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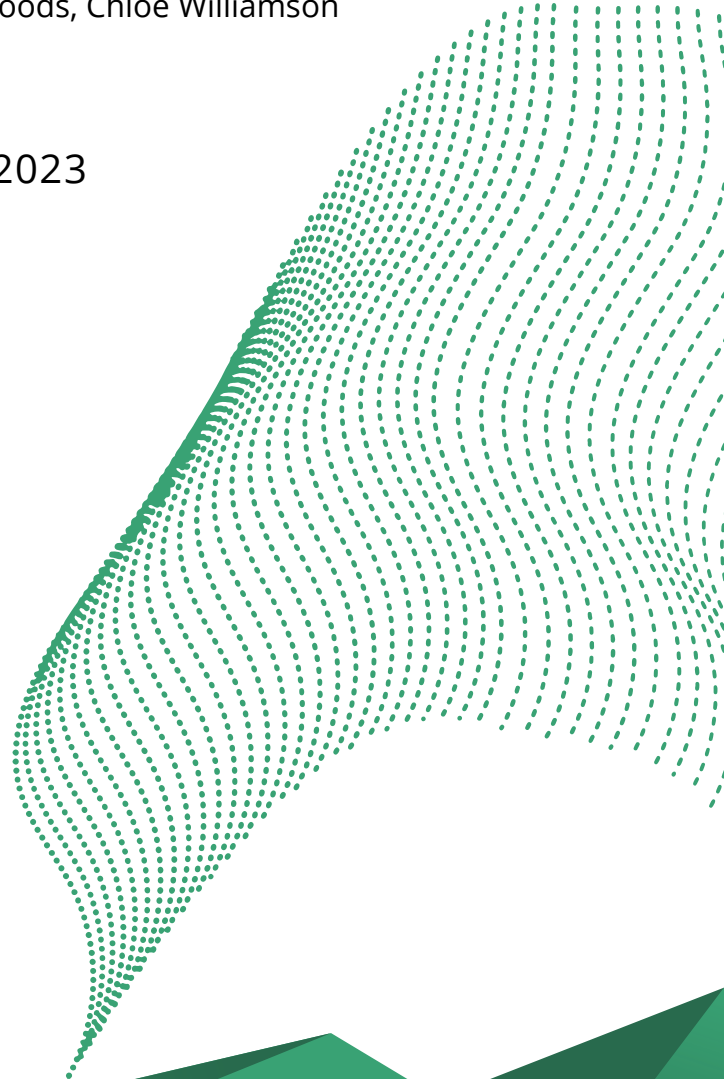


Update of the National Physical Activity and Sedentary Behaviour Guidelines for Ireland

Final Research Report

Elaine Murtagh, Dylan Power, Charlie Foster, Marie Murphy, Seán Healy, Gráinne Hayes, Niamh Murphy, Catherine Woods, Chloë Williamson

December 2023



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Executive Summary

This project aimed to update the National Physical Activity and Sedentary Behaviour Guidelines for Ireland. The previous guidelines for Ireland were published by the Department of Health & Children in 2009. Subsequently, the World Health Organisation published two iterations of global physical activity guidelines: *The Global Recommendations on Physical Activity for Health* in 2010, followed by the updated *Guidelines on Physical Activity and Sedentary Behaviour* in 2020. The World Health Organisation encourages national governments to adopt these guidelines as part of their national policy frameworks, thus providing a “rapid and cost-effective method to develop guidelines tailored to local context”. The current project drew upon these guidelines and the evidence reviews underpinning them to develop national guidelines for the following population subgroups: children under 5 years of age, children and adolescents (5 – 17 years), adults (18 – 64 years), older adults (age 65 years and older), children and adolescents (aged 5 – 17 years) and adults (aged 18 years and older) living with disability. In addition, the current project also sought to develop physical activity messages - educational or persuasive material based on the guidelines - for both public and professional audiences. The research was conducted over a three-stage process. Firstly, a review of evidence published since the *Guidelines on Physical Activity and Sedentary* (WHO 2020) was conducted. Subsequently draft guidelines and messages were developed, and public and professional perceptions of this content were gathered by consultation surveys. Finally, a consensus meeting was held with national level stakeholders with a role in the promotion of physical activity in Ireland to gain feedback on key issues arising from the consultation surveys.

Findings from stage one suggested that there was limited evidence published since 2019 and none that would warrant deviation from the recommendations in the Guidelines on Physical Activity and Sedentary Behaviour for most population subgroups (WHO 2020). An exception was the guidelines for children with disability, given the rapid evidence review conducted in the UK for the Chief Medical Officers’ update of the physical activity guidelines in 2022 (Smith *et al.* 2022b). The research team developed lay versions of the guidelines and a suite of persuasive messages targeted at public and professional audiences. An online survey, distributed via social media platforms and through key professional organisations, was used to gather the perceptions of the public and professional audiences to both the guidelines and the messages. There was a high level of agreement amongst 215 respondents of the public survey that the lay versions of the physical activity guidelines were clear and relevant to all population groups. There was also a high level of agreement among members of the public that the persuasive messages were motivating and appealing. Data collected from 187 professionals and practitioners with a role in physical activity promotion suggested the physical activity guidelines were important and frequently used in their professional roles. Findings from the professionals and practitioners also suggested that the physical activity and sedentary behaviour guidelines were clear and understandable. The consensus meeting provided further valuable insights into the preferred physical activity messages, how best to describe physical activity intensity, guidelines for children with disability, the content of the guidelines publication. The research team collaborated with the Health Service Executive Healthy Eating and Active Living Team in reaching consensus on the final version of guidelines and messages.

The finalised guidelines are an adapted version of the World Health Organisation's 2020 Guidelines on Physical Activity and Sedentary Behaviour. The guidelines are accompanied with a suite of lay guidelines and persuasive messages for public audiences developed specifically for this project. Messages for professional audiences, tailored for range of sectors, are also included. Future work should develop a dissemination plan to ensure wide reach of guidelines and messages throughout Ireland.

Introduction

The first National Guidelines on Physical Activity for Ireland were published by the Health Service Executive (HSE) and the Department of Health and Children in 2009 to emphasise the importance of physical activity to the health of all Irish people, and to outline the recommendations for physical activity for people of all ages and abilities (Department of Health and Children & Health Service Executive 2009). Written for those involved in promoting health and physical activity (e.g., health professionals, teaching staff and sports coaches), the guidelines set out the recommended type and amount of physical activity for children and young people (aged 2 – 8), adults (aged 18 – 64), older people (aged 65+), and adults with disabilities.

Since the publication of the National Guidelines on Physical Activity for Ireland (Department of Health and Children & Health Service Executive 2009) in 2009, many countries and international organisations have updated and published physical activity guidelines. During the period 2010 – 2019, the content of almost all of these guidelines were based on the World Health Organisation’s Global Recommendations for Physical activity for Health published in 2010 (World Health Organization 2010). In Europe, for example, the World Health Organisation’s Global Recommendations for Physical Activity for Health (2010) informed the Austrian recommendations for health-effective physical activity in 2012 (Fonds Gesundes Österreich 2012) and Swiss recommendations for health-enhancing physical activity in 2013 (Switzerland Eidgenossenschaft Bundesamt für Sport BASPO and Bundesamt für Gesundheit BAG 2013). Some countries also began to address the topic of prolonged sedentary time in their recommendations. Examples include the recommendations from Australia in 2013 (The Royal Australian College of General Practitioners 2013) and Canada in 2014 (All-party Commission on Physical Activity 2014). Subsequently, physical activity guidelines have become interlinked with other health behaviours (i.e., screen time and sleep). The Canadian Society for Exercise Physiology (CSEP) announced 24-Hour Movement Guidelines for Children and Youth (5-17 years) and these guidelines were the first evidence-based guidelines to address the whole day and multiple behaviours (Tremblay *et al.* 2016).

Following a comprehensive review of the scientific evidence on the relationship between physical activity and health, conducted by the 2018 US Physical Activity Guidelines Advisory Committee (2018 Physical Activity Guidelines Advisory Committee 2018), the 2nd edition of the Physical Activity Guidelines for Americans were published (U.S. Department of Health and Human Services 2018). Drawing heavily on the evidence review conducted for the 2nd Edition of the Physical Activity Guidelines for Americans, the World Health Organisation published updated Guidelines on Physical Activity and Sedentary Behaviour in 2020 (WHO 2020). These guidelines were written for policy-makers, government officials, people working in nongovernmental organisations, the education sector, private sector, research, and healthcare providers. The World Health Organisation encourages national governments to adopt *the Guidelines for Physical Activity and Sedentary Behaviour* as part of their national policy frameworks, thus providing a “*rapid and cost-effective method to develop guidelines tailored to local context*” (WHO 2020). Several countries and sub-regions have already adopted the World Health Organisation’s Guidelines for Physical Activity and Sedentary Behaviour (2020) (e.g. Bulgaria, Estonia, Thailand, Mongolia, Finland, Pacific Islands), with the process ranging from translation into the local language/s to adaptation to national context, including inclusion of

locally relevant examples of physical activity and other cultural considerations. The next update of the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour is set to commence in 2026, with publication in 2030.

To support the promotion of physical activity in Ireland, the National Physical Activity Plan, published in 2016, contained 60 multilevel actions, which were the responsibility of multidisciplinary organisations, to promote population levels of physical activity in Ireland (Department of Health 2016). A 2022 review indicating that 53% and 39% of the 60 defined actions have been completed or partially completed respectively, with only 8% considered to have changed or not been realised (Crowe Consulting 2022).

The National Physical Activity and Sedentary Behaviour Guidelines for Ireland presented in this report update the 2009 guidelines across all age groups, taking into account new and even more compelling evidence confirming that regular physical activity has benefits for all people, for society, and for the planet. These new guidelines are important in an international context also. The World Health Organisation's Global Action Plan on Physical Activity lays out a framework for action up to 2030 with the aim of achieving a 15% relative reduction in the global prevalence of physical inactivity in adults and in adolescents by 2030 (World Health Organization 2018). Physical activity can also be a powerful way to contribute to many of the United Nations' Sustainable Development Goals (United Nations 2019). These new guidelines place particular emphasis on optimal messaging for professional and public audiences, underpinned by evidence and consultation with relevant stakeholders.

Methods

Overview

The update of the National Physical Activity and Sedentary Behaviour Guidelines for Ireland was a multi-stage project which commenced in September 2023 and concluded in December 2023 (Figure 1). Stage 1 involved a review and compilation of the available evidence published since the publication of the World Health Organisation’s Guidelines for Physical Activity and Sedentary Behaviour in 2020 (World Health Organisation, 2020). In Stage 2, a meeting amongst the research team was convened to agree upon draft physical activity and sedentary behaviour guidelines and associated professional and public facing messages. Stage 3 involved consultation with key stakeholders on the draft guidelines and messages. Surveys were used to assess the perceptions of the public and professional audiences to the draft guidelines and messages. Following the analysis of data from the surveys, a meeting was convened with cross-sectoral stakeholders to gain feedback on the proposed physical activity and sedentary behaviour guidelines for Ireland. In the final stage, the research team gathered in a final meeting to discuss and integrate findings from the consensus meeting. The approaches taken in each stage will be described below.

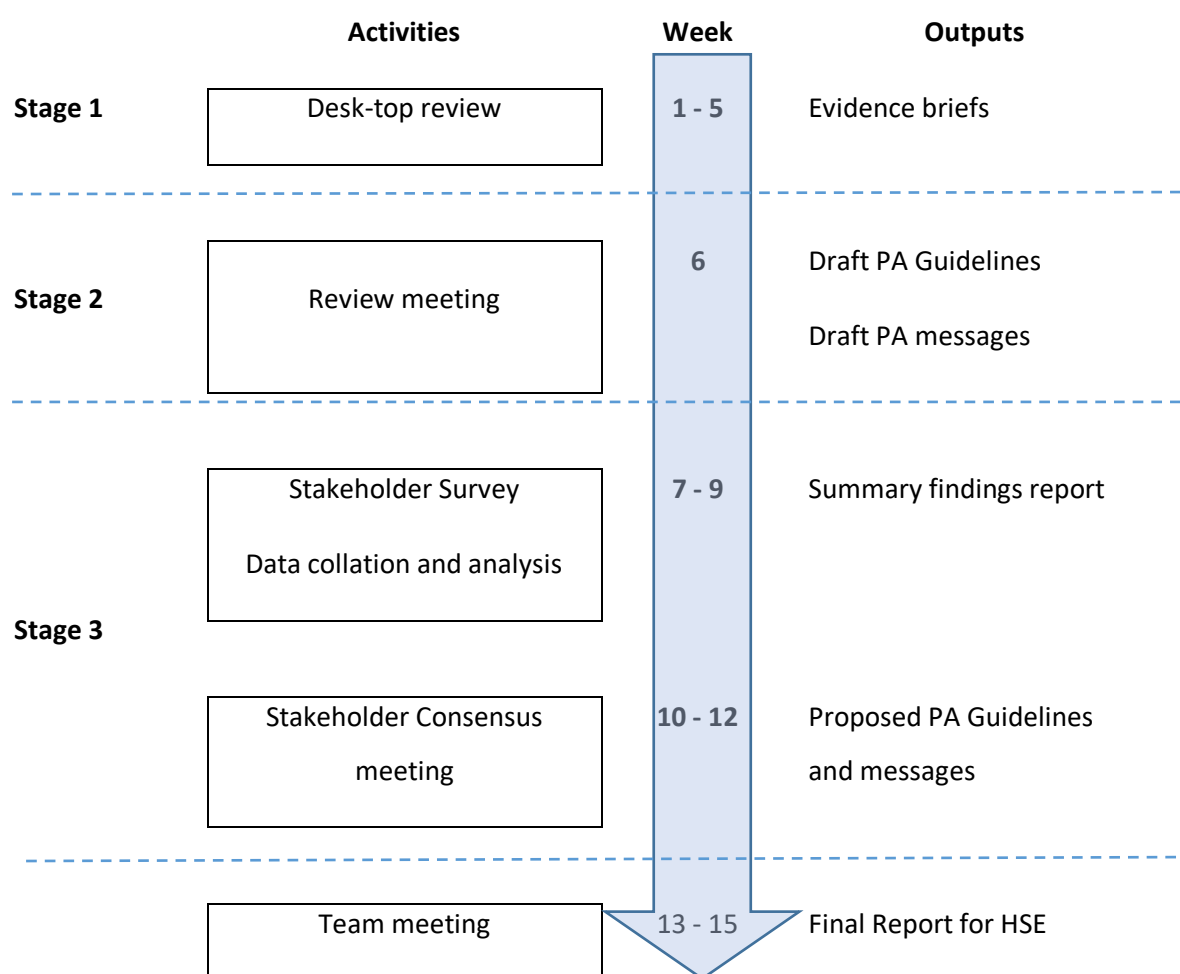


Figure 1: Overview of process to update the National Physical Activity and Sedentary Behaviour Guidelines for Ireland

Stage 1: Desk-top review

Research Design

Stage 1 was a purposive literature search of physical activity related literature published since September 2019. Specifically, this stage involved the examination of: (a) discrepancies between the current National Physical Activity guidelines for Ireland (Department of Health and Children & Health Service Executive 2009) and the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (World Health Organisation, 2020), (b) systematic reviews published since the literature review which informed the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (World Health Organisation, 2020), to consider new evidence, and (c) national/sub-regional adoption and adaptation of World Health Organisation's 2020 Guidelines for Physical Activity and Sedentary Behaviour by other countries.

Procedures

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation's guidelines for physical activity and sedentary behaviour was conducted. Search terms included "physical activity", "guidelines", "recommendations", "sedentary behaviour", "systematic review", "observational", "cohort", "meta-analysis". Searches were replicated six times, with the addition of additional search terms for each population group (e.g., "adults", "older adults", "infants", "disabilit*"). Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified relevant research articles from their personal libraries for inclusion. The selection of articles included in the evidence briefs was guided by the expertise of project team members and, cognisant of the Bradford Hill criteria (Hill 1965), their assessment of studies' potential to impact the formation of population level guidelines.

Stage 2: Review Meeting

A meeting was convened by the project team to discuss the key considerations relating to the physical activity guidelines for each population sub-group and areas for concern which arose in the preliminary stage of the project. Prior to the meeting, the Project Team reviewed the evidence briefs produced during the initial stage of the project. The Project Team determined the wording for each component of draft guidelines for each population subgroup and associated messages that need to be tested with stakeholders.

A physical activity message is defined as "Educational or persuasive material to be relayed to a specific individual or group within the public with the aim of ultimately increasing physical activity levels" (Williamson *et al.* 2021). Messages were developed for both (a) the public, and (b) professional audiences guided by a project team member who is a global expert in physical activity messaging. Messages for the public were developed drawing on principles from the Physical Activity Messaging Framework (PAMF) (Williamson *et al.* 2021) and available evidence for each guideline group. Two message sets were developed for each subgroup with two distinct aims. Message set 1 aimed to

improve knowledge of guidelines and therefore involved translating the guidelines into lay-friendly messages including the key information. Message set 2 aimed to improve perceptions, attitudes, motivation to be active, and therefore involved the creation of messages promoting key benefits of physical activity to each group.

Messages for professional audiences who will benefit from knowing, understanding, and applying the guidelines in practice were developed using the UK Chief Medical Officers' physical activity guidelines communications framework (Department of Health and Social Care 2023). The messages drafted at this stage were used as starting points for the stakeholder consultation that occurred in Stage 3.

Stage 3: Stakeholder Consultation

Stakeholder surveys

Research Design

Stage 3 consisted of two online surveys investigating the perceptions of (a) the public and (b) professionals regarding the draft guidelines and messages. Stage 3 also involved an in-person meeting with multidisciplinary stakeholders with a role in the promotion of physical activity in Ireland to gain consensus on the draft guidelines and messages. Ethics approval was received from the University of Limerick Education and Health Science Research Ethics Committee.

Survey development

The processes of developing the online surveys for both the public and professional surveys are described below. Surveys were developed across a 5-phase approach between September and November 2023.

Phase 1: Draft survey development

Initial draft public and professional surveys were developed by the project team and adopted questions from previous research that examined perceptions of public and professionals to the Canadian 24-hour movement guidelines (Faught *et al.* 2020). Demographic questions were replicated from the Census of Ireland question bank. The draft surveys were circulated to the research team for feedback and refinement. The surveys included Likert scale questions which investigated the perceived clarity and relevance of the draft physical activity guidelines and messages. Survey respondents were also provided with the opportunity to provide open feedback on the contents of the messages.

Phase 2: Feedback on survey content from research team.

All members of the research team provided written feedback on survey questions, layout and flow. Following the incorporation of expert feedback, a revised version of the survey was developed.

Phase 3: Survey pilot

A pilot of the public survey was launched for a one-week period in October 2023 and was completed by forty participants. The professional survey was not piloted, however it did receive extensive feedback and consultation from the project team.

Phase 4: Final survey development

Findings from the pilot public survey, and feedback from project team on professional survey, were incorporated into development of a final iteration of both surveys. Confirmation from all members of the project team on the contents of the survey was obtained before launching the final survey to the general public and professional audiences (the full surveys can be found in Appendix 1 and 2).

Population and sampling

Members of the general public and professional audiences were directly recruited via the University of Limerick Department of Physical Education and Sport Sciences (PESS) social media accounts (X/Twitter, LinkedIn, Facebook, Instagram). The professional survey was sent to relevant professional organisations and these were asked to share the survey with their membership (see appendix 3).

Procedures

Both surveys were launched via Qualtrics (Qualtrics, Provo, UT) in October 2023 and remained open for two weeks.

Data analysis

Online survey data were exported from Qualtrics into an Excel file and were processed for descriptive analysis.

Consensus meeting

A meeting with cross departmental stakeholders with a role in physical activity promotion in Ireland was convened in November 2023 in Dublin. The purpose of the meeting was to discuss the findings from the surveys and to get feedback to inform consensus on the draft guidelines and messages. The meeting began with a series of presentations of project findings from project team members, Head of the World Health Organisation's Physical Activity Unit, and the Chief Medical Officer of Ireland. The schedule for the event can be seen below. Following presentations, a workshop-style discussion was held amongst delegates to discuss issues across four key areas: 1) Guidelines for children with disabilities; 2) Format of the Update Physical Activity and Sedentary Behaviour Guidelines; 3) Describing Physical Activity Intensity; and, 4) Top ranked messages across groups. A copy of the instructions for discussion facilitators and prompt sheets, and photographs of the day can be found in Appendix 4.

Consensus Meeting Schedule

10:00 – 10:10am	Registration & Welcome	Sarah O'Brien, National Lead, Healthy Eating Activity Living Programme, HSE Professor Elaine Murtagh, University of Limerick
10:10 – 10:20am	Chief Medical Officer address	Professor Breda Smyth
10:20 – 10:40am	World Health Organization - Global focus on Physical Activity	Dr Fiona Bull, Head of Physical Activity Unit, Department of Health Promotion, World Health Organisation (video call)

10:40 – 11:10am	Draft Physical Activity Guidelines	Professor Marie Murphy, University of Ulster / University of Edinburgh
11:10 – 11:30am	Development of Physical Activity Messages	Dr Chloë Williamson, University of Edinburgh
11:30 – 11:45am	Break	
11:45am - 12:45pm	Expert consultation on guidelines and messages	Prof Charlie Foster, RCSI/ University of Bristol Dr Seán Healy, University of Limerick Dr Gráinne Hayes, University of Limerick Dr Dylan Power, University of Limerick
12:45 – 1:00pm	Closing	Prof Elaine Murtagh

Final development stage

At a meeting of the research team on 22nd November 2023, the team reviewed the findings from the stakeholder consultation and the feedback received during the Consensus Meeting. In addition, findings from a focus group conducted with adolescents to gain their perceptions of physical activity messages were considered (see appendix 5). Agreement was reached on the content of the proposed physical activity and sedentary behaviour guidelines and messages.

The proposed messages and guidelines were then shared with the HSE Healthy Eating & Active Living team for review. Feedback received was incorporated into the final versions of the guidelines and messages.

In the final stages of the project, the project team considered findings the consensus meeting and feedback from the HSE Healthy Eating Active Living team to agree on the proposed guidelines and messages.

Findings

Stage 1: Desk-top review

(a) International adoption and adaptation of World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (2020) by other countries.

Forty-six countries were included in the analysis. Data suggest that 43% of countries included in the analysis had physical activity and sedentary behaviour guidelines which were based on previous guidance by the World Health Organisation (World Health Organization, 2010). Eleven (24%) of countries had adopted or adapted the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (World Health Organisation, 2020). 13% (n=6) of countries included in the analysis had no physical activity/sedentary behaviour guidelines, and 13% (n=6) were in the process of developing physical activity/sedentary behaviour guidelines at the time of the analysis.

(b) Discrepancies between the National Guidelines on Physical Activity for Ireland (2009) and the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (2020):

- The National Guidelines on Physical Activity for Ireland published in 2009 do not provide sedentary behaviour guidelines, in contrast to the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (WHO 2020).
- The WHO Guidelines for Physical Activity and Sedentary Behaviour (WHO 2020) recommend that aerobic physical activity guidelines be achieved across the week. The National Guidelines on Physical Activity for Ireland (Department of Health and Children & Health Service Executive 2009) recommend aerobic physical activity guidelines be achieved on at least 5 days of the week.
- The National Guidelines on Physical Activity for Ireland (Department of Health and Children & Health Service Executive 2009) provide recommendations for four population groups, whereas the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (WHO 2020) provide recommendations for seven population groups.
- The committee that led the development of the National Guidelines on Physical Activity for Ireland was clinically oriented. This is evident in the structure of steering group and consultants. For example, steering group members and consultants were made up of 46% and 54% health stakeholders, respectively.
- Differences in the presentation of the guidelines can be observed between both sets of guidelines. For example, recommendations for strength component are given the same emphasis in presentation as the aerobic component in the World Health Organisation's Guidelines on Physical Activity and Sedentary Behaviour (World Health Organisation, 2020). In the National Guidelines on Physical Activity for Ireland (Department of Health and Children & Health Service Executive 2009) recommendations for muscle-strengthening physical activity appear in the small text following the aerobic recommendation, often on a separate page.

(c) Systematic reviews published since the World Health Organisation's Guidelines on Physical Activity and Sedentary Behaviour literature review

Overall, there was limited evidence published since September 2019 (cut-off for review conducted by the World Health Organisation which informed the guidelines on Physical Activity and Sedentary Behaviour) which would warrant inclusion in the formation of updated physical activity and sedentary behaviour guidelines for Ireland. Complete versions of the evidence reviews can be found in Appendix 6.

Stage 2: Review meeting

The findings from Stage 1 were reviewed at a meeting in October 2023 consisting of the project team members who are global experts in physical activity, physical activity messaging, adapted physical activity, epidemiology, public health, and health promotion research. All project team members agreed on the contents of the evidence briefs, the draft physical activity and sedentary behaviour guidelines, and messages. The draft physical activity and sedentary behaviour guidelines were based on the World Health Organisation's Guidelines on Physical Activity and Sedentary Behaviour (World Health Organisation, 2020), the World Health Organisation's guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age (World Health Organisation, 2019), and the UK Chief Medical Officers' physical activity guidelines for disabled children and disabled young people (Smith *et al.* 2022a; Smith *et al.* 2022b).

Stage 3: Stakeholder Consultation

The findings from the professional and public audiences are presented separately below. A separate report detailing the findings is available in Appendix 7 and 8.

Characteristics of respondents

Professionals and Practitioners

Survey respondents

The majority of respondents to the professional survey were healthcare professionals (n=85, 45.45%) and respondents from the sport and physical activity sector (n=58, 31.02%) (Table 1).

Table 1: Sectors the professional survey participants worked in

Sector	Number (%)
Health	85 (45.45%)
Sport/Physical Activity	58 (31.02%)
Transport	1 (.54%)
Community Development	2 (1.07%)
Education	37 (19.79%)
Social care	2 (1.07%)
Other	2 (1.07%)
Total	187

Overall, respondents' perceived level of importance of the physical activity and sedentary behaviour guidelines to their role was high (Figure 2), with over half (n= 87, 58%) of respondents stating that the physical activity guidelines were very important to their professional role.

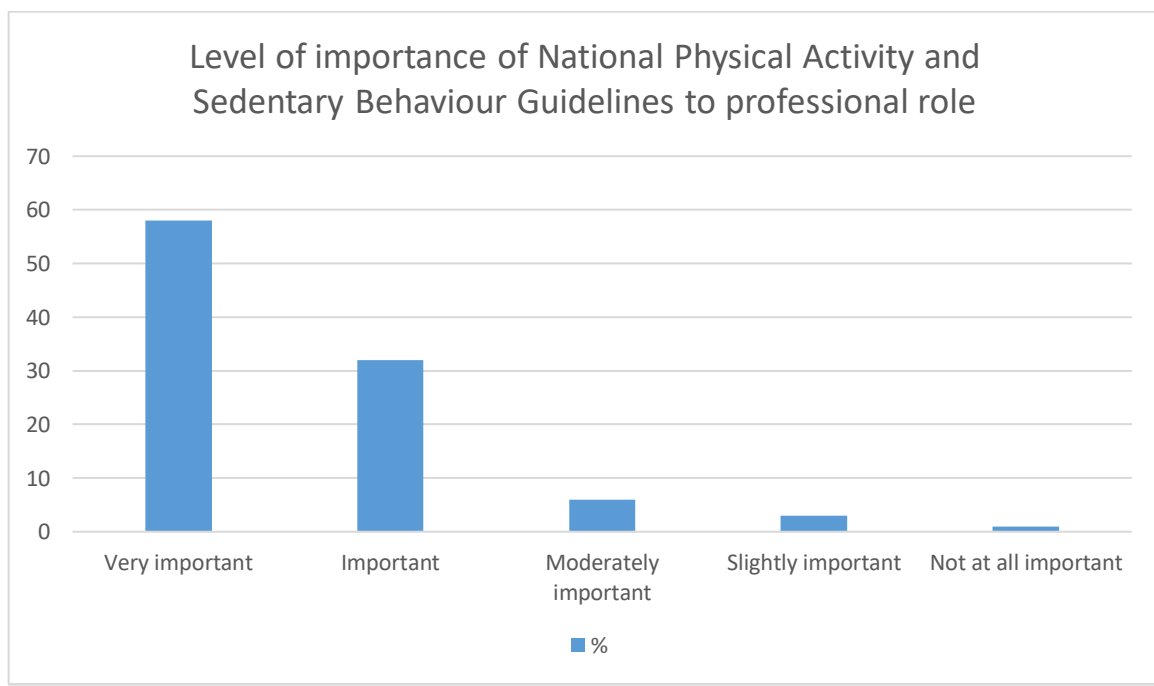


Figure 2: Level of importance of National Physical Activity and Sedentary Behaviour Guidelines to professional role (n=150).

42.67% stated they frequently or always use the National Physical Activity and Sedentary Behaviour Guidelines in their work (Figure 3).

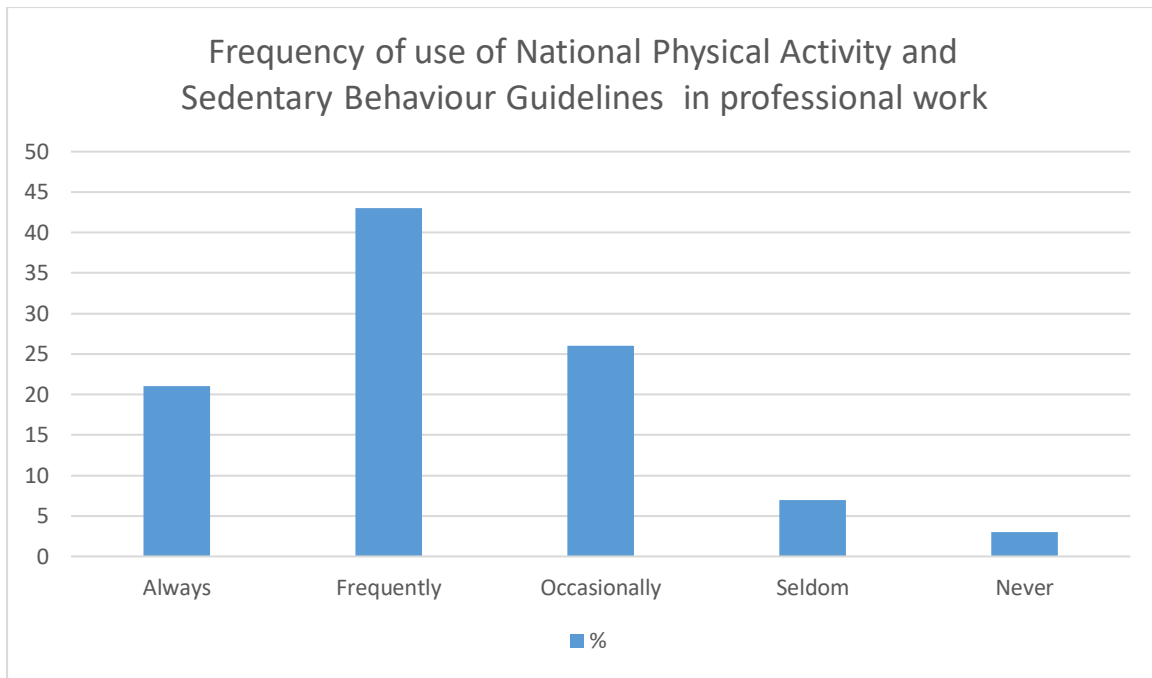


Figure 3: Frequency of use of National Physical Activity and Sedentary Behaviour Guidelines in professional work (n=150)

Attendees of Consensus Meeting

Thirty-one (64.5% female) participants attended the Consensus Meeting on 15th November 2023. Participants represented a range of disciplines, including health, education, physical activity, sport, and public health sectors. Members of the National Physical Activity Plan Implementation Group and multiple Health Service Executive chronic disease clinical programmes also attended. Meeting delegates also came from a range of governmental levels including local community-based stakeholders to national policy makers. The list of participants can be viewed in Appendix 9.

General Public

The majority of public survey participants were female (n=151, 70.23%) (Table 2), white Irish (n=211, 98.14%) (Table 3). Most (n=209, 96.76%) public survey participants were educated to at least Upper Secondary (NFQ Level 4 or 5) (Table 4).

Table 2: Gender of survey respondents (n=215)

Gender	Number (%)
Male	64 (29.77%)
Female	151 (70.23%)

Table 3: Ethnic background of survey respondents (n=215)

Ethnicity	Number (%)
White/White Irish	211 (98.14%)
Black/Black Irish	1 (0.46%)
Asian or Asian Irish	3 (1.40%)

Table 4: Education level of respondents (n=215)

Education level	Number (%)
No formal education/training	1 (0.46%)
Primary education (NFQ Levels 1 or 2)	1 (0.46%)
Lower Secondary (NFQ Level 3)	5 (2.32%)
Upper Secondary (NFQ Level 4 or 5)	66 (30.70%)
Technical or Vocational (NFQ Levels 4 or 5)	7 (3.26%)
Advanced Certificate/Completed Apprenticeships (NFQ Level 6)	13 (6.05%)
Ordinary Bachelor Degree or National Diploma (NFQ Level 7)	13 (6.05%)
Honours Bachelor Degree/Professional qualification or both (NFQ Level 8)	43 (20%)
Postgraduate Diploma or Masters Degree (NFQ Level 9)	46 (21.40%)
Doctorate (PhD) or higher (NFQ Level 10)	20 (9.30%)

Perceptions of the draft guidelines

Overall, there was a high level of agreement on the clarity of the physical activity and sedentary behaviour guidelines among professional audiences for all population sub-groups. A full breakdown of the agreement to physical activity and sedentary behaviour guidelines can be found in Figure 4 and 5, respectively.

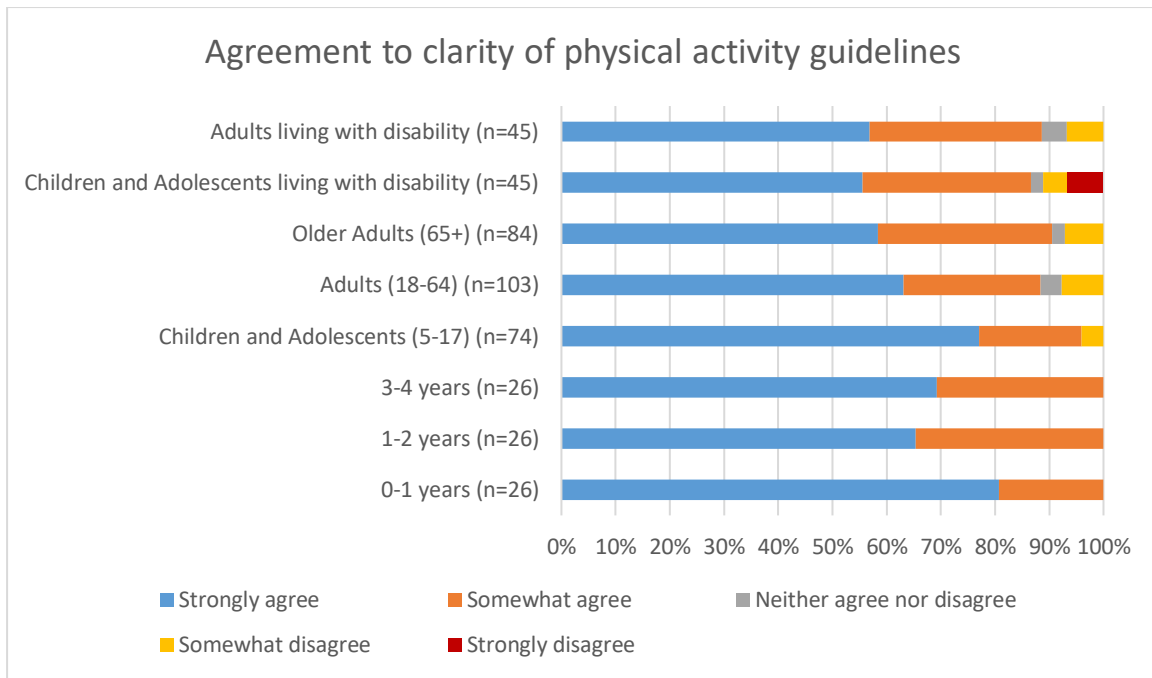


Figure 4: Agreement of professional audience to clarity of the National Physical Activity Guidelines

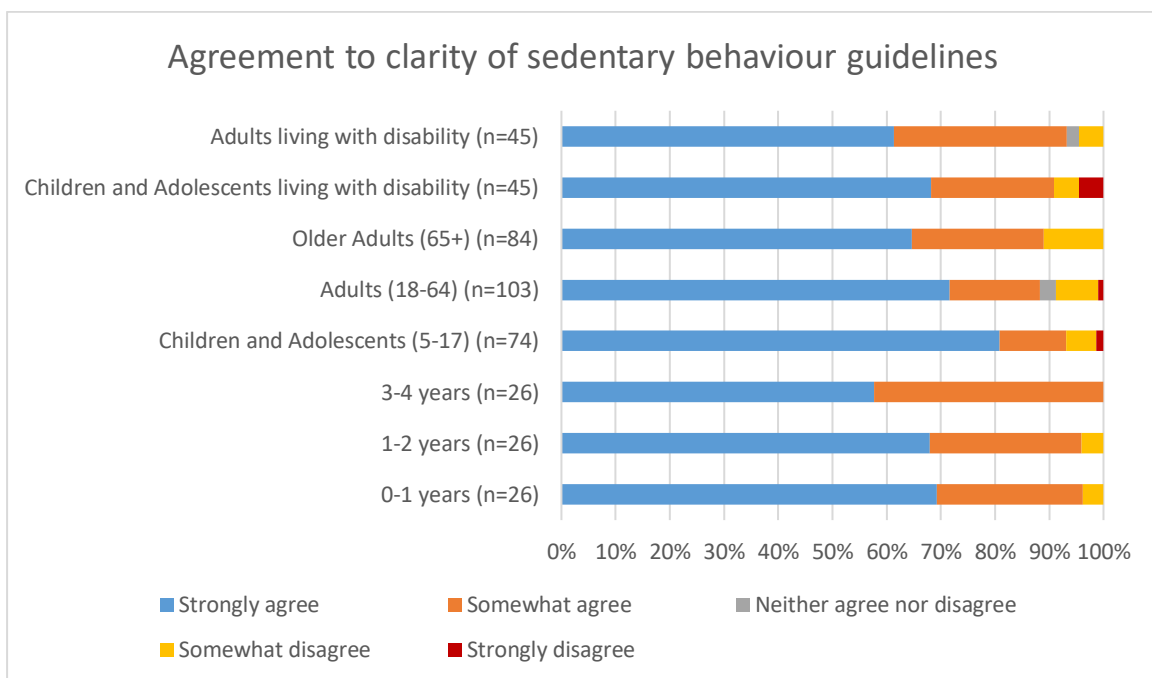


Figure 5: Agreement of professional audience to clarity of the National Sedentary Behaviour guidelines

Perceptions of the draft educational messages for professionals and practitioners

Educational messages were developed for stakeholders with a role in the promotion of physical activity in Ireland to increase awareness and knowledge of the physical activity and sedentary behaviour guidelines, and increase knowledge, skills and confidence in promoting physical activity

within the context of their role. Overall, there was a high level of agreement on the clarity and relevance of all (education; healthcare; social care; physical activity/sport; and other) sector specific educational messages. A full breakdown of responses to each sector specific educational messages can be found in Appendix 7.

Preferences for description of duration in the messages

Adult (18-64) and Older Adult (65+) members of the public expressed their preferences relating to how the time recommendations of the physical activity guidelines were presented are presented. Data collected from adults suggest presenting the physical activity as hours and decimal point (n=54, 39.29%) and hours and minutes (n=53, 37.86%) were the most popular (Table 5). Similarly, responses from older adults suggest that hours and minutes (n=7, 38.89%) and hours and decimal (n=6, 33.33%) were the preferred format of recommendations (Table 6). Presenting the time recommendation as minutes was the least popular response in both adults (n=32, 22.86%) and older adults (n=5, 27.78%) population groups.

Table 5: Preferences of adults on format of messages (n=139)

Format	%
Minutes (i.e., 150-300 minutes)	32 (22.86%)
Hours and decimal (i.e., 2.5 hours)	54 (39.29%)
Hours and minutes (i.e., 2 hours and 30 minutes).	53 (37.86%)

Table 6: Preferences of older adults on format of messages (n=18)

Format	%
Minutes (i.e., 150-300 minutes)	5 (27.78%)
Hours and decimal (i.e., 2.5 hours)	6 (33.33%)
Hours and minutes (i.e., 2 hours and 30 minutes).	7 (38.89%)

Perceptions of the lay versions of the draft guidelines (Message Set 1)

Overall, there was a high level of agreement amongst the general public that the lay summaries of physical activity and sedentary behaviour guidelines (Message Set 1) were clear and relevant across all population groups. Open comment responses from survey respondents suggest that language used for sedentary (particularly minimising screen time) recommendations and defining physical activity intensity should be amended. There was some concern that the messages could be considered judgemental by parents of under 5's. A full breakdown of the perceptions of the general public to the lay summaries of the physical activity and sedentary behaviour guidelines can be found in Appendix 8.

Perceptions of the persuasive messages (Message set 2)

Overall, there was high agreement among public survey respondents that the persuasive messages provided for each population group were motivating and appealing. For children under five years, responses suggest that lay descriptions of terms such as ‘cognitive development’ are required. For persuasive messages targeted at Children and Adolescents (5-17), respondents stated that there may be scope to substitute words such as ‘moving’ and ‘being active’ for physical activity. Open responses gathered for persuasive messages targeted at adults suggested that some messages lead respondents to feel overwhelmed and made smaller amounts of physical activity seem insufficient. Older adults suggested that persuasive messages should include examples of incorporating active travel into daily life. For children and adults living with disability, respondents noted that the list of messages provided for disability populations was less extensive than other population groups.

Feedback from the Stakeholder Consultation Group (Consensus Meeting)

Key Physical Activity and Sedentary Behaviour Messages

A number of table discussions took place during the consensus meeting that further explored findings from the public survey on the newly developed physical activity messages. Specifically, there were two key tasks or aims: (a) to identify the preferred message for each population group, and (b) to discuss the use of a key message tagline that could link several of the developed messages together for campaign purposes.

(a) Preferred messages

Attendees of the consensus meeting were shown the top three messages for each guideline subgroup (as ranked in the public survey) and were asked to use a Post-It note to indicate their preference. There was a consistent top-rated message across all adult groups that focused on autonomy and enjoyment, and conveyed that all activity is beneficial: “Move your body and be active in a way that you enjoy - any physical activity is good physical activity”. The top-rated messages for each subgroup are displayed below in Table 7.

Table 7: Top ranked messages for each population group.

Group	Message(s)	Number of votes
Children <5	Being active can improve your baby's/toddler's/child's motor and cognitive development and improve their mental and physical health	6
Children and adolescents (5-17)	Being active with your friends is a great way to spend time with them	6
Adults (18-64)	Move your body and be active in a way that you enjoy - any physical activity is good physical activity	16

Older adults (65)	Move your body and be active in a way that you enjoy - any physical activity is good physical activity	9
	Being physically active can help you keep your independence into older adulthood	9
Children and adolescents living with disability	Physical activity can help you meet new people	8
Adults living with disability	Move your body and be active in a way that you enjoy - any physical activity is good physical activity	12

(b) Key tagline

Attendees were tasked with discussing an all-encompassing ‘tagline’ that could be used to link the set of developed messages together. The attendees generally agreed that the tagline should be short and simple, but still communicate that all physical activity counts, and that physical activity is enjoyable and brings a wide range of benefits (as opposed to having a tagline that just focuses on one key benefit). Attendees agreed that one possibility could be “Every Move is a Good Move”. Attendees also discussed the important of consistency, and thus discussed the possibility of adopting the same tagline as the World Health Organisation’s Guidelines on Physical Activity and Sedentary Behaviour (2020), “Every Move Counts”.

Representation of people with disabilities in the guidelines

In response to the mixed feedback from the stakeholder survey, a table was dedicated to the discussion of how to present guidelines for people living with disability in the new physical activity and sedentary behaviour guidelines. Key areas of discussion included the following:

Engagement with people living with disability: There was a consensus on the need for more engagement with individuals who have lived experience of disability. The low level of survey responses relating to the guidelines for people with disabilities was noted as a disappointment, indicating a need for further outreach to Irish people with disabilities and related organisations.

Terminology: There was no agreement on the terms to be used when referring to persons with disabilities. This suggests a need for more discussion and standardisation in language use. The Health Service Executive’s position on disability terminology will inform the language within this report and the guidelines publication.

Guidelines Specificity: There remained a lack of consensus about how disability should be reflected in Ireland’s new physical activity and sedentary behaviour guidelines. Several options were discussed including (1) integration of ‘disability’ within the general guidelines for both children and youth and adults, (2) adoption of the World Health Organisation’s guidelines for children and adolescents living with disabilities and adults living with disabilities (World Health Organisation, 2020), which suggests a quantity of physical activity that mirrors the general guidelines, or (3) adopt specific guidelines for

people with disabilities akin to the UK guidelines for disabled children and youth and disabled adults. The pros and cons of each approach was discussed.

Messaging: There was consensus about the importance of accessible, targeted, stakeholder-informed messaging of the physical activity and sedentary behaviour guidelines, for specific groups of people living with disability.

Describing physical activity intensity

Although it was acknowledged by participants that the guidelines were not messages aimed at the public, but rather recommendations which would be read by professionals, all agreed that there was a need to include a description of the intensity of physical activity that went beyond just “moderate” and “vigorous”. Some consensus meeting participants felt that a threshold descriptor “at least moderate intensity” was simpler for professionals to understand than both moderate and vigorous. Although perhaps more relevant for messages than guidelines some participants stressed the need for intensity descriptors to move beyond just words to include pictorial representation for those who are non-verbal or had limited capacity to interpret the written word. In addition to descriptors, most participants agreed that it would be good to have an expanded list of example activities beyond walking.

Participants who indicated the need for greater explanation of intensity suggested that the explanation provided in the presentations which classified activity in terms of energy expenditure (METs), relative physiological demand (% of maximum oxygen uptake and % of maximum heart rate) and using lay terms to describe temperature (warm, hot, sweating) breathing rate (able to carry on a conversation, difficult to carry talk).

While it was acknowledged that these descriptors will work well for the “aerobic component” of the guidelines, it is much more challenging to explain the intensity of activities designed to improve or maintain muscle strength. There were few suggestions and limited consensus on how this would best be achieved but all agreed that such descriptors were important and should avoid terms that would indicate that the only/best way to achieve this guideline was through gym-based activity.

Format of the guidelines publication

In response to the feedback from the stakeholder survey, a table was dedicated to the discussion of the format of the updated physical activity and sedentary guidelines. Key areas of discussion included the following: “What content should be included in the National Physical Activity and Sedentary Behaviour Guidelines for Ireland Publication?”

Content in the Document: There was a consensus on the requirement for the inclusion of short, clear, and succinct summaries of the evidence from the World Health Organisation’s Guidelines on Physical Activity and Sedentary Behaviour (World Health Organisation, 2020) review documents. Stakeholders proposed that hyperlinks to the World Health Organisation published works should be included in the National Physical Activity and Sedentary Behaviour Guidelines for Ireland. There was strong consensus that the summary of evidence should not overshadow the guidelines themselves.

Certainty of Evidence Statements: There was a consensus on the need for the inclusion of the certainty of evidence statements for each component of the guidelines.

Literacy Component: There was a consensus on the need for the use of clear and consistent language within the guidelines. Stakeholders strongly recommended the need for standardisation of the use of hours rather than minutes for each guideline. Some members of the consensus agreed that there was a need to include age-appropriate examples and explanations of the intensity of physical activity that extend beyond “moderate” and “vigorous”.

Equal Emphasis of Aerobic, Strength and Sedentary Components: There was a consensus on the requirement that all components (aerobic, strength and balance and sedentary) of the guidelines should be given equal emphasis. There remained a lack of consensus on how to achieve this. Some participants felt that components should be represented graphically using standardised pie charts with equal weighting. Other consensus meeting participants proposed the use of three separate documents for the aerobic, strength and balance and sedentary guidelines for professional audiences.

Messaging: There was consensus about the use of the tagline “Every Move Counts” to be consistent with the WHO Guidelines on Physical Activity and Sedentary Behaviour (WHO 2020) message.



Photo 1: From left to right: Professor Charlie Foster (RCSI/University of Bristol), Sarah O'Brien (HSE), Dr Dylan Power (UL), Prof Elaine Murtagh (UL), Prof Breda Smyth CMO (HSE), Prof Marie Murphy (UU/University of Edinburgh), Dr Gráinne Hayes (UL), Dr Chloë Williamson (University of Edinburgh), Dr Sean Healy (UL).



Photo 2: Attendees at the Consensus Meeting on 15 November 2023

Final Consensus on proposed Guidelines and Messages

At a meeting amongst the project team on 22nd November 2023, final agreement was reached on the content of the proposed physical activity and sedentary behaviour guidelines and messages. The team reviewed the findings from the stakeholder consultation, the feedback received during the Consensus Meeting and findings from a focus group conducted with adolescents.

The team carefully discussed the proposed guidelines for children with disability, as this was the one area where there was considerable disparity in perspectives. We propose the World Health Organisation's Guidelines for children and adolescents living with disability and for adults living with disability (World Health Organisation, 2020) be adopted by Ireland with two modifications. First, based on the findings from the evidence synthesis underpinning the UK's recent guidelines for disabled children, adolescents, and adults (Smith *et al.* 2022b), as well as mechanistic physiological studies highlighting increased energy expenditure in exercise for certain disabilities (e.g., cerebral palsy (Nardon *et al.* 2021), muscular dystrophy (Mutlu *et al.* 2018)), we advise adding a provision. This provision would acknowledge that for individuals with specific disabilities, a reduced level of physical activity might be adequate to attain optimal health benefits, considering their higher energy cost of physical activity. Second, the guideline language should be aligned with Irish terminology relating to disability. This report and the guidelines follow the National Disability Authority guidance for public bodies on disability language and terminology and uses people-first language such as 'people living with disability', while also recognising that people with an impairment are disabled by barriers in society and their environment, particularly when it comes to physical activity (National Disability Authority 2022). We recognise that some people and organisations prefer identity-first language such as 'disabled person' and that some people don't identify with either term. Disabled persons are not a homogenous group and may choose to identify in different ways. Disabled Persons Organisations (DPOs) are best placed to advise on the use of language for their members. In this regard, the terms 'people living with a disability' or 'disabled person' may be used flexibly when these bodies are communicating and promoting the guidelines.

There was large agreement during the stakeholder consultation for the educational messages for professional and practitioners. The research team agreed that these messages should be adopted.

Feedback from the survey part of the stakeholder consultation regarding some of the language in the public messages being viewed as 'judgemental' was addressed in the revised messages. Additional changes included:

- Inclusion of further examples of alternatives to screen-time for under 5's
- Using relatable terms, e.g., buggy or pram
- Addition of active travel examples
- Changing wording of message relating to muscle-strengthening activities to ensure it is seen as equally important to the aerobic physical activity component.

The meeting also considered the feedback received on the development of the overall message or tagline. Ultimately, to maintain consistency with promotion of the global guidelines by the WHO, the stakeholder group chose to adopt "Every Move Counts" as the key tagline for the updated National Physical Activity and Sedentary Behaviour Guidelines for Ireland. We believe that this tagline

successfully conveys that every duration and type of physical activity contributes towards achieving the overall guidelines and towards attaining health benefits.

The final versions of the proposed physical activity and sedentary behaviour guidelines for all subgroups, educational messages for professionals, and messages for the public can be found in Appendices 9 and 10 respectively.

Recommended content for the National Physical Activity and Sedentary Behaviour Guidelines for Ireland publication

We recommend that the National Physical Activity and Sedentary Behaviour Guidelines for Ireland publication includes the following content:

- 1-page visual summary for the guidelines for quick reference. For an example see: https://cdn.who.int/media/images/default-source/health-topics/physical-activity/summary-infographic-guideline-on-physical-activity.jpg?sfvrsn=246f54b7_9
- Summary of the process (or in a diagram) to develop the guidelines (see appendix 12),
- Guidelines for each population subgroup, including GRADE statements regarding the certainty of the evidence (see appendix 10),
- Public Messages (see appendix 11),
- Messages for Professionals/Practitioners (see appendix 11),
- Short summary of the key evidence supporting each guideline (see appendix 13) with links to the WHO evidence review for readers who wish to read further detail,
- Explanation of exercise intensity and examples of activities for each intensity (see appendix 14)
- Glossary of terms (see appendix 15).

Conclusions and Recommendations

This report provides a comprehensive summary of our research to update the National Physical Activity and Sedentary Behaviour Guidelines for Ireland. Following a review of published evidence, a stakeholder consultation (including a consensus meeting with expert groups), and several research team meetings, we propose a new set of physical activity and sedentary behaviour guidelines and associated messages for adoption by the HSE. The guidelines are based on the World Health Organisation's Guidelines on Physical Activity and Sedentary Behaviour (World Health Organisation, 2020) and the World Health Organisation's Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age (World Health Organisation, 2019).

A novel aspect of the current work is that messages for professional and public audiences were included as a key deliverable from the project. We believe this is the first time that evidence-informed messages have been developed simultaneously with national physical activity and sedentary behaviour guidelines. These educational messages for professionals/practitioners, and both educational and persuasive messages for the public, will be of huge importance to government departments, statutory agencies and other organisations seeking to disseminate public health guidance.

General Recommendations

We make the following recommendations in order to maximise uptake of the guidelines and messages, and to guide further work arising from this project:

- The HSE is funded to lead the construction and implementation of a plan and communication resources for the dissemination of the new guidelines to internal and external stakeholders.
- The guidelines and messages should be disseminated to all government departments who have role in promoting physical activity. This includes, but is not limited to, health, education, sport and transport.
- The development of concise policy briefs would provide further guidance to those seeking to promote physical activity and thus enhance uptake of these guidelines.
- Funding should be allocated to ensure widespread dissemination of the guidelines and message.
- A forum should be established to foster discussion and agreement among those involved in monitoring and surveillance of physical activity, e.g., Growing Up in Ireland Study, Healthy Ireland Study, Irish Sports Monitor, so that standardised questions are developed that reflect the updated physical activity and sedentary guidelines. International representative from other nations who have already tackled these surveillance issues should be invited to contribute.
- Guidelines for pregnant and postpartum women, and for adults and older adults with chronic conditions, were outside the scope of this project. The development of guidelines for these groups should be progressed as a priority.
- Further consultation with population subgroups, particular people living with disability and those working with people living with disability, will ensure that the language and examples used in the messages remain relevant to the intended users.

- The public messages and infographics should be translated into other languages as appropriate to the population in Ireland. We note that the full document will be translated into Irish as per Official Languages Act 2023.
- It is expected that the World Health Organisation’s Guidelines on Physical Activity and Sedentary Behaviour (2020) will be next updated in the period 2026- 2030. This timeline should be factored into planning of future updates to the National Physical Activity and Sedentary Behaviour Guidelines for Ireland.
- Research into physical activity messaging is an emerging field of expertise. The current project draws on the best available evidence in developing messages for the public. In developing future iterations of the messages, the Health Service Executive may want to consider messages that communicate the appropriate intensity of muscle strengthening activities. The description used in the Sport England Covid-19 Physical Activity Survey may be a useful reference point in starting this work¹.

Recommendations for policy

Informed by good practice in public policy implementation (Woods *et al.* 2022), bodies with a role in physical activity promotion (e.g., the National Physical Activity Plan Implementation Group) and relevant government departments should now:

- Ensure access to and regular dissemination of the National Physical Activity and Sedentary Behaviour Guidelines for Ireland and key documents to the public.
- Regularly monitor physical activity levels across the life-course based on representative samples, using the National Physical Activity and Sedentary Behaviour Guidelines for Ireland. Where monitoring systems do not exist for key population subgroups (e.g., primary school aged children), these need to be developed.
- Provide opportunities for training and professional development related to the dissemination of the updated National Physical Activity and Sedentary Behaviour Guidelines for Ireland to relevant professionals across the domains known to be effective in enhancing population levels of physical activity (i.e. education, transport, urban design, sport, healthcare, public education including mass media and workplace) (Milton *et al.* 2021).
- Ensure that in healthcare, the routine screening for physical activity should now be guided by the updated National Physical Activity and Sedentary Behaviour Guidelines for Ireland. For all insufficiently active patients, provision of brief advice, brief intervention and sign-posting or referral as needed to appropriately trained practitioners and/or physical activity opportunities.
- Develop clearly defined, evidenced informed population physical activity guidelines for population subgroups not covered in these guidelines e.g., people living with chronic diseases, and pregnant and post-partum women.

• ¹ Muscle=strengthening questions in the Sport England Covid-19 Physical Activity Survey: “activities that worked your muscles (i.e. they felt tired, hot or were shaking)? These could be specific exercises (using weights or resistance bands, repetitive sit to stands, repetitive stair climbing, slow heel or toe raises or online/DVD exercise class for example), OR other strengthening activities (such as heavy gardening or DIY, walking with heavy shopping, or repetitively lifting children or heavy items).”

- Ensure that all media and education campaigns that promote and support physical activity, use the National Physical Activity and Sedentary Behaviour Guidelines for Ireland and tag-line “Every Move Counts” and are sustained and monitored. These campaigns should use multiple media modes/channels (e.g., via posters, social media, radio as well as TV) combined with complementary community initiatives to promote the benefits of physical activity and disseminate physical activity and sedentary behaviour guidelines.
- Define population targets for meeting the physical activity and sedentary behaviour guidelines. These targets should cover the life-course and be tailored to different population subgroups as needed. They should also be underpinned by evidence informed and evidence-based strategies, a timeline for achievement and be allocated sufficient resources.

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Appendices

Appendix 1: Survey for Professionals and Practitioners

The survey for professional and practitioners can be [downloaded from here](#).

Appendix 2: Survey for the General Public

The survey for the general public can be [downloaded from here](#).

Appendix 3: Professional Organisations asked to disseminate the survey

Active Disability Ireland
Active School Flag
Age and Opportunity
Association of Occupational Therapists of Ireland
Clare Education Centre
Clare Sports Partnership
Community Games
Early Childhood Ireland
Federation of Irish Sport
Get Ireland Walking
Healthy Limerick
HSE Healthy Eating and Active Living programme
HSE Health & Wellbeing
Ireland Active
Ireland's Association for Adventure Tourism
Irish Association of Social Workers
Irish College of General Practitioners
Irish Gerontological Society
Irish Heart Foundation
Irish Men's Sheds Association
Irish Nurses and Midwives Organisation
Irish Physical Activity Research Collaboration
Irish Primary PE Association
Irish Primary Principals Network
Irish Society of Chartered Physiotherapists
Limerick Sports Partnership
Oide (Dept of Education School Support Service)
Oide Physical Education Post-primary
Oide Primary Physical Education team
PEPAYS Ireland
Physical Education Association of Ireland
Social Care Ireland
Special Olympics Ireland
Sport Ireland
Student Sport Ireland
UNESCO Chair in Inclusive PE Sport Recreation and Fitness (MTU
Tralee)
Mental Health Ireland
GAA

Appendix 4: Instructions for facilitators at the Consensus Meeting

11:45 – 12:45pm Consultation on guidelines and messages Instructions for Chairs

There is 1 hour allocated for this section. Participants will begin at their “home” table, and then rotate around the other tables so that everyone gets to contribute to each topic (approx. 10 – 12 mins per topic). We have selected the items that were raised during the consultation.

Table	Topic	Chairs
1	Guidelines for children with disabilities	Charlie & Seán
2	Format and content of the guidelines document/publication	Gráinne
3	Issues regarding describing intensity	Marie
4	Top ranked public messages across subgroups	Dylan & Chloë

Please see the worksheets for each table (printed on A3 sheets).

Each worksheet has a task or discussion prompt. Your role is to:

1. Introduce the task/discussion prompt
2. Encourage participants to write individual thoughts/reflections on post-it notes, and these can be gathered on the work-sheet. If they wish – they might just prefer to get into the discussion!
3. Facilitate a discussion around the responses.

There will be approx. 10-12 minutes per group x 4 groups.

Please be prepared to provide a summary of the key points raised at the end of the session.

Table 1: Guidelines for Children with Disabilities

The research team recommended adoption of the UK 2022 guidelines for disabled children and young people. In the survey with professionals/practitioners, some respondents questioned why the guideline is different to the WHO 2020 guidelines (see feedback on separate sheet).

Discussion prompt: How can we best address the concerns raised during the consultation with professionals/practitioners?

Table 2: Format of the Updated Physical Activity Guidelines

The format and content of the guidelines documents varies by country, region and organisation.

Task:

a) What content should be included in the National Physical Activity Guidelines for Ireland publication? Note: Remember that the guidelines are written for professionals and practitioners who have a role in promoting physical activity. What information is useful for this audience?

B) How can we ensure the strength (and balance) components of the guidelines are given emphasis alongside the aerobic component?

Table 3: Describing physical activity intensity

The stakeholder consultation revealed that terms such as moderate-intensity and vigorous-intensity physical activity are not widely understood among professional/practitioners. Furthermore, there is confusion among public audiences about how intensity is described. Here is a sample of the description we used in the public messages:

- moderate intensity physical activity (such as brisk walking)....vigorous intensity physical activity (such as running).
- You'll know your activity is intense enough to gain health benefits if you can talk but not sing (moderate), or if you are unable to say more than a few words during the activity (vigorous).

Task: How should intensity be moderate-intensity and vigorous-intensity be explained to professionals/practitioners and the general public? What examples should we include to support our explanation?

Table 4: Top ranked messages across groups

In the public survey we asked respondents to rank their top 3 physical activity messages.

Task:

a) Please note your preferred message for each population subgroup (add a small post-it next to your preference for each subgroup)

b) Is there an overall "message for all" or tagline we can use for all subgroups?

Appendix 5: Overview of focus group with adolescents

Participants: Five 1st year students (typically aged 12 – 13 years), 3 boys, 2 girls

Facilitators: Elaine Murtagh, Caera Grady (PhD researcher)

Date: 21st Nov 2023

Students were presented with message set 1 and message set 2 (see annex below). The main feedback is as follows.

Message set 1:

Participants felt these message were clearly stated.

The following message may be confusing for some teenagers:

We recommend that you take part in physical activities that you enjoy. To get the greatest benefits to health, you may try to take part in mostly aerobic (such as walking briskly, running or team sports) with muscle-strengthening activities (such as lifting weights or doing body weight exercises) on at least 3 days of the week.

Comments: meaning of the word “aerobic”. Sentence is long.

Participants noted that message 5 (re sedentary behaviour) is the best one for teenagers, because “too many people like said they're on Xbox and stuff and not being active”

Message set 2:

Favourite message for each participant: 7, 6, 3, 1, 4

Why picked those as favourite: “Because this is the truth, and the truth is that sounds good.”

Least favourite messages for each participant: 9, 9, 13, 10, 10

Why picked those as least favourite: “there wasn't much info”, no context

How should they messages be shared with teenagers?

Phone

Social media

Music platforms

Adverts on TV

x-box

Annex

Message set 1

1. If you are between 5 and 17 years old, you can improve your physical and mental health by being active for 1 hour or more each day.
2. We recommend that you take part in physical activities that you enjoy. To get the greatest benefits to health, you may try to take part in mostly aerobic (such as walking briskly, running or team sports) with muscle-strengthening activities (such as lifting weights or doing body weight exercises) on at least 3 days of the week.
3. You'll know your activity is intense enough to gain health benefits and 'count' towards your one hour if you can talk but not sing (moderate), or if you are unable to say more than a few words during the activity (vigorous).
4. You can make up your weekly physical activity when and how you want to
5. We recommend trying to reduce the amount of time you spend sitting still for long periods of time, particularly if this time is spent on a screen (e.g., watching TV or playing video games).

Message set 2

1. Being active with your friends is a great way to spend time with them
2. Moving your body makes you feel good
3. Physical activity is fun
4. Being physically active can help your brain function better
5. Moving your body more can help promote good mental health
6. Being active is good for your brain and your body
7. Being active every day can help you feel happier and fitter
8. Move your body and be active in a way that you enjoy – any physical activity is good physical activity
9. Every little helps
10. Some is good more is better
11. Physical activity can help you meet new people
12. Physical activity can help build your confidence and concentration
13. Physical activity can give you a sense of achievement
14. Physical activity can help improve your mental health, make you feel calmer, and less stressed
15. Physical activity can help make your muscles stronger, and improve your motor skills, balance and coordination

a) < 5 years

Update of the National Guidelines on Physical Activity for Ireland Evidence Brief: Children under 5 years of age

Key Points

- There is evidence to suggest that various forms of physical activity are beneficial to a range of health-related outcomes in Children under 5 years of age.
- Current physical activity behaviour guidelines for children under 5 years are perceived to be achievable and acceptable. However, current sedentary behaviour guidelines are perceived to be unrealistic.

What are the differences between Ireland 2009 recommendations and WHO 2020 recommendations?

- The World Health Organisation provide PA and SB guidelines for three specific age groups within this population (Less than 1 year; Children 1-2 years of age; and Children 3-4). Ireland's 2009 Guidelines provide PA guidelines which apply to Children and Young People aged 2-18.
- The Ireland 2009 guidelines do not provide sedentary behaviour recommendations for this population group.

What did the World Health Organisation find in their 2019 review?

Physical Activity

- Moderate to vigorous intensity, vigorous intensity and total physical activity were beneficially associated with several health indicators. Although it was not possible to determine the most favourable frequency or duration of PA, more PA appeared to be better.
- In infants <1 year of age, 30 minutes of prone position was favourably associated with health indicators.

Sedentary Behaviour

- There was no association between objectively measured SB and adiposity or motor development.
- There was a predominantly unfavourable, or a null association between screen time and adiposity, cognitive or motor development and psychosocial health.
- There was moderate to very low-quality evidence for screen time and adiposity, motor and cognitive development and psychosocial health. There was very low-quality evidence for overall sedentary time and adiposity, motor development, and psychosocial health.
- The overall quality of the evidence investigated the associations between SB and various health outcomes in Children <5 years of age was rated as very low.

What large scale cohort studies have been published since September 2019?

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation’s guidelines for physical activity and sedentary behaviour was conducted. Search terms included “physical activity”, “guidelines”, “recommendations”, “adults”, “sedentary behaviour”, “systematic review”, “observational”, “cohort”, “meta-analysis”. Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified research articles from their personal libraries for inclusion. The selection of articles included in the evidence brief was guided by the expertise of project team members and, cognisant of the Bradford Hill criteriaⁱⁱⁱ, their assessment of studies’ potential to impact the formation of population level guidelines.

The identified studies are:

- Xanne Janssen, Anne Martin, Adrienne R. Hughes, Catherine M. Hill, Grigorios Kotronoulas, Kathryn R. Hesketh, Associations of screen time, sedentary time and physical activity with sleep in under 5s: A systematic review and meta-analysis, *Sleep Medicine Reviews*, Volume 49, 2020, 101226, ISSN 1087-0792.

Systematic review and meta-analysis of 31 studies investigating the association between screen time, sedentary behaviour and physical activity with sleep outcomes in infants (0-1y); toddlers (1-2y); and pre-schoolers (3-4y). Findings suggest that future 24-h movement behaviour guidelines should highlight the importance of limiting screen time in young children. The quality of the evidence was very low, and high-quality experimental evidence is required.

Our recommendations

Few large-scale epidemiological studies have been published since the September 2019. We have assessed the evidence on its impact to add new insight to World Health Organisation’s Guidelines. We recommend for the physical activity and sedentary behaviour recommendations of the World Health Organisation for Children under 5 years to be adopted in the updated Physical Activity guidelines for Ireland.

Prepared by Dr Dylan Power on behalf of the Expert Group (Prof Elaine Murtagh, Prof Catherine Woods, Prof Charlie Foster, Dr Sean Healy, Dr Gráinne Hayes, Prof Marie Murphy, Prof Niamh Murphy, Dr Chloë Williamson) for the Update of the National Physical Activity Guidelines for Ireland.

b) Children and Adolescents

Update of the National Guidelines on Physical Activity for Ireland Evidence Brief: Children and Adolescents (5-17 years)

Key Points:

- There is substantial evidence to suggest that regular moderate- to vigorous- physical activity (aerobic and muscle strengthening exercise) is beneficial for a range of health-related outcomes in children and adolescents.
- Relatable imagery and examples of how PA guidelines can be achieved should be included for end-users (parents, health promotion professionals).
- Sedentary behaviour recommendations should include mention of limiting screen time, especially in this population group. It is important to engage with end-users (parents, youth) on how realistic/achievable screen time recommendations are.

What are the differences between Ireland 2009 recommendations and WHO 2020 recommendations?

- Ireland define “Children and Young People” as 2-18, whereas WHO define “Children and Adolescents” as 5-17. WHO provide specific guidelines for children under 5.
- Ireland 2009 guidelines do not provide guidelines on sedentary behaviour. WHO provide SB recommendations with a particular emphasis on minimising screen time for this population group.
- Both Ireland (2009) and WHO (2020) provide guidelines of 60 minutes of moderate to vigorous aerobic PA per day. However, Ireland guidelines recommend a minimum of 60 minutes per day, whereas WHO recommend an average of 60 minutes per day across the week.

What did the World Health Organisation find in their 2019 Review?

Physical Activity

- There is moderate certainty evidence that greater amounts of moderate and vigorous intensity PA are associated with improved cardiorespiratory fitness and muscular fitness, cardiometabolic health and bone health in children and adolescents.
- There is moderate certainty evidence that both short- and long-term moderate to vigorous intensity PA have positive effects on cognitive function, academic outcomes and mental health.
- Evidence supported amending the previous specification of a minimum daily threshold of 60 minutes of PA to an average of 60 minutes per day per week.
- There is moderate certainty evidence that greater amounts of vigorous intensity PA are associated with improved cardiorespiratory fitness.
- There is moderate certainty evidence that muscle-strengthening activities should be incorporated at least 3 days a week.

Sedentary Behaviour

- There is low certainty evidence that higher duration of SB is significantly associated with lower physical fitness and cardiometabolic health in children and adolescents.
- There is very low to moderate certainty evidence that higher durations of sedentary behaviour (screen time, TV viewing, video games) are significantly associated with

unfavourable measures of mental health and behavioural conduct in children and adolescents.

- The benefits of limiting the amount of SB for children and adolescents outweigh the harms.

What large scale cohort studies have been published since September 2019?

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation's guidelines for physical activity and sedentary behaviour was conducted. Search terms included "physical activity", "guidelines", "recommendations", "adults", "sedentary behaviour", "systematic review", "observational", "cohort", "meta-analysis". Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified research articles from their personal libraries for inclusion. The selection of articles included in the evidence brief was guided by the expertise of project team members and, cognisant of the Bradford Hill criteriaⁱⁱⁱ, their assessment of studies' potential to impact the formation of population level guidelines.

The studies which were identified are:

- García-Hermoso A, Ezzatvar Y, Ramírez-Vélez R, Olloquequi J, Izquierdo M. Is device-measured vigorous physical activity associated with health-related outcomes in children and adolescents? A systematic review and meta-analysis. *J Sport Health Sci.* 2021 May;10(3):296-307. doi: 10.1016/j.jshs.2020.12.001. Epub 2020 Dec 5. PMID: 33285309; PMCID: PMC8167335.

Systematic review and meta-analysis of 23 studies including 13674 participants investigating the prospective association between vigorous intensity physical activity and health-related outcomes in children and adolescents. Significant associations were found between vigorous physical activity at baseline and overall adiposity ($r = -0.09$, 95%CI: -0.15 to -0.03; $p = 0.002$; $I^2 = 89.8\%$), cardiometabolic risk score ($r = -0.13$, 95%CI: -0.24 to -0.02, $p = 0.020$; $I^2 = 69.6\%$), cardiorespiratory fitness ($r = 0.25$, 95%CI: 0.15-0.35; $p < 0.001$; $I^2 = 57.2\%$), and total body bone mineral density ($r = 0.16$, 95%CI: 0.06 to 0.25; $p = 0.001$; $I^2 = 0\%$). Findings suggest that vigorous physical activity is negatively associated to adiposity and positively associated to cardiorespiratory fitness and today body bone mineral density in later life.

- Miguel Angel Tapia-Serrano, Javier Sevil-Serrano, Pedro Antonio Sánchez-Miguel, José Francisco López-Gil, Mark S. Tremblay, Antonio García-Hermoso, Prevalence of meeting 24-Hour Movement Guidelines from pre-school to adolescence: A systematic review and meta-analysis including 387,437 participants and 23 countries, *Journal of Sport and Health Science*, Volume 11, Issue 4, 2022, Pages 427-437, ISSN 2095-2546, <https://doi.org/10.1016/j.jshs.2022.01.005>.

Systematic review and meta-analysis of 63 studies 387437 individuals (51% girls, aged 3-18) investigating the overall adherence to the 24-Hour Movement Guidelines among pre-schoolers, children, and adolescents worldwide. Overall, 7.12% (95%CI: 6.45%–7.78%) of youth met all three 24-Hour Movement Guidelines, and 19.21% (95%CI: 16.73%–21.69%) met none of the 3

recommendations. Concerning sex, adherence to all recommendations was significantly lower in girls (3.75%, 95%CI: 3.23%–4.27%) than in boys (6.89%, 95%CI: 5.89%–7.89%) ($p < 0.001$). Findings suggest that most young people failed to meet the 3 recommended behaviours (sleep, sedentary behaviour, and physical activity) of the 24-Hour Movement Guidelines. Adherence to the guidelines was lower in adolescents, especially in girls.

- López-Gil, JF, Tapia-Serrano, MA, Sevil-Serrano, J, Sánchez-Miguel, PA, García-Hermoso, A. Are 24-hour movement recommendations associated with obesity-related indicators in the young population? A meta-analysis. *Obesity (Silver Spring)*. 2023; 1-13. doi:[10.1002/oby.23848](https://doi.org/10.1002/oby.23848).

A meta-analysis of 29 studies investigating the relationship between meeting all three 24-hour movement recommendations (i.e., physical activity, sleep duration, and screen time) and obesity-related indicators in young people. Meeting all three recommendations was related to lower odds of overweight/obesity 0.65 (95% CI: 0.56 to 0.76) and obesity alone 0.28 (95% CI: 0.16 to 0.50). Findings suggest that meeting the 24-hour movement recommendations was cross-sectionally associated with lower overall obesity-related indicators, but no longitudinal association was found.

Our recommendations

Few large-scale epidemiological studies have been published since the September 2019. Studies have examined associations between physical activity exposure and morbidity risk or mortality outcomes. We have assessed each on its impact to add new insight to WHO Guidelines. We recommend for the physical activity and sedentary behaviour recommendations of the World Health Organisation for Children and Adolescents to be adopted in the updated Physical Activity guidelines for Ireland.

Prepared by Dr Dylan Power on behalf of the Expert Group (Prof Elaine Murtagh, Prof Catherine Woods, Prof Charlie Foster, Dr Sean Healy, Dr Gráinne Hayes, Prof Marie Murphy, Prof Niamh Murphy, Dr Chloë Williamson) for the Update of the National Physical Activity Guidelines for Ireland.

c) Adults

Update of the National Guidelines on Physical Activity for Ireland Evidence Brief: Adults (18-64 years)

Key Points:

- There is substantial evidence to suggest that regular moderate- to vigorous- physical activity (aerobic and muscle strengthening exercise) is beneficial for a range of health-related outcomes in adults.
- There is moderate certainty evidence that higher sedentary behaviour times are associated with higher rates of all-cause mortality, cardiovascular disease mortality, cancer mortality, and type-2 diabetes.
- When developing public facing guidelines, effort should be placed on providing various examples of how adults of different ages, socioeconomic backgrounds, and abilities can achieve the physical activity guidelines through a range of activities.

What are the differences between Ireland 2009 recommendations and WHO 2020 recommendations?

- The Ireland 2009 guidelines recommend a minimum threshold of at least 30 minutes on 5 days per week (or 150 minutes a week). The WHO recommend adults should do at least 150-300 minutes of moderate aerobic PA, or 75-150 vigorous intensity PA, throughout the week.
- There are no sedentary behaviour recommendations in the Ireland 2009 guidelines.
- There are recommendations in both the Ireland 2009 and WHO 2020 guidelines which recommend that adults do muscle-strengthening exercise on 2 or more days of the week. However, the Ireland 2009 guidelines do not present the strength recommendations with the same emphasis as aerobic guidelines as they appear in the small text following the aerobic recommendation.

What did the World Health Organisation find in their 2019 review?

Physical Activity

- There is high certainty evidence that any level and any intensity of PA is associated with lower risk of all-cause mortality, incidence of hypertension, cardiovascular disease, type-2 diabetes in adults. There is moderate to high certainty evidence to suggest that higher levels of PA are associated with lower risk of site-specific cancers.
- More PA is associated with larger effects on health outcomes, although the relative benefits level off after higher levels of PA.
- There is moderate certainty evidence that PA of any duration is associated with improved health outcomes, and prior specification that aerobic activity should be performed in bouts of at least 10 minutes should be removed.
- There is moderate certainty evidence that 150-300 minutes of moderate intensity aerobic PA or equivalent, per week, reduced risk for multiple health outcomes, and risk reduction continues, but starts to plateau beyond 300 minutes a week.
- There is moderate certainty evidence that muscle-strengthening activities undertaken on 2 or more days a week, provide additional health benefits, but there is insufficient evidence to specify a duration for optimal health benefits.

- There is moderate certainty evidence that PA undertaken in different domains can provide health benefits, although currently it is not possible to differentiate the effect of different domains of PA on various health outcomes.

Sedentary Behaviour

- There is moderate certainty evidence of an association between greater SB time and higher all cause mortality, cardiovascular disease mortality, cancer mortality, incidence of cardiovascular disease, type 2 diabetes, and incident endometrial, colon, and lung cancers.
- There is insufficient evidence to set quantified (time-based) recommendations on sedentary behaviours.
- There is insufficient evidence to make recommendations on the frequency and/or duration of breaks in sedentary behaviour.
- Higher amounts of moderate- to vigorous-intensity PA can attenuate the detrimental association between SB and health outcomes.

What large scale cohort studies have been published since September 2019?

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation’s guidelines for physical activity and sedentary behaviour was conducted. Search terms included “physical activity”, “guidelines”, “recommendations”, “adults”, “sedentary behaviour”, “systematic review”, “observational”, “cohort”, “meta-analysis”. Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified research articles from their personal libraries for inclusion. The selection of articles included in the evidence brief was guided by the expertise of project team members and, cognisant of the Bradford Hill criteriaⁱⁱⁱ, their assessment of studies’ potential to impact the formation of population level guidelines.

The studies which were identified are:

- Liang Z-d, Zhang M, Wang C-z, Yuan Y and Liang J-h (2022) Association between sedentary behavior, physical activity, and cardiovascular disease-related outcomes in adults—A meta-analysis and systematic review. *Frontiers in Public Health* 10. DOI: 10.3389/fpubh.2022.1018460

This systematic review and meta-analysis of 148 RCTs and 36 longitudinal studies investigates the association between PA and/or SB and CVD-related outcomes in healthy adults. Findings from longitudinal studies suggest that long-term PA was associated with a significantly lower risk of CVD in healthy adults [HR 0.71 (95% CI: 0.66 to 0.77). Conversely, long-term SB increased the risk of CVD in healthy adults [HR 1.34 (95% CI: 1.26 to 1.43)].

- Lee DH, Rezende LF, Joh H-K, Keum N, Ferrari G, Rey-Lopez JP, Rimm EB, Tabung FK and Giovannucci EL (2022) Long-term leisure-time physical activity intensity and all-cause and cause-specific mortality: a prospective cohort of US adults. *Circulation* 146(7): 523-534.

Prospective US cohort study of 116221 participants investigating the graded association between long-term moderate and vigorous intensity PA and all-cause and cause-specific mortality. In analyses

mutually adjusted for MPA and VPA, hazard ratios comparing individuals meeting the long-term leisure-time VPA guideline (75–149 min/wk) versus no VPA were 0.81 (95% CI, 0.76–0.87) for all-cause mortality, 0.69 (95% CI, 0.60–0.78) for cardiovascular disease (CVD) mortality, and 0.85 (95% CI, 0.79–0.92) for non-CVD mortality. Meeting the long-term leisure-time MPA guideline (150–299 min/wk) was similarly associated with lower mortality: 19% to 25% lower risk of all-cause, CVD, and non-CVD mortality. Findings support the current PA guidelines and further suggest higher levels of long-term leisure-time vigorous and moderate intensity PA to achieve the maximum benefit of mortality reduction.

- Ekelund U, Tarp J, Fagerland MW, Johannessen JS, Hansen BH, Jefferis BJ, Whincup PH, Diaz KM, Hooker S, Howard VJ, Chernofsky A, Larson MG, Spartano N, Vasani RS, Dohrn IM, Hagströmer M, Edwardson C, Yates T, Shiroma EJ, Dempsey P, Wijndaele K, Anderssen SA, Lee IM. Joint associations of accelerometry-measured physical activity and sedentary time with all-cause mortality: a harmonised meta-analysis in more than 44 000 middle-aged and older individuals. *Br J Sports Med.* 2020 Dec;54(24):1499-1506. doi: 10.1136/bjsports-2020-103270. PMID: 33239356; PMCID: PMC7719907.

Harmonised meta-analysis of nine prospective cohort studies (n=44370) from four countries investigating the joint associations of accelerometer-measured physical and sedentary behaviour time with all-cause mortality. Compared with the reference group (highest physical activity/lowest sedentary time), the risk of death increased with lower levels of MVPA and greater amounts of sedentary time. Among those in the highest third of MVPA, the risk of death was not statistically different from the referent for those in the middle (16%; 95% CI 0.87% to 1.54%) and highest (40%; 95% CI 0.87% to 2.26%) thirds of sedentary time. Those in the lowest third of MVPA had a greater risk of death in all combinations with sedentary time; 65% (95% CI 1.25% to 2.19%), 65% (95% CI 1.24% to 2.21%) and 263% (95% CI 1.93% to 3.57%), respectively. Findings suggest that higher sedentary time is associated with higher mortality in less active individuals when measured by accelerometry. About 30-40 minutes of moderate to vigorous physical activity attenuates the association between sedentary time and risk of death.

- Wu J, Fu Y, Chen D, Zhang H, Xue E, Shao J, Tang L, Zhao B, Lai C, Ye Z. Sedentary behavior patterns and the risk of non-communicable diseases and all-cause mortality: A systematic review and meta-analysis. *Int J Nurs Stud.* 2023 Oct; 146:104563. doi: 10.1016/j.ijnurstu.2023.104563. Epub 2023 Jul 13. PMID: 37523952.

Systematic review and meta-analysis of 11 prospective cohort and 7 cross sectional studies investigating the association of sedentary behaviour patterns and risk of non-communicable diseases and all-cause mortality. Findings suggest that the risk elicited by a prolonged sedentary behaviour pattern could be reduced or eliminated by physical activity, and only extremely high levels of prolonged sitting significantly increased the risk of several major NCD's and all-cause mortality. There was some evidence for a threshold of 30-60 minutes of prolonged sitting, above which clinically significant negative health implications were seen.

- Seaw Jia Liew, Nicholas A. Petrunoff, Nithya Neelakantan, Rob M. van Dam, Falk Müller-Riemenschneider. Device-Measured Physical Activity and Sedentary Behavior in Relation to Cardiovascular Diseases and All-Cause Mortality: Systematic Review and Meta-Analysis of Prospective Cohort Studies. *AJPM Focus*, 2023, 100054, ISSN 2773-0654, [10.1016/j.focus.2022.100054](https://doi.org/10.1016/j.focus.2022.100054).

Systematic review and meta-analysis of 29 prospective cohort studies investigating the association of device-measured physical activity and sedentary behaviour with cardiovascular disease and all-cause mortality among adults. Comparing the highest with the lowest exposure categories, the pooled hazard ratios (95% CIs) for cardiovascular disease mortality were 0.29 (CI=0.18, 0.47) for total physical activity, 0.37 (CI=0.25, 0.55) for moderate-to-vigorous physical activity, 0.62 (0.41–0.93) for light physical activity, and 1.89 (CI=1.09, 3.29) for sedentary behaviour. The pooled hazard ratios (95% CIs) for all-cause mortality were 0.42 (CI=0.34, 0.53) for total physical activity, 0.43 (CI=0.35, 0.53) for moderate-to-vigorous physical activity, 0.58 (CI=0.43, 0.80) for light physical activity, and 1.58 (CI=1.19, 2.09) for sedentary behaviour. Findings suggest that being more physically active at any intensity, accumulating more daily steps, and spending less time sedentary were associated with lower risk of cardiovascular disease and all-cause mortality. Cardiovascular disease outcomes and all-cause mortality were strongly associated with total physical activity, moderate to vigorous physical activity, and step counts, whereas the associations with light-intensity physical activity and sedentary behaviour were somewhat weaker and less consistent across studies.

- Cillekens B, Huysmans MA, Holtermann A, van Mechelen W, Straker L, Krause N, van der Beek AJ, Coenen P. Physical activity at work may not be health enhancing. A systematic review with meta-analysis on the association between occupational physical activity and cardiovascular disease mortality covering 23 studies with 655 892 participants. *Scand J Work Environ Health*. 2022 Mar 1;48(2):86-98. doi: 10.5271/sjweh.3993. Epub 2021 Oct 17. Erratum in: *Scand J Work Environ Health*. 2023 Apr 1;49(3):231-244. PMID: 34656067; PMCID: PMC9045238.

Systematic review and meta-analysis of 31 articles including 655892 participants investigating the association between occupational physical activity and cardiovascular disease mortality. Occupational physical activity showed no significant association with overall CVD mortality for both males [hazard ratio (HR) 1.00, 95% confidence interval (CI) 0.87–1.15] and females (HR 0.95, 95% CI 0.82–1.09). Findings suggest that occupational physical activity was not related to overall CVD mortality. Beneficial health effects that are frequently reported for leisure-time physical activity may not apply to occupational physical activity with regards to CVD mortality.

Our recommendations

Few large-scale epidemiological studies have been published since the September 2019. Studies have examined associations between physical activity exposure and morbidity risk or mortality outcomes. We have assessed each on its impact to add new insight to WHO Guidelines. We recommend for the physical activity and sedentary behaviour recommendations of the World Health Organisation for Adults to be adopted in the updated Physical Activity guidelines for Ireland.

Key sources:

- The National Guidelines on Physical Activity for Ireland. Dublin: Department of Health & Children and Health Service Executive; 2009.
- WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020. Licence: CC BY-NC-SA 3.0 IGO.

Prepared by Dr Dylan Power on behalf of the Expert Group (Prof Elaine Murtagh, Prof Catherine Woods, Prof Charlie Foster, Dr Sean Healy, Dr Gráinne Hayes, Prof Marie Murphy, Prof Niamh Murphy, Dr Chloë Williamson) for the Update of the National Physical Activity Guidelines for Ireland.

d) Older Adults

Update of the National Guidelines on Physical Activity for Ireland Evidence Brief: Older Adults (65+ Years)

Key Points:

- There is substantial evidence to suggest that regular moderate- to vigorous- physical activity (aerobic and muscle strengthening exercise) is beneficial for a range of health-related outcomes in Older Adults.
- Due to a lack of evidence on older adult populations, WHO recommend the same sedentary behaviour guidelines for adults.
- Effort should be placed on defining terms (i.e., aerobic, intensity, moderate) and providing clear instructions and examples of how end-users can achieve physical activity guidelines.

What are the differences between Ireland 2009 recommendations and WHO 2020 recommendations?

- The Ireland 2009 guidelines recommend a minimum threshold of least 30 minutes on five days of the week, or at least 150 minutes a week, of moderate intensity PA. Whereas the WHO recommend a range of 150-300 minutes of moderate intensity PA, or 75-150 minutes of vigorous activity (or combination) across the week.

What did the World Health Organisation find in their 2019 review?

Physical Activity

- There is moderate certainty evidence that PA improves physical function and reduces the risk of age-related loss of physical function in the general population.
- There is high certainty evidence of an inverse dose-response relationship between volume of aerobic PA and risk of physical functions limitations in the general older adult population.
- There is high certainty evidence that higher levels of PA that combines, strength, gait, and functional training are associated with a reduced rate of falls and risk of injury from falls in older adults.

Sedentary Behaviour

- *Due to a lack of population-specific evidence, the primary evidence base for assessing the associations between SB and health outcomes in older populations was the same literature collated and reviewed for adult populations. Please see evidence brief presented for Adults (18-64).

What large scale cohort studies have been published since September 2019?

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation's guidelines for physical activity and sedentary behaviour was conducted. Search terms included "physical activity", "guidelines", "recommendations", "adults", "sedentary behaviour", "systematic review", "observational", "cohort", "meta-analysis". Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified research articles from their personal libraries for inclusion. The selection of articles included in the evidence

brief was guided by the expertise of project team members and, cognisant of the Bradford Hill criteriaⁱⁱⁱ, their assessment of studies' potential to impact the formation of population level guidelines.

The studies which were identified are:

- Junga Lee, The association between physical activity and risk of falling in older adults: A systematic review and meta-analysis of prospective cohort studies, *Geriatric Nursing*, Volume 41, Issue 6, 2020, Pages 747-753, ISSN 0197-4572, 10.1016/j.gerinurse.2020.05.005.

Systematic review and meta-analysis of 10 prospective cohort studies including 58241 older adult participants (add age range & SD) investigating the association between physical activity and risk of falling in older adults. Findings suggest that older adults who participated in physical activity had a decreased risk of falling [0.976 (95% CI: 0.957–0.996, $p = 0.019$)], and inactive older adults had an increased risk of falling [1.082 (95% CI: 1.007–1.163, $p = 0.031$).

- Erika Aparecida Silveira, Carolina Rodrigues Mendonça, Felipe Mendes Delpino, Guilherme Vinícius Elias Souza, Lorena Pereira de Souza Rosa, Cesar de Oliveira, Matias Noll, Sedentary behavior, physical inactivity, abdominal obesity and obesity in adults and older adults: A systematic review and meta-analysis, *Clinical Nutrition ESPEN*, Volume 50, 2022, Pages 63-73, ISSN 2405-4577, 10.1016/j.clnesp.2022.06.001.

Systematic review and meta-analysis of 23 studies including 638000 adults and older adults investigating the prevalence of sedentary behaviour and physical inactivity, the association of sedentary behaviour and physical inactivity with obesity, and the objective and subjective measures, diagnostic criteria, and cut-off points to estimate sedentary behaviour and physical inactivity in adults and older adults with obesity. Significant associations were identified between obesity and sedentary behaviour [OR 1.45, 95% CI: 1.21–1.75] and physical inactivity [OR 1.52, 95% CI, 1.23–1.87].

- Anna G.M. Rojer, Keenan A. Ramsey, Marijke C. Trappenburg, Natascha M. van Rijssen, René H.J. Otten, Martijn W. Heymans, Mirjam Pijnappels, Carel G.M. Meskers, Andrea B. Maier, Instrumented measures of sedentary behaviour and physical activity are associated with mortality in community-dwelling older adults: A systematic review, meta-analysis and meta-regression analysis, *Ageing Research Reviews*, Volume 61, 2020, 101061, ISSN 1568-1637, 10.1016/j.arr.2020.101061.

Systematic review and meta-analysis of 11 cohorts including 38141 participants aiming to quantify the association between instrumented measures of sedentary behaviour and physical activity with mortality in community-dwelling older adults. Findings suggest that high instrumented sedentary behaviour and low instrumented physical activity are associated with a higher mortality risk. The highest mortality risk for instrumented physical activity was found for total instrumented physical activity, suggesting all physical activity levels contribute to lowering mortality risk.

Our recommendations

Few large-scale epidemiological studies have been published since the September 2019. Studies have examined associations between physical activity exposure and morbidity risk or mortality outcomes. We have assessed each on its impact to add new insight to WHO Guidelines. We recommend for the physical activity and sedentary behaviour recommendations of the World Health Organisation for Older Adults to be adopted in the updated Physical Activity guidelines for Ireland.

Prepared by Dr Dylan Power on behalf of the Expert Group (Prof Elaine Murtagh, Prof Catherine Woods, Prof Charlie Foster, Dr Sean Healy, Dr Gráinne Hayes, Prof Marie Murphy, Prof Niamh Murphy, Dr Chloë Williamson) for the Update of the National Physical Activity Guidelines for Ireland.

e) People living with disability

Update of the National Guidelines on Physical Activity for Ireland Evidence Brief: Children and Adolescents (5-17) and adults (18+) living with disability¹

Key Points:

- There is evidence to suggest that regular moderate- to vigorous- physical activity (aerobic and muscle strengthening exercise) is beneficial for a range of health-related outcomes in people of all ages living with a disability.
- Sedentary behaviour time in children, young people, adults and older adults living with a disability should be minimised.
- The review of evidence relating to children and adolescents living with a disability conducted by the World Health Organisation does not include sufficient literature which is representative of children/young people population groups. Therefore, the findings of the United Kingdom's CMO Guidelines Rapid Review should be used in the formation of PA guidelines for children and adolescents living with a disability.

What are the differences between Ireland 2009 recommendations and WHO 2020 recommendations?

- Ireland's 2009 guidelines provide recommendations for "Adults with disabilities" only. The World Health Organisation's guidelines provide guidelines for "Children and Adolescents (5-17) and adults (18+) living with a disability".
- The Ireland 2009 guidelines provide no recommendations for sedentary behaviour in this population group.
- The Ireland PA guidelines outlined in 2009 recommend adults to be as active as is allowed by the nature of one's disability. The WHO recommendations provide specific (time, age, intensity) recommendations.

What did the World Health Organisations find in their 2019 review?

*** NB: Due to the studies included in the World Health Organisation's review, the findings presented below reflect mostly adult and older adult population groups.*

Physical Activity

- In individuals living with spinal cord injury, there is low certainty evidence that PA reduces shoulder pain and improves vascular function in paralysed limbs and enhances health-related quality of life. There is also moderate evidence that PA improves walking function, muscular strength, and upper extremity function in individuals living with spinal cord injury.
- In individuals with diseases or disorders that impair cognitive function, including Parkinson's disease, there is high certainty evidence that PA improves a number of functional outcomes including walking, balance, strength, and disease specific motor scores. There is also moderate certainty evidence that moderate to vigorous PA can have beneficial effects on cognition in those living with disorders that impair cognitive function.
- In individuals with a history of stroke, there is moderate certainty evidence that mobility-oriented PA can have beneficial effects on physical function and cognition.

- In individuals with diseases or disorders that impair cognitive function, including schizophrenia, there is moderate certainty evidence that PA improves quality of life. There is also high certainty evidence that moderate to vigorous intensity PA can have beneficial effects on cognition, working memory, social cognition and attention.
- In adults with major clinical depression, there is moderate certainty evidence that PA improves quality of life.
- In adults with multiple sclerosis, there is high certainty evidence that PA, particularly aerobic and muscle-strengthening activities, improves physical function, functional mobility, walking speed and endurance, and cardiorespiratory fitness, strength and balance. There is moderate certainty evidence that PA can have a beneficial effect on cognition, and low certainty evidence that PA improves quality of life in people living with multiple sclerosis.
- In children and adults with intellectual disability, there is low certainty evidence that PA improves physical function.
- In children and adolescents with ADHD, there is moderate evidence that moderate- to vigorous-intensity PA can have beneficial effects on cognition, including attention, executive, and social disorders.

Sedentary Behaviours

- The benefits of minimising SB in children, adolescents, adults and older adults living with disability outweigh the harms.
- The evidence on sedentary behaviours in child and adolescent populations could generally be extrapolated to children and adolescents living with disability, according to their specific ability.
- The evidence on SB in the general adult population could generally be extrapolated to adults and older adults living with disability, according to their specific ability.

What large scale cohort studies have been published since September 2019?

A purposive search of academic databases (PubMed, ScienceDirect, and PsycInfo) and grey literature published since the publication of the World Health Organisation’s guidelines for physical activity and sedentary behaviour was conducted. Search terms included “physical activity”, “guidelines”, “recommendations”, “adults”, “sedentary behaviour”, “systematic review”, “observational”, “cohort”, “meta-analysis”. Articles published in English and after September 2019 were included. In addition, the project team members – who are experts in the fields of physical activity, public health, physical education, physiology, health promotion, and adapted physical activity – identified research articles from their personal libraries for inclusion. The selection of articles included in the evidence brief was guided by the expertise of project team members and, cognisant of the Bradford Hill criteria, their assessment of studies’ potential to impact the formation of population level guidelines.

The studies which were identified are:

- Smith B, Rigby B, Netherway J, Wang W, Dodd-Reynolds C, Oliver E, Bone L and Foster C. Physical activity for general health in disabled children and disabled young people: summary of a rapid evidence review for the UK Chief Medical Officers’ update of the physical activity guidelines. Department of Health and Social Care: London, UK. 2022.

Rapid review of 176 reports/studies investigating health outcomes from PA for disabled children and young people (aged 2-17) with physical disabilities (n=79), intellectual and learning disability (n=79), sensory impairments (n=9), and mixed disabilities (n=9). Findings from this review suggest that, for likely substantial health benefits, disabled children and disabled young people should engage in 120 to 180 minutes of mostly aerobic PA per week, at a moderate-to-vigorous intensity. This should be accompanied by challenging but manageable strength and balance-focused activities on average 3 times per week.

- Huising-Scheetz MJ, Li L, Wroblewski KE, Schumm LP, McClintock MK, Pinto JM. Exploring Shared Effects of Multisensory Impairment, Physical Dysfunction, and Cognitive Impairment on Physical Activity: An Observational Study in a National Sample. *J Aging Phys Act.* 2021 Oct 5;30(4):572-580. doi: 10.1123/japa.2021-0065. PMID: 34611055; PMCID: PMC9843725.

Observational study including a nationally representative sample of 507 US home dwelling older adults with 5 year follow up investigating the effects of multisensory impairments, physical dysfunction, and cognitive impairment on objectively measured PA. Worse multisensory impairment predicted lower PA across three scales (Global Sensory Impairment: $\beta=-0.04$, 95% confidence interval [-0.07, -0.02]; Total Sensory Burden: $\beta=-0.01$, 95% confidence interval [-0.03, -0.003]; and Number of Impaired Senses: $\beta=-0.02$, 95% confidence interval [-0.04, -0.004]). Findings suggest that multisensory impairment is a powerful signal of subsequent reduced PA in older US adults, independent of physical dysfunction and cognitive impairment.

- Joana Vítor, Catarina Melita, Mário Rodrigues, Diana Aguiar de Sousa, João Costa, JM Ferro, Ana Verdelho, Physical activity in vascular cognitive impairment: Systematic review with meta-analysis, *Journal of Stroke and Cerebrovascular Diseases*, Volume 32, Issue 8, 2023, 107133, ISSN 1052-3057, 10.1016/j.jstrokecerebrovasdis.2023.107133.

Systematic review and meta-analysis including 9 observational prospective studies investigating the potential preventive role of physical activity on vascular cognitive impairment. There was considerable methodological heterogeneity across studies. Only three studies reported significant associations. The overall effect was statistically significant (HR 0.68, 95%CI 0.54-0.86, I^2 6.8%), with higher levels of physical activity associated with a smaller risk of vascular cognitive impairment overtime, particularly vascular dementia. Findings suggest that regular physical activity is associated with a reduced risk for vascular cognitive impairment in the elderly, in particular vascular dementia.

- Mary Njeri Wanjau, Holger Möller, Fiona Haigh, Andrew Milat, Rema Hayek, Peta Lucas, J. Lennert Veerman, Physical Activity and Depression and Anxiety Disorders: A Systematic Review of Reviews and Assessment of Causality, *AJPM Focus*, Volume 2, Issue 2, 2023, 100074, ISSN 2773-0654, <https://doi.org/10.1016/j.focus.2023.100074>.

Systematic review of reviews including 4 reviews investigating the epidemiologic evidence on the strength of the association between physical activity and incident cases of depression and anxiety. From the 2 included reviews that reported pooled estimates, people with high physical activity levels were found to have a decreased risk of incident depression (adjusted RR=0.83, 95% CI=0.76, 0.90) and reduced odds of developing anxiety (adjusted OR=0.74, 95% CI=0.62, 0.88) when compared with those with low physical activity levels.

- Azianah Ibrahim, Arimi Fitri Mat Ludin, Devinder Kaur Ajit Singh, Nor Fadilah Rajab, Suzana Shahar, Changes in cardiovascular-health blood biomarkers in response to exercise intervention among older adults with cognitive frailty: A scoping review, *Frontiers in Physiology*, 10.3389/fphys.2023.1077078, 14, (2023).

Harmonised analysis of longitudinal data from 11988 participants in 10 cohorts to examine the dose-response relationship between late-life physical activity and incident dementia among older adults. Using no physical activity as a reference, dementia risk decreased with duration of physical activity up to 3.1 to 6.0 hours/week (hazard ratio [HR] 0.88, 95% confidence interval [CI] 0.67 to 1.15 for 0.1 to 3.0 hours/week; HR 0.68, 95% CI 0.52 to 0.89 for 3.1 to 6.0 hours/week), but plateaued with higher duration. For the amount of physical activity, a similar pattern of dose-response curve was observed, with an inflection point of 9.1 to 18.0 metabolic equivalent value (MET)-hours/week (HR 0.92, 95% CI 0.70 to 1.22 for 0.1 to 9.0 MET-hours/week; HR 0.70, 95% CI 0.53 to 0.93 for 9.1 to 18.0 MET-hours/week). Findings suggest that performing 3.1-6.0 hours of physical activity and expending 9.1 to 18.0 MET-hours of energy per week may reduce dementia risk.

Our recommendations

Few large-scale epidemiological studies have been published since the September 2019. Studies have examined associations between physical activity exposure and morbidity risk or mortality outcomes. We have assessed each on its impact to add new insight to WHO Guidelines. We recommend for the physical activity and sedentary behaviour recommendations of the World Health Organisation for Adults and Older Adults living with a disability to be adopted in the renewed Physical Activity guidelines for Ireland. For Children and Adolescents living with disabilities, we recommend for the recommendations of the UK's Department of Health and Social Care to be adopted in the updated Physical Activity guidelines for Ireland.

Prepared by Dr Dylan Power on behalf of the Expert Group (Prof Elaine Murtagh, Prof Catherine Woods, Prof Charlie Foster, Dr Sean Healy, Dr Gráinne Hayes, Prof Marie Murphy, Prof Niamh Murphy, Dr Chloë Williamson) for the Update of the National Physical Activity Guidelines for Ireland.

Appendix 7: Consultation with Professionals and Practitioners - Summary of Key Findings

The Summary of Key Findings from the survey consultation with professionals and practitioners can be [downloaded from here](#).

Appendix 8: Consultation with the General Public – Summary of Key Findings

The Summary of Key Findings from the survey consultation with the public can be [downloaded from here](#).

Appendix 9: Consensus Meeting Participants

#	Name	Surname	Organisation
1	Niamh	Barry	Department of Education and Skills
2	Paul	Brosnan	Department of Health
3	Gabriel	Castles	Health Service Executive
4	Eimear	Cotter	Health Service Executive
5	Benny	Cullen	Sport Ireland
6	Anne	Culloty	Health Service Executive
7	Helen	Deely	Health Service Executive
8	Linda	Drummond	Health Service Executive
9	Charlie	Foster	University of Bristol/Royal College of Surgeons Ireland
10	Hannah	Goss	Dublin City University
11	Caera	Grady	University of Limerick
12	Gráinne	Hayes	University of Limerick
13	Seán	Healy	University of Limerick
14	Elaine	Hynes	Department of Education and Skills
15	Hayley	Kavanagh	Special Olympics
16	Martina	Lanigan	Health Service Executive
17	Sarah	McCormack	Health Service Executive
18	Suzanne	McDonough	Royal College of Surgeons Ireland
19	María	McEneaney	Health Service Executive
20	Eoin	McNamara	Department of Children, Equality, Disability, Integration and Youth
21	Margaret	McQuillan	Health Service Executive
22	Joey	Murphy	University of Bristol
23	Marie	Murphy	Ulster University/University of Edinburgh
24	Elaine	Murtagh	University of Limerick
25	Amir	Naizi	Health Service Executive
26	Sarah	O'Brien	Health Service Executive
27	María	O'Brien	Health Service Executive
28	Dylan	Power	University of Limerick
29	Martin	Ryan	Irish Heart Foundation
30	Breda	Smyth (CMO)	Department of Health
31	Chloë	Williamson	University of Edinburgh

Appendix 10: Proposed Physical Activity Guidelines

The following evidence summaries are adapted and reproduced under the [CC BY-NC-SA 3.0](#) licence from the following sources:

- Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. Geneva: World Health Organization; 2019.
- WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.

Children under 5 years

These guidelines are for all healthy children under 5 years of age, irrespective of gender, cultural background or socio-economic status of families and are relevant for children of all abilities. Caregivers of children with a disability or those with a medical condition, however, may seek additional guidance from a health professional.

< 1 years

Infants (less than 1 year) should:

- be physically active several times a day in a variety of ways, particularly through interactive floor-based play; more is better. For those not yet mobile, this includes at least 30 minutes in prone position (tummy time) spread throughout the day while awake (*strong recommendations, very low quality evidence*);
- not be secured for more than 1 hour at a time (e.g., prams/strollers, high chairs, or strapped on a caregiver's back). Screen time is not recommended. When sedentary, engaging in reading and storytelling with a caregiver is encouraged (*strong recommendation, very low quality evidence*).

1 - 2 years

Children 1-2 years of age should:

- spend at least 3 hours in a variety of types of physical activities at any intensity, including moderate- to vigorous-intensity physical activity, spread throughout the day; more is better (*strong recommendations, very low quality evidence*);
- not be secured for more than 1 hour at a time (e.g., prams/strollers, high chairs, or strapped on a caregiver's back) or sit for extended periods of time. For 1-year-olds, sedentary screen time (such as watching TV or videos, playing computer games) is not recommended. For those aged 2 years, sedentary screen time should be no more than 1 hour; less is better. When sedentary, engaging in reading and storytelling with a caregiver is encouraged (*strong recommendations, very low quality evidence*).

3 - 4 years

Children 3-4 years of age should:

- spend at least 3 hours in a variety of types of physical activities at any intensity, of which at least 1 hour is moderate- to vigorous-intensity physical activity, spread throughout the day; more is better (*strong recommendations, very low quality evidence*);
- not be secured for more than 1 hour at a time (e.g., prams/strollers) or sit for extended periods of time. Sedentary screen time should be no more than 1 hour; less is better. When sedentary, engaging in reading and storytelling with a caregiver is encouraged (*strong recommendations, very low quality evidence*).

Children and Adolescents (5-17 years)

It is recommended that:

- Children and adolescents should do at least an average of 1 hour per day of moderate- to vigorous- intensity, mostly aerobic, physical activity, across the week (*Strong recommendation, moderate certainty evidence*).
- Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone, should be incorporated at least 3 days a week (*Strong recommendation, moderate certainty evidence*).

It is recommended that:

- Children and adolescents should limit the amount of time spent being sedentary, particularly the amount of recreational screen time (*Strong recommendation, low certainty evidence*).

Children and Adolescents living with disability

It is recommended that:

- Children and adolescents living with disability should do at least an average of 1 hour per day of moderate- to vigorous- intensity, mostly aerobic, physical activity, across the week (*Strong recommendation, moderate certainty evidence*)
- Vigorous-intensity aerobic activities, as well as those that strengthen muscle and bone should be incorporated at least 3 days a week (*Strong recommendation, moderate certainty evidence*).

For some children and adolescents with certain disabilities (e.g., cerebral palsy, muscular dystrophy) a reduced level of physical activity may be adequate to attain significant health benefits, considering their higher energy cost of physical activity.

It is recommended that:

- Children and adolescents living with disability should limit the amount of time spent being sedentary, particularly the amount of recreational screen time (*Strong recommendation, low certainty evidence*).

Adults (18-64 years)

It is recommended that:

- All adults should undertake regular physical activity (*Strong recommendation, moderate certainty evidence*).
- Adults should do at least 2 hours and 30 minutes to 5 hours of moderate-intensity aerobic physical activity; or at least 1 hour and 15 minutes to 2 hours and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits (*Strong recommendation, moderate certainty evidence*).
- Adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits (*Strong recommendation, moderate certainty evidence*).
- Adults may increase moderate-intensity or vigorous-intensity aerobic physical activity to do more than the recommended amount* for additional health benefits (*Conditional recommendation, moderate certainty evidence*).

*i.e., more than 5 hours of moderate-intensity aerobic physical activity; or more than 2 hours and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week.

It is recommended that:

- Adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits (*Strong recommendation, moderate certainty evidence*).
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity (*Strong recommendation, moderate certainty evidence*).

Older Adults (65+ years)

It is recommended that:

- All older adults should undertake regular physical activity (*Strong recommendation, moderate certainty evidence*).
- Older adults should do at least 2 hours and 30 minutes to 5 hours of moderate-intensity aerobic physical activity; or at least 1 hour and 15 minutes to 2 hours and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week, for substantial health benefits (*Strong recommendation, moderate certainty evidence*).
- Older adults should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits (*Strong recommendation, moderate certainty evidence*).
- As part of their weekly physical activity, older adults should do varied multicomponent physical activity that emphasises functional balance and strength training at moderate or greater intensity, on 3 or more days a week, to enhance functional capacity and to prevent falls (*Strong recommendation, moderate certainty evidence*).
- Older adults may increase moderate-intensity or vigorous intensity aerobic physical activity to do more than the recommended amount* for additional health benefits (*Conditional recommendation, moderate certainty evidence*).

*i.e., more than 5 hours of moderate-intensity aerobic physical activity; or more than 2 hours and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week.

It is recommended that:

- Older adults should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits (*Strong recommendation, moderate certainty evidence*).
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, older adults should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity (*Strong recommendation, moderate certainty evidence*).

Adults living with disability

It is recommended that:

- All adults living with disability should undertake regular physical activity (*Strong recommendation, moderate certainty evidence*).
- Adults living with disability should do at least 2 hours and 30 minutes to 5 hours of moderate-intensity aerobic physical activity; or at least 1 hour and 15 minutes to 2 hours and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for substantial health benefits (*Strong recommendation, moderate certainty evidence*).

- Adults living with disability should also do muscle-strengthening activities at moderate or greater intensity that involve all major muscle groups on 2 or more days a week, as these provide additional health benefits (*Strong recommendation, moderate certainty evidence*).
- As part of their weekly physical activity, older adults living with disability should do varied multicomponent physical activity that emphasises functional balance and strength training at moderate or greater intensity on 3 or more days a week, to enhance functional capacity and prevent falls (*Strong recommendation, moderate certainty evidence*)
- Adults living with disability may increase moderate-intensity or vigorous-intensity aerobic physical activity to more than the recommended amount* for additional health benefits (*Conditional recommendation, moderate certainty evidence*)

*i.e. More than 5 hours of moderate-intensity aerobic physical activity; or more than 2 hour and 30 minutes of vigorous-intensity aerobic physical activity; or an equivalent combination of moderate- and vigorous-intensity activity throughout the week

It is recommended that:

- Adults living with disability should limit the amount of time spent being sedentary. Replacing sedentary time with physical activity of any intensity (including light intensity) provides health benefits (*Strong recommendation, low certainty evidence*)
- To help reduce the detrimental effects of high levels of sedentary behaviour on health, adults living with disability should aim to do more than the recommended levels of moderate- to vigorous-intensity physical activity (*Strong recommendation, low certainty evidence*)

Appendix 11: Proposed Physical Activity Messages

The following evidence summaries are adapted from the Department of Health and Social Care (2023) UK Chief Medical Officers' physical activity guidelines communications framework. Available from: <https://www.gov.uk/government/publications/uk-chief-medical-officers-physical-activity-guidelines-communications-framework>

Educational Messages for Professionals and Practitioners

Health and Social care professionals and practitioners

Educational Message
Physical activity can have a protective effect on a range of chronic conditions including coronary heart disease, obesity and type 2 diabetes, mental health problems and social isolation. Particularly in later life, it can also help treat and offset the symptoms of depression, cardiovascular disease and Parkinson's disease
Being inactive is harmful to health
In childhood, strengthening activities help to develop muscle strength and build healthy bones. In adults and older adults, activities which improve strength and balance contribute to healthy ageing, reduce the risk of falls and help people feel more confident
Being active makes daily tasks easier and increases independence, particularly for people with a disability and those in later life
The relationship between physical activity and health is clear. The more time spent being physically active, the greater the health benefits – even relatively small increases in physical activity can contribute to improved health and quality of life
Regular physical activity provides a range of physical, mental and social health benefits. These include: reducing the risk of disease; managing existing conditions; making it easier to maintain a healthier weight; developing and maintaining physical and mental function; and increasing motivation and confidence
Recent evidence demonstrates that there is no minimum amount of physical activity required to achieve some health benefits
Even aiming to do at least 10 minutes of activity at a time can be effective as a behavioural goal for people starting from low levels of activity
For children and young people, taking part in physical activity helps to build confidence and develop social skills, and is also associated with improved learning and attainment
Achieving higher levels of physical activity in the early years helps maintain higher levels later in childhood and adolescence, and into adulthood
Myths about physical activity being harmful for people with a disability should be dispelled

Educational Message
Achieving higher levels of physical activity in the early years helps maintain higher levels later in childhood and adolescence, and into adulthood
Being inactive is harmful to health
For children and young people, taking part in physical activity helps to build confidence and develop social skills
Regular physical activity provides a range of physical, mental and social health benefits. These include: reducing the risk of disease; managing existing conditions; making it easier to maintain a healthier weight; developing and maintaining physical and mental function; and increasing motivation and confidence
In childhood, strengthening activities help to develop muscle strength and build healthy bones. In adults and older adults, activities which improve strength and balance contribute to healthy ageing, reduce the risk of falls and help people feel more confident
Regular physical activity is associated with improved learning and attainment both directly (improved grades, school engagement, behaviour and reduced absenteeism) and indirectly (by enhancing skills such as self-control and concentration, team working and time management)
The relationship between physical activity and health is clear. The more time spent being physically active, the greater the health benefits – even relatively small increases in physical activity can contribute to improved health and quality of life
Physical activity can have a protective effect on a range of chronic conditions including coronary heart disease, obesity and type 2 diabetes, mental health problems and social isolation. Particularly in later life, it can also help treat and offset the symptoms of depression, cardiovascular disease and Parkinson’s disease
Recent evidence demonstrates that there is no minimum amount of physical activity required to achieve some health benefits
Even aiming to do at least 10 minutes of activity at a time can be effective as a behavioural goal for people starting from low levels of activity

Educational Message
The relationship between physical activity and health is clear. The more time spent being physically active, the greater the health benefits – even relatively small increases in physical activity can contribute to improved health and quality of life
For children and young people, taking part in physical activity helps to build confidence and develop social skills
In childhood, strengthening activities help to develop muscle strength and build healthy bones. In adults and older adults, activities which improve strength and balance contribute to healthy ageing, reduce the risk of falls and help people feel more confident
Regular physical activity provides a range of physical, mental and social health benefits. These include: reducing the risk of disease; managing existing conditions; making it easier to maintain a healthier weight; developing and maintaining physical and mental function; and increasing motivation and confidence
Being active makes daily tasks easier and increases independence, particularly for people with a disability and those in later life
Physical activity can have a protective effect on a range of chronic conditions including coronary heart disease, obesity and type 2 diabetes, mental health problems and social isolation. Particularly in later life, it can also help treat and offset the symptoms of depression, cardiovascular disease and Parkinson’s disease
Recent evidence demonstrates that there is no minimum amount of physical activity required to achieve some health benefits
Even aiming to do at least 10 minutes of activity at a time can be effective as a behavioural goal for people starting from low levels of activity
Regular physical activity is associated with improved learning and attainment both directly (improved grades, school engagement, behaviour and reduced absenteeism) and indirectly (by enhancing skills such as self-control and concentration, team working and time management)
Achieving higher levels of physical activity in the early years helps maintain higher levels later in childhood and adolescence, and into adulthood
Being inactive is harmful to health

Educational Message
The relationship between physical activity and health is clear. The more time spent being physically active, the greater the health benefits – even relatively small increases in physical activity can contribute to improved health and quality of life
Being inactive is harmful to health
Regular physical activity provides a range of physical, mental and social health benefits. These include: reducing the risk of disease; managing existing conditions; making it easier to maintain a healthier weight; developing and maintaining physical and mental function; and increasing motivation and confidence
Physical activity can have a protective effect on a range of chronic conditions including coronary heart disease, obesity and type 2 diabetes, mental health problems and social isolation. Particularly in later life, it can also help treat and offset the symptoms of depression, cardiovascular disease and Parkinson’s disease
Even aiming to do at least 10 minutes of activity at a time can be effective as a behavioural goal for people starting from low levels of activity
Recent evidence demonstrates that there is no minimum amount of physical activity required to achieve some health benefits
Achieving higher levels of physical activity in the early years helps maintain higher levels later in childhood and adolescence, and into adulthood
Physical activity can be supported through designing and providing universal and accessible access to outdoor and indoor spaces and facilities where people can be physically active
Reallocation of space from motorised transport to active travel and/or active recreation can support physical activity.
The provision of green open spaces and/or mixed land use and/or compact urban design can support physical activity.
Physical activity can be supported through infrastructures to support safe walking and/or cycling and/or wheeling, including measures to calm speed, reduce vehicle traffic and enhance active mobility.
Physical activity can be supported through programmes encouraging people to increase their use of public transport and active travel options for going to and from places.

Public Messages

Note: Presented below are two sets of messages with distinct aims for each population group. Message Set 1 represent lay summaries of the physical activity and sedentary behaviour guidelines. Message Set 2 represents draft messages which are intended to improve perceptions towards physical activity, and increase motivation to be physically active.

Overall tagline

Every Move Counts

<5 years

< 1 years (Message Set 1)
If your baby is younger than 12 months old, you can help them to be happy and healthy by helping them to be physically active several times a day in a variety of ways, particularly through interactive floor-based play. The more the better!
If your baby is not yet crawling, their daily physical activity can include 30 minutes of tummy time spread throughout the day while they are awake
We recommend trying not to have your baby secured, for example in a buggy/pram or in a high chair, for more than 1 hour at a time while they are awake if possible.
We know that screen time can sometimes be helpful to parents, but when your baby is not being physically active, they will benefit more from activities such as playing with toys or engaging in reading or storytelling with their caregiver if possible.

1-2 years (Message Set 1)
If your child is 1-2 years of age, you can help them to be happy and healthy by helping them engage in 3 hours of physical activity at any intensity (from moderate to vigorous intensity) spread throughout the day (e.g., walking, crawling, or dancing). The more the better!
We recommend not having your toddler secured, for example in a buggy/pram or in a high chair, for more than 1 hour at a time while they are awake if possible, and avoid having them sit still for extended periods of time while they are awake.
We know that screen time can sometimes be helpful to parents, but when your toddler is not being active, they will benefit more from activities such as playing with toys or engaging in reading or storytelling with their caregiver if possible.
If your child is aged 2, we recommend trying to limit their screen time to 1 hour, but less is better.

3-4 years (Message Set 1)
If your child is 3-4 years old, you can help them to be happy and healthy by helping them engage in 3 hours of physical activity each day. They will benefit even more if 1 hour of these 3 hours is moderate- to vigorous- intensity (such as dancing, running, skipping or scooting). The more the better!
We recommend not having your child secured, for example in a buggy/pram or in a high chair, for more than 1 hour at a time while they are awake, and avoiding having them sit still for extended periods of time while they are awake if possible
We know that screen time can be helpful to parents, but when your child is not being active, they will benefit more from activities such as playing with toys or colouring, or engaging in reading or storytelling with their caregiver if possible.
Where possible, we recommend limiting their screen time to 1 hour, but less is better.

<5 years Message Set 2

Being active with your child is a great way to bond and spend quality time with them
--

Being active can improve your child's body and brain development and improve their mental and physical health

An active child is a happy and healthy child
--

Note: "Child" has been used as it applies to all under 5s. You may wish to substitute "child" for "baby" (<12 months) or "toddler" (1-2 years) to target specific age group.

Children and Adolescents 5-17 (Message Set 1)
If you are between 5 and 17 years old, you can improve your physical and mental health by being physically active for 1 hour or more each day.
We recommend that you take part in physical activities that you enjoy. To get the greatest benefits to health, you may try to take part in mostly aerobic activities (such as walking to school, running or playing sports) with muscle-strengthening activities (such as climbing or doing body weight resistance exercises) on at least 3 days of the week.
You'll know your activity is intense enough to gain health benefits and 'count' towards your 1 hour if you can talk but not sing (moderate), or if you are unable to say more than a few words during the activity (vigorous).
You can make up your daily and weekly physical activity when and how you want to.
We recommend trying to reduce the amount of time you spend sitting still for long periods of time, particularly if this time is spent on a screen (e.g., watching TV or playing video games).

Children and Adolescents 5-17 (Message Set 2)
[1] Being physically active with your friends is a great way to spend time with them
[2] Moving your body makes you feel good
[3] Physical activity can help improve your mental health, make you feel calmer, and less stressed
Physical activity is fun
Being physically active can help your brain function better
Moving your body more can help promote good mental health
Being physically active is good for your brain and your body
Being physically active every day can help you feel happier and fitter
Move your body and be active in a way that you enjoy – any physical activity is good physical activity
Physical activity can help you meet new people
Physical activity can help build your confidence and concentration
Physical activity can give you a sense of achievement
Physical activity can help make your muscles stronger, and improve your movement skills, balance and coordination
Explore activities that make you feel good and that you enjoy!

Note: Top 3 ranked messages are marked

Children living with disability (Message Set 1)
If you are a child or adolescent living with a disability, you can improve your physical and mental health by being active for 1 hour or more each day if you are able.
We recommend that you take part in physical activities that you enjoy. To get the greatest benefits to health, you may try to take part in mostly aerobic activities (such as walking to school, running or playing sports) with muscle-strengthening activities (such as climbing or doing body weight exercises) on at least 3 days of the week.
If you do not feel able to be physically active for 1 hour or more each day, you can still improve your physical and mental health with a smaller amount. Aim to do what you can and listen to your body.
You'll know your activity is intense enough to gain health benefits and 'count' towards your one hour if you can talk but not sing (moderate), or if you are unable to say more than a few words during the activity (vigorous).
You can make up your weekly physical activity when and how you want to
We recommend trying to reduce the amount of time you spend sitting still for long periods of time, particularly if this time is spent on a screen (e.g., watching TV or playing video games).
When you first start to exercise, build up slowly so you enjoy it more

Children living with disability (Message Set 2)
[1] Physical activity can help you meet new people
[2] Physical activity can help build your confidence and your concentration
[3] Physical activity can help make your muscles stronger and improve your movement skills, balance and coordination
Explore activities that make you feel good and that you enjoy!
Physical activity can give you a sense of achievement
Physical activity can improve your mental health, make you feel calmer and less stressed
Being physically active with your friends is a great way to spend time with them
Moving your body makes you feel good
Physical activity is fun
Being physically active can help your brain function better
Moving your body more can help promote good mental health
Being physically active is good for your brain and your body
Being physically active every day can help you feel happier and fitter
Move your body and be active in a way that you enjoy – any physical activity is good physical activity

Note: Top 3 ranked messages are noted

Adults (18-64 years)

Adults 18-64 (Message Set 1)
If you are aged 18-64, you can improve your mental and physical health by taking part in at least 2 hours and 30 minutes of moderate intensity physical activity (such as brisk walking), or at least 1 hour and 15 minutes of vigorous intensity physical activity (such as running) per week.
Taking part in activities that strengthen your muscles (such as resistance training or yoga) on 2 or more days each week brings important health benefits
More physical activity is better and will bring additional health benefits
You can make up your weekly physical activity when and how you want to
We recommend trying to limit the amount of time you spend sitting still
Breaking up and replacing some of your time spent sitting still with some movement can benefit your health

Adults 18-64 (Message Set 2)
[1] Move your body and be active in a way that you enjoy – any physical activity is good physical activity
[2] A little movement for a little mood improvement
[3] Moving more today can help you sleep better tonight
Walk or wheel away your worries
Move your body more and feel better
Move today and boost your mood
Walking, housework, and other daily activities 'count' as physical activity
Make time to move – you deserve it
Being active feels good
Some is good more is better
Feel accomplished by setting and smashing a step goal

Note: Top 3 ranked messages are marked

Older Adults 65+ years (Message Set 1)
If you are aged 65 or older, you can improve your health by taking part in at least 2 hours and 30 minutes of moderate intensity physical activity (such as walking to the shop, gardening and swimming), or at least 1 hour and 15 minutes of vigorous intensity physical activity (such as running, stair climbing, and playing sport) each week.
Taking part in activities that strengthen your muscles (such as resistance training, carrying heavy bags, or yoga) on 2 or more days each week brings important health benefits
More physical activity is better and will bring additional health benefits
You can make up your weekly physical activity when and how you want to
We recommend that you try to limit the amount of time you spend sitting still.
Breaking up and replacing some of your time spent sitting still with some movement can benefit your health

Older Adults 65+ years (Message Set 2)
[1] Move your body and be active in a way that you enjoy – any physical activity is good physical activity
[2] Every move counts
[3] Being physically active can help you keep your independence into older adulthood
Some is good, more is better
Move your body more and feel better
Move more today to boost your mood
Make time to move - you deserve it
Moving more today can help you sleep better tonight
Walking, housework, and other daily activities 'count' as physical activity
Walk or wheel away your worries
Being active feels good
Try moving in different ways and find what you enjoy
Being active with your loved ones is a great way to spend quality time together
Stay connected by engaging in physical activity with friends and family
A little movement for a little mood improvement

Note: Top 3 ranked messages are noted

Adults living with disability (Message Set 1)
If you are an adult living with a disability, you can enhance your health by taking part in 2 hours and 30 minutes – 5 hours of physical activity each week.
You'll know your activity is intense enough to gain health benefits and 'count' towards your one hour if you can talk but not sing (moderate), or if you are unable to say more than a few words during the activity (vigorous).
You can make up your weekly physical activity however you want to, for example 30 minutes 5 times per week, or 50 minutes 3 times per week.
To get the most health benefits, try to incorporate activities that strengthen your muscles (such as lifting weights or yoga) on 2 or more days a week.
If you are an older adult living with a disability, you can take part in various activities that strengthen your muscles and improve balance (such as lifting weights or yoga) on 3 or more days each week.
We recommend that you try to limit the amount of time you spend sitting still.
Breaking up and replacing some of your time spent sitting still with some movement can benefit your health.
If you are unable to stand, you can move in other ways, for example by completing upper body led activities, or inclusive and/or wheelchair-specific activities.

Adults living with disability – Message Set 2
[1] Move your body and be active in a way that you enjoy – any physical activity is good physical activity
[2] Move your body more and feel better
[3] Every move counts
Physical activity can help you meet new people
Physical activity can improve your mental health, make you feel calmer and less stressed
Some is good, more is better
A little movement for a little mood improvement
Move more today to boost your mood
Moving more today can help you sleep better tonight
Walking, wheeling, housework, and other daily activities 'count' as physical activity
Walk or wheel away your worries
Being active feels good
Try moving in different ways and find what you enjoy
Physical activity can help build your confidence and your concentration
Physical activity can give you a sense of achievement
Physical activity can help you improve your muscles and motor skills, balance and coordination
Explore activities that make you feel good and that you enjoy!
Make time to move - you deserve it

Appendix 12: Overview of the Research Project to update the National Guidelines

The Update of the National Physical Activity Guidelines for Ireland was a multi-stage project which commenced in September 2023 and concluded in December 2023. Stage 1 involved a review and compilation of the available evidence published since the publication of the World Health Organisation's Guidelines for Physical Activity and Sedentary Behaviour (World Health Organisation, 2020). In Stage 2, a meeting of the project team was convened to agree upon the draft physical activity and sedentary behaviour guidelines and messages. Stage 3 involved consultation with key stakeholders on the draft guidelines, messages for professionals and practitioners, and messages for the public. Surveys were used to assess the perceptions of the public and professional audiences to the draft guidelines and messages. Following the analysis of data from the surveys, a meeting was convened with cross-sectoral experts to gain feedback on the proposed physical activity and sedentary behaviour guidelines for Ireland. Finally, the project team considered findings the consensus meeting and feedback from the HSE Healthy Eating Active Living team to agree on the proposed guidelines and messages.

Research Team members:

Prof Elaine Murtagh, University of Limerick (Chair)
Dr Dylan Power, University of Limerick (Research assistant)
Prof Charlie Foster, Royal College of Surgeons in Ireland and University of Bristol
Prof Marie Murphy, University of Edinburgh and Ulster University
Dr Sean Healy, University of Limerick
Dr Grainne Hayes, University of Limerick
Prof Niamh Murphy, South East Technological University
Prof Catherine Woods, University of Limerick
Dr Chloë Williamson, University of Edinburgh

Appendix 13: Evidence summaries to accompany the guidelines

The following evidence summaries are reproduced under the [CC BY-NC-SA 3.0](#) licence from the following sources:

- Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. Geneva: World Health Organization; 2019.
- WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.

Children and adolescents (aged 5–17 years)

In children and adolescents, physical activity confers benefits for the following health outcomes: improved physical fitness (cardiorespiratory and muscular fitness), cardiometabolic health (blood pressure, dyslipidaemia, glucose, and insulin resistance), bone health, cognitive outcomes (academic performance, executive function), mental health (reduced symptoms of depression); and reduced adiposity.

In children and adolescents, higher amounts of sedentary behaviour are associated with the following poor health outcomes: increased adiposity; poorer cardiometabolic health, fitness, behavioural conduct/pro-social behaviour; and reduced sleep duration.

Children and adolescents (aged 5–17 years) living with disability

Many of the health benefits of physical activity for children and adolescents, as set out in the section above, also relate to those children and adolescents living with disability. Additional benefits of physical activity to health outcomes for those living with disability include: improved cognition in individuals with diseases or disorders that impair cognitive function, including attention-deficit/hyperactivity disorder (ADHD); improvements in physical function may occur in children with intellectual disability.

In children and adolescents, higher amounts of sedentary behaviour are associated with the following poor health outcomes: increased adiposity; poorer cardiometabolic health, fitness, and behavioural conduct/pro-social behaviour; and reduced sleep duration.

Adults (aged 18–64 years)

In adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers,^[1] incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression); cognitive health, and sleep; measures of adiposity may also improve.

In adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality and incidence of cardiovascular disease, cancer and type-2 diabetes.

Older adults (aged 65 years and older)

In older adults, physical activity confers benefits for the following health outcomes: improved all-cause mortality, cardiovascular disease mortality, incident hypertension, incident site-specific cancers, incident type-2 diabetes, mental health (reduced symptoms of anxiety and depression), cognitive health, and sleep; measures of adiposity may also improve. In older adults, physical activity helps prevent falls and falls-related injuries and declines in bone health and functional ability.

In older adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality, and incidence of cardiovascular disease, cancer and incidence of type-2 diabetes.

Adults (aged 18 years and older) living with disability

Many of the health benefits of physical activity for adults, as set out in the section above, also relate to adults living with disability. Additional benefits of physical activity to health outcomes for those living with disability include the following: for adults with multiple sclerosis – improved physical function, and physical, mental, and social domains of health-related quality of life; for individuals with spinal cord injury – improved walking function, muscular strength, and upper extremity function; and enhanced health-related quality of life; for individuals with diseases or disorders that impair cognitive function – improved physical function and cognition (in individuals with Parkinson’s disease and those with a history of stroke); beneficial effects on cognition; and may improve quality of life (in adults with schizophrenia); and may improve physical function (in adults with intellectual disability); and improves quality of life (in adults with major clinical depression).

In adults, higher amounts of sedentary behaviour are associated with the following poor health outcomes: all-cause mortality, cardiovascular disease mortality and cancer mortality and incidence of cardiovascular disease, cancer and type-2 diabetes.

For further information please see the:

- WHO guidelines on physical activity and sedentary behaviour
<https://www.who.int/publications/i/item/9789240015128>
- WHO Evidence profiles
<https://iris.who.int/bitstream/handle/10665/336657/9789240015111-eng.pdf>
-

^[1] Site-specific cancers of: bladder, breast, colon, endometrial, oesophageal adenocarcinoma, gastric, and renal.

Appendix 14: Explanation of moderate and vigorous intensity, and sample activities

Physical Activity Intensity

	Light	Moderate	Vigorous
METs*	1.5 - 3	3 – 6	> 6
% HR max	50-63	64-76	77-93
Talk test	You can talk and sing without issue	You can talk but not sing during the activity	You will not be able to say more than a few words without pausing for a breath
Warmth	-	Warmer	Hot and sweating
RPE (6 – 20 scale)	10-11	12-13	14-16

*One MET is the energy equivalent expended by an individual while seated at rest.

Sample Activities

Children and Adolescents

Moderate Intensity	Vigorous Intensity	Muscle-strengthening
Brisk walking	Running	Body weight exercises (i.e., push ups, pull-ups)
Housework and gardening	Playing tag	Yoga
Riding a scooter without a motor	Skipping	Tree climbing
Riding a bicycle slowly	Martial arts	Climbing in a playground
PE class	Sports (i.e., soccer, hurling, Gaelic football, tennis)	Games such as tug-of-war
Playing games of catch and throw, such as frisbee or rounders	Dancing	
	Hiking	

Adults

Moderate Intensity	Vigorous Intensity	Muscle-strengthening
Brisk walking	Running	Lifting weights
Water aerobics	Swimming	Working with resistance bands
Riding a bicycle slowly	Sports (i.e., soccer, hurling, Gaelic football, tennis singles, rugby)	Body weight exercises
Housework and gardening	Martial arts	Yoga
Tennis doubles	Walking up the stairs	Climbing

Farming or taking care of animals	Gymnastics	Repetitively lifting children or heavy items
Dancing		Repetitive stair climbing
Hiking		Wheeling a wheelchair
Golf		Pilates

Appendix 15: Glossary of Terms

This glossary is reproduced under the [CC BY-NC-SA 3.0](#) licence from the following sources:

- Guidelines on physical activity, sedentary behaviour and sleep for children under 5 years of age. Geneva: World Health Organization; 2019.
- WHO guidelines on physical activity and sedentary behaviour. Geneva: World Health Organization; 2020.

Aerobic physical activity	Activity in which the body's large muscles move in a rhythmic manner for a sustained period of time. Aerobic activity – also called endurance activity – improves cardiorespiratory fitness. Examples include walking, running, swimming, and bicycling.
Balance training	Static and dynamic exercises that are designed to improve an individual's ability to withstand challenges from postural sway or destabilizing stimuli caused by self-motion, the environment, or other objects.
Bone-strengthening activity	Physical activity primarily designed to increase the strength of specific sites in bones that make up the skeletal system. Bone-strengthening activities produce an impact or tension force on the bones that promotes bone growth and strength. Running, jumping rope, and lifting weights are examples of bone-strengthening activities.
Cardiometabolic health	The interplay of blood pressure, blood lipids, blood glucose and insulin on health.
Cardiorespiratory fitness (endurance)	A health-related component of physical fitness. The ability of the circulatory and respiratory systems to supply oxygen during sustained physical activity. Usually expressed as measured or estimated maximal oxygen uptake (VO ₂ max).
Cognitive development	The process of learning, memory, attention, concentration and language development.
Cognitive function	Cerebral activities, i.e., reasoning, memory, attention, and language that lead to the attainment of information and knowledge. This can also include learning.
Disability	From the International Classification of Functioning, Disability and Health, an umbrella term for impairments, activity limitations, and participation restrictions, denoting the negative aspects of the interaction between an individual (with a health condition) and that individual's contextual factors (environmental and personal factors).
Exercise	A subcategory of physical activity that is planned, structured, repetitive, and purposeful in the sense that the improvement or maintenance of one or more components of physical fitness is the objective. "Exercise" and "exercise training" frequently are used interchangeably and generally refer to physical activity performed during leisure time with the primary purpose of improving or maintaining physical fitness, physical performance, or health.
Fitness	A measure of the body's ability to function efficiently and effectively in work and leisure activities, and includes, for example, physical fitness and cardiorespiratory fitness.

Flexibility	A health- and performance-related component of physical fitness that is the range of motion possible at a joint. Flexibility is specific to each joint and depends on a number of specific variables including, but not limited to, the tightness of specific ligaments and tendons. Flexibility exercises enhance the ability of a joint to move through its full range of motion.
Floor based play	Supervised play for infants, where children move on the floor and develop motor skills.
Functional exercises	Exercises that can be embedded into everyday tasks to improve lower-body strength, balance, and motor performance. Examples include tandem and one-leg stands, squatting, chair stands, toe raises, and stepping over obstacles.
Infant	Child aged less than one year, for the purposes of studies aged 0–11.9 months.
Interactive play	<i>See “Play”.</i> Interactive play is play with a parent or caregiver where the child and adult/older child interact and engage in play for both cognitive and motor learning.
Light-intensity physical activity	Light-intensity physical activity is between 1.5 and 3 METs, i.e. activities with energy cost less than 3 times the energy expenditure at rest for that person. This can include slow walking, bathing, or other incidental activities that do not result in a substantial increase in heart rate or breathing rate. Light intensity physical activity is equivalent to 1.5–4 METs in children, i.e., activities with energy cost 1.5 to 4.0 times the energy expenditure at rest for that child. For young children, this can include slow walking, bathing, or other incidental activities that do not result in the child getting hot or short of breath.
Major muscle groups	Major muscle groups include the legs, back, abdomen, chest, shoulders and arms.
Metabolic equivalent of task (MET)	The metabolic equivalent of task, or simply metabolic equivalent, is a physiological measure expressing the intensity of physical activities. One MET is the energy equivalent expended by an individual while seated at rest.
Moderate-intensity physical activity	On an absolute scale, moderate-intensity refers to the physical activity that is performed between 3 and less than 6 times the intensity of rest. On a scale relative to an individual’s personal capacity, moderate-intensity physical activity is usually a 5 or 6 on a scale of 0–10. Moderate PA is equivalent to 4–7 METs in children, i.e., 4–7 times resting energy expenditure at rest for that child. Vigorous PA is equivalent to >7 METs. For young children, this can include brisk walking, cycling, running playing ball games, swimming, dancing etc. during which the child gets hot and breathless. <i>See “Energetic play”.</i>
Motor development	Development of a child’s musculoskeletal system and acquisition of gross motor skills (sometimes referred to as fundamental movement skills), and fine motor skills, including object control.
Muscle-strengthening activity	Physical activity and exercise that increase skeletal muscle strength, power, endurance, and mass (e.g. strength training, resistance training, or muscular strength and endurance exercises).
Multicomponent physical activity	For older adults, multicomponent physical activity is important to improve physical function and decrease the risk of falls or injury from a fall. These activities can be done at home or in a structured group setting. Many studied interventions combine all types of exercise (aerobic, muscle strengthening, and balance training) into a session, and this has been shown to be effective. An example of a multicomponent

	physical activity programme could include walking (aerobic activity), lifting weights (muscle strengthening), and incorporates balance training. Examples of balance training can include walking backwards or sideways or standing on one foot while doing an upper body muscle-strengthening activity, such as bicep curls. Dancing also combines aerobic and balance components.
Physical activity	Movement of the body that uses energy over and above resting. For young children, this can include walking, crawling, running, jumping, balancing, climbing in, through and over objects, dancing, riding wheeled toys, cycling, jumping rope etc.
Physical inactivity	An insufficient physical activity level to meet present physical activity recommendations.
Pre-school child	Child aged 3 to under 5 years (36.0–59.9 months).
Prone position	Child lying on their front. <i>See “tummy time”.</i>
Psychosocial health	Include mental, emotional and social dimensions of health.
Recreational screen time	Time spent watching screens (television (TV), computer, mobile devices) for purposes other than those related to education/study or work.
Secured (also ‘restrained’)	Time when an infant or child is strapped or harnessed in a pram, stroller, high chair, or on an adult’s body (front or back) and unable to move freely.
Sedentary screen time	Time spent watching screen-based entertainment (TV, computer, mobile devices). Does not include active screen-based games where physical activity or movement is required.
Sedentary behaviour	Any waking behaviour characterized by an energy expenditure of 1.5 METS or lower while sitting, reclining, or lying. Most desk-based office work, driving a car, and watching television are examples of sedentary behaviours; these can also apply to those unable to stand, such as wheelchair users. The guidelines operationalize the definition of sedentary behaviour to include self-reported low movement sitting (leisure time, occupational, and total), television (TV viewing or screen time, and low levels of movement measured by devices that assess movement or posture). For children under 5 years of age includes time spent restrained in car seat, high-chair, stroller, pram or in a carrying device or on a caregiver’s back. Includes time spent sitting quietly listening to a story.
Sport	Sport covers a range of activities performed within a set of rules and undertaken as part of leisure or competition. Sporting activities involve physical activity carried out by teams or individuals and may be supported by an institutional framework, such as a sporting agency.
Toddler	Child aged 1 to under 3 years (12.0–35.9 months).
Tummy time	Time an infant spends lying on their front (in prone position) while awake with unrestricted movement of limbs.
Vigorous-intensity physical activity	On an absolute scale, vigorous-intensity refers to physical activity that is performed at 6.0 or more METS. On a scale relative to an individual’s personal capacity, vigorous-intensity physical activity is usually a 7 or 8 on a scale of 0–10.

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