

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

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38

39 **Abstract**

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

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

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

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

56

57 Introduction

58

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

71

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

81

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

83 Sustainable Development'.¹³ Its vision of 'no-one left behind', starting with the most vulnerable, put
84 a focus on disability inclusion, which has subsequently been embraced in key policy developments in
85 physical activity and sport.^{12,14,15} Disability has been recognised by the World Health Organization
86 (WHO) as a development priority.¹² The publication of the first WHO guidelines on physical activity
87 and sedentary behaviour for people living with disability¹⁶ reflects the WHO's commitment to
88 inclusive actions, aligned with the 2030 Agenda and expressed in the Global Action Plan on Physical
89 Activity 2018 – 2030.¹² Incorporating equity and human rights is integral to the WHO guideline
90 development process.¹⁷ The emergence of these public health recommendations for people living
91 with disability facilitates the development and implementation of related policies, research and
92 practices that can reduce discrimination and create opportunities for inclusive physical activity
93 participation and better health outcomes among this population.

94

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

101

102 **Methods**

103

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

109 disability. Public consultation on the draft guidelines was conducted. This was widely circulated to
110 organisations and individual researchers in the field of disability and physical activity. The WHO
111 guidelines were developed in accordance with the WHO Handbook for Guideline Development¹⁷ and
112 details of the methodology can be found elsewhere.^{16,19}

113

114 The scientific report of the Physical Activity Guidelines Advisory Committee²⁰ provides a summary of
115 evidence on physical activity and sedentary behaviour for health outcomes from 2008 to 2016,
116 including disability. For the purposes of developing the new WHO guidelines, this review was
117 updated through a search for systematic reviews and pooled analyses of cohort studies published
118 from 2017 up to September 2019.

119

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

127

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

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

138

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

145

146 **Results**

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

157

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

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

163

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

178

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

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

195

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

207

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

213

214 **Discussion**

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

222

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

234

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

238 the physiological response to physical activity and sedentary behaviour, regardless of impairment.
239 Where condition specific evidence was not reviewed, e.g. autism, spina bifida, many functions
240 affected by these conditions were addressed in the evidence, this enabled broadening the
241 applicability of the evidence. As previously mentioned, in the case of other disability areas (e.g.
242 visual or hearing impairments), where there was no physiological reason to assume different health
243 outcomes, the opportunity to accrue health outcomes associated with physical activity and limiting
244 sedentary behaviour relate more to factors beyond impairment or health conditions alone.
245
246 While the evidence base for the general age-specific populations was also applied to those with
247 impairments in order to increase the total volume of evidence considered, this does not mitigate the
248 need to increase the volume of disability-specific research in the future. Physical activity outcomes
249 and side effects may vary across different impairment groups in ways that have not yet been
250 studied. New research could help increase the evidence base and thereby inform the specificity of
251 recommendations and contraindications. In the case of upper body led physical activities, less is
252 known about the health risks and benefits, and the extrapolations from the general population are
253 mostly based on lower body or a combination of upper and lower body physical activities. Future
254 research should adopt a functional approach to disability, considering the nature and impact of the
255 impairment on functioning and ability rather than just the diagnosed condition. This could increase
256 the number of participants available for specific research studies, thereby increasing the strength,
257 and possibly quality, of the evidence. Research funding mechanisms should prioritise this area to
258 improve knowledge and practice.

259

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

264 levels of disability and the International Classification of Functioning Disability and Health³ enabling
265 examination of physical activity according to functioning.^{24,25} These tools can be used to support a
266 functional approach to the classification of disability in future research studies.

267

268 During the development of the guidelines, it was critical to use language that that was inclusive and
269 that effectively reflected the evidence for the reviewed outcomes; a point emphasised in the public
270 consultation and peer review process. One important example concerns sedentary behaviour.

271 According to Tremblay et al.,²⁶ sedentary behaviour is sitting, lying, or reclining with low energy
272 expenditure; however, it is common to colloquially equate 'sedentary time' with 'sitting time'. The
273 terms 'sitting' or 'sit' in messages such as 'move more, sit less' or 'standing instead of sitting' may be
274 more accessible to the wider public than the term 'sedentary', but could lead to misinterpretation of
275 the recommendations and of the underlying evidence base if energy expenditure is not also
276 emphasized. Sitting while cycling, canoeing or propelling a wheelchair are, of course, not sedentary
277 behaviours. Hence, 'sit-less' messages are not considered to be inclusive, especially for people with
278 limited mobility, who sit or lie down all day but can still do light or higher intensity physical activities
279 while sitting or lying down. The use of universally acceptable language across all recommendations
280 was a priority of the GDG and should remain a priority for stakeholders as they communicate about
281 these new guidelines at a country level.

282

283 **Mainstreaming Inclusion**

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

290

291 Addressing barriers to physical activity requires comprehensive changes across all four strategic
292 objectives of the Global Action Plan on Physical Activity 2018 – 2030: social norms and attitudes;
293 spaces and places; programmes and opportunities; and governance and policy enablers. Providing
294 reasonable accommodations, such as accessible equipment, spaces or programmes, appropriate to
295 the nature and degree of impairment, and personal and environmental factors³ can enable physical
296 activity participation aligned with ability and help reduce sedentary behaviour.

297

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

306

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

313

314 **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

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

345

346 **Conclusion**

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

355

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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

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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

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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 through 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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467 Textbox 1. The WHO guidelines on physical activity and sedentary behaviour for children and
 468 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

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471 Textbox 2. The WHO guidelines on physical activity and sedentary behaviour for adults living with
472 disability¹⁶

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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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