis is limited to documents published before April 2018, and does not cover recommendations developed in several Member States since then. Examples include Hungary [63], Italy [64], Malta [65], and the United Kingdom[66]. Likewise, important reference documents have received updates in the meantime or are about to do so, including the US Guidelines for Americans (2nd edition published in 2018)[13], the WHO recommendations for children under the age of 5 (published in 2019)[60], and the WHO Global Recommendations on Physical Activity in Youth, Adults and Older Adults (update to be published in 2020)[67]. Moreover, the visibility of national PA recommendations varies significantly, making some documents more difficult to identify and retrieve than others. While some recommendations are high-profile documents that are easily found on search engines, advertised on dedicated websites, and sport an official-looking layout, some others are hard to identify as government documents and exist only on national-language websites. In this context, there is obviously a bias towards countries whose native language is English and those that have chosen to publish supplementary English language versions of their recommendations. We have attempted to overcome this problem by relying both upon fellow PA researchers in the respective countries, the expertise of the WHO Regional Office for Europe and, where necessary, direct inquiry with the national PA Focal Points to ensure that all existing documents were reliably identified and obtained for our analysis.

The language barrier is always one of the greatest potential issues in a cross-country comparison, esp. when 21 different languages are involved as in this case. We worked to

solve this problem by using a combination of electronic translation and verification of our initial translations by native speakers with a thorough background in PA promotion. In our specific case, the issue was somewhat alleviated by the fact that most recommendations were rather concise and did not use complicated language.

All in all, we believe that our analysis, building on unique information obtained directly from national governments obtained by the European Commission and WHO, provides an excellent snapshot of existing PA recommendations in the EU, allowing us both to assess the current situation in the Union and the progress made in the last years.

Our results show that the large majority of EU Member States currently either have national PA recommendations in place or are in the process of developing them. In addition, there is a general tendency for Member States (13 out of 20) to build their recommendations on the 2010 WHO Global Recommendations [4] (and, by extension, the PA Guidelines for Americans[5]). A minority of 7 countries based their recommendations on other documents such as the slightly older CDC/ACSM recommendations [62]. Most of the countries (except for Austria, Finland and Ireland) published their national PA recommendations in the years after WHO global recommendations were released, but it may have taken a while for these new recommendations to be universally known.

Children and adolescents are arguably the age group with the greatest variation between countries, especially regarding the number and range of age brackets for which separate recommendations exist. At the time of data collection, WHO recommendations started at the age of 5, but 10 countries had already added information for younger age groups. This may underline the relevance of this group for national policy-making, but

also the fact that PA needs diverge substantially along the continuum between very young children and teenagers, and the evidence base for different age sub-groups is constantly expanding.

Comparing our results to previous studies, we find that the number of countries in the EU with national PA recommendations has clearly increased over time, from 16 in 2011 [11] via 19 in 2015 [18] to 23 in 2018. National PA recommendations for children and adults were available for 21 countries, which is almost twice as many as in 2011 (11 for children and 12 for adults [11]). This development is most clearly visible for older adults: In 2011, only 5 documents were available for analysis [11]; by 2018, this number had increased to 18.

The analysis also showed that many countries have mentioned special population groups in their recommendations in recent years. More than half (12) of reviewed documents include recommendations for women during pregnancy and breastfeeding, and several countries (9) specified PA recommendations for people with chronic diseases. A few also (2) add recommendations for postmenopausal women. Special target groups seem to be a relatively new topic, as they do not appear in previous analyses of PA recommendations [11 18].

Finally, the number of countries which incorporated recommendations on avoiding prolonged periods of sitting or inactivity has also increased. In 2018, 13 countries had such recommendations for children, 11 for adults, and 10 for older adults. These figures had also been substantially lower in 2011, both for children and adolescents (4 countries) as well as for adults and older adults (UK only) [11].

By contrast, specific recommendations on reducing or maintaining body weight remain relatively uncommon and are only mentioned the current PA recommendations of 3 EU Member States.

Conclusion

This article has presented an overview of the current status of PA recommendations in EU Member States. It can be viewed in the context of efforts by the European Commission to monitor the progress of implementation of the Council Recommendation on HEPA across Sectors and by WHO to build capacity for PA promotion in the European Region. It also helps highlight current developments in the field (e.g. further differentiation of age groups, needs of special populations, relevance of sedentary behavior and weight management) and the extent to which new research evidence is translated into policy development. Some of these new additions may also be reflected in the planned update to the 2010 WHO Global Recommendations, work on which is due to begin in the second half of 2019 [67].

Our findings may also help inspire policy development in other countries of the WHO European Region, who may, for example, look to EU countries with comparable population size, geography or PA culture in order to decide how to best adopt and adapt basic WHO recommendations to their own national situation. In this context, it may also be interesting to analyze in greater detail which processes, tools and stakeholders countries used to draw up their national recommendations. Preliminary data from our survey indicate that information on guideline development processes is currently available for five of the 28 EU Member States. These countries used different

combinations of approaches, including systematic literature reviews (three countries), expert consultation (four countries), and analysis/adaptation of existing recommendations issued by WHO or other national governments (four countries). However, further research would be needed to obtain more comprehensive information from all EU Member States and potentially make comparisons with other national guideline development processes around the world.

From a scientific point of view, more research may be needed on the effectiveness of national PA recommendations, i.e. their direct impact on population-level PA behavior and the extent to which they guide (public) health professionals in their efforts to promote PA. A related question is to what extent national adaptations of basic WHO recommendations actually improve the effectiveness of PA promotion, and whether these effects justify the effort of developing country-specific recommendations.

The EU Physical Activity Focal Points Network was instrumental both in collecting the data which this study is based and in fostering exchange between EU Member States on how to improve and harmonize PA promotion for all citizens of the Union. This analysis is therefore also testimony of the utility of international collaboration in health promotion, both between EU Member States as well as between the European Commission and WHO.

Acknowledgements: We would like to thank the national representatives of the EU Physical Activity Focal Points Network for their support in collecting the data for this article. We would also like to thank Tuula Aira, Jacopo Cristini, Gregor Jurak, Susanna Kugelberg, Nemanja Lakicevic, Lorena Miranda, Paschalis-Odysseas Moysidis, Jana

Pelclova, Julia Soquet, and Nina Vischer for verifying specific details in national PA recommendation documents that were published in languages not spoken by the authors.

Disclosure statement: The writing group takes sole responsibility for the content of this article and the content of this article reflects the views of the authors only. JB and SW are staff members of the WHO. The authors alone are responsible for the views expressed in this publication and they do not necessarily represent the decisions or the stated policy of the World Health Organization.

Funding statement: This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests statement: The authors declare that they have no competing interests.

Contributors: PG, KAO and AT conceptualized the study. SW and RM developed the survey questionnaire and collected the survey data. STM supported data management during the survey. JRB and SW supervised the survey. PG, AT and KAO analyzed the survey data. AT obtained and analyzed national recommendation documents. PG and KAO collected additional information from experts and Physical Activity Focal Points. PG drafted the manuscript. All authors participated in the revision of the article. All authors contributed to and have approved the final manuscript.

Data availability statement: Data are available upon written request from the WHO Regional Office for Europe, but written consent of the Physical Activity Focal Points of involved countries, the European Commission, and the WHO Regional Office for Europe may be required.

Ethics approval: Ethical approval not required for the use of country-level policy data as included in this study.

References

1. World Health Organisation. Global Strategy on Diet, Physical Activity and Health, 2004.
2. World Health Organisation. Physical activity strategy for the WHO European Region 2016-2025, 2015.
3. World Health Organisation. Global action plan on physical activity 2018–2030: more active people for a healthier world. Geneva, 2018.
4. World Health Organisation. Global Recommendations on Physical Activity for Health. Geneva, 2010.
5. U.S. Department of Health and Human Services. 2008 Physical Activity Guidelines for Americans. Be Active, Healthy, and Happy!, 2008.
6. Pate RR, Pratt M, Blair SN, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *Jama* 1995;273(5):402-7. doi: 10.1001/jama.273.5.402 [published Online First: 1995/02/01]
7. European Commission. EU Physical Activity Guidelines. Recommended Policy Actions in Support of Health-Enhancing Physical Activity, 2008.
8. Council recommendation of 26 November 2013 on promoting health-enhancing physical activity across sectors. *Official Journal of the European Union* 2013;56:C 354/1 - /5.
9. Cameron C, Craig CL, Bull FC, et al. Canada's physical activity guides: has their release had an impact? *Canadian journal of public health = Revue canadienne de sante publique* 2007;98 Suppl 2:S161-9. [published Online First: 2008/01/25]
10. Rutten A, Abu-Omar K, Messing S, et al. How can the impact of national recommendations for physical activity be increased? Experiences from Germany. *Health research policy and systems* 2018;16(1):121. doi: 10.1186/s12961-018-0396-8 [published Online First: 2018/12/15]
11. Kahlmeier S, Wijnhoven TM, Alpiger P, et al. National physical activity recommendations: systematic overview and analysis of the situation in European countries. *BMC Public Health* 2015;15:133. doi: 10.1186/s12889-015-1412-3 [published Online First: 2015/04/17]
12. European Commission. Commission staff working document: A monitoring framework for the implementation of policies to promote healthenhancing physical activity (HEPA), based on the EU Physical Activity Guidelines. SWD(2013) 310 final. In: European Commission, ed. Brussels, 2013.
13. U.S. Department of Health and Human Services. Physical Activity Guidelines for Americans. 2nd edition. Washington, DC, 2018.
14. Tremblay MS, Warburton DE, Janssen I, et al. New Canadian physical activity guidelines. *Appl Physiol Nutr Metab* 2011;36(1):36-46; 47-58. doi: 10.1139/h11-009 [published Online First: 2011/02/18]
15. Tremblay MS, Chaput JP, Adamo KB, et al. Canadian 24-Hour Movement Guidelines for the Early Years (0-4 years): An Integration of Physical Activity, Sedentary Behaviour, and Sleep. *BMC Public Health* 2017;17(Suppl 5):874. doi: 10.1186/s12889-017-4859-6 [published Online First: 2017/12/09]
16. Bellew B, Schoeppe S, Bull FC, et al. The rise and fall of Australian physical activity policy 1996 - 2006: a national review framed in an international context. *Australia and New Zealand health policy* 2008;5:18. doi: 10.1186/1743-8462-5-18 [published Online First: 2008/08/01]
17. Department of Health. Australia's Physical Activity and Sedentary Behaviour Guidelines, 2014.

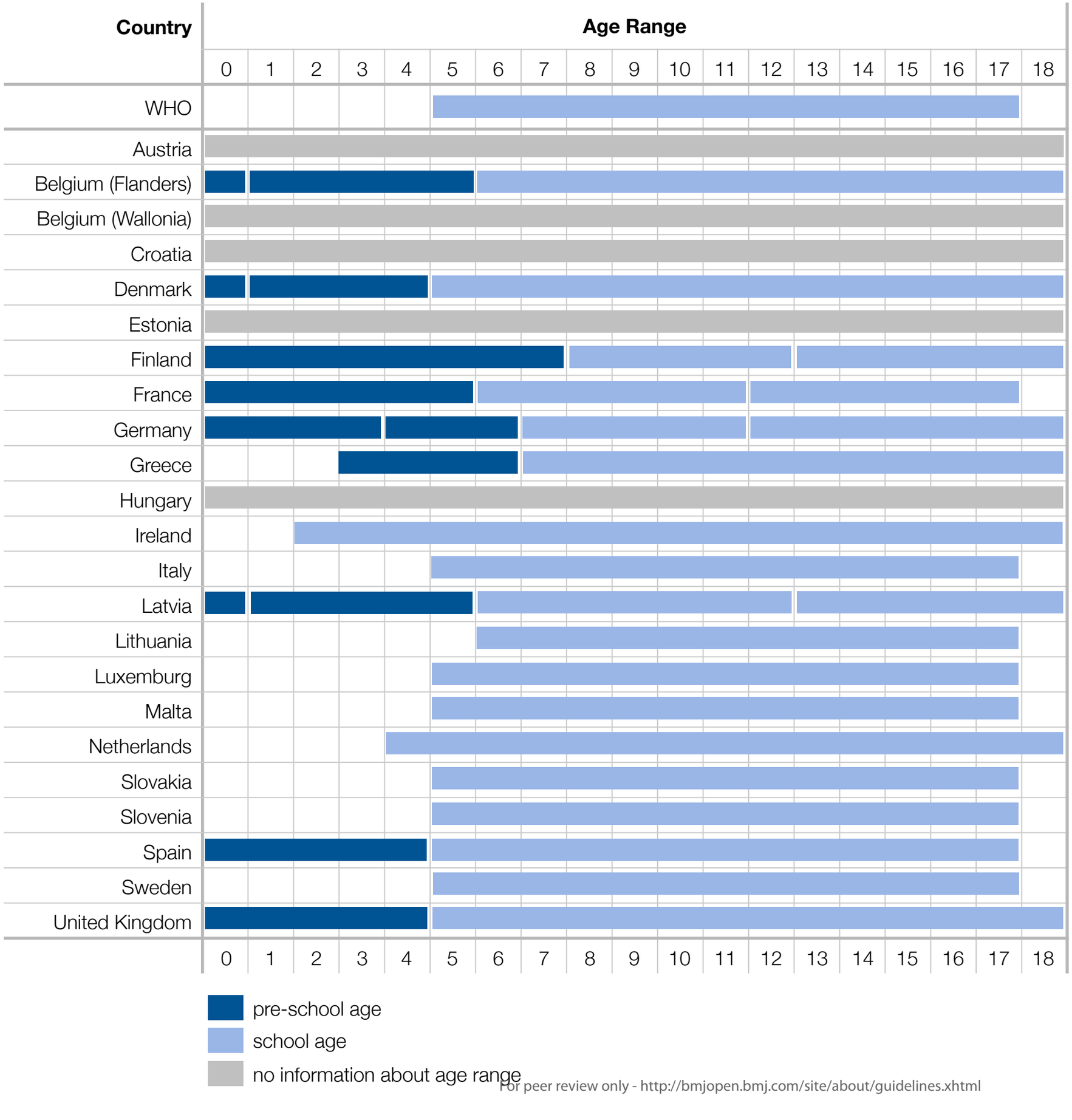
18. Breda J, Jakovljevic J, Rathmes G, et al. Promoting health-enhancing physical activity in Europe: Current state of surveillance, policy development and implementation. *Health Policy* 2018;122(5):519-27. doi: 10.1016/j.healthpol.2018.01.015 [published Online First: 2018/02/10]
19. World Health Organisation. Physical activity factsheets for the 28 European Union Member States of the WHO European Region. Copenhagen: WHO Regional Office for Europe 2018.
20. Vlaams Instituut Gezond Leven. Vlaamse gezondheidsaanbevelingen sedentair gedrag (lang stilzitten) en lichaamsbeweging [Flemish health recommendations on sedentary behaviour (long sitting) and physical activity]. Brussel: Vlaams Instituut Gezond Leven vzw 2017.
21. Plan Prévention et Promotion de la Santé en Wallonie [Plan for Prevention and Health Promotion in Wallonia].
22. Titze S, Ring-Dimitriou S, Schober PH, et al. Österreichische Empfehlungen für gesundheitswirksame Bewegung [Austrian recommendations for health-enhancing physical activity]. Wien: Fonds Gesundes Österreich 2010.
23. Hrvatski zavod za javno zdravstvo. Živjeti zdravo: tjelesno zdravlje [Healthy Living: Physical Health]. Zagreb.
24. Ministerstvo zdravotnictví. Zdraví 2020 Národní strategie ochrany a podpory zdraví a prevence nemocí. Akční plán č. 1: Podpora pohybové aktivity na období 2015-2020 [Health 2020 National strategy for the protection and promotion of Health and disease prevention. Action Plan 1: support for physical activity 2015-2020]: Ministerstvo zdravotnictví; 2015 [Available from: http://www.mzcr.cz/Admin/_upload/files/5/ak%C4%8Dn%C3%AD%20pl%C3%A1ny%20-%20p%C5%99%C3%ADlohy/AP%2001%20podpora%20pohybov%C3%A9%20aktivity.pdf accessed April 2019.
25. Danish Health Authority. Recommendations for children and adolescents (5-17 years old) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-children-and-adolescents- accessed March 2019.
26. Danish Health Authority. Recommendations for adults (18-64 years old) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-adults accessed March 2019.
27. Danish Health Authority. Recommendations for older people (65 years old and older) Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/recommendations-for-older-people- accessed March 2019.
28. Danish Health Authority. Recommendations for physical activity children 1–4 years old Copenhagen2016 [Available from: https://www.sst.dk/en/health-and-lifestyle/~/media/038D1AD667D14453BB02E3AAD26F9033.ashx accessed March 2019.
29. Danish Health Authority. Recommendations for pregnant women Copenhagen2014 [Available from: https://www.sst.dk/en/health-and-lifestyle/physical-activity/recommendations/pregnant-women accessed March 2019.
30. Danish Health Authority. Recommendations for physical activity infants younger than 1 year old Copenhagen2016 [Available from: https://www.sst.dk/en/health-and-lifestyle/~/media/4D712D1E17794FCCA10B18B3BE8CD0DD.ashx accessed March 2019.

31. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused lastele ja noortele [Recommendations for physical activity for children and young people] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/lastele-ja-noortele accessed March 2019.
32. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused täiskasvanutele [Recommendations for physical activity for adults] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/taiskasvanutele accessed March 2019.
33. Tervise Arengu Instituut. Kehalise aktiivsuse soovitused eakatele [Recommendations for physical activity for the elderly] 2015 [Available from: http://www.terviseinfo.ee/et/valdkonnad/liikumine/soovitused-liikumiseks/eakatele accessed March 2019.
34. Recommendations for the physical activity of school-aged children. Helsinki: Ministry of education 2008.
35. Reduce sedentary time – get healthier! National recommendations to reduce sedentary time. Helsinki: Ministry of social affairs and Health,, Finland, 2015.
36. Finnish recommendations for physical activity in early childhood 2016. Joy, play and doing together.: Ministry of the Education and Culture, 2016.
37. UKK Institute. Kolme soveltavaa liikuntapiirakkaa toimintakyvyn mukaan [Three suitable exercise pies according to persons movement ability] [Available from: http://www.ukkinstituutti.fi/liikuntapiirakka/soveltavat_liikuntapiirakat accessed March 2019.
38. UKK Institute. Terveysliikunnan suositus yli 65-vuotiaille [Physical activity recommendations for people over 65 years] 2008 [Available from: http://www.ukkinstituutti.fi/filebank/2890-UKK-liikuntapiirakka-yli-65-v-tulostettava.pdf accessed March 2019.
39. UKK Institute. Physical Activity Pie 2009 [Available from: http://www.ukkinstituutti.fi/en/products-services/physical_activity_pie accessed March 2019.
40. UKK Institute. Physical exercise during and after pregnancy 2009 [Available from: http://www.ukkinstituutti.fi/filebank/276-englanti.pdf accessed March 2019.
41. Agence nationale de sécurité sanitaire de l'alimentation, de l'environnement et du travail,. Actualisation des repères du PNNS - Révisions des repères relatifs à l'activité physique et à la sédentarité [Revisions of benchmarks relating to physical activity and sedentary lifestyle]. Maisons-Alfort, 2016.
42. Istitut National du Cancer. Bénéfices de l'activité physique pendant et après cancer. Des connaissances scientifiques aux repères pratique [Benefits of physical activity during and after cancer. From scientific knowledge to practical benchmarks]: Istitut National du Cancer 2017.
43. Rütten A, Pfeifer K, editors. *National recommendations for physical activity and physical activity promotion*. Erlangen: FAU University Press, 2016.
44. The Institute of Preventive Medicine, Environmental and Occupational Health. Σωματική Δραστηριότητα, Συστάσεις [Physical activity recommendations] [Available from: http://www.diatrofikoiodigoi.gr/?Page=systaseis accessed March 2019.
45. 2011. évi CXC. törvény a nemzeti köznevelésről [Law on national public education]: Nemzeti Jogszabálytár; 2011 [accessed April 2019.
46. Department of Health and Children, Health Service Executive. The National Guidelines on Physical Activity for Ireland, 2009.

47. Ministero della Salute. Informativa OMS: attività fisica [WHO information: physical activity], 2014.
48. Sveikatos mokymo ir ligų prevencijos centras. Fizinio aktyvumo rekomendacijos 3 amžiaus grupėms [Physical activity recommendations for 3 age groups] Vilnius: Lietuvos Respublikos sveikatos apsaugos ministerija (Ministry of Health Republic of Lithuania); [Available from: https://sam.lrv.lt/lt/veiklos-sritys/visuomenes-sveikatos-prieziura/mityba-ir-fizinis-aktyvumas-2/fizinis-aktyvumas-mytyba-ir-fizinis-aktyvumas/rekomendacijos accessed March 2019.
49. Zabolotnaja T, Zumeras R, Rimdeikienė I, et al. Tėvų su kūdikiais mankštos rekomendacijos [Physical activity recommendations for parents with babies], 2017.
50. Ernährung und Bewegung [Nutrition and physical activity]: Ministère de la Santé (Ministerium für Gesundheit) 2016.
51. Superintendence of Public Health Ministry for Health, the Elderly and Community Care. A Healthy Weight for Life: A National Strategy for Malta 2012 - 2020. Msida: Superintendence of Public Health 2012.
52. Health Council of the Netherlands. Physical activity guidelines 2017. The Hague: Health Council of the Netherlands 2017.
53. Národný akčný plán pre podporu pohybovej aktivity na roky 2017 - 2020 [National Action Plan to Support Physical Activity for 2017-2020]. Bratislava, 2017.
54. Resolucija o nacionalnem programu o prehrani in telesni dejavnosti za zdravje 2015–2025 [Resolution on the national programme on nutrition and physical activity for health 2015-2025], 2015.
55. Ministerio de Sanidad, Servicios Sociales e Igualdad,. Actividad Física para la Salud y Reducción del Sedentarismo. Recomendaciones para la población [Physical activity for health and reduction of sedentary lifestyle. Recommendations for the population]. Madrid: Ministerio de sanidad, servicios sociales e igualdad centro de publicaciones 2015.
56. Yrkesföreningar Fysisk Aktivitet. Hur mycket fysisk aktivitet behöver barn och ungdomar? [How much physical activity do children and young people need?]: Yrkesföreningar Fysisk Aktivitet; [Available from: http://www.fyss.se/rekommendationer-for-fysisk-aktivitet/for-barn-och-ungdomar/ accessed March 2019.
57. Yrkesföreningar för Fysisk Aktivitet. Rekommendationer om fysisk aktivitet för vuxna: Yrkesföreningar för Fysisk Aktivitet; 2011 [Available from: http://www.yfa.se/rekommendationer-for-fysisk-aktivitet/ accessed March 2019.
58. Department of Health, Physical Activity, Health Improvement and Protection. Start Active, Stay Active: A report on physical activity from the four home countries' Chief Medical Officers. London, 2011.
59. Department of Health and Social Care. Physical activity in pregnancy infographic London2017 [Available from: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/622336/CMO_physical_activity__pregnant_women_infographic.jpg accessed August 2019.
60. World Health Organisation. Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. Geneva: World Health Organisation 2019.
61. Pate RR, Pratt M, Blair S, et al. Physical activity and public health. A recommendation from the Centers for Disease Control and Prevention and the American College of Sports Medicine. *JAMA* 1995;273(5):402-07.

62. Haskell WL, Lee IM, Pate RR, et al. 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* 2007;39(8):1423-34.
63. Magyar Diáksport Szövetség [The Hungarian Student Sport Association]. Hivatalosan is elstartolt a DO60 mozgalom a HIPE 2018 – nemzetközi testnevelési konferencián #társak #játék [The DO60 movement at HIPE 2018 - international bodybuilding conference is officially started #people #game] 2018 [Available from: http://www.mdsz.hu/hirek-hu/mdsz-hu-hu/2018/11/15/hivatalosan-is-elstartolt-a-do60-mozgalom-a-hipe-2018-nemzetkozi-testnevelesi-konferencian-tarsak-jatek/ accessed August 8 2019.
64. De Mei B, Cadeddu C, Luzi P, et al., editors. *Movimento, sport e salute: l'importanza delle politiche di promozione dell'attività fisica e le ricadute sulla collettività [Movement, sport and health: the importance of policies to promote physical activity and the effects on the community]*. Roma: Istituto Superiore di Sanità, 2018.
65. Palamentary secritariat for youth, sport and volontary organisations,. Aiming higher. An Overview of the National Strategy for Sport and Physical Activity in Malta 2019 [
66. Foster C. Overview of the 2019 Physical Activity. Guidelines and implementation plans 2018 [Available from: http://www.fuse.ac.uk/media/sites/researchwebsites/fuse/Overview%20of%20the%202019%20Physical%20Guidelines%20and%20implementation%20plans%20-%20Charlie%20Foster.pdf accessed August 2019.
67. World Health Organisation. Call for Expression of Interest to participate in the WHO Guideline Development Group for the updating of the 2010 Global Recommendations on Physical Activity in Youth, Adults and Older Adults Genewa: World Health Organisation; 2019 [Available from: https://www.who.int/ncds/prevention/physical-activity/update-global-recommendations-physical-activity/en/ accessed April 2019.

Figure 1. *Comparison of age ranges in national PA recommendations for children and adolescents. WHO: World Health Organization.*



The RECORD statement – checklist of items, extended from the STROBE statement, that should be reported in observational studies using routinely collected health data.

	Item No.	STROBE items	Location in manuscript where items are reported	RECORD items	Location in manuscript where items are reported
Title and abstract					
	1	(a) Indicate the study's design with a commonly used term in the title or the abstract (b) Provide in the abstract an informative and balanced summary of what was done and what was found	(a) Page 1, lines 1-2 Page 2, line 7 (b) Page 2, lines 2-5, 12-25	RECORD 1.1: The type of data used should be specified in the title or abstract. When possible, the name of the databases used should be included. RECORD 1.2: If applicable, the geographic region and timeframe within which the study took place should be reported in the title or abstract. RECORD 1.3: If linkage between databases was conducted for the study, this should be clearly stated in the title or abstract.	Page 2, lines 2-5, 12-15 Page 1, line 2 No linkage between databases was conducted
Introduction					
Background rationale	2	Explain the scientific background and rationale for the investigation being reported	Page 5, lines 1-25 Page 6, lines 1-15		
Objectives	3	State specific objectives, including any prespecified hypotheses	Page 6, lines 17-23		
Methods					
Study Design	4	Present key elements of study design early in the paper	Page 7, lines 3-11		
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	Page 7, lines 13-21		
Participants	6	*(a) Cohort study* - Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up *Case-control study* - Give the eligibility criteria, and the sources	(a) Page 7, lines 13-18 (Cross-sectional study)	RECORD 6.1: The methods of study population selection (such as codes or algorithms used to identify subjects) should be listed in detail. If this is not possible, an explanation should be provided.	Page 7, lines 16-18

		and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls *Cross-sectional study* - Give the eligibility criteria, and the sources and methods of selection of participants *(b) Cohort study* - For matched studies, give matching criteria and number of exposed and unexposed *Case-control study* - For matched studies, give matching criteria and the number of controls per case	(b) Does not apply	RECORD 6.2: Any validation studies of the codes or algorithms used to select the population should be referenced. If validation was conducted for this study and not published elsewhere, detailed methods and results should be provided. RECORD 6.3: If the study involved linkage of databases, consider use of a flow diagram or other graphical display to demonstrate the data linkage process, including the number of individuals with linked data at each stage.	Does not apply Does not apply
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable.	Page 8, lines 10-16	RECORD 7.1: A complete list of codes and algorithms used to classify exposures, outcomes, confounders, and effect modifiers should be provided. If these cannot be reported, an explanation should be provided.	Page 8, lines 17-18
Data sources/ measurement	8	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	Page 7, lines 5-11		
Bias	9	Describe any efforts to address potential sources of bias	Page 7, lines 18-25 Page 8, lines 1-7		
Study size	10	Explain how the study size was arrived at	Page 7, lines 13-21		
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen, and why	Does not apply		
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding (b) Describe any methods used to examine subgroups and interactions	Does not apply		

		(c) Explain how missing data were addressed (d) *Cohort study* - If applicable, explain how loss to follow-up was addressed *Case-control study* - If applicable, explain how matching of cases and controls was addressed *Cross-sectional study* - If applicable, describe analytical methods taking account of sampling strategy (e) Describe any sensitivity analyses			
Data access and cleaning methods ..				RECORD 12.1: Authors should describe the extent to which the investigators had access to the database population used to create the study population.	Page 6, lines 17-18 Page 7, lines 3-5 Page 7, lines 13-21
				RECORD 12.2: Authors should provide information on the data cleaning methods used in the study.	Page 7, lines 23-25 Page 8, lines 1-7
Linkage		..		RECORD 12.3: State whether the study included person-level, institutional-level, or other data linkage across two or more databases. The methods of linkage and methods of linkage quality evaluation should be provided.	Does not apply
Results					
Participants	13	(a) Report the numbers of individuals at each stage of the study (*e.g.*, numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed) (b) Give reasons for non-participation at each stage. (c) Consider use of a flow diagram	(a) Page 8, lines 24-25 Page 9, lines 5-6	RECORD 13.1: Describe in detail the selection of the persons included in the study (*i.e.,* study population selection) including filtering based on data quality, data availability and linkage. The selection of included persons can be described in the text and/or by means of the study flow diagram.	Page 8, lines 24-25 Page 9, lines 1-7
Descriptive data	14	(a) Give characteristics of study participants (*e.g.*, demographic,	(a) Does not apply		

		clinical, social) and information on exposures and potential confounders (b) Indicate the number of participants with missing data for each variable of interest (c) *Cohort study* - summarise follow-up time (*e.g.*, average and total amount)	(b) Page 8, lines 24-25 Page 9. Lines 1-4		
Outcome data	15	*Cohort study* - Report numbers of outcome events or summary measures over time *Case-control study* - Report numbers in each exposure category, or summary measures of exposure *Cross-sectional study* - Report numbers of outcome events or summary measures	Page 9, lines 5-7 (cross-sectional study)		
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (e.g., 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Page 10, lines 7-27 Page 11, lines 1-25 Page 14, lines 3-23 Page 15, lines 1-13 Page 17, lines 1-16 Page 19, lines 1-23 Page 20, lines 1-11		
Other analyses	17	Report other analyses done—e.g., analyses of subgroups and interactions, and sensitivity analyses	Does not apply		
Discussion					
Key results	18	Summarise key results with reference to study objectives	Page 22, lines 11-25 Page 23, lines 1-3		
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	Page 21, lines 3-25 Page 22, lines 1-4	RECORD 19.1: Discuss the implications of using data that were not created or collected to answer the specific research question(s). Include discussion of misclassification bias, unmeasured	Page 21, lines 4-13, 25-25 Page 22, lines 1-4

				confounding, missing data, and changing eligibility over time, as they pertain to the study being reported.	
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	Page 23, lines 5-25 Page 24, lines 1-4		
Generalisability	21	Discuss the generalisability (external validity) of the study results	Page 22, lines 6-9 Page 25, lines 15-20		
Other Information					
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	Page 26, lines 11-12		
Accessibility of protocol, raw data, and programming code		..		RECORD 22.1: Authors should provide information on how to access any supplemental information such as the study protocol, raw data, or programming code.	Page 27, lines 1-4

*Reference: Benchimol EI, Smeeth L, Guttmann A, Harron K, Moher D, Petersen I, Sørensen HT, von Elm E, Langan SM, the RECORD Working Committee. The REporting of studies Conducted using Observational Routinely-collected health Data (RECORD) Statement. *PLoS Medicine* 2015; in press.