The first global physical activity and sedentary behaviour guidelines for people living with disability

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Abstract

Background: The World Health Organization (WHO) has released the first global public health guidelines on physical activity and sedentary behaviour for people living with disability. This paper presents the guidelines, related processes and evidence, and elaborates how the guidelines can support inclusive policy, practice and research.

Methods: Methods were consistent with WHO protocols for developing guidelines. Systematic reviews of the evidence on physical activity for health for people living with disability were appraised, along with consideration of the evidence used to inform the general 2020 WHO guidelines.

Results: Evidence supported the development of recommendations for people living with disability, stressing that there are no major risks to engaging in physical activity appropriate to an individual's current activity level, health status and physical function, and that the health benefits accrued generally outweigh the risks. They also emphasise the benefits of limiting sedentary behaviour.

Conclusions: The guidelines mark a positive step forward for disability inclusion, but considerable effort is needed to advance the agenda. This paper highlights key considerations for implementation of the new recommendations for people living with disability, in line with the human rights agenda underpinning the Global Action Plan on Physical Activity 2018 – 2030 and allied policies.

Introduction

Disability "is part of the human condition" that most people will experience to varying degrees in their lifetime[1 (p3)] and it impacts opportunities to engage in physical activity. Disability can be understood as an interaction between personal, biological, societal and environmental factors that can prevent *"full and effective participation in society on an equal basis with others"*.[2(p4)-4] Disability can be represented on a continuum, relevant to all, underlining the need for societies to mainstream disability in all sectors.[1,5] Disability is a global public health and human rights issue, with 1.5 billion people currently living with disability worldwide.[1,6] People with disability face barriers in accessing health services, and experience stigmatisation, discrimination and rights violations,[4] leading to social, economic and health marginalization.[7] Globally, over the last 30 years, the total burden of disability, driven in large by the inclusion of conditions associated with non-communicable disease, increased by 52%.[8] This can be reversed, and health gains made, by attending to and resourcing the drivers of health,[8] including physical activity.

Disability negatively impacts upon opportunities to gain health benefits, mitigate health risks and improve health outcomes through physical activity and limiting sedentary behaviour. People living with disability are at least twice as likely to be physically inactive as those without disability, [9] increasing the risk of non-communicable diseases and co-morbidities, while also being potentially detrimental for mental health and social wellbeing.[1,9,10] Lower participation reflects additional barriers faced by people with disability including physical, personal, social and environmental barriers.[11,12] Creating opportunities for inclusion in physical activity for people living with disability can help eliminate such barriers, by changing perceptions, emphasising strengths and abilities, promoting personal resilience and having onward impact on inclusion in society.[7]

In 2015, the United Nations (UN) launched 'Transforming our World: the 2030 Agenda for

Sustainable Development'.[13] Its vision of 'no-one left behind', starting with the most vulnerable, put a focus on disability inclusion, which has subsequently been embraced in key policy developments in physical activity and sport.[12,14,15] Disability has been recognised by the World Health Organization (WHO) as a development priority.[12] The publication of the first WHO guidelines on physical activity and sedentary behaviour for people living with disability[16] reflects the WHO's commitment to inclusive actions, aligned with the 2030 Agenda and expressed in the Global Action Plan on Physical Activity 2018 – 2030.[12] Incorporating equity and human rights is integral to the WHO guideline development process.[17] The emergence of these public health recommendations for people living with disability facilitates the development and implementation of related policies, research and practices that can reduce discrimination and create opportunities for inclusive physical activity participation and better health outcomes among this population.

The aims of this paper are to: (1) summarise the process and evidence that informed the first global guidelines on physical activity and sedentary behaviour for people living with disability; (2) present the guidelines; (3) discuss how these guidelines can support policy implementation in physical activity and sedentary behaviour in the context of human rights and disability inclusion and; (4) present 10 areas for advancing inclusive practice in physical activity and sedentary behaviour for people living with disability.

Methods

In 2019, the WHO commenced work to update the 2010 Global Recommendations on Physical Activity for Health.[18] A Guideline Development Group (GDG) was established, consisting of 27 experts from relevant scientific disciplines, including the disability area, as well as practitioners and decision makers in the field, representing all regions. The WHO steering group was composed of staff from different areas of the organization and included a disability expert who also lives with

disability. Public consultation on the draft guidelines was conducted. This was widely circulated to organisations and individual researchers in the field of disability and physical activity. The WHO guidelines were developed in accordance with the WHO Handbook for Guideline Development [17] and details of the methodology can be found elsewhere.[16,19]

The scientific report of the Physical Activity Guidelines Advisory Committee[20] provides a summary of evidence on physical activity and sedentary behaviour for health outcomes from 2008 to 2016, including disability. For the purposes of developing the new WHO guidelines, this review was updated through a search for systematic reviews and pooled analyses of cohort studies published from 2017 up to September 2019.

Evidence on the association between physical activity and health for eight specific conditions that can lead to disability in children, adolescents and adults were included: multiple sclerosis, spinal cord injury, intellectual disability, Parkinson's disease, stroke, schizophrenia, major clinical depression, and attention deficit hyperactivity disorder (ADHD). Four health outcomes were considered across the eight health conditions, namely: comorbidities, physical function, cognitive function and quality of life, and are summarised in Table 1. The Grading of Recommendations Assessment, Development and Evaluation (GRADE) method was used to rate the certainty of the evidence for each outcome.[21]

Given the dearth of research assessing the associations between physical activity and the critical health outcomes of cardiovascular disease mortality, incident hypertension, incident site-specific cancers and incident type-2 diabetes, the GDG assessed the scientific evidence used to inform the development of recommendations for age-specific population groups in adults and older adults. Similarly, the scientific evidence collated for the development of recommendations for children and adolescents was also reviewed. The GDG considered the applicability of the broader evidence to children and adults living with disability and the appropriateness of extrapolation to support the

development of recommendations. Full details of the critical and important outcomes that were assessed in relation to the age-specific population recommendations are documented in detail elsewhere.[16]

Where extrapolation from the general age-group guidelines was considered appropriate, the evidence rating was downgraded due to indirectness. In addition to the evidence, the following were also considered when developing the recommendations for consideration by the WHO: the benefits and harms, values and preferences of those affected by the guidelines, the resource implications of the recommendations, the impact on health equity, and the acceptability and feasibility of the recommendations.

Results

From the evidence considered by the PAGAC and 187 new reviews identified; 101 reviews met the inclusion criteria to inform the development of specific recommendations for consideration by the WHO. A key reason for exclusion was that many studies involving people living with disability centred on fitness and functional outcomes as part of clinical care and rehabilitation; these studies were not deemed relevant given the 'public health' focus of the guidelines. The volume of evidence varied by condition, from the highest number of reviews for multiple sclerosis (n=28), followed by Parkinson's (n=24), history of stroke (n=15), spinal cord injury (n=13), intellectual disability (n=7), Schizophrenia (n=6), major clinical depression (n=5) and ADHD (n=3). The included reviews covered a broad range of study designs including randomised controlled trials, non-randomised controlled studies, before and after studies, case controls, case reports/case studies, and observational studies.

The certainty of the evidence across conditions ranged from low to high. There were no studies found on physical activity and comorbidity in people living with multiple sclerosis and insufficient evidence to inform a judgement on the association with comorbidity and quality of life in people

with intellectual disability. A summary of the evidence available for each specific health condition and outcome is provided in Table 2.

When considering the critical and important health outcomes assessed in the development of the general age-specific recommendations, this included assessing whether there was any evidence or reasons that the findings would not apply to people living with disability. The GDG concluded, based on expert opinion, that the associations between physical activity and sedentary behaviour on selected key outcomes could be expected to result in the same health benefits for people living with disability as the general population. For youth this included favourable outcomes on cardiorespiratory and muscular fitness, cardiometabolic health, bone health, cognitive outcomes, mental health and adiposity; for adults this included reduction in all-cause mortality, cardiovascular mortality, incident hypertension, incident site-specific cancers, incident type-2 diabetes, improved mental health, cognitive health and sleep, and possible improvements in adiposity; and for older adults this included the additional benefits of prevention of falls and falls-related injuries and favourable outcomes on bone health and functional ability. As a result, the physical activity recommendations drafted for children and adolescents and for adults were adopted and applied to people living with disability.

The recommendations were also deemed applicable to people living with disability broadly, including those living with disability arising from health conditions that were not considered in this review. Chronic conditions are addressed separately in both the guidelines and associated publications.[16,22] In many instances, the impairment rather than the health condition *per se* can impact the exercise response. People living with Parkinson's or history of stroke (evidence for which was reviewed) can experience difficulties with mobility, motor control, tremors, and paralysis in limbs, which could also be experienced by people living with muscular dystrophy or cerebral palsy. In the case of other disability areas e.g. visual or hearing impairments, while specific evidence was not

reviewed there is no physiological reason to assume different health outcomes from physical activity participation or limiting sedentary behaviour. However due to the indirectness of evidence, the certainty of the evidence was downgraded to reflect the extrapolation. The GDG noted specifically that resultant recommendations were applicable for those living with disability 'where possible and as able', to recognise and acknowledge the heterogeneity of this population. Consistent with the recommendations developed for other population groups, the GDG concluded that some physical activity is better than none, and that people living with disability should start with small amounts of physical activity and gradually increase the frequency, intensity and duration over time where able.

Due to the lack of evidence on sedentary behaviour and health outcomes among people living with disability, the evidence from the general population was considered. The GDG concluded that there were no reasons to believe that the health outcomes of limiting sedentary behaviour would be any different in people living with disability. It was therefore agreed, based on expert opinion, that the evidence on sedentary behaviour and countering high levels of sedentary behaviour through undertaking more light, and moderate to vigorous physical activity from general populations, could be extrapolated to people living with disability. The certainty of the evidence was downgraded due to indirectness. Replacing sedentary behaviour with light intensity physical activity is especially important for people who are the least active and people with mobility impairments who spend much or all day sitting or lying down and for whom moderate to vigorous intensity physical activity may present a challenge.

The guidelines stress that there are no major risks to people living with disability engaging in physical activity when it is appropriate to an individual's current activity level, health status and physical function, and that the health benefits accrued generally outweigh the risks. Importantly, all physical activity counts, including light intensity physical activity. The new WHO guidelines for children and adolescents with disability, and adults with disability, are shown in Textbox 1 and 2 respectively.

Discussion

The publication of the WHO guidelines on physical activity and sedentary behaviour for people living with disability bridges a gap between policy aspirations and practical implementation. They affirm the associated health benefits, quantify the related volume and type of activity necessary to achieve the benefits, and provide good practice suggestions. This set of recommendations gives clarity to those designing and delivering public health physical activity interventions and advocacy messages, on the *why*, *what* and *how*, people with disability should engage in physical activity and limit sedentary behaviour.

The emergence of these guidelines marks a purposeful and positive step towards including people living with disability in mainstream physical activity initiatives, thereby advancing their human rights and mainstreaming disability inclusion. Human Rights approaches underpin the Global Action Plan on Physical Activity 2018 – 2030, the Kazan Action Plan and the UN Action Plan on Sport for Development and Peace.[12,14,15] All three action plans acknowledge the inequity in access to physical activity for people living with disability. These complementary instruments, together with their follow up implementation initiatives, have stimulated input from many stakeholders, including academia, designed to eliminate barriers and universalize access to physical activity.[15] The new guidelines will support advancing an inclusive agenda, and the increasing acceptance that inclusion not only benefits people living with disability, but also their families, communities, and all members of society.

The evidence-based guidelines bring clarity around physical activity and sedentary behaviour for people living with disability. The capacity to combine the evidence base for those living with disability with evidence extrapolated from the general population, emphasises the homogeneity in

the physiological response to physical activity and sedentary behaviour, regardless of impairment. Where condition specific evidence was not reviewed, e.g. autism, spina bifida, many functions affected by these conditions were addressed in the evidence, this enabled broadening the applicability of the evidence. As previously mentioned, in the case of other disability areas (e.g. visual or hearing impairments), where there was no physiological reason to assume different health outcomes, the opportunity to accrue health outcomes associated with physical activity and limiting sedentary behaviour relate more to factors beyond impairment or health conditions alone.

While the evidence base for the general age-specific populations was also applied to those with impairments in order to increase the total volume of evidence considered, this does not mitigate the need to increase the volume of disability-specific research in the future. Physical activity outcomes and side effects may vary across different impairment groups in ways that have not yet been studied. New research could help increase the evidence base and thereby inform the specificity of recommendations and contraindications. In the case of upper body led physical activities, less is known about the health risks and benefits, and the extrapolations from the general population are mostly based on lower body or a combination of upper and lower body physical activities. Future research should adopt a functional approach to disability, considering the nature and impact of the impairment on functioning and ability rather than just the diagnosed condition. This could increase the number of participants available for specific research studies, thereby increasing the strength, and possibly quality, of the evidence. Research funding mechanisms should prioritise this area to improve knowledge and practice.

There are examples of physical activity studies that have taken a functional approach to disability, incorporating populations with a wide range of health conditions, levels of disability (from none to extremely high) and impairment (mental and sensory, voice and speech, neuromusculoskeletal and movement related). These studies utilised the WHO Disability Assessment Schedule [23] to assess

levels of disability and the International Classification of Functioning Disability and Health [3] enabling examination of physical activity according to functioning.[24,25] These tools can be used to support a functional approach to the classification of disability in future research studies.

During the development of the guidelines, it was critical to use language that that was inclusive and that effectively reflected the evidence for the reviewed outcomes; a point emphasised in the public consultation and peer review process. One important example concerns sedentary behaviour. According to Tremblay et al.,[26] sedentary behaviour is sitting, lying, or reclining with low energy expenditure; however, it is common to colloquially equate 'sedentary time' with 'sitting time'. The terms 'sitting' or 'sit' in messages such as 'move more, sit less' or 'standing instead of sitting' may be more accessible to the wider public than the term 'sedentary', but could lead to misinterpretation of the recommendations and of the underlying evidence base if energy expenditure is not also emphasized. Sitting while cycling, canoeing or propelling a wheelchair are, of course, not sedentary behaviours. Hence, 'sit-less' messages are not considered to be inclusive, especially for people with limited mobility, who sit or lie down all day but can still do light or higher intensity physical activities while sitting or lying down. The use of universally acceptable language across all recommendations was a priority of the GDG and should remain a priority for stakeholders as they communicate about these new guidelines at a country level.

Mainstreaming Inclusion

There is increasing acceptance that we need to do more to address disability inclusion in physical activity and sedentary behaviour research, policy, and practice, not as a niche and distinct area but through universal design and mainstreaming. Universally, for people living with disability and those without, the opportunity to sustain participation in physical activity and limit sedentary behaviour involves a combination of factors that go far beyond the individual to a broader set of provisions, involving a wide variety of stakeholders and enabling environments.[27,28]

Addressing barriers to physical activity requires comprehensive changes across all four strategic objectives of the Global Action Plan on Physical Activity 2018 – 2030: social norms and attitudes; spaces and places; programmes and opportunities; and governance and policy enablers. Providing reasonable accommodations, such as accessible equipment, spaces or programmes, appropriate to the nature and degree of impairment, and personal and environmental factors[3] can enable physical activity participation aligned with ability and help reduce sedentary behaviour.

Table 3 outlines 10 key target areas for advancing practice, informed by feedback from the peer review and public consultation processes, deliberations of the GDG, the policy and human rights context, the International Classification of Functioning Disability and Health, and the Global Action Plan on Physical Activity. The target areas are globally relevant to a broad range of stakeholders who are involved in creating supportive environments for physical activity and limiting sedentary behaviour, and they can be tailored to context and situational needs. Stakeholders include policy makers and government officials at national, sub-national and municipal levels, NGOs, research organisations, health service professionals, and exercise and health professionals.

There are financial costs associated with full and effective inclusion, but these inclusive investments benefit all of society, helping to reduce inequity through a proportional universality approach by directing resources to those facing the greatest barriers, as called for in the Global Action Plan on Physical Activity 2018 – 2030. Investment in inclusive physical activity is empowering and health enhancing and pays dividends by supporting the onward inclusion of people living with disability in other aspects of society and community life.[29,30]

Evidence & Capacity Gaps

315 The evidence available to inform these guidelines on physical activity for people living with disability
316 was relatively small, and there is a need to increase the volume of research in this field. The
317 evidence that was available was limited to people with specific conditions or types of impairment,
318 and a limited number of health outcomes, namely comorbidity, physical function, cognitive function
319 and quality of life. There was a dearth of research evidence on the critical outcomes that are
320 typically considered in the development of physical activity guidelines, including reduction in all-
321 cause and cause-specific mortality, reduced incidence of cardiovascular disease, reduced incidence
322 of cancer (site-specific), reduced incidence of type-2 diabetes, better bone health, and
323 improvements in adiposity. This is due to people living with disability either not being included in
324 large epidemiological studies, or the sample of people living with disability being too small for sub-
325 group analysis.
326
327 A challenge to the inclusion of people living with disability in physical activity practice, and in
328 mainstream studies and disability-specific studies, is the lack of expertise in disability inclusion
329 among many stakeholders working in physical activity. This has resulted in gaps in our knowledge on
330 how best to integrate people living with disability in public health, physical activity and sedentary
331 behaviour interventions. There is a growing body of evidence on the effectiveness of feasible and
332 scalable interventions to promote inclusive physical activity, which should be strengthened for
333 people living with disability. There are many freely available resources, programmatic guidance
334 documents, infrastructure considerations, and training opportunities that can be used to
335 mainstream inclusion.
336
337 A call for prioritised action on human rights, disability and intersectional inclusion in recent policy
338 initiatives is a most positive development. The ‘decade of action’ on the Sustainable Development
339 Goals calls for accelerated action to ‘leave no one behind’. It is hoped that in the aftermath of
340 COVID-19, the attention and investment needed to continue progress will not be eroded. Central to

this involves examining how we can continue to leverage human rights instruments, intentions and reporting to stimulate more inclusive access to physical activity.[31] This has yet to be fully embraced at national and local levels across communities, schools, workplaces and in higher education, in order to enable those living with disability to meet the recommendations.

Conclusion

It is hoped that the publication of the first WHO guidelines on physical activity and sedentary behaviour for people living with disability will facilitate concerted efforts across all sectors to bridge gaps in inequalities. At the policy, regulatory, and statutory levels, there is consensus on the need to prioritise and mainstream disability inclusion. However, much work is needed to achieve equity in physical activity opportunities, access, and participation for people living with disability. Multiple stakeholders have a role to play, including the research and academic community, in co-creating the inclusive environments that will enable all of us, including those living with disability, to participate in physical activity.

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455 **Tables**

456 Table 1. Critical outcomes considered by health condition and number of reviews.

	Comorbidity	Physical function	Quality of life	Cognition
Multiple sclerosis	0	15	12	1
Spinal cord injury	3	8	2	
Intellectual disability	1	5	1	
Parkinson's disease		22		2
Stroke		14		1
Schizophrenia			4	2
Major clinical depression			5	
ADHD				3

457

458

459 Table 2. Summary of the evidence on health outcomes for each condition group

Condition and health outcome	Description of certainty of evidence by disability and health outcome
Multiple sclerosis	
Comorbidity	Not assignable
Physical function	High certainty evidence shows aerobic and muscle-strengthening activities improve physical function, functional mobility, walking speed and endurance, and cardiorespiratory fitness, strength and balance
Quality of life	Low certainty evidence of improved quality of life, including symptoms of fatigue and depressive symptoms among adults
Cognition	Moderate certainty evidence of a beneficial effect on cognition
Spinal cord injury	
Comorbidity	Low certainty evidence that physical activity reduces shoulder pain and improves vascular function in paralyzed limbs
Physical function	Moderate certainty evidence shows improved walking function, muscular strength, and upper extremity function
Quality of life	Low certainty evidence that physical activity enhances health-related quality of life
Intellectual disability	
Comorbidity	Not assignable
Physical Function	Low certainty evidence of improved physical function in children and adults
Quality of Life	Not assignable
Parkinson's disease	
Physical function	High certainty evidence of improvement in walking, balance, strength, and disease specific motor scores
Cognition	Moderate certainty evidence indicates that moderate to vigorous physical activity can have beneficial effects on cognition
Stroke	
Physical function	Moderate certainty evidence for improved gait speed and ability, walking speed, distance and endurance, cardiorespiratory fitness, upper limb function, sensory motor function of the lower limb, balance, mobility and activities of daily living
Cognition	Moderate certainty evidence of beneficial effects on cognition
Schizophrenia	
Quality of life	Moderate certainty evidence indicates improved quality of life
Cognition	High certainty evidence that moderate to vigorous physical activity can have beneficial effects on cognition, working memory, social cognition and attention/ vigilance
Major clinical depression	
Quality of life	Moderate certainty evidence that physical activity improves quality of life in adults

ADHD	
Cognition	Moderate certainty evidence that moderate to vigorous physical activity can have beneficial effects on cognition, including attention, executive function, and social disorders

460

461

462 Table 3. 10 target areas for advancing inclusive policy, practice and research in physical activity and
463 sedentary behaviour.
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10 Target Areas	Actions Needed
1. Awareness	Tailored awareness campaigns are needed to draw attention to the inequity experienced by people living with disability in relation to physical activity. Emphasis on disability as an interaction between a health condition, personal characteristics and the environment, will help reduce exclusion and point to the broad range of sectors and actions that are needed to co-create inclusive physical activity solutions.
2. Communication	Communication campaigns for promoting physical activity and limiting sedentary behaviour need to be targeted at, and accessible to, people with a wide variety of impairments through a variety of formats and technologies. General communication messages need to avoid ableist language and sentiment and be universally accessible.
3. Environment	Inclusive access to local amenities, facilities and services, including green spaces, blue spaces and networks may require new products, technologies, environmental changes, supportive relationships and inclusive social attitudes. Safe and connected active transport should be made accessible for people living with disability so that they can participate more independently where they live, work, play or go to school. This will help limit sedentary behaviour and increase physical activity among people living with disability.
4. Training	Training and education providers need to supply inclusive practitioners across sectors that impact physical activity and sedentary behaviour to meet the specific needs of people living with disability. Disability awareness training for a broad range of community stakeholders (professionals to volunteers) would build much needed understanding and help reduce the disabling impact of the social and physical environment.
5. Partnership	Facilitating inclusion in and through physical activity is a whole of society issue. Multidisciplinary partnerships from national policy to local delivery levels are needed to address barriers and facilitators to create opportunities for participation. They must involve disability service organisations and people living with disability. Dedicated disability sport inclusion staff, working with disability organisations, can support the inclusion of individuals with disability in physical activity at community levels.
6. Research	Mechanisms to gather disaggregated data on participation in physical activity, sedentary behaviour and disability is essential to monitor progress in participation on all levels - local, national and international. An increased volume and quality of research exploring barriers and enablers to physical activity and its effects, along the disability continuum and across the domains of functioning (including life activities and participation) is needed to inform effective inclusive policy solutions and public health interventions.
7. Human Rights	Protecting, respecting and fulfilling human rights with and for people with disability in and though physical activity is critical, including targeted interventions for those enduring intersectional discrimination. Increased understanding of roles and responsibilities pertaining to human rights is

	needed and must transfer to inclusive actions, advocacy and investments across multiple sectors.
8. Programmes	Community-based physical activity programs need to consider disability specific accommodations (across fully inclusive to segregated activities) and universal design principles. Facilitating choice in programming is critical as is the need to provide opportunities to build positive experiences beginning early in childhood.
9. Investment	Investment is needed across sectors, to advance disability inclusion in and through physical activity, in line with human rights obligations. It can be tailored according to means through innovative approaches. Appropriate and effective practical measures, or 'reasonable accommodations', such as assistants, carers and assistive technologies should be provided to help people living with disability to be active and to limit sedentary behaviour.
10. Governance	Creating inclusive societies requires significant changes at governance and policy levels. Disability inclusion in public health and physical activity should be mainstreamed through policies and legal frameworks. Partnerships, finance and all relevant organs of society should be mobilised to address disability inclusion. With broad interagency governance structures, physical activity can be a driver of inclusive action in broader society.

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Textbox 1. The WHO guidelines on physical activity and sedentary behaviour for children and adolescents living with disability [16]

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

It is recommended that:

• Children and adolescents living with disability should do at least an average of 60 minutes 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

Good practice statement:

- *Doing some physical activity is better than doing none.*
- *If children and adolescents living with disability are not meeting these recommendations, doing some physical activity will bring benefits to health.*
- *Children and adolescents living with disability should start by doing small amounts of physical activity and gradually increase the frequency, intensity and duration over time.*
- *There are no major risks for children and adolescents living with disability engaging in physical activity when it is appropriate to an individual's current activity level, health status and physical function; and the health benefits accrued outweigh the risks.*
- *Children and adolescents living with disability may need to consult a health-care professional or other physical activity and disability specialist to help determine the type and amount of activity appropriate for them.*

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

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

471 Textbox 2. The WHO guidelines on physical activity and sedentary behaviour for adults living with
472 disability [16]

Adults (aged 18 years and over) 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 150 - 300 minutes of moderate intensity aerobic physical activity, or do at least 75 - 150 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 emphasizes 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 aerobic physical activity to more than 300 minutes, or do more than 150 minutes of vigorous-intensity aerobic physical activity, or an equivalent combination of moderate- and vigorous-intensity activity throughout the week for additional health benefits.

Conditional recommendation, moderate certainty evidence

Good practice statement:

- *Doing some physical activity is better than doing none.*
- *If adults living with disability are not meeting these recommendations, doing some physical activity will bring benefits to health.*
- *Adults living with disability should start by doing small amounts of physical activity, and gradually increase the frequency, intensity and duration over time.*
- *There are no major risks to adults living with disability engaging in physical activity when it is appropriate to the individual's current activity level, health status and physical function; and when the health benefits accrued outweigh the risks.*
- *Adults living with disability may need to consult a health-care professional or other physical activity and disability specialist to help determine the type and amount of activity appropriate for them.*

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

It is recommended that:

- Adults living with disability should limit the amount of time spent being sedentary and replacing sedentary time with physical activity of any intensity (including light intensity) has 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 physical activity.

Strong recommendation, low certainty evidence

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