



# Community Empowerment (Scotland) Act 2015

## Asset Transfer Request Form

### Important Notes.

You do not need to use this form to make an asset transfer request, but using the form will help you to make sure you include all the required information.

You should read the asset transfer guidance provided by the Scottish Government before making a request:

<http://www.gov.scot/Topics/People/engage/AssetTransfer>

You are strongly advised to contact the Council's Estates Team to discuss your proposals before submitting an asset transfer request:

**Estates, Corporate Services, Council Offices, School Place,  
Kirkwall KW15 1NY.**

E-mail: [property@orkney.gov.uk](mailto:property@orkney.gov.uk)

Telephone: 01856873535 extension 2731 or 2303.

When completed, this form must be sent to Orkney Islands Council using one of the methods below:

By Email:

[property@orkney.gov.uk](mailto:property@orkney.gov.uk)

By Post:

Estates Manager, Corporate Services, Council Offices, School Place, Kirkwall,  
KW15 1NY.

This is an asset transfer request made under Part 5 of the Community Empowerment (Scotland) Act 2015.

## Section 1: Information about the Community Transfer Body (CTB) making the request

1.1. Name of the CTB making the asset transfer request.

Name: Orkney Amateur Weight Lifting Club

1.2. CTB address. This should be the registered address, if you have one.

Postal address and postcode:

20 Meadow Drive  
Kirkwall  
KW15 1EY

1.3. Contact details. Please provide the name and contact address to which correspondence in relation to this asset transfer request should be sent.

Contact name:	[REDACTED]
Postal address and postcode:	[REDACTED]
Email:	OrkneyAWLC@gmail.com
Telephone:	[REDACTED]

We agree that correspondence in relation to this asset transfer request may be sent by email to the email address given above. (Please tick to indicate agreement).

You can ask the Council to stop sending correspondence by email, or change the email address, by telling us at any time, as long as 5 working days' notice is given.

1.4. Please mark an "X" in the relevant box to confirm the type of CTB and its official number, if it has one.

<input type="checkbox"/>	Company, and its company number is:	
<input type="checkbox"/>	Scottish Charitable Incorporated Organisation (SCIO), and its charity number is:	
<input type="checkbox"/>	Community Benefit Society (BenCom), and its registered number is:	
<input checked="" type="checkbox"/>	Unincorporated organisation (no number).	

Please attach a copy of the CTB's constitution, articles of association or registered rules.

1.5. Has the organisation been individually designated as a community transfer body by the Scottish Ministers?

No

Yes

If yes, please give the title and date of the designation order:

1.6. Does the organisation fall within a class of bodies which has been designated as community transfer bodies by the Scottish Ministers?

No

Yes

If yes what class of bodies does it fall within?

*Community Controlled Body / Community Amateur Sports Club*

## Section 2: Information about the land and rights requested

2.1. Please identify the land to which this asset transfer request relates.

You should provide a street address or grid reference and any name by which the land or building is known. If you have identified the land on the Council's register of land and property, please enter the details listed there.

It may be helpful to provide one or more maps or drawings to show the boundaries of the land requested. If you are requesting part of a piece of land, you **must** attach a map and full description of the boundaries of the area to which your request relates. If you are requesting part of a building, please make clear what area you require. A drawing will be helpful.

Stromness Squash Court Coirston Road Stromness KW16 3JS
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2.2. Please provide the UPRN (Unique Property Reference Number), if known. This can be found on the Council's register of land and property.

UPRN: 201361.10
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### Type of request, payment and conditions.

2.3. Please tick what type of request is being made:

- For ownership (under section 79(2)(a)) - go to section 3A.
- For lease (under section 79(2)(b)(i)) - go to section 3B.
- For other rights (section 79(2)(b)(ii)) - go to section 3C.

### 3A - Request for ownership

What price are you prepared to pay for the land or property requested?:

Proposed price: £

Please attach a note setting out any other terms and conditions you wish to apply to the request.

### 3B - Request for lease

What is the length of lease you are requesting?

50 years

How much rent are you prepared to pay? Please make clear whether this is per year or per month.

Proposed rent: £1

Per Month (open to negotiation)

Please attach a note setting out any other terms and conditions you wish to be included in the lease, or to apply to the request in any other way.

### 3C - Request for other rights

What are the rights you are requesting?

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Do you propose to make any payment for these rights?

Yes

No

If yes, how much are you prepared to pay? Please make clear what period this would cover, for example per week, per month, per day?

Proposed payment: £

Per

Please attach a note setting out any other terms and conditions you wish to apply to the request.

## Section 3

### Community Proposal

3.1. Please set out the reasons for making the request and how the land or building will be used.

This should explain the objectives of your project, why there is a need for it, any development or changes you plan to make to the land or building, and any activities that will take place there.

Please see appendix 1

## **Benefits of the proposal**

**3.2.** Please set out the benefits that you consider will arise if the request is agreed by the Council.

This section should explain how the project will benefit your community, and others.

Please see appendix 1

## Restrictions on use of the land

3.3. If there are any restrictions on the use or development of the land, please explain how your project will comply with these.

Restrictions might include, amongst others, environmental designations such as a Site of Special Scientific Interest (SSI), heritage designations such as listed building status, controls on contaminated land or planning restrictions.

## Negative consequences

3.4. What negative consequences (if any) may occur if your request is agreed to? How would you propose to minimise these?

You should consider any potential negative consequences for the local economy, environment, or any group of people, and explain how you could reduce these.

*Please see appendix 1*

## Capacity to deliver

3.5. Please show how your organisation will be able to manage the project and achieve your objectives.

This could include the skills and experience of members of the organisation, any track record of previous projects, whether you intend to use professional advisers.

Please see appendix 1

## Section 4

### Level and nature of support

4.1. Please provide details of the level and nature of support for the request, from your community and, if relevant, from others.

This could include information on the proportion of your community who are involved with the request, how you have engaged with your community beyond the members of your organisation and what their response has been. You should also show how you have engaged with any other communities that may be affected by your proposals.

Please see appendix 1

## Section 5

### Funding

5.1. Please outline how you propose to fund the price or rent you are prepared to pay for the land, and your proposed use of the land.

You should show your calculations of the costs associated with the transfer of the land or building and your future use of it, including any redevelopment, ongoing maintenance and the costs of your activities. All proposed income and investment should be identified, including volunteering and donations. If you intend to apply for grants or loans you should demonstrate that your proposals are eligible for the relevant scheme, according to the guidance available for applicants.

Please see appendix 1

## Signature

Two office-bearers (board members, charity trustees or committee members) of the community transfer body must sign the form. They must provide their full names and home addresses for the purposes of prevention and detection of fraud.

This form and supporting documents will be made available online for any interested person to read and comment on. Personal information will be redacted before the form is published.

**We, the undersigned on behalf of the Community Transfer Body as noted at Section 1, make an asset transfer request as specified in this form.**

**We declare that the information provided in this form and any accompanying documents is accurate to the best of our knowledge.**

Name:	[Redacted]
Address:	[Redacted]
Date:	15/03/21
Position:	Chairman / Head Coach
Signature:	[Redacted]

Name:	[Redacted]
Address:	[Redacted]
Date:	31/3/21
Position:	Treasurer
Signature:	[Redacted]

## Checklist of accompanying documents

To check that nothing is missed, please list any documents which you are submitting to accompany this form.

**Section 1** - You must attach your organisation's constitution, articles of association or registered rules.

Title of document attached: *Club Constitution*

**Section 2** - Any maps, drawings or description of the land requested

Documents attached:

**Section 3** - Note of any terms and conditions that are to apply to the request

Documents attached:

**Section 4** - About your proposals, their benefits, any restrictions on the land or potential negative consequences and your organisation's capacity to deliver.

Documents attached:

**Section 5** - Evidence of community support

Documents attached: *Weightlifting Scotland letter, Seomness Academy letter, Public/member consultation results,*

**Section 6** - Funding

Documents attached:

## Appendix 1- Question Answers:

### 3.1 Community Proposal:

**Please set out the reasons for making the request and how the land or building will be used.**

1- Orkney Amateur Weight Lifting Club (OAWLC) are applying to take on a lease of the Stromness Squash Court, to help promote the long-term survivability of the sport of Weightlifting & Paralympic Powerlifting (the sports) in Orkney and its environs. Currently the club hires space from a local gym, but this agreement has presented us with a number of issues and is coming to an end, thereby putting the future of the sports in serious jeopardy.

2- This proposal, if successful, will allow OAWLC to have a permanent training facility to promote the sport to more people from different demographics at recreational and competitive levels.

3- Currently the club hires space from a local independent gym in town, this means we are very fixed in our session times which has been identified as a major barrier to members joining our club (see questionnaire answers). There are also concerns over taking young people into our current gym, and we do not believe it would be appropriate to take younger athletes (8-12 years old) into the space we currently use.

4- The proposed project aims to provide Orkney with a Weightlifting & Para-Powerlifting facility. Neither of which sports are readily available outwith our limited operating hours. The current gyms in Orkney do not have the specific equipment for either Para Powerlifting, or Weightlifting, but also fall short for disabled access friendliness which excludes 3 potential disabled people from engaging in a sport in Orkney. The clubs focus on coaching and making the sport accessible to young people will see young Orcadians gain access to the recommended weekly levels of muscle strengthening exercises (see attached document) in a fully structured, safe and supervised environment, which is currently not possible. Given that there is a large focus on physical activity as a way to help combat obesity and inactivity related illness and mortality, we believe that there is a need for more facilities that promote sport and physical activities such as the one we propose to make.

5- The clubs athletes, who are now competing at every level of British competition, have represented and are currently members of Team Scotland, have broken numerous Scottish records, and some of whom are on course to be selected for future Commonwealth Games squads currently are only able to train for 2 hours a week where they can use the specialist equipment they need, in an atmosphere conducive to performance with their team and under the eyes of a coach, for reference most elite athletes at this level will train for at least 12 hours a week.

6- If the club is granted a lease on the Stromness Squash Court we will be able to invest in the equipment that we need to be able to engage with the remote and rurally isolated communities in Orkney, as made clear by our Isles Outreach Project. At present there are concerns over investing in Weightlifting equipment and storing it at the facility we currently hire.

7- The club will change the use of the squash court building to a weightlifting club. This will involve removal of the wooden floor, re-concreting and matting the whole area. The facility will then be outfitted with Weightlifting and Para-Powerlifting equipment. A disabled stairlift may be installed, and minor aesthetic changes to the inside of the building will also be made.

### 3.2- Benefits of the proposal:

**Please set out the benefits that you consider will arise if the request is agreed by the Council.**

Increased access to sport & physical activity as per Scottish Government guidance: In adults this will allow us to provide more adults the opportunity to take part in muscle and bone strengthening exercises at least 2 times per week (as per Scottish Government guidance). The need is more apparent in Orkney for under 16's who currently are unable to meet guidance to strengthen muscles and bones 3 days per week in a safe, structured and fully coached environment. (see attached documents for Government guidance on physical activity, and consensus statements from British Medical Journal & the International Olympics Committee). For reference, in Scottish Adults only 31% of males and 27% of females are meeting the recommended guidance in both muscle strengthening and moderate physical activity, according to the Scottish Governments health survey in 2019.

Engage more females with sport: Over half of the people who replied to our survey were female, and one of the biggest barriers identified was confidence. We believe that the club is helping to tackle gender inequality in sport, which can be seen at every level of our club: Our board is 2/3rds female (IOC recommended 1/3<sup>rd</sup> female in sports boards to represent participation); our senior section is around 55% female; and we have taken the number of Orcadian female strength sport athletes who have competed officially from 2 to 5. If we are successful in this application, we can do more for girls and women in Orkney by offering same sex lifting sessions which we hope will remove more barriers to the sport and allow more females to become physically active and engage with a local sporting community.

If the club is successful, we can offer lifting sessions to younger children, giving them a fundamental understanding of the safe techniques needed to train effectively in Weightlifting, other strength sports, to aid their progression in other sports, or for health & wellbeing.

The squash court facility is currently a very underutilised asset (see attached usage statistics). OAWLC has had 498 uses since reopening last year in September, demonstrating a very clear demand for the sport of Weightlifting. This is despite the squash court being open and available much more than the Weightlifting club currently is (4 hours a week as opposed to ~36 hours a week).

We believe that the increased traffic into Stromness by both parents and senior lifters may benefit local businesses, and see an increased usage of public transport, by driving more passing trade into the town, thereby benefitting the local economy.

### **3.4- Negative consequences**

**What negative consequences (if any) may occur if your request is agreed to? How would you propose to minimise these?**

Given the facility is currently a squash court, there will be a negative consequence to the users of the facility. However, given the extremely low usage numbers, the close proximity of other Squash facilities (the Pickaquoy Centre); the positive response from within the local community (see letters of support); and the fact that there is not currently a squash club operating within Stromness we believe that these negative consequences are outweighed by the positive.

### **3.5- Capacity to deliver**

**Please show how your organisation will be able to manage the project and achieve your objectives.**

Given a premise, we would immediately be able to offer more hours per week to our junior section, senior section and be able to begin in person sessions with the Paralympic Powerlifting section (1 junior athlete who we engage with online).

The club currently has 3 qualified coaches, one is actively coaching, one is studying in Edinburgh and will return in Summer and the other has concerns over Covid-19 and will return once the situation has improved. The club is aiming to have 3 more coaches qualified and through a mentoring process by the end of this year. This will allow us to begin effective delivery on our 8–12-year-old programme (Titans) and same sex sessions (Amazonians & Spartans).

We are currently in talks with the PE department at Stromness Academy, and are willing to engage with and upskill members of the teaching staff there so that there may be a partnership between OAWLC and the Academy to deliver after school, or during school hours programmes.

Please see attached documents for year 1 and year 2 proposed timetables.

**4.1 Level & Nature of Support**

**Please provide details of the level and nature of support for the request, from your community and, if relevant, from others.**

OAWLC has taken an active approach in engaging with the community and key stakeholders with regards to the proposed project, this has included contacting a number of local sports clubs, businesses, community groups, and other organisations that promote physical activity.

- 1- Public Consultations survey, which was published over social media and received 66 unique responses (see survey results)
- 2- Stromness Community Association were contacted and gave indication that they thought the project could be positive but the community must be consulted thoroughly as there were some potential negatives.
- 3- Stromness Academy head of P.E was contacted and provided a letter of support
- 4- Orkney Amateur Swimming Club were contacted as they train in close proximity to the site, a positive letter of support was provided.
- 5- Stromness Athletic Football Club have been contacted, as they currently use the other half of the building. No response has been received as of yet.
- 6- Stromness Golf Club have been contacted, as they are in close proximity to the site, no response has been received yet.
- 7- Active Schools have been contacted, and talks are ongoing with them. Having a premise offers us a chance to have the dedicated equipment to work in partnership with ActiveSchools around the whole of Orkney (as evidenced by our plan to begin an isles outreach programme)
- 8- Orkney Rugby Football Club have been contacted, but no reply has been received as of yet.
- 9- Stromness Primary School has been contacted but no reply has been received as of yet

10- Heriot Watt University, Head of Sport has been contacted. We believe that given the proximity of their Orkney campus we can offer benefit to their students. No response has been received as of yet.

11- Businesses in Stromness have been contacted, including Argos Bakery, the responses have been positive.

12- Weightlifting Scotland and British Weightlifting have been contacted. We have received a letter of support from Weightlifting Scotland, and British Weightlifting.

13- The club has been working closely with SportScotland on the project, they believe that the project will be a positive step for sports in Orkney and have been very supportive.

We believe that, based on these communications there is a clear feeling of community support. We also recognise that many of our attempts to reach out to the local and wider community have, as of yet, gone unanswered. The club expects there to be more replies in the coming month and are more than happy to provide them as we receive them.

### **5.1 Funding**

**Please outline how you propose to fund the price or rent you are prepared to pay for the land and your proposed use of the land.**

#### Initial outlays:

Removing wooden flooring and re-concreting- £3000

Cost to outfit the gym and provide equipment- £14000-£37000. (see attached quotes)

#### Ongoing costs:

Licenses, insurance, software etc- £1500 per annum

Rates & Electricity- ~£150PCM

(the club are not in a position to accurately estimate the ongoing costs of the building, but we are more than confident that we will be in a place to competently manage the financial situation if we are successful in this application)

The club aims to fundraise the costs for changing the use of the facility through sponsorship, member fundraising, and grant funding. The club has a number of grant applications in progress, and that we are waiting to hear back from. The club and SportScotland have been working on the facilities grant fund which allows any funds raised by the club to be match funded by SportScotland, and we believe that this fund looks very promising for us. The club has also been approaching local businesses and our members have been fundraising, which has provided us with over £3000 in money towards the project already.

#### Income

Current income through membership and session attendance- £200-300 PCM.

Projected income (please note that year 1 is at 50% of max attendance, year 2 75% and year 3 100%)

	A	B	C	D	E	F	G	H	I	J	K
1											
	<b>Session</b>	<b>Days per week</b>	<b>Cost per session</b>	<b>Maximum participants</b>	<b>Revenue per week</b>	<b>Weeks per year</b>	<b>Revenue per year</b>	<b>75% Capacity</b>	<b>50% Capacity</b>		
2	Teen Titans	4	3	10	120	41	4920	3690	1845		
3	Titans	3	3	16	144	41	5904	4428	2214		
4	Club	6	5	10	300	50	15000	11250	5625		
5	Beginners	2	5	4	40	41	1640	1230	615		
6	Amazonians	1	5	10	50	50	2500	1875	937.5		
7	Spartans	1	5	10	50	50	2500	1875	937.5		
8					<b>704</b>		<b>32464</b>	<b>24348</b>	<b>12174</b>		
9											
10											
11											

Enter text or formula



Annual sponsorship- £1500 per annum

Money raised through social events, sale of merchandise, raffles etc- £1000-1500 Per annum

## **CONSTITUTION**

**July 2020**

### **1. Name**

The name of the organisation shall be 'Orkney Amateur Weightlifting Club' (OAWLC), hereinafter referred to as the 'Club'.

### **2. Objectives**

The Club is established to pursue the following objectives:

- 2.1 To promote participation in the sport of weightlifting (hereinafter referred to as 'the sport') in Orkney;
- 2.2 To facilitate the sport of weightlifting to become available to all in Orkney and its environs;
- 2.3 To promote appropriate pathways to competitive national and international standards in Orkney and its environs;
- 2.4 To maintain the highest standard of coaching and technical competence in the sport;
- 2.5 To maintain the highest safety standards in the sport;
- 2.6 To help, where possible, to facilitate development in other sports clubs, charitable bodies & community projects in Orkney & its environs;
- 2.7 The provision of training and playing facilities for it's members;
- 2.8 Upholding the rules and values of the sport; and
- 2.9 Providing equal opportunities for successful participation by all sections of the community.

### **3. Affiliation**

The Club shall be associated and thereafter officially affiliated to Weightlifting Scotland (WLS) & British Weightlifting (BWL) (hereinafter referred to as the "National Governing Bodies").

### **4. Membership**

All members are subject to the Constitution of the Club and the regulations of the National Governing Bodies.

- a) Membership is open to all and no application for membership will be refused on other than reasonable grounds.

- b) There will be no discrimination on grounds of age, disability, gender reassignment, marriage and civil partnership, pregnancy and maternity, race, religion or belief, sex; sexual orientation, political or other opinion.
- c) All applications for membership shall be accompanied by the appropriate annual membership fee, which shall thereafter be payable on demand.
- d) The members of the following categories shall be entitled to vote at General or Annual General Meetings: Competitive Members, Associate Members, Honorary Member, Officials and Coaches.
- e) The members of the following categories may be elected and serve on the Management Committee. Competitive Members, Associate Members, Honorary Member, Officials and Coaches.
- f) All members will receive a copy / be given an electronic version / website link of the relevant Code of Conduct, a copy of the Club's Child Protection Policy and a copy of the Constitution.
- g) Members shall be enrolled on one of the following categories: (Examples)

Competing Member (adult/ junior)-Members who have passed basic competency sign off to be able to train independently or in team sessions.

Associate Member- (non competing)

Coach (qualified). Level 1 coaches, who assist in sessions. Level 2, who lead sessions, lead level 1 coaches, assign programmes, coach at competitions.

Official (qualified).

Volunteer/ Helper.

Junior Member – under the age of 16 years old.

Honorary Member- members who's contribution to the club has been deemed outstanding and receive free lifetime membership.

## **5. Suspension, Refusal or Termination of Membership**

- a) The Management Committee shall be entitled to:
  - i) Refuse any application for membership on the grounds that such membership would be prejudicial to the objectives of the Club as set out in Rule 2 of this constitution.

- ii) For good and sufficient reason to refuse renewal of any existing membership or terminate or suspend any membership provided that the member concerned shall have the right to be heard by the full Management Committee before a final decision is made.
- iii) Any reason for refusal or termination must be communicated in writing to the individual and shall be treated as final.
- c) Any member or person under suspension by WLS, BWL, UKAD, WADA or IOC shall be subject to the same sanctions by the Club.
- d) Any member who fails to pay their fees by the date required shall forfeit their right to representation on the management committee and at general meetings, and shall be suspended from taking part in any event under the control of the Club until such fees are paid.
- e) Any member under suspension shall be barred from taking part in any match or event under the control of the Club.
- f) Notification of the termination of a membership will be forwarded to the Governing Body.

## **6. General Meetings**

### **a) Annual General Meeting (AGM)**

The AGM shall be held each year at such time and place as determined by the Management Committee, at approximately twelve monthly intervals, but no more than fourteen months after the date of the previous AGM. At each AGM the following business shall be conducted:

- i) Receive and confirm the minutes of the previous AGM.
- ii) Presentation of the clubs financial accounts for the year.
- iii) Presentation of clubs projected financial situation for the forthcoming year, and the setting of all fees
- iv) Presentation of Chairpersons report.
- v) Election of officers to the Management Committee.
- vi) Any other business brought before the meeting which has been submitted in writing to the secretary not less than seven days prior to the AGM, and any other business deemed relevant by the chairperson

### **b) Extraordinary General Meeting (EGM)**

An EGM may be called upon the written demand of:

- i) 33% of the total number of Competitive and Associate Members; or
- ii) The Chairperson; or
- iii) ½ majority of the Management Committee.

Notice for an EGM shall be of a minimum of fourteen days notice, and stating the business to be discussed

## **7. Rules for General Meetings**

- a) A minimum of fourteen days notice in writing shall be given to all members, except in the event of an EGM where the notice shall be a minimum of seven days.
- b) The Chairperson, or in his/her absence a member selected by the meeting, will take the Chair.
- c) All members shall register with the Secretary prior to the start of the meeting.
- d) Each member shall have one vote.
- e) All votes shall be determined by a simple majority. In the event of a tied vote, the Chair may exercise a casting vote.
- f) The quorum shall be 50% or 2 of those individuals eligible to vote, whichever number is smaller.
- g) The Secretary shall keep the minutes of the meetings and record all proceedings and resolutions.

## **8. Election of Officers To The Management Committee**

- a) The members of the Management Committee shall be drawn from the membership, as defined in clause 4 of this constitution.
- b) Candidates shall be elected by show of hands at the AGM, or EGM, and shall be members of the Management Committee from the conclusion of that AGM until the conclusion of the following AGM, or in the event of a re-election at an EGM.
- c) All nominations of candidates for election shall: have the consent of the nominee; be seconded; be received by the secretary.
- d) Uncontested posts may be filled by nomination(s) and election at the AGM.
- e) The Secretary shall inform all members of all nominations.

## **9. Members of the Management Committee**

- a) The Management Committee shall consist of the following Officers:

Chairperson

Secretary

Treasurer

Social Secretary

Fundraising Secretary

Parent Rep

b) As detailed above, all elected members of the Management Committee shall be entitled to one vote each at General Meetings, except the Chair of the meeting who may have the deciding vote in the event of a tie.

c) The committee may co-opt any member to any unfilled post until the conclusion of the following AGM, providing that the number of co-optees shall not exceed one third of the total number of persons serving on the committee at that time.

d) The management committee may appoint any sub-committees it may deem necessary to deal with the matters of the club, until the conclusion of the following AGM. The proceedings of all such committees shall report to the management committee by a representative elected by that sub-committee.

#### **10. Rules for the Management Committee**

a) The Chairperson shall chair the meeting, or in his/her absence one of either the Treasurer or Secretary or a nominee from the committee in the event of all those mentioned being absent.

b) Fourteen days notice of any meeting of the Management Committee shall be given by the Secretary, except when:

i) The date of the meeting had been agreed at the previous management meeting, in which case seven days notice shall be given.

ii) In an emergency the Chairperson may call a meeting at four days notice.

c) The quorum shall be two of those officers entitled to vote, as listed at Rule 9.

d) All members of the Management Committee as listed at Rule 9. a) shall be entitled to vote.

e) All votes shall be determined by a simple majority. In the event of a tied vote, the Chair may exercise a casting vote.

g) In the event that committee members are unable to attend meetings, proxy votes may be cast.

## **11. Finance**

- a) The income and property of the club, however derived, shall be applied solely towards the objectives of the club as set out in Rule 2, of this Constitution.
- b) The club shall have the power to raise money by means of yearly or monthly affiliation fees, match fees, trading of goods, session fees and course fees and any other such means as determined by the Management Committee at the Annual General Meeting.
- c) All monies shall be lodged in a bank account in the name of the club.
- d) The Chairperson, Treasurer and Secretary shall be authorised signatories to sign cheques on behalf of the club, of which two signatories shall be needed.
- e) The Chairman, Secretary and Treasurer will have the power to sign any legal documentation required on behalf of the club and will have the power to operate any bank accounts or any other financial matters incidental thereto
- f) The financial year of the club shall run from 1<sup>st</sup> June to 31<sup>st</sup> May
- g) The organisation has power to do anything which is calculated to further its purposes or is conducive or incidental to doing so in particular but without prejudice to the foregoing generality to buy or lease heritable property, to operate bank accounts, and to employ any person required to facilitate the club's purposes.

## **12. Amendments to the Constitution**

This Constitution may only be amended by a proposal passed by a majority of members present and entitled to vote at an Annual or Extraordinary General Meeting.

## **13. The Dissolution of the Club.**

- a) Any resolution to dissolve the club may be passed at any General Meeting provided that:
  - i) the terms of the proposed resolution are received by the Secretary at least forty two days before the meeting at which the resolution is to be brought forward, and that
  - ii) at least twenty eight days of the proposed resolution shall be given in writing by the secretary to all members, and that
  - iii) such a resolution shall receive the assent of two thirds of those present and entitled to vote.

b) If, upon the winding up or dissolution of the Club there remains after the satisfaction of all the Club's debts and liabilities any property whatsoever, the same shall be given or transferred to some other organisation or organisations having objects (that is, aims and activities) similar to the objects of the Club by Resolution passed at a General meeting at or before the time of the dissolution, and in so far as effect cannot be given to such provision then to some charitable objects.

**14. Declaration**

It is hereby certified that this document represents a true and most up to date version of the Constitution of the Club.

**SIGNATURES**

Chair Person [Redacted]

Date 21.03.21

Secretary [Redacted]

Date 20/03/21

Treasurer [Redacted]

Date 21/3/21

Social Secretary [Redacted]

Date 20/03/2021

Fundraising Secretary [Redacted]

Date 24/03/2021

Parent Representative [Redacted]

Date 21.03.21



Education, Leisure and Housing  
STROMNESS ACADEMY  
Stromness, Orkney KW16 3JS

Tel: (01856) 850660 Fax: (01856) 850171  
admin.sa@glow.orkneyschools.org.uk  
www.stromnessacademy.org.uk



Head Teacher Mrs Jane Partridge

---

Dear [REDACTED] and the Orkney Amateur Weightlifting club,

I am writing to put in writing my thoughts that I shared over our Zoom meeting the other day in regards to your application and potential move to the new squash courts with the weightlifting club.

Whilst I was disappointed to hear of its lack of use for squash, it seems the building is being completely underused and I am fully supportive of the weightlifting club moving there. I am really excited for the opportunities that this could create for us at Stromness Academy, with the move potentially allowing a 'weightlifting' Friday activity or after school clubs and possibly giving our talented athletes the chance to receive strength and conditioning training for their own sport, with a qualified S and C coach.

Whilst these ideas are in their infancy, I think that the weightlifting club moving to the squash court would be a much better use of facilities and would be much more beneficial from our point of view as we could take much larger groups down there as opposed to only being able to take a very small group to squash, due to 2/3 pupils being able to fit on the court at one time.

Again, if the weightlifting club were to move to the squash courts, I believe this would give our west mainland pupils much more opportunities to get involved in weightlifting outside of school as many, I am sure, may go but don't know about or aren't able to make it along to your Kirkwall base. So I would be looking forward to setting up some strong links between the club and the school.

If there's anything else I can do to help with your application, please don't hesitate to give me a shout.

Kind regards,  
Hamish Flett  
PT PE  
Stromness Academy.



Community Asset Transfer-Orkney Amateur Weight Lifting Club

To whom it may concern,

We are delighted to support the Orkney Amateur Weight Lifting Club in their application for the community transfer of the "Squash Court Facility to a Weightlifting/Para-Powerlifting Facility."

Weightlifting Scotland fully supports the above application for the change of use for OAWLC.

We can confirm our organisation fully endorses the weightlifting development work currently engaged in Orkney by [REDACTED] (Chair of OAWLC) and his team.

If you need any further assistance on this matter, please feel free to contact me directly.

Yours sincerely



Colin A Hannah  
General Secretary  
Weightlifting Scotland



23<sup>rd</sup> March 2021

**To whom it may concern**

British Weight Lifting, the UK's recognised National Governing Body for weightlifting and para-powerlifting, is pleased to support Orkney Amateur Wight Lifting Club.

I can highly recommend the club as a well-established and successful club. We are pleased with the level and standard of coaching shown in the club.

The club offers access to all, catering for all interested in taking part in weightlifting. Orkney Amateur Wight Lifting Club actively recruit mature, young, and teen athletes.

Orkney Amateur Wight Lifting Club have been a great asset to British Weight Lifting and the weightlifting community, keeping people active and providing a safe and engaging environment and we hope will have the opportunity to continue doing so.

I cannot recommend enough the efforts that Orkney Amateur Wight Lifting Club, have gone to establish and keep the club running. Their standards are extremely high, adhering closely to British Weight Lifting guidelines and how British Weight Lifting teaches and educates in the community.

Yours faithfully



Tom Wilkinson  
Regional relationship manager

1st Floor Office Suite, St Ann's  
Mill, Kirkstall Road, Leeds, West  
Yorkshire, LS5 3AE

t. 0113 224 9402  
e. [enquiries@britishweightlifting.org](mailto:enquiries@britishweightlifting.org)



Unit 2, Greaves Way  
Stanbridge Road  
Leighton Buzzard,  
Beds, LU7 4UB

Tel: 01582 560555  
[www.pullumsports.com](http://www.pullumsports.com)  
[info@pullumsports.com](mailto:info@pullumsports.com)

## Professional Gym Equipment Quotation

  
**Chairman & Head Coach**  
Orkney Amateur Weightlifting Club



By  
Steve Waters

[steve@pullumsports.com](mailto:steve@pullumsports.com)

[www.pullumsports.com](http://www.pullumsports.com)





## Professional Gym Equipment Quotation – V1 – 25/03/21

### **Why buy from Pullum?**

#### **Quality, Functionality & Support.**

Pullum has been supplying professional gym equipment to the UK market for over 100 years. We proudly support a wide range of customers throughout the UK and Ireland. Our customers include: Universities, professional sports bodies, premiership rugby and football teams, national rowing teams and numerous high-level gyms and fitness centres.

#### **Quality**

As well as manufacturing our own high-quality equipment, we work closely with suppliers of products which we believe offer both quality and true value for money. We continuously search for new manufacturers/suppliers to ensure our product range comprehensively supports our customer needs.

Whenever we introduce a new supplier, we test a sample of products to ensure they also deliver the quality we demand. In many product areas, we source from multiple suppliers to ensure we can offer choice in the design, functionality, and price of the product.

#### **Functionality**

With our own manufactured products, we strive to deliver functionality with simplicity. In our experience when we achieve this our customers get lower costs and products which will stand the test of time. We select suppliers who also place functionality and reliability at the top of their design criteria.

#### **Support**

We pride ourselves in offering our customers full support through the entire decision making and buying process. We help them to select the correct products for their specific needs, supply a tailored quotation within their budget requirements, manufacture equipment including bespoke options and deliver and install the equipment within a specified timeframe.

It doesn't end there. Once you have purchased products from Pullum we are still available to offer advice and guidance and should it become necessary support the product. We don't make it hard to get hold of us and will look to resolve issues as quickly as possible. Because of our in-house engineering team many issues can be resolved by ourselves, speeding up resolution time.

We offer service contracts or repair call-out options so we can ensure your equipment is fully functional and safe.

Our standard price reflects not just the product but the service and support we put around that. We strive to keep our list prices as low as possible and regularly benchmark ourselves with quality competitors. Our goal is to keep your costs down, but at the same time offer you the best value for money, so consider the product cost averaged out over the life of the product.

# PULLUM

## Professional Gym Equipment Quotation – V1 – 25/03/21

### OPTION 1 SILVER

Code	Product	Qty	Retail price	Discount Price	Final Price	Discount
	Pullum back to wall rack with external safety bars and Roller catch cups	6	£850.00	£748.00	£4,488.00	12.00%
	Multiple grip chinning frame	6	£100.00	£88.00	£528.00	12.00%
	Double Storage system	3	£720.00	£633.60	£1,900.80	12.00%
BDPT140	Pullum 140kg Olympic Competition Disc set	6	£760.00	£684.00	£4,104.00	10.00%
BT2B02	2XL Olympic training bar - 20kg	6	£225.00	£202.50	£1,215.00	10.00%
	Pullum One Tun adjustable Bench	3	£450.00	£396.00	£1,188.00	12.00%
	Pullum Paralympic Bench with stands	1	£1,050.00	£924.00	£924.00	12.00%
	Pullum 2XL Powerlifting Bar	1	£247.50	£217.80	£217.80	12.00%
	Titex IPF approved 159kg Powerlifting disc set	1	£698.00	£628.20	£628.20	10.00%
	High Density Rubber Mats 1m x1m x 48mm	53	£68.00	£61.20	£3,243.60	10.00%
	1m x 2m Oak Lifting Platforms	6	£650.00	£585.00	£3,510.00	10.00%
	Discounted price				£21,947.40	
	Shipping only				£1,050.00	
	Discounted Delivered Price				£22,997.40	
	VAT @ 20%				£4,599.48	
	<b>Total Price</b>				<b>£27,596.88</b>	





## Professional Gym Equipment Quotation – V1 – 25/03/21

### **OPTION 2 GOLD**

Code	Product	Qty	Retail price	Discount Price	Final Price	Discount
	Pullum back to wall rack with external safety bars and Roller catch cups	6	£850.00	£748.00	£4,488.00	12.00%
	Multiple grip chinning frame	6	£100.00	£88.00	£528.00	12.00%
	Double Storage system	3	£720.00	£633.60	£1,900.80	12.00%
	Eleiko 190KG NXG Performance Sports Training sets	6	£2,395.00	£2,035.75	£12,214.50	15.00%
	Pullum One Tun adjustable Bench	3	£450.00	£396.00	£1,188.00	12.00%
	Pullum Paralympic Bench with stands	1	£1,050.00	£924.00	£924.00	12.00%
	Eleiko IPF Approved Powerlifting Competition set	1	£1,955.00	£1,661.75	£1,661.75	15.00%
	High Density Rubber mats 1m x 1m x 48mm	53	£68.00	£61.20	£3,243.60	10.00%
	Oak Lifting Platforms 1m x 2m	6	£650.00	£585.00	£3,510.00	10.00%
	Discounted price				£29,658.65	
	Shipping only				£1,050.00	
	Discounted Delivered Price				£30,708.65	
	VAT @ 20%				£6,141.73	
	<b>Total Price</b>				<b>£36,850.38</b>	



## Professional Gym Equipment Quotation – V1 – 25/03/21



- **British built equipment that is built to last from a Company with the strongest heritage and track record**
- **Customisation of colours to create a unique training environment**
- **Faster lead times to hit business deadlines**
- **Peace of mind from robust kit and strong warranties**

All Pullum Pro equipment will be finished in our default colour White (with black attachments) unless otherwise specified when ordering. Please see the colour chart attached for our standard options. Other colours are available on request but may cost more.

A delivery date will be confirmed once the order has been placed. We stock a large number of products which can be dispatched within days. For larger orders this is usually within 6 weeks of the order date. Please advise us if you have a target date as we will always try to work to your timescales where practicable.



## Professional Gym Equipment Quotation – V1 – 25/03/21

Ownership of all equipment remains with Pullum Sports Ltd until paid for in full.

We require written confirmation of all orders which must detail delivery and invoicing addresses and provide contact points with telephone numbers for both. If your organisation requires us to present an order number when invoicing then please provide that with the order.



All upholstery vinyl used has an anti-bacterial agent built in to the vinyl rather than a surface coating. They are all inherently flame retardant to BS5852 section 4 and have been tested to surpass Martindale abrasion in excess of 300,000 rubs. Our pads are made in-house and we double stitch and double seam all products to ensure our pads are hard wearing.

The vendor warrants new Pullum branded equipment to be free of defects in materials and workmanship as below from the date of installation. During such period, any servicing or rectification required due to such defects shall be carried out by the vendor without charge.

In respect of racks, benches, disc loading or selectorised machines the warranty will extend to the following products from the date of installation:

Frames: 10 years;

Mechanical Components: 2 years;

Saddles, seats and rubberised materials (e.g. grip materials and foot straps): 12 months.

Such warranty will not extend to defects or damage resulting, in the Supplier's reasonable opinion, from misuse or neglect of, or accident to the equipment or failure to follow the instructions or advice of the Supplier or the manufacturer of the Non-Pullum Equipment;



## Pro-Forma #: 200408

Customer: [REDACTED]  
Company: Orkney Weightlifting Club

**Invoice to:**

ORKNEY WEIGHTLIFTING CLUB  
UNITED KINGDOM

**Deliver to:**

ORKNEY WEIGHTLIFTING CLUB  
UNITED KINGDOM

Qty	Item name	SKU	Item net	Total net	Item gross	Total gross
6	Weightlifting Platform 2400 * 1930 * 30mm - Bamboo + Rubber Mat	WEIGHTPLATFORMAPOLLO	£666.6583	£3999.95	£799.99	£4799.94
2	Bison Series - 3 Bay Wall Mounted Rig 1800mm » 1050MM Single CHS connector Bar x 3 » WF-F1-75/75 2.5 Meter upright x 6 » J HOOK (PAIRS) x 3 » 1800 MM CHS CONNECTOR BAR x 8	3BAYWM1800	£1124.9917	£2249.98	£1349.99	£2699.98
6	Foundation Bar all Hard Chrome - 2200mm -28mm -1500lb - 8 Bearings	REFOUNDATIONBARCHROME	£170.8333	£1025.00	£205.00	£1230.00
6	Foundation Bar Handle Chrome sleeves Black-2010mm -25mm -1000lb - 8 Bearings	REFOUNDATIONBARLADIESCHROME	£164.5833	£987.50	£197.50	£1185.00
12	New Collar Black	Collar - Black	£14.5833	£175.00	£17.50	£210.00
6	HI TEMP SET 150 KG ( BLACK/FLECK) » BISON HIGH IMPACT PLATES 25KG RED FLECK (PAIR) x 1 » BISON HIGH IMPACT PLATES 15KG YELLOW FLECK (PAIR) x 1 » BISON HIGH IMPACT PLATES 20KG BLUE FLECK (PAIR) x 1 » BISON HIGH IMPACT PLATES 5KG GREY FLECK (PAIR) x 1 » BISON HIGH IMPACT PLATES 10KG GREEN FLECK (PAIR) x 1	HITEMPSET150KG	£420.0000	£2520.00	£504.00	£3024.00
6	ADJUSTABLE BENCH (FID24)	ADJBENCH1	£229.1583	£1374.95	£274.99	£1649.94
84	Club Gym tile 100 x 100 20mm	GYMTILE20MM	£25.0000	£2100.00	£30.00	£2520.00
1	Discount		£-2164.8500	£-2164.85	£-2597.82	£-2597.82
			<b>Subtotal</b>		<b>£12267.53</b>	
			VAT @ 20%		£2453.51	
			<b>Total</b>		<b>£14721.04</b>	
			Paid to date		£0.00	

WOLVERSON FITNESS LTD.  
44 BILSTON LANE  
WILLENHALL  
WEST MIDLANDS  
WV13 2LH  
UNITED KINGDOM  
  
+44 (0)1922 618780

VAT number: GB 190 2834 09  
Company Registration Number: 09096001  
Accounts email address: [accounts@wolverson-fitness.com](mailto:accounts@wolverson-fitness.com)  
Bank account: 42316456  
Sort code: 56-00-69

---

NATWEST BANK, Bow Street, WV13

Account No / IBAN UK: GB76NWBK56006942316456

PayPal payments - [accounts@wolverson-fitness.com](mailto:accounts@wolverson-fitness.com)

- \* Quote valid for 30 days
- \* All previous versions of this form are obsolete
- \* Standard kerbside delivery unless requested otherwise
- \* Standard delivery lead-time 5-7 working days unless stated otherwise

# OAWLC Public Consultation

Monday, March 15, 2021

Powered by  SurveyMonkey

**66**

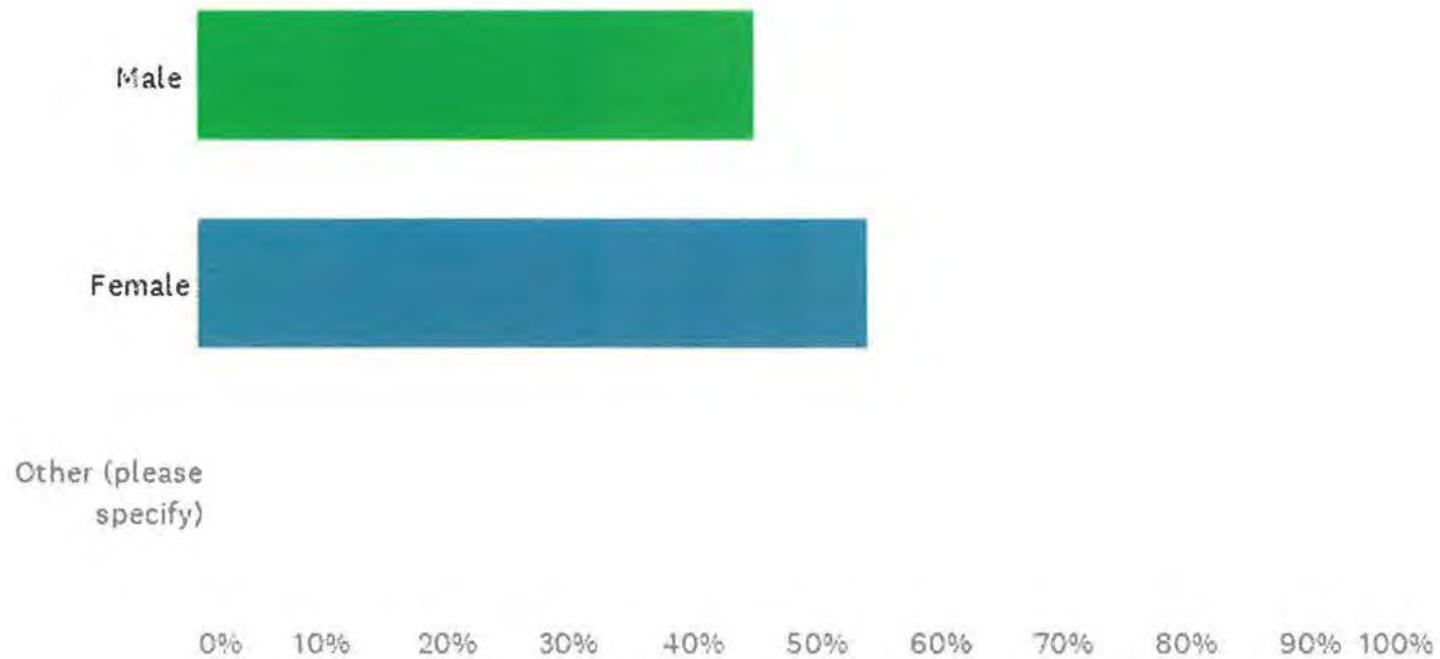
**Total Responses**

Date Created: Wednesday, January 27, 2021

Complete Responses: 66

# Q1: What is your gender?

Answered: 66 Skipped: 0



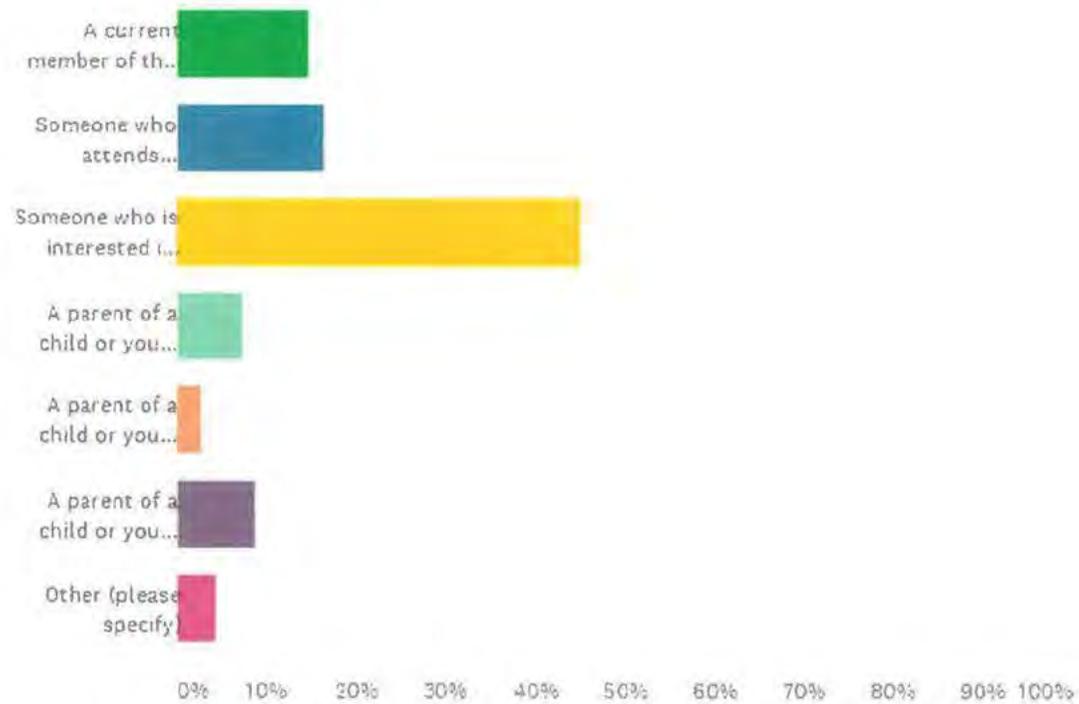
# Q1: What is your gender?

Answered: 66 Skipped: 0

ANSWER CHOICES	RESPONSES	
Male	45.45%	30
Female	54.55%	36
Other (please specify)	0.00%	0
TOTAL		66

## Q2: Are you?

Answered: 66 Skipped: 0



## Q2: Are you?

Answered: 66 Skipped: 0

### ANSWER CHOICES

### RESPONSES

A current member of the club

15.15% 10

Someone who attends sessions but is not a member

16.67% 11

Someone who is interested in attending OAWLC sessions/ joining the club

45.45% 30

A parent of a child or young person who is a club member

7.58% 5

A parent of a child or young person who attends sessions but is not a member

3.03% 2

A parent of a child or young person who is interested in attending OAWLC sessions

9.09% 6

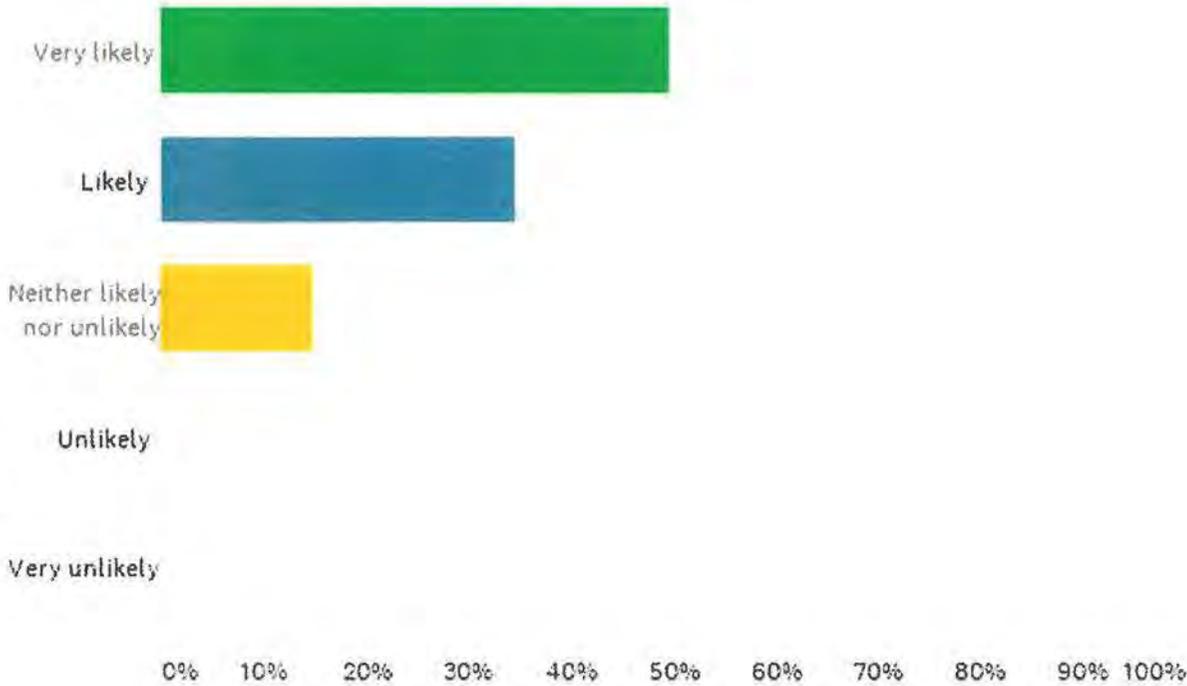
Other (please specify)

4.55% 3

Total Respondents: 66

### Q3: How likely would you be to recommend OAWLC to others?

Answered: 66 Skipped: 0



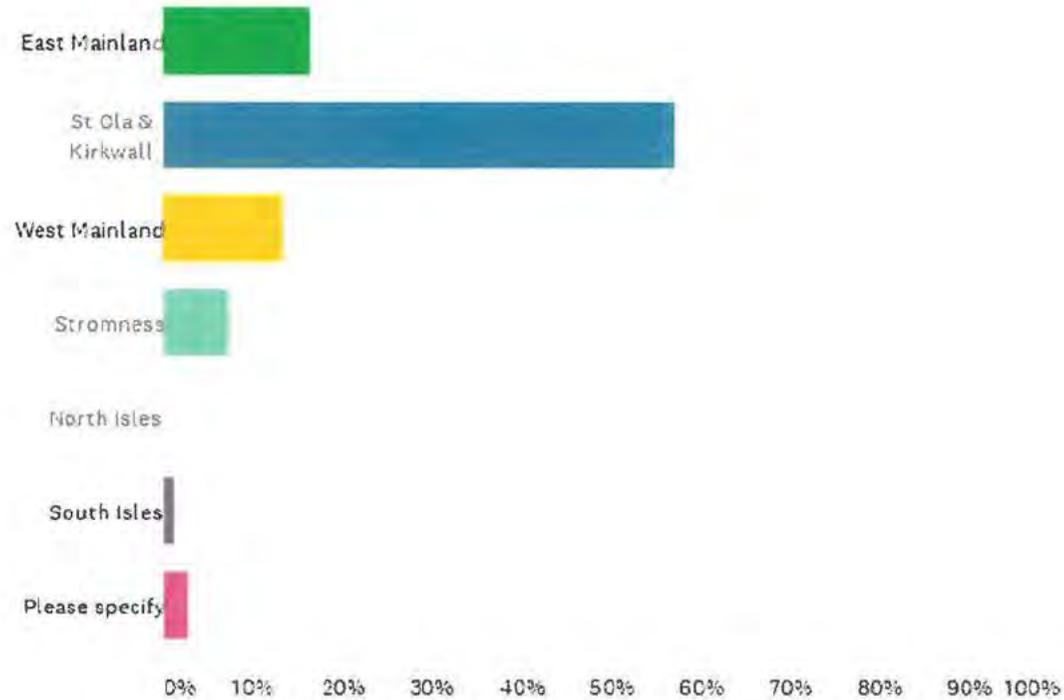
### Q3: How likely would you be to recommend OAWLC to others?

Answered: 66 Skipped: 0

ANSWER CHOICES	RESPONSES	
Very likely	50.00%	33
Likely	34.85%	23
Neither likely nor unlikely	15.15%	10
Unlikely	0.00%	0
Very unlikely	0.00%	0
TOTAL		66

## Q4: Where are you located?

Answered: 66 Skipped: 0



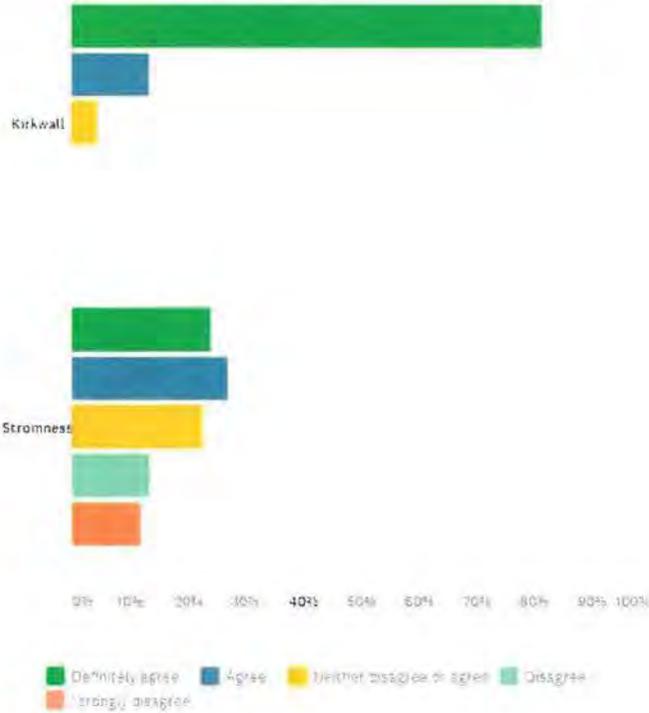
## Q4: Where are you located?

Answered: 66 Skipped: 0

ANSWER CHOICES	RESPONSES	
East Mainland	16.67%	11
St Ola & Kirkwall	57.58%	38
West Mainland	13.64%	9
Stromness	7.58%	5
North Isles	0.00%	0
South Isles	1.52%	1
Please specify	3.03%	2
<b>TOTAL</b>		<b>66</b>

# Q5: Would you be willing to travel to the following locations for training?

Answered: 66 Skipped: 0



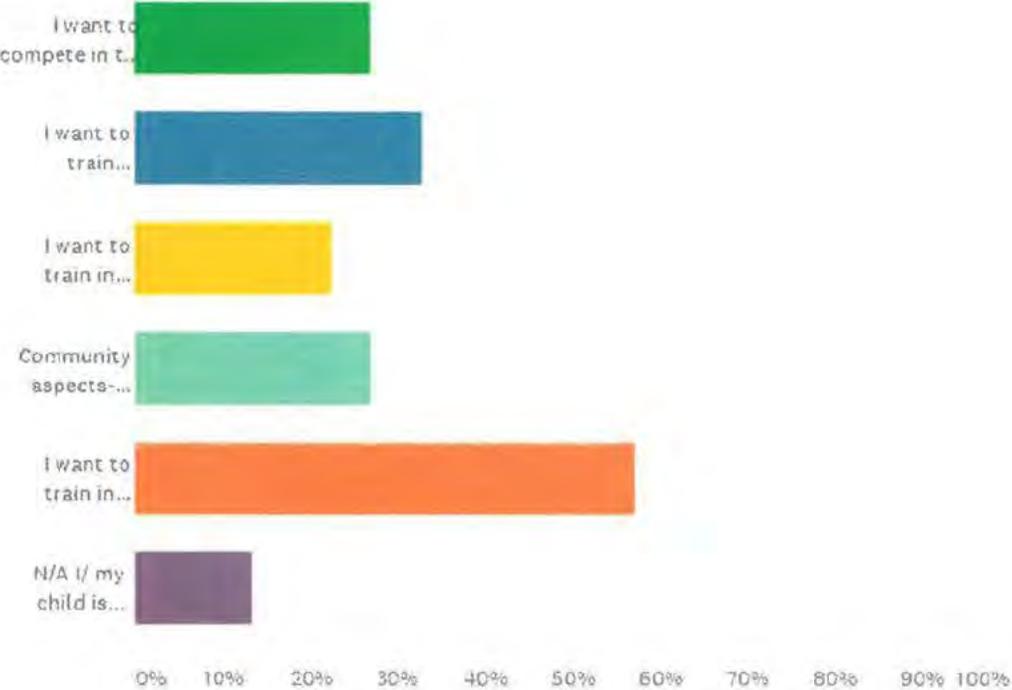
## Q5: Would you be willing to travel to the following locations for training?

Answered: 66 Skipped: 0

	DEFINITELY AGREE	AGREE	NEITHER DISAGREE OR AGREE	DISAGREE	STRONGLY DISAGREE	TOTAL RESPONDENTS
Kirkwall	81.82% 54	13.64% 9	4.55% 3	0.00% 0	0.00% 0	66
Stromness	24.24% 16	27.27% 18	22.73% 15	13.64% 9	12.12% 8	66

# Q6: What attracts you to Weightlifting?

Answered: 66 Skipped: 0



# Q6: What attracts you to Weightlifting?

Answered: 66 Skipped: 0

## ANSWER CHOICES

## RESPONSES

I want to compete in the sport of Weightlifting.

27.27% 18

I want to train recreationally and enjoy Weightlifting but not at a highly competitive level.

33.33% 22

I want to train in Weightlifting to benefit other sports I take part in.

22.73% 15

Community aspects- meeting people and making friends.

27.27% 18

I want to train in Weightlifting to help keep me healthy & fit.

57.58% 38

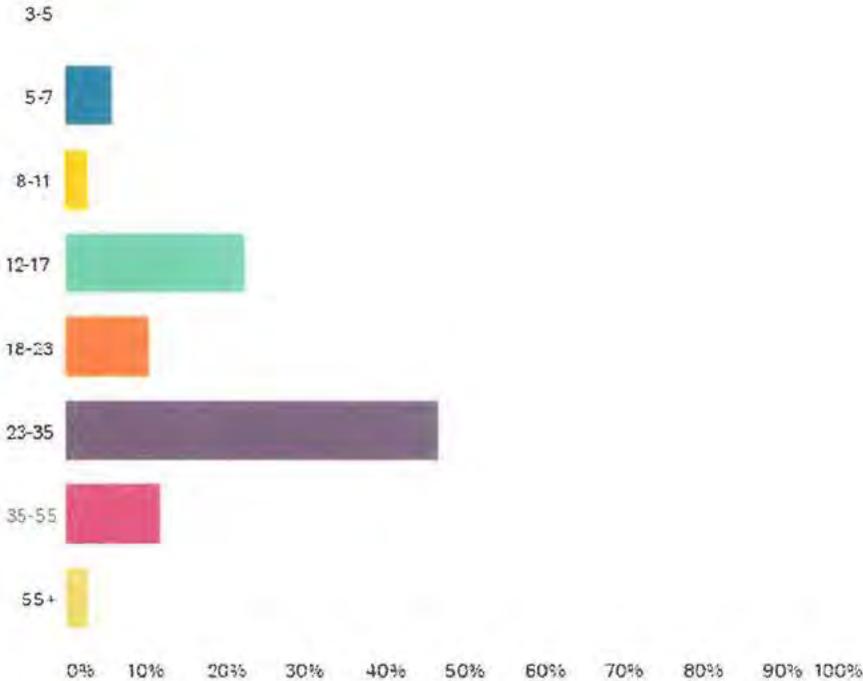
N/A // my child is already a member

13.64% 9

Total Respondents: 66

# Q7: What is you/ your child's age?

Answered: 66 Skipped: 0



## Q7: What is you/ your child's age?

Answered: 66 Skipped: 0

### ANSWER CHOICES

3-5

5-7

8-11

12-17

18-23

23-35

35-55

55+

Total Respondents: 66

### RESPONSES

0.00% 0

6.06% 4

3.03% 2

22.73% 15

10.61% 7

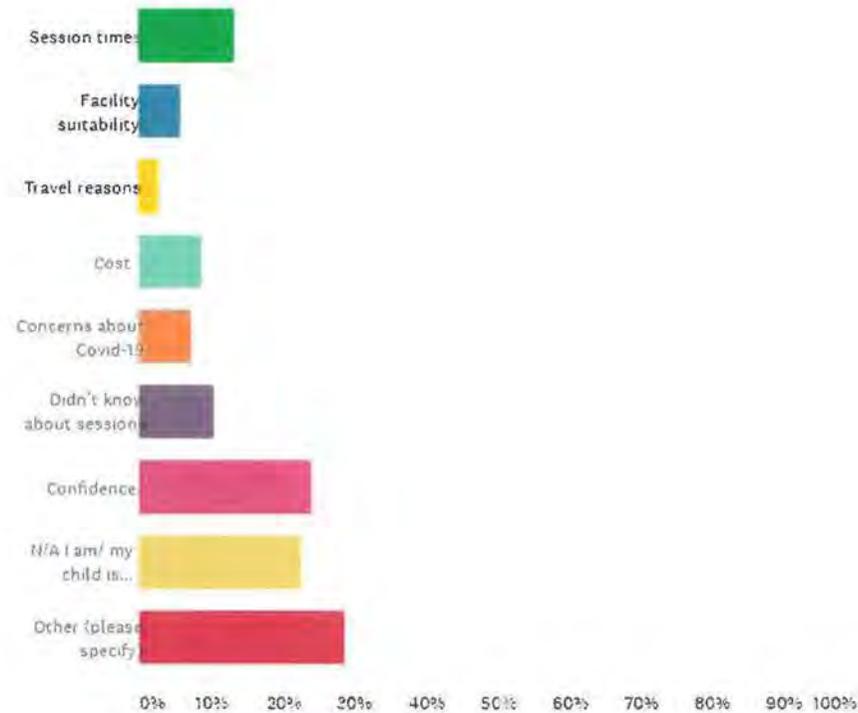
46.97% 31

12.12% 8

3.03% 2

## Q8: What holds you back from joining OAWLC or returning to training?

Answered: 66 Skipped: 0



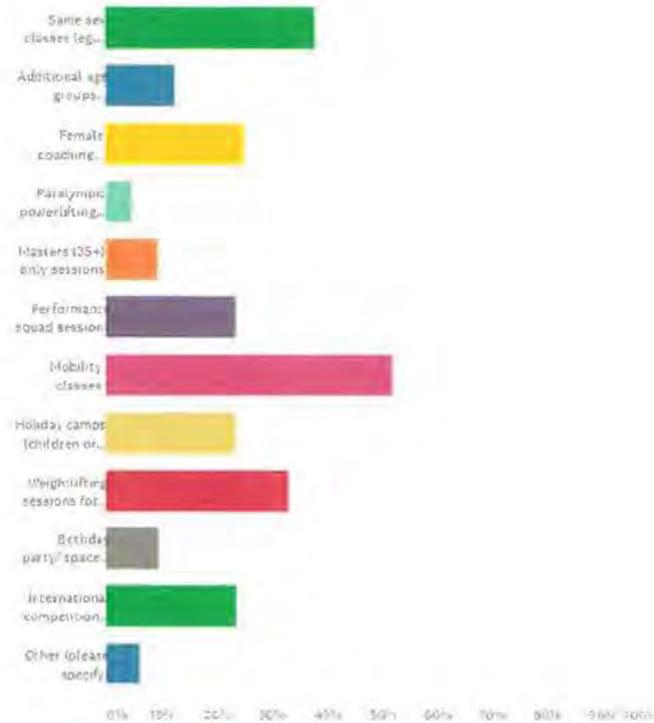
## Q8: What holds you back from joining OAWLC or returning to training?

Answered: 66 Skipped: 0

ANSWER CHOICES	RESPONSES	
Session times	13.64%	9
Facility suitability	6.06%	4
Travel reasons	3.03%	2
Cost	9.09%	6
Concerns about Covid-19	7.58%	5
Didn't know about sessions	10.61%	7
Confidence	24.24%	16
N/A I am/ my child is already a member	22.73%	15
Other (please specify)	28.79%	19
Total Respondents: 66		

## Q9: Would you be interested in any of the following from OAWLC

Answered: 63 Skipped: 3



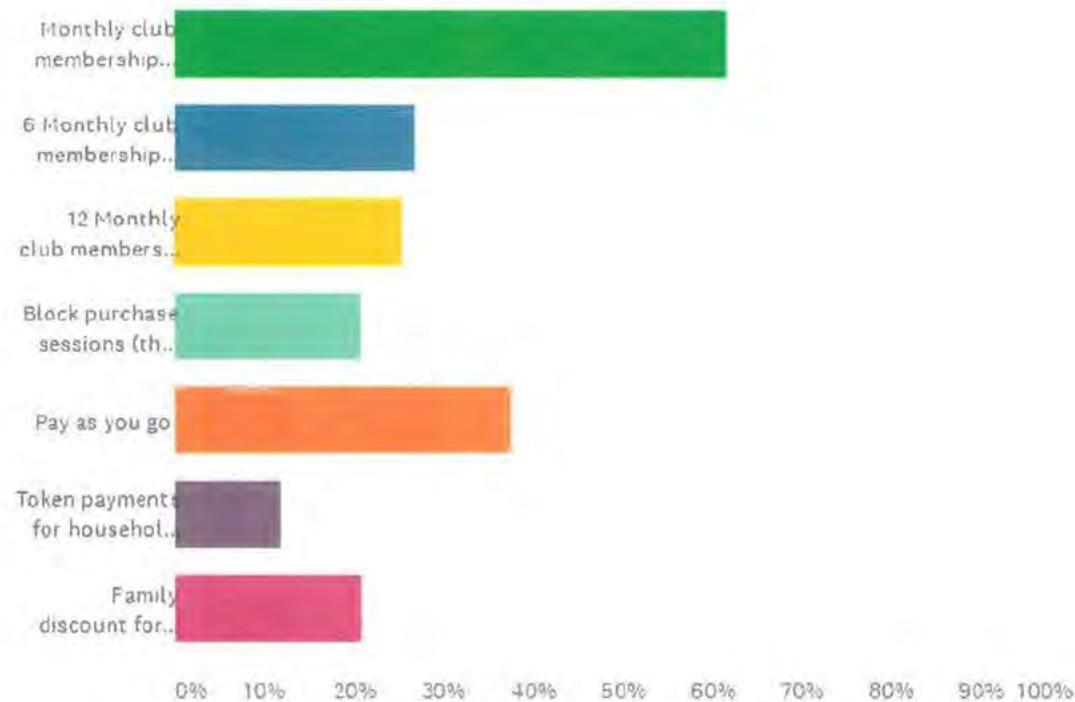
# Q9: Would you be interested in any of the following from OAWLC

Answered: 63 Skipped: 3

ANSWER CHOICES	PERCENTAGE	RESPONSES
Same sex classes (eg. girls only, or boys only)	38.10%	24
Additional age groups (5-7/8-11)	12.70%	8
Female coaching personnel	25.40%	16
Paralympic powerlifting sessions	4.76%	3
Masters (35+) only sessions	9.52%	6
Performance squad sessions	23.81%	15
Mobility classes	52.38%	33
Holiday camps (children or adults)	23.81%	15
Weightlifting sessions for other sports	33.33%	21
Birthday party/ space hire	9.52%	6
International competition viewings	23.81%	15
Other (please specify)	6.35%	4
Total Respondents		63

## Q10: What membership options would be most appealing to you?

Answered: 66 Skipped: 0



# Q10: What membership options would be most appealing to you?

Answered: 66 Skipped: 0

ANSWER CHOICES	RESPONSES	
Monthly club membership (unlimited access to sessions/ classes & online classes)	62.12%	41
6 Monthly club membership payment (with discount)	27.27%	18
12 Monthly club membership payment (with discount)	25.76%	17
Block purchase sessions (that can be used as and when required)	21.21%	14
Pay as you go	37.88%	25
Token payments for households on universal credit/ benefits	12.12%	8
Family discount for youth athletes	21.21%	14
Total Respondents: 66		

## Potential Facility Design

This is a facility design provided to us by Pullum, of a facility in Kent, that is of the same dimensions as the Squash Court facility. This is not representative of our final design, but ours may be similar.





Day of Week Total

Saturday	210
Thursday	175
Sunday	58
Wednesday	50
Tuesday	5

DAWLC usage numbers

From 1/9/20 - 30/3/21



Editor's choice  
Scan to access more  
from content

# International Olympic Committee consensus statement on youth athletic development

Michael F Bergeron,<sup>1,2</sup> Margo Mountjoy,<sup>3,4</sup> Neil Armstrong,<sup>5</sup> Michael Chia,<sup>6</sup> Jean Côté,<sup>7</sup> Carolyn A Emery,<sup>8</sup> Avery Faigenbaum,<sup>9</sup> Gary Hall Jr,<sup>10</sup> Susi Kriemler,<sup>11</sup> Michel Léglise,<sup>12</sup> Robert M Malina,<sup>13,14</sup> Anne Marte Pensgaard,<sup>15</sup> Alex Sanchez,<sup>16</sup> Torbjørn Soligard,<sup>17</sup> Jorunn Sundgot-Borgen,<sup>18</sup> Willem van Mechelen,<sup>19,20,21</sup> Juanita R Weissensteiner,<sup>22</sup> Lars Engebretsen<sup>17,23</sup>

For numbered affiliations see end of article.

## Correspondence to

Dr Michael F Bergeron, Youth Sports of the Americas, Lemak Sports Medicine, 500 Office Park Drive, Suite 200, Birmingham, AL 35223 USA; mbergeron.phd01@gmail.com

Accepted 18 May 2015

## ABSTRACT

The health, fitness and other advantages of youth sports participation are well recognised. However, there are considerable challenges for all stakeholders involved—especially youth athletes—in trying to maintain inclusive, sustainable and enjoyable participation and success for all levels of individual athletic achievement. In an effort to advance a more unified, evidence-informed approach to youth athlete development, the IOC critically evaluated the current state of science and practice of youth athlete development and presented recommendations for developing healthy, resilient and capable youth athletes, while providing opportunities for all levels of sport participation and success. The IOC further challenges all youth and other sport governing bodies to embrace and implement these recommended guiding principles.

## INTRODUCTION

The goal is clear: Develop healthy, capable and resilient young athletes, while attaining widespread, inclusive, sustainable and enjoyable participation and success for all levels of individual athletic achievement. Yet, this is a considerable challenge for all stakeholders in youth sports—parents, coaches, administrators, sport governing bodies and, especially, youth athletes.

The process begins with a subjective assessment of potential talent, followed by a structured programme of training in a specific sport. However, the limited success of talent identification and athlete development programmes is not surprising, as the model of athlete development is built on an individually unique and constantly changing base, including the demands of normal physical growth, biological maturation and behavioural development, and their interactions.<sup>1–3</sup> Athletic development is also multidimensional and difficult to assess in youth, and the trajectories from the novice to elite levels can vary greatly among athletes. Adding to the complexity, the demands of specific sports are superimposed on this dynamic integrated scheme. Moreover, the development of sport-specific skills, motivation and behaviours in an integrated learning culture is not well characterised; and, given the selectivity and exclusivity of sport, it is the choice athletes who generally receive the most attention in research. Accordingly, less is known about those who are systematically excluded (cut), who drop out (voluntarily withdraw) or are injured, along with

contributing factors such as overuse, overtraining and burnout.

There is also an urgent need to extend our views of youth athlete development to include the 'culture' of specific sports and youth sports in general, including the underlying philosophy for developing youth athletes, the systems of specific sports and interactions between athletes, coaching styles and practices, the effects on youth athletes from parental expectations and the view of youth athletes as commodities, which is often intrusive with a fine line between objectivity and sensationalism.

In an effort to advance a more unified, evidence-informed approach to youth athlete development, the IOC convened a consensus meeting of experts in the field in November 2014. The group was charged with two tasks:

1. Highlight key considerations and challenges in competitive youth sport, and critically evaluate the current state of science and practice of youth athlete development;
2. Create guidelines for a sustainable model to develop healthy, resilient and capable youth athletes, while providing opportunities for all levels of sport participation and success.

## MATURATION

### Assessment of biological maturity status and timing

Biological maturation is an ongoing process that begins prenatally and continues through approximately the first two decades of postnatal life. Outcomes of the underlying biological processes are observed, assessed and/or measured to provide an indication of *maturity status* (ie, the status of the youngster at the time of observation), commonly specified by skeletal age (SA) and secondary sex characteristics. *Maturity timing* refers to the chronological ages when specific maturational events occur, frequently assessed by age at peak height velocity (PHV) and age at menarche. For accuracy, both require longitudinal data that span adolescence, as recalled age at menarche has error associated with memory and a tendency for reporting in whole years.<sup>2–6</sup>

SA is the most useful estimate of maturity status and can be used from childhood into late adolescence.<sup>2</sup> It can also be used with current body height and/or mid-parent height to predict mature height, which is of interest in some sports. Radiation



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exposure with hand-wrist radiographs is minimal; although, expert interpretation is required. SA and fusion of the distal radius based on MRI are periodically used for chronological age verification, especially in some male youth sport competitions.

Given the maturity-related gradient in selection favouring early maturing males in many sports, the likelihood of false negatives is increased. Ethnic variation in skeletal maturation is also a related consideration.<sup>7</sup> As such, SA and fusion of the distal radius should not be used for age verification purposes in sport.

Secondary sex characteristics (breasts, genitalia, pubic hair) are useful only during the pubertal interval. Assessments indicate stage of puberty at the time of observation, but provide no information on age at entry into and duration of a stage. Moreover, for some, assessment of secondary sex characteristics can be invasive; and accuracy of assessment can be significantly discordant among physicians, and between physicians and youth in self-assessments.<sup>10,11</sup>

Percentage of predicted mature (adult) height at the time of observation provides an estimate of maturity status.<sup>12</sup> The method has moderate concordance with classifications of maturity status, based on SA in youth American football and soccer players.<sup>13,14</sup> Predicted time before PHV (maturity offset) and, in turn, predicted age at PHV provide an estimate of maturity timing.<sup>15</sup> However, validation studies indicate several limitations.<sup>16–22</sup> Predicted offset and age at PHV increase with chronological age at prediction; predicted ages at PHV have a reduced range of variation (SDs ~0.5 year); and predicted age at PHV is affected by actual age at PHV in both sexes, and age at menarche. Also, height prediction equations are available primarily for European ancestry, which limits their global applicability. Maturity offset was suggested as a categorical variable, pre-PHV or post-PHV;<sup>15</sup> as such, it is most useful close to the time of actual age at PHV in average (on time) maturing boys within a narrow age range, 13.00–14.99 years, which limits its utility with elite male athletes who tend to be early maturing.<sup>7</sup> The trend is more variable in girls, as the protocol overestimates age at PHV more than in boys. Ethnic variation in sitting height and estimated leg length is also a confounder in the prediction equations. Moreover, identification of the ethnicity of youth is not permitted in some countries.<sup>19</sup>

## Physiological and performance changes across maturation

### Muscle metabolism

Muscle biopsy studies indicate that resting muscle ATP concentration is invariant with age; but phosphocreatine (PCr) and glycogen concentrations increase with age, at least in boys aged 11–15 years. Glycogen depletion with exercise is greater in older boys and is reflected by increased muscle lactate accumulation with age. Children and adolescents accumulate less blood lactate than adults during exhaustive exercise, and there is a negative relationship between the percentage of peak  $\dot{V}O_2$  at the lactate threshold and age. However, sex and/or maturation effects on blood lactate accumulation remain to be proven.<sup>20,21</sup> Sparse data indicate enhanced oxidative enzyme activity in children and adolescents compared with adults and lower glycolytic enzyme activity in pre-pubertal children than in adolescents or adults; though, differences in glycolytic enzyme activity between adolescents and adults are less clear.<sup>21–23</sup>

During submaximal exercise, children's enhanced ability to oxidise lipids, and therefore spare glycogen, means that they are well-equipped for long-term moderate intensity exercise. Young people have higher rates of exogenous carbohydrate oxidation than adults; but, the optimal carbohydrate supplementation to sustain endurance performance during youth is unknown.<sup>6,25</sup>

### Muscle strength

The development of muscle strength is dependent on a combination of muscular, neural and biomechanical factors. Strength increases with few sex differences in a relatively linear manner through childhood. During puberty, however, sex differences emerge with boys demonstrating accelerated increases in strength, while girls continue to develop at a similar rate as during pre-puberty. Sex differences in strength are both muscle-group and muscle-action specific; but, on average, by late puberty, there is a sex difference in the expression of strength of ~50%.<sup>26,27</sup>

### Aerobic and anaerobic fitness/performance

There is an almost linear increase in boys' peak  $\dot{V}O_2$  from 8 to 18 years, with a similar but less consistent trend in girls' values, which tend to plateau in the mid-teens. Peak  $\dot{V}O_2$  increases by ~80% in girls and by ~150% in boys from 8 to 16 years of age, with the sex difference increasing from ~10% at age 10 to ~35% by age 16 years. Increasing muscle mass is the dominant influence on peak  $\dot{V}O_2$  during adolescence; but, maturation has a significant positive effect on peak  $\dot{V}O_2$ , independent of age and body size and composition.<sup>28</sup> The time constant of the exponential rise in the pulmonary (p)  $\dot{V}O_2$  kinetic response to exercise above the lactate threshold increases with age from childhood through adolescence. The p $\dot{V}O_2$  slow component also increases with age. Pulmonary  $\dot{V}O_2$  kinetics studies provide compelling evidence that, at the onset of exercise above the lactate threshold, children and adolescents have an enhanced potential for oxidative metabolism compared with adults.

In the absence of intra-muscular data, research on anaerobic performance has focused on the assessment of external cycling peak power output (CPP), using variants of the Wingate anaerobic test. There is an almost linear increase in CPP in both sexes from ~7 to 12 years and then a more marked increase in boys' CPP through to young adulthood. Girls often outscore boys until ~12 years of age, due to their more advanced maturation; but, by age 17 years, the sex difference in CPP is ~50%.<sup>10</sup> There is an asynchronous increase in anaerobic and aerobic performance with age and maturation. From ages 12 to 17 years, girls increase their CPP by ~65% compared with boys, who experience a ~120% increase in CPP. Both sexes experience a more marked improvement in CPP than in peak  $\dot{V}O_2$  during maturation, with peak  $\dot{V}O_2$  increasing by ~70% and ~25%, respectively, in boys and girls aged from 12 to 17 years.<sup>10,22</sup>

### Fatigue resistance and recovery

Resistance to fatigue and recovery from high-intensity intermittent exercise undergo a gradual decline from childhood to adulthood in males. In females, the adult profile appears to be established by mid-puberty. The distinction has been attributed to children having more rapid cardiorespiratory recovery kinetics, enhanced oxidative activity, faster PCr re-synthesis, different motor unit recruitment, better acid-base regulation and lower production and/or more efficient removal of metabolic by-products, than adults.<sup>16,19</sup>

### Responses to exercise training

Evidence-based IOC recommendations for muscle strength, and aerobic and anaerobic training programmes are documented.<sup>10</sup> Pre-pubertal children benefit from resistance training; but, the trainability of muscle strength increases with age. There is a minor sex-effect during pre-puberty, which increases with age and maturation. It is, however, unclear which maturational changes account for the enhanced strength trainability of boys.

There is no compelling evidence to suggest that, after adjusting for initial fitness, aerobic or anaerobic responses to training are related to sex, age or maturation during youth.<sup>30-48</sup>

### Sleep

Several hormonal and neurological changes occur during puberty, affecting the homeostatic and circadian regulation of sleep.<sup>49-51</sup> Adolescents have later bedtimes and wake times,<sup>52</sup> with a recommended optimal level of sleep of 8.5-9.5 h.<sup>43</sup> However, international trends indicate a prevalence of insufficient sleep among adolescents,<sup>54</sup> often prompted by early school-start times, academic demands, social activities and events, caffeine consumption and screen-time at night.<sup>18, 40, 54</sup> For youth athletes, the training and competition schedule further exacerbates the deficiency of sleep,<sup>47-50</sup> with preliminary evidence indicating an increased likelihood of injury with insufficient sleep.<sup>57</sup> Given the potential consequences of insufficient sleep on health, behaviour, attention, and learning and athletic performance, interventions (eg, tailored training and even perhaps schooling schedules) to support adequate sleep in youth athletes should be implemented.<sup>40, 52</sup>

### Growth, maturation and performance on the field

Sport performance during youth is underpinned by a range of physical and physiological variables that are governed by the timing and tempo of growth and maturation. Youth sport, however, is highly selective,<sup>33, 74</sup> with a maturity-associated selection/exclusion process commonly occurring during the interval of puberty and the adolescent growth spurt, which covers the period between 9 and 15 years of age.<sup>7, 59-68</sup> Sport performance progressively improves with growth and maturation, and appropriate aerobic, anaerobic and resistance training further enhance performance; but there is asynchronous development through childhood and adolescence into young adulthood. Thus, initial selection, long-term athletic/sport performance prediction and optimal athlete development remain a challenge. Research has developed a sound scientific foundation to inform decision-making; but those involved in youth athlete development must nurture talented individuals, and appreciate that both positive and negative changes in performance might be more related to biological clocks than to coaching and training.

## CHALLENGES TO HEALTH, WELL-BEING AND PERFORMANCE

### Specialisation

Children are increasingly specialising in a sport at an early age, beyond the customary early specialisation seen in gymnastics, swimming, diving and figure skating. Various factors account for this contemporary phenomenon, including investment by the myriad stakeholders involved in sports, as well as incentives for Olympic and other athletic success. This has led to the development of talent identification and development schemes, aimed to identify and guide youth athletes towards professional sports, and/or Olympic achievement. The result has been an increase in competitiveness and professionalisation within youth sport itself, intensified and expanded physical training and increased competition volume and frequency with insufficient allocation of time for rest and recovery. One consequence is an ongoing escalation in sport-related injuries and health problems at all levels of youth sports,<sup>59-62</sup> including overuse injury, overtraining and burnout.

In contrast to premature emphasis on a single sport, research suggests that youth should avoid early sport specialisation, as diverse athletic exposure and sport sampling enhance motor

development and athletic capacity, reduce injury risk and increase the opportunity for a child to discover the sport(s) that he/she will enjoy and possibly excel at.<sup>62, 64-66</sup> Numerous successful elite athletes participated in several sports before specialising.<sup>34, 35, 64, 65, 67-69</sup> However, the message would be reinforced with more definitive evidence indicating that children who participate in a variety of sports and specialise only after reaching the age of puberty, for example, tend to be more consistent performers, have fewer injuries and adhere to sports play longer than those who specialise early.<sup>52, 60</sup>

### Injury and health concerns of systematic training and competition

#### Musculoskeletal injury

The competitive careers of youth athletes across all sports are too often temporarily halted or permanently derailed by overuse injuries that are the consequence of disproportionate training and repetitive homogenous loads, hastened and exacerbated by insufficient rest and recovery.<sup>70, 71</sup> This scenario is notably pervasive with youth athletes transitioning too rapidly to higher levels of training and competition demands during adolescence.<sup>40, 70</sup> However, certain aspects of growth (eg, linear rate) and maturation may predispose some youth athletes to specific injuries involving the immature spine (eg, spondylolysis, spondylolisthesis), joint surfaces (osteochondritis dissecans) and traction apophysitis (eg, Osgood-Schlatter disease, Sever's disease).<sup>64, 72-75</sup> Because of potential growth disturbances, injuries to epiphyseal growth centres are of particular concern.

#### Growth and sexual maturation

There has been a long-standing concern that extensive high intensity sports training can alter growth rates; however, results from cross-sectional and longitudinal studies do not support this speculation.<sup>3, 56, 76</sup> The short stature of youth athletes in artistic gymnastics is often cited in the context of potential negative effects of training. Nevertheless, current consensus is that regular gymnastics training does not attenuate pubertal growth and maturation or compromise adult stature.<sup>54</sup> Youth gymnasts of both sexes have the growth and maturity characteristics of short, normal late-maturing children with short parents.<sup>77</sup> It should also be noted that youth figure skaters and divers also, on average, present with shorter statures, though not as short as gymnasts. Likewise, evidence indicates no effects of systematic training and competition during childhood and adolescence on the sexual maturation of either sex. Although menarche occurs, on average, at a later age among participants in some sports,<sup>78</sup> close scrutiny of the data indicates overlap with the normal range of variability in the general population.

#### Cardiac

Despite the well-documented benefits of regular physical activity in promoting cardiac health,<sup>69, 91</sup> unsuspected cardiovascular disease represents the most common cause of sudden death in competitive youth athletes.<sup>82</sup> Accordingly, careful assessment to rule out hypertension, congenital heart disease, dysrhythmia, heart murmur or structural/acquired heart disease, is imperative.<sup>83</sup> However, the utility of pre-participation cardiovascular screening in reducing the (already very low) prevalence of sudden cardiac death (SCD) remains contentious,<sup>84, 85</sup> and there is no consensus for screening youth athletes. While there has been some evidence indicating features of the 'athlete's heart' with pre-pubertal children involved in intensive endurance training, these structural changes are mild and may simply represent adaptive responses versus pathological conditions.<sup>86-89</sup>

However, given the nature and grave consequences of potential negative cardiac adaptations and dysfunctions, closer longitudinal study of the cardiac characteristics and health profiles of youth training at elite levels is recommended.

### Injury rates and prevention strategies

#### Injury rates in youth sport

An estimated injury incidence proportion in athletes aged 11–18 years has been reported as 35 injuries/100 youth annually requiring medical attention.<sup>90–91</sup> Lower extremity injury and concussion accounted for over 60% and 15% of the overall injury burden, respectively.<sup>90–91</sup> The highest sport-specific injury incidence rates for boys are in ice hockey, rugby, basketball, football (soccer) and American football, along with wrestling, running and snowboarding. For girls, the highest injury incidence rates are in basketball, football, ice hockey, gymnastics, field hockey and running.<sup>92–93</sup> The combination of high sport-specific participation rates in those sports with high injury rates leads to the highest burden of injury in youth sport.

#### Injury prevention in youth sport

It is impossible to eliminate all injury in youth sport; however, injury prevention strategies can reduce the frequency and severity of injuries. Multifaceted neuromuscular training and programmes focused on intrinsic factors such as strength, endurance and proprioception/balance, have been shown to reduce injury incidence in youth football, handball, basketball and multisport by between 28% and 80%,<sup>94–110</sup> with specific efficacy in reducing lower extremity, knee and ankle injuries.<sup>94–96, 100, 101, 104–107, 109</sup>

Prevention strategies have also been developed to address extrinsic risk factors via the use of protective equipment (eg, ankle bracing and taping,<sup>100</sup> mouth and wrist guards,<sup>110–111</sup> and helmets<sup>112</sup>), and implementing rules and regulations.<sup>112–113</sup> Unfortunately, without policies to enforce the implementation of prevention strategies, the uptake may not be optimal.<sup>94–96</sup> Rule changes in some sports have often not been rigorously evaluated; however, meta-analysis and cohort evidence demonstrate that policy allowing body checking in youth ice hockey increases the risk of injury and concussion twofold to fourfold,<sup>114–115</sup> which has led to national policy changes in Canada and the USA.

Effective and sustainable implementation of injury prevention research into practice is context-specific (eg, sport, age, level and organisational structure).<sup>116–117</sup> There are also evident deficiencies in coach, athlete and parent knowledge and behaviours regarding injury prevention programmes in youth sport populations, despite the evidence to support their implementation.<sup>118–120</sup> Accordingly, there is a need to focus on effective evidence-informed injury prevention strategies in all youth sports, with special attention to sports with a high risk of injury and a paucity of research (eg, rugby, field hockey, football, volleyball, field hockey, running, lacrosse, gymnastics, martial arts, tennis and wrestling).

### Chronic and acute clinical health conditions

While many clinical health conditions (CHCs) are not compatible with high-level sports participation, numerous youth athletes with asthma, attention deficit-hyperactivity disorder, insulin-dependent diabetes, iron deficiency or certain orthopaedic malformations train and compete. However, special considerations for youth athletes with these and other CHCs are essential to ascertain and optimise well-being and minimise the risk of injury.<sup>121</sup> A break in training and competition is often therapeutically essential, and ultimately more beneficial to the athlete, than trying to maintain the usual routine and consequently inhibit

recovery of an injury or acute illness. The responsible physician must assure that individual-specific health-related risks from training and competing are minimised, including proper instruction for the athlete, parents and coaches, especially regarding detection and management of potential life-threatening conditions, such as seizures in epilepsy,<sup>121</sup> hypoglycaemia in insulin-dependent diabetes,<sup>122–123</sup> or SCD.<sup>124</sup>

Prior to sport participation, as part of the pre-participation examination, the following should be considered for any athlete with a CHC: (1) evidence-based diagnosis, severity and progression of the CHC; (2) CHC burden to the athlete; (3) potential performance limitations by the CHC or its treatment; (4) health risks for the athlete from the CHC or its treatment and (5) application for a Therapeutic Use Exemption for the treatment of the CHC, if required by WADA. Antidoping rules generally do not pose a major problem for the elite young athlete with a CHC, so long as team physicians are knowledgeable of the Therapeutic Use Exemption programme of the World Anti-Doping Code.<sup>125</sup> Over-reporting or overdiagnosis is sometimes motivated by a medical treatment having a purported potential of performance enhancement, as in asthma or attention-deficit hyperactivity disorder;<sup>126–127</sup> although performance-enhancing effects at therapeutic doses are often unremarkable.<sup>128–129</sup> Moreover, at the elite level, athletes need to meet strict diagnostic criteria, so overdiagnosis is less likely.

### Psychological overload from excessive demands and expectations

Psychological stress can have both training and straining effects on the individual.<sup>130</sup> Psychological overload, however, occurs when the level of stress becomes excessive, no longer affecting a positive response. Youth athletes are increasingly being exposed to inappropriate and unrealistic demands and expectations, and consequent psychological overload (self or coach/parent induced).<sup>61–66</sup> How youth athletes perceive and cope with these stressors is neither predictable nor benign,<sup>131</sup> with athlete burnout and subsequent related drop-out from sport being a recognised part of competitive youth sport.<sup>132</sup> Use of performance-based field criteria (eg, resting cortisol levels and Profile of Mood test) may facilitate early detection of youth at risk of burnout.<sup>133</sup> There is also the potential for developing maladaptive perfectionistic tendencies, prompted by elevated parental expectations and criticism.<sup>134</sup>

Widespread (often unrecognised) depressive disorder is especially prevalent in adolescent girls,<sup>135</sup> and the psychosocial stress of an unhealthy youth sports environment or an injury could exacerbate the risk and levels of depression and anxiety.<sup>135–136</sup> Providing youth athletes with specific coping skills through mental training seems promising,<sup>137</sup> and goal setting can have a positive effect in reducing fear of failure among young elite athletes.<sup>138</sup> Coping effectiveness specific to the competitive level and the demands of the sport can also be directly related to athletic achievement.<sup>139–140</sup> Potential interactions between sport-related stressors and those associated with normal adolescence must also be recognised and addressed.

Coaching education should emphasise the importance of creating autonomy-supportive, mastery-oriented sporting climates that result in less stress and more intrinsic motivation,<sup>141–142</sup> which is especially important in elite youth sport where the pressure to perform is often overwhelming and can even increase the risk of injury.<sup>143–144</sup> By focusing on a mastery developmental climate, a positive (sporting) community can evolve.<sup>145</sup> Parent supporting involvement is also important in mitigating dysfunctional and/or destructive responses. Indeed,

parents reportedly welcome advice on how to become a better sporting parent;<sup>120-122</sup> although implementation is a challenge.

### Safeguarding the youth athlete from abuse in sport

While sexual abuse and harassment in sport is one of the more concerning threats to children,<sup>123</sup> other forms of relational abuse have also been identified involving emotional and physical abuse, including forced physical exertion.<sup>149</sup> The scope of threats to the youth athlete, however, extend beyond relational abuse to include organisational threats, such as systems that promote overtraining,<sup>124</sup> the endorsement of abusive hazing rituals<sup>131</sup> and the utilisation of selection procedures that promote eating disorders or competing with an injury.<sup>134</sup> Medical mismanagement is another organisational threat for the child athlete. In particular, the excessive and often systematic use of analgesic medication by team physicians in elite youth football is reported.<sup>133</sup> As indicated in selected study settings and populations, almost 25% of youth athletes have admitted to misuse of their prescribed medication (pain, stimulant, sleep, antianxiety),<sup>150</sup> and 13–68% have admitted to anabolic androgenic steroid abuse in the sport context.<sup>152</sup> Insufficient medical coverage during training and competition, by relying on insufficiently trained coaches to manage medical issues, is another recognised threat to youth athletes.<sup>130</sup>

The prevalence of various forms of abuse, associated risk factors and consequences for the athlete need to be more closely examined. Moreover, an organisational approach beyond the perpetrator and the victim is essential to reveal how the culture of an organisation can facilitate or prevent abuse. There is also a need for research exploring the efficacy and effectiveness of specific strategies that can protect and promote the well-being of youth athletes.

### Nutrition: energy and nutrient needs and dietary supplements

Owing to metabolic variability within and between individuals,<sup>115</sup> and methodological difficulties in estimating energy intake and expenditure,<sup>116</sup> it is difficult to define the precise energy requirements of youth athletes. Carbohydrate needs and fat intake should be in accordance with established guidelines,<sup>153</sup> and youth athletes do not need protein supplements to meet elevated protein needs, as these can be readily met by appropriate and well-timed eating patterns.<sup>154</sup> As many youth athletes are at risk of low vitamin D status, correction of insufficiency through supplementation may be necessary to ensure optimal bone health and mitigate injury risk.<sup>155, 161</sup> Dietary iron intake (particularly for girls) should be consistent with the Reference Daily Intake, with only medically warranted supplementation.<sup>155</sup> Increased calcium intake, especially in adolescent female athletes, is often needed to meet the recommendation of 1300 mg daily. Not surprisingly, poor nutrition knowledge among elite coaches<sup>162</sup> and adolescent athletes<sup>162</sup> has been reported.

Supplement use (including energy drinks) and muscle-enhancing behaviours (eg, excess protein intake) are common, especially among male adolescents.<sup>103, 163</sup> Factors influencing supplement use include pressure to perform, physical ideals and availability of dietary supplements targeting youth athletes. However, it is recognisably considered inappropriate and unacceptable to encourage dietary supplements for performance enhancement with youth athletes.<sup>155, 165, 166</sup> Athletes who take supplements are also at risk of violating antidoping rules.<sup>167</sup>

### Eating disorders in adolescent athletes

Weight and body composition are crucial performance variables in some sports. Unfortunately, in an attempt to conform to

various self-imposed expectations, demands from others or competition regulations that might be ill-suited to their physique, many youth athletes develop the Female Athlete Triad,<sup>168</sup> recently termed 'Relative Energy Deficiency in Sport' (RED-S),<sup>169</sup> with or without disordered eating (DE) or eating disorders (EDs). The prevalence of DE is high in competitive youth sports, with the peak onset of EDs<sup>170</sup> coinciding with sport specialisation and increases in demanding competition. A high prevalence of EDs exists in male (3%) and female (14%) elite adolescent athletes, compared to non-athletic male (0%) and female (5%) controls.<sup>169</sup> DE and an ED can lead to adverse short-term and long-term effects on health and performance.<sup>171</sup>

The pathogenesis of EDs is multifactorial. Cultural, individual, family and genetic/biochemical factors are involved,<sup>172-174</sup> in addition to sport-specific factors, such as dieting to enhance performance, personality factors (such as perfectionism, obsessiveness), pressure to lose weight, frequent weight cycling, premature sport-specific training, overtraining, recurrent and non-healing injuries, inappropriate coaching and parental behaviour, and regulations in some sports.<sup>172</sup> The potentially grave health consequences related to RED-S and EDs underscores the importance of early screening, during the annual Periodic Health Examination.<sup>189, 175</sup> The diagnosis of RED-S and an ED, however, is challenging, as symptomatology can be subtle. Athletes in judged, weight category and endurance sports are particularly at risk, so that early detection is crucial to prevent long-term health consequences and to improve performance. Investigation and treatment should be initiated when an athlete presents with unexpected weight loss, lack of normal growth and development, recurrent injuries and/or illnesses, mood changes and/or unexpected decreased performance.<sup>164</sup>

Very few studies have examined EDs prevention in youth athletes. However, a recent randomised controlled trial demonstrated that it is possible to prevent new cases of EDs and associated symptoms in adolescent female elite athletes.<sup>164</sup>

### Environmental challenges

All stressful environmental conditions, including heat and humidity, cold and altitude, can pose particular health and performance challenges for youth athletes.<sup>177</sup> With the cold, elevated metabolic heat production from physical exertion, and behavioural and physiological responses acting to minimise exposure and preserve body temperature, are generally sufficient to mitigate cold-related health risk during sport; although, inhalation of cold air during sport can have adverse health effects for asthmatic and healthy athletes. Moreover, cold acclimatisation efforts provide little, if any, practical advantage in terms of preserving normal body temperature. With respect to altitude, youth athletic events are held at elevations that pose little-to-no health risks. While even modest altitudes can affect sport performance, any decrement in performance is subject to a high degree of sport- and event-specific variation, with influencing factors often being mutually offsetting. Arriving at altitude in advance of competing (~3–5 days) is sufficient for altitude acclimatisation; though, it is not advisable for youth to train at altitude or use passive exposure to hypoxia.

Training or conditioning for, or playing, sports effectively and safely in the heat, is distinctly challenging, especially when participating multiple times on the same day.<sup>178</sup> Notably, the health, safety and performance challenges from sweat-prompted body water and exchangeable sodium losses can be increasingly greater as youth athletes grow, physically develop and mature.<sup>178</sup> Anticholinergic drugs or other medications that affect hydration or thermoregulation (eg, a dopamine reuptake inhibitor to treat

attention-deficit/hyperactivity disorder or enhance performance<sup>123</sup> or diuretics), or current or recent illness (especially involving vomiting, diarrhoea and/or fever), can also contribute to decreased exercise-heat tolerance and increased exertional heat illness risk. However, with sufficient preparation (including progressive heat acclimatisation), ample hydration, appropriate modification of known contributing risk factors and close monitoring, thermal and cardiovascular strain can be minimised, and exertional heat illness is usually preventable.<sup>146–183</sup>

## YOUTH ATHLETIC DEVELOPMENT

### Athlete development frameworks

Despite a predominance of popular frameworks, gaps in the youth athletic development pathway prevail.<sup>184–192</sup> At the initial sports participation stage, inappropriate guidance and developmental activities contribute to compromised fundamental skill acquisition, injury, burnout, dropout and unrealised talent potential of youth athletes.<sup>185 187–190</sup> Furthermore, individual athletic performance and achievement is based on a complementary, and sport-specific, mix of athletic attributes and skills (technical, perceptual, neurocognitive, psycho-social and physical) that are, in turn, altered by environmental, system and chance factors.<sup>68 184 191–194</sup> Because of this complexity and low rate of conversion from youth sport to elite sport success, development frameworks should be inclusive in considering the complement of sports participation, as well as pre-elite and high-performance elements. Athlete development frameworks should also be holistic in embracing the multidimensional nature of athlete development, and predicated on recognised 'best practice' for each developmental phase, rather than age-related prescription based on physical and maturational factors, and flexible to embrace the inherent complexity and non-linearity of athlete development.<sup>184 187 190–192</sup>

An effective integrated approach to athlete development highlights the changing elements of the personal, social and physical features of different activities in sport throughout development.<sup>145 187 196</sup> When overall youth development and skill acquisition are considered as integrated, many personal and environmental factors interact to affect sport involvement. In this integrated approach, the activities of youth in sport become the developmental environment that incorporates specific social relationships and physical features of the setting. The developmental activities of youth in sport can be categorised along two continuums: first, the social structure of the activity (adult-led to youth-led) and second, the personal value the activity provides to the participants (extrinsic to intrinsic).<sup>198</sup> When combined, these two continuums form a matrix in which the different activities of youth sport can be located, resulting in an integrated learning approach. Accordingly, the different activities of this integrated approach offer unique interactions, learning opportunities and potential for growth. A diversity of sport activities during childhood allows young athletes to experience a range of opportunities and then select (or be selected to) a specific path of more targeted training activities during adolescence and young adulthood. Empirical evidence shows that a diversity of activities (including variations of play and practice) in early development is an indicator of continued involvement in more intense activities later in life, elite performance and continued participation in sport.<sup>100</sup>

### Talent identification and development

The search for talent in sport at relatively young ages is far more prevalent and systematised than in the past. Formal talent identification programmes can be traced to the former socialist East

European countries, often labelled as 'scientific selection'.<sup>200</sup> However, success of these systems predicated on physical parameters and juvenile levels of performance has been limited.<sup>83 94 201–203</sup>

Effective sport talent identification and development in youth for achieving elite performance remains a fundamental challenge for sports institutions, with the allocation of limited resources for the uncertain probability of future international sporting achievement. However, sport is extremely selective; and the probability of elite success is highly unlikely for most. Moreover, accurate talent identification and appropriate athletic development of potentially gifted youth athletes is far too complex to be distilled into a singular, universally accepted process, especially since this is greatly dependent on country, culture and context. The difficulties in effectively utilising valid performance measures (eg, physiological, cognitive, functional motor, psychosocial etc), as well as the interactions from unknown influencing variables, further complicate a very complex task.<sup>205</sup> Elite athletic success is also vulnerable to deviations in sport focus, as well as the impact of normal behavioural development and interactions with adults, which can alter the sport-life balance. Not surprisingly, therefore, there exists an apparent disconnect with discordant results between advocated talent development systems and the evidence of actual outcomes.<sup>68 105 107</sup>

The efficacy of early talent identification predicated solely on physical factors and juvenile levels of athletic performance in predicting future elite sport performance is confounded by maturational factors, which often exclude late developers in demonstrated athletic capacity and sport skill.<sup>206 207</sup> Moreover, when children or adolescents are grouped by age, older individuals generally outperform younger ones. Research specific to elite athletes from multiple sports and in different countries repeatedly revealed that sampling of sport during childhood is not detrimental to adult elite levels of sport achievement in sports where peak performance is achieved during adulthood.<sup>53 190</sup> Data specific to professional German football players affirm that a more inclusive, long-term approach to athlete development, involving recurrent selection and de-selection of athletes, could address the uncertainty involved in and shortcomings of early talent identification.<sup>208</sup>

Success at the elite level of sport performance stems from a combination of factors that vary based on the sociocultural and politicoeconomic context of a country. Intrinsic (eg, body height and rate of maturation, aptitude, adaptation to training, motivation, psychological skills) as well as extrinsic (eg, environment, access and opportunity, athlete development pathway, coaches, family, educators) factors work in synchrony to determine an athlete's success in sport, with the interactions between heritable characteristics and environments thought to be the primary determining factors.<sup>210</sup>

### Coaching education and effectiveness

Coaches of youth athletes play a pivotal role in determining whether sport systems provide opportunities for peak athlete performance, promote lifelong participation and shape personal development. Therefore, coach education and mentoring to develop coach competencies should be a priority of sport organisations. Contemporary coaching theory<sup>211</sup> indicates that coach effectiveness should be driven by an understanding that (1) coaching knowledge is multidimensional, (2) there are key athlete assets and several related athlete outcomes and (3) that effective coaching is influenced by the coaching context. It is also essential that coaches understand physical growth,

biological maturation and behavioural development, as they affect performance and injury risk.

#### Coaches' knowledge

Although a major component of coaching effectiveness resides in one's ability to teach sport-specific skills, coaching effectiveness is also reflected in the ability to create and maintain relationships with others, and the ability to learn from one's own practice.<sup>212-214</sup> Therefore, coaches' effectiveness encapsulates coaches' ability to access and use a combination of professional knowledge (eg, sport-specific content, paediatric exercise science, injury prevention and pedagogical knowledge), interpersonal knowledge (eg, relationships with athletes, parents and local community) and intrapersonal knowledge (eg, reflection and introspection).

#### Athletes' assets and outcomes

The four Cs—Competence, Confidence, Connection and Character—is a set of athletes' assets that should become the focal point of coaching practice.<sup>211</sup> It is the coaches' responsibility to establish positive training and competitive environments, and to create relationships that focus on individual athletes' needs in addition to the long-term objectives of performance, participation and personal development.<sup>212-216</sup> Repeated positive developmental experiences in sport that result from regular engagement in fun and challenging activities that focus on athletes' four Cs are known to have long-term positive effects on performance and participation.<sup>217-219</sup>

#### Coaching contexts

The Developmental Model of Sport Participation<sup>25, 60</sup> was used<sup>220</sup> to propose a typology of four different categories of coaches, based on contrasting competitive demands (ie, performance vs participation) and for developmental level (eg, age or maturation). The four categories include *participation* coaches for (1) children and (2) adolescents and adults; and *performance* coaches for (3) young adolescents and (4) older adolescents and adults. This and other similar typologies identify appropriate and differing criteria and expectations for coaching effectiveness.

#### Coaching effectiveness definition

The integration of these three components (coaches' knowledge, athletes' assets and outcomes and coaching contexts) led to a definition of coaching effectiveness:

The consistent application of integrated professional, interpersonal and intrapersonal knowledge to improve athletes' competence, confidence, connection and character in specific coaching contexts.<sup>211</sup>

Accordingly, coaches across the continuum of youth athletic progression require a unique mix of professional, interpersonal and intrapersonal knowledge to effectively cultivate athletes' competence, confidence, connection and character (4 Cs). Although all effective coaches require a high level of professional, interpersonal and intrapersonal knowledge, there will be great variation between each context as to the nature of the knowledge and strategies required to appropriately nurture athletes' assets respective to their developmental and competitive levels. Ultimately, this definition of coaching effectiveness provides the foundation to develop coaching education programmes specifically emphasising sport-specific coaching knowledge, a coach's ability to maintain high-quality relationships with athletes and coaching peers, and reflection on

personal experiences. Coaches who are able to improve their athletes' four Cs are making an enormous contribution to the development of sport and society.

#### Developing fitness, athleticism and a functional foundation

Despite a compelling body of scientific evidence that supports regular participation in age-related strength and conditioning activities,<sup>22-24, 221-223</sup> secular declines in measures of muscular strength, fundamental movement skills and neuromuscular fitness in the general population of youth have been reported.<sup>224-227</sup> The observed regressions in muscular fitness may be, in part, due to worldwide reductions in frequent varied exposure to moderate-to-vigorous intensity physical activity in school-age youth.<sup>228, 123</sup> Participation in organised sports, however, does not ensure a suitable level of integrated strength, neuromuscular fitness and other essential characteristics (eg, biomotor abilities, including coordination and balance) to adequately meet the physical and functional demands of sport consistent with elite, and sustainable, athletic performance. In contrast, sports participation with appropriate preparatory strength and fitness conditioning decreases the risk of sports-related injuries, and enhances the likelihood of achieving and sustaining an enjoyable, high level of performance.<sup>229-232</sup>

Muscular fitness and effective movement skills serve as the foundation for achieving optimal and sustainable long-term athletic performance; accordingly, a suitable emphasis on developing muscular strength, power, speed and agility of young athletes with appropriate age-related interventions is essential.<sup>233, 234</sup> Early exposure to strength and conditioning can improve markers of health, enhance physical performance, and reduce injury risk in children and adolescents.<sup>235-237</sup> Indeed, the IOC encourages early identification of individual deficits in physical fitness in young athletes and the qualified prescription of training programmes specifically designed to address individual limitations.<sup>236</sup>

To optimise training adaptations and manage fatigue, youth conditioning should be considered a long-term process that involves the sensible integration of different training methods and the periodic manipulation of programme variables (eg, training intensity and volume) over time, while providing regular opportunities for rest and recovery. Integrative neuromuscular training is specifically designed to improve essential athletic elements for sport, and foster positive skill development with the intent to make organised youth sports more engaging, enjoyable and safe for all youth athletes.<sup>237-239</sup> Extensive evidence suggests that young athletes who are not exposed to this type of strength and conditioning early on in their athletic careers will inevitably need to address neuromuscular deficiencies to enhance athletic development or in rehabilitation following an injury.<sup>240-242</sup> The desired result encompasses having sufficient physical capacities of balance, coordination, flexibility, agility, strength, power, endurance, variable speed and the ability to read (through various senses and experiences), integrate and interpret a wide range of athletic scenarios and challenging situations, and respond efficiently and effectively with confidence, anticipation and optimal decision-making.

#### Physiological monitoring and sport-specific performance testing

A rationale for the assessment and monitoring of youth athletes might include purportedly identifying talent, predicting future performance, determining strengths and weaknesses, informing the selection process, evaluating the effectiveness of training programmes, monitoring current health and performance,

motivating the athlete, enhancing the athlete's (and coach's) understanding of the demands of the sport, and improving present and future performance.<sup>240–251</sup> The sport physiologist, as a member of the athlete-integrated science and medical support team (psychology, biomechanics, medicine, nutrition and physiotherapy) works collaboratively to choose appropriate testing, and to interpret and communicate test results and their application to performance to the coach and athlete. Those who work with youth athletes (coaches, physiologists, physicians, dietitians, etc) should also be knowledgeable of methods for assessing and interpreting the growth and maturity status of youth athletes.

#### Ethics of testing youth athletes

The ethics of non-therapeutic testing of minors are well-documented.<sup>242–244</sup> Sport physiologists should also be aware of power differentials and coercion in the recruitment process, as it is unlikely that a youth athlete will refuse to participate if the coach gives proxy permission on his/her behalf. To protect all parties, written informed consent (or parental/guardian consent and child assent for children <18 years) should be obtained following an explanation, appropriate to the athlete's level of comprehension, of the purpose, procedures and potential benefits and risks of the tests. It is advisable that a contract clearly outlining the role the sport physiologist is signed by all parties.

#### Testing youth athletes

Clear rationales and guidelines for the physiological assessment and interpretation of, for example, young people's body composition,<sup>245</sup> muscle strength,<sup>246</sup> aerobic fitness<sup>247</sup> and anaerobic performance<sup>248</sup> are well-documented. A body of knowledge on assessing the kinetic responses to rapid changes in exercise intensity is also emerging.<sup>249</sup> As well, the interpretation of exercise testing data in relation to body size has been comprehensively addressed.<sup>248</sup> To be effective, physiological testing of youth athletes should be as sport-specific as possible. Several well-documented sport-specific tests for adult athletes<sup>249</sup> can be applied to youth athletes. A number of sport-specific field tests designed for youth athletes have recently emerged; but, more research is required to establish their effectiveness.

The precise influence of a change in a laboratory or field test outcome on sport performance during youth is unknown. A single change in a physiological variable may have little effect on subsequent performance, as it is often an accumulation of related changes that enhance performance. Moreover, it may take several years of training for some factors related to performance (eg, running economy) to significantly improve, and this is compounded during youth by the asynchronous development of aspects of physiology (eg, the interplay of anaerobic and aerobic metabolism). Although laboratory testing provides a gold standard for physiological variables and enables close control over extraneous factors, sport-specific field tests have greater specificity and ecological validity. Laboratory and field tests can both play valuable roles in monitoring progress, and the balance of use and frequency is best made on a sport-by-sport basis.

#### IOC RECOMMENDATIONS FOR YOUTH ATHLETIC DEVELOPMENT

While the field of youth athletic development has advanced considerably, new research and validated practical solutions to effectively improve current practices are of paramount importance. There is also an urgency to address the 'culture' of specific sports and youth sports in general, which have become

disproportionately both adult and media centred. The much maligned 'specialisation' in youth sports is a related recognised concern that also needs to be addressed appropriately and realistically. Appropriate diversity and variability of athletic exposure within a single sport, while supporting sufficient learning of foundational skills and sport-specific technique and biomechanics to minimise injury risk and optimise performance, along with consistent adequate rest and recovery and a balanced emphasis on other priorities (eg, family and school, life skills and social development), can be acceptable and healthy, so long as the youth athlete is enjoying and benefitting fully from the experience.

While recognising the broad challenges, and lack of sufficient sport-specific and athletic development stage-specific data, evidence-informed best practices should be emphasised to minimise illness and injury risk, enhance well-being and promote sustainable, enjoyable, long-term athletic development, performance and success in all youth athletes. To this end, the IOC authors recommend these guiding principles:

#### General principles

- ▶ Youth athlete development is contingent on an individually unique and constantly changing base of normal physical growth, biological maturation and behavioural development, and therefore it must be considered individually.
- ▶ Allow for a wider definition of sport success, as indicated by healthy, meaningful and varied life-forming experiences, which is centred on the *whole* athlete and development of the *person*.
- ▶ Adopt viable, evidence-informed and inclusive frameworks of athlete development that are flexible (using 'best practice' for each developmental level), while embracing individual athlete progression and appropriately responding to the athlete's perspective and needs.
- ▶ Commit to the psychological development of *resilient* and *adaptable* athletes characterised by mental capability and robustness, high self-regulation and enduring personal excellence qualities—that is, upholding the ideals of Olympism.
- ▶ Encourage children to participate in a variety of different unstructured (ie, deliberate play) and structured age-appropriate sport-related activities and settings, to develop a wide range of athletic and social skills and attributes that will encourage sustained sport participation and enjoyment.
- ▶ Make a commitment to promote safety, health and respect for the rules, other athletes and the game, while adopting specific policies and procedures to avert harassment and abuse.
- ▶ Across the entire athletic development pathway, assist each athlete in effectively managing sport-life balance to be better prepared for life after sport.

#### Coaching

- ▶ Provide a challenging and enjoyable sporting climate that focuses on each athlete's personal assets and mastery orientation.
- ▶ Coaching practices should be informed by research-based developmental guidelines that promote flexibility and innovation, while accommodating individual skills and athletic development trajectories.
- ▶ Coaching should be context-specific (eg, participation vs performance focus) and aligned with individual athletic readiness.
- ▶ Coaching education programmes should assist coaches in establishing meaningful relationships that enrich the personal assets of their athletes and foster their own intrapersonal and interpersonal skills (eg, reflection and communicative skills).

- ▶ Coaches should seek interdisciplinary support and guidance in managing a youth athlete's athletic development, fitness and health, and mental and social challenges and needs.

#### Conditioning, testing and injury prevention

- ▶ Encourage regular participation in varied strength and conditioning programmes that are suitably age based, quality technique driven, safe and enjoyable.
- ▶ Design youth athlete development programmes comprising diversity and variability of athletic exposure, to mitigate the risk of overuse injuries and other health problems prompted by inappropriate training and competition that exceed safe load thresholds, while providing sufficient and regular rest and recovery, to encourage positive adaptations and progressive athletic development.
- ▶ Maintain an ethical approach to, and effectively translate, laboratory and field testing to optimise youth sports participation and performance.
- ▶ Develop, implement and continue to evaluate knowledge translation strategies and resources that will enhance injury prevention and promote health in youth athletes, such as the *Get Set—Train Smarter* injury prevention app developed by the IOC for the 2014 Youth Olympic Games.<sup>11</sup>
- ▶ Promote evidence-informed injury prevention programmes, protective equipment legislation and rule changes that are context specific, adaptable and consistent with maintaining the integrity of the sport and participation goals.
- ▶ Strictly adhere to a “No youth athlete should compete—or train or practice in a way that loads the affected injured area, interfering with or delaying recovery—when in pain or not completely rehabilitated and recovered from an illness or injury”.

#### Nutrition, hydration and exertional heat illness

- ▶ Dietary education for young athletes should emphasise optimal eating patterns to support health, normal growth and sport participation demands, with emphasis on a balanced intake of nutrient-dense carbohydrates, high-quality protein and sufficient dietary calcium, vitamin D and iron.
- ▶ Youth athletes and their support personnel should be educated on the risks associated with dietary supplements and energy drinks.
- ▶ Emphasise and mitigate the risks of sport-related EDs, DE and RED-S, by raising awareness through education, improving screening and treatment, and implementing applicable rule modifications.
- ▶ Education and training on exertional heat illness risks and effective prevention and risk-reduction strategies (including practical preparation, offsetting measures and management and immediate response protocols) and policies should be regularly provided and emphasised to youth athletes, coaches and staff, and others overseeing or assisting with children and adolescents participating in outdoor sports.
- ▶ A written emergency action plan and effective response protocols should be in place and practiced ahead of time with trained personnel, as well as readily available facilities on-site for managing and treating all forms of exertional heat illness and other medical emergencies, for all youth athletic activities, especially in the heat.

#### Sport and sports medicine governing bodies and organisations

- ▶ Sport and sports medicine governing bodies and organisations should protect the health and well-being of youth in sport by providing ongoing education, and fully implementing and monitoring practical, and effective, athlete safeguarding policies and procedures in all youth athlete programming.<sup>12,13,14</sup>

- ▶ Youth athlete selection and talent development philosophies should be based on the physiological, perceptual, cognitive and tactical demands of the sport, and a long-term, individually variable developmental context.
- ▶ Diversification and variability of athletic exposure between and within sports should be encouraged and promoted.
- ▶ Competition formats and settings should be age and skill appropriate, while allowing for sufficient rest and recovery time between multiple same-day contests.

#### A CALL TO ACTION

We challenge all youth and other sport governing bodies to emphasise awareness, education and implementation of these IOC recommendations and to support the promotion of evidence-informed perspectives to coaches, the athlete entourage, medical providers and administrators involved in youth sports to ensure an enjoyable, safe, healthy and sustainable experience for all participants.

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# UK Chief Medical Officers' Physical Activity Guidelines

Published 6 September 2019



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## Foreword by the Chief Medical Officers



A handwritten signature in black ink that reads "Sally C Davies".

Professor Dame Sally C Davies  
Chief Medical Officer, England



A handwritten signature in black ink that reads "Frank Atherton".

Dr Frank Atherton  
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A handwritten signature in black ink that reads "Michael McBride".

Dr Michael McBride  
Chief Medical Officer, Northern Ireland



A handwritten signature in black ink that reads "Catherine Calderwood".

Dr Catherine Calderwood  
Chief Medical Officer, Scotland

In 2010, we were among the first Nations in the world to set out the evidence for how much and what kinds of physical activity we need to do to keep ourselves healthy.

Since then, the evidence has become more compelling and the message is clear:

"If physical activity were a drug, we would refer to it as a miracle cure, due to the great many illnesses it can prevent and help treat."

Physical activity is not just a health issue. It brings people together to enjoy shared activities and contributes to building strong communities whilst supporting the economy to grow.

These physical activity guidelines update the 2011 guidelines across all age groups. We have also drawn on new evidence to develop additional guidance on being active during pregnancy and after giving birth, and for disabled adults.

We want as many people as possible to make use of these guidelines to work towards and achieve the recommended activity levels. With that in mind, we have developed updated infographics to help bring these guidelines to life and make them easy for everyone to use.

Being active every day provides a foundation for a healthier and happier life. The recommendations we made in 2011 on muscle strength have not achieved the recognition we believe they merit. We therefore want to underline the importance of regular strength and balance activities: being strong makes all movement easier and increases our ability to perform normal daily tasks.

We want this report to be a catalyst for change in our attitudes to physical activity. Our environment can make it difficult to be healthy and our health is being damaged by inactivity. But the good news is that even small changes can make a big difference over time, such as using the stairs for a couple of floors rather than taking the lift or getting off the bus a stop early and walking the rest of the way.

You always feel better for being active. We want as many people as possible to protect their future health and start their journey to a healthier life now.

September 2019

## Acknowledgements

We would like to give special thanks for the support we have received from the Centre for Exercise, Nutrition and Health Sciences, School for Policy Studies at the University of Bristol and the leadership provided by Dr Charlie Foster.

We would like to thank the contributing authors and members of our UK Chief Medical Officer (CMO) Guidelines Writing Group and the members of the expert working groups (listed in Annex B). Their ongoing advice and support have been invaluable.

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Thanks also to Kate Willis (Centre for Exercise, Nutrition and Health Sciences, School for Policy Studies, University of Bristol); Catherine Falconer (England Chief Medical Officer's office); and Scottish Physical Activity Research Connections (SPARC), who all contributed to the report and/or to the Scientific Consensus meetings; as well as to the UK policy leads

for physical activity of the four home countries for their contributions. Our thanks to our UK External Reviewers: Professors Melvyn Hillsdon, Gareth Stratton, Alan Batterham, and Dr Simon Williams.

Finally, a special thanks to the UK Government Department of Health of Social Care and Active Scotland Division of the Scottish Government, in particular Beelin Baxter and Caspian Richards who project managed this work on behalf of the four home countries, supported by Fiona Cunnah and Ian McClure. We would like to also acknowledge support provided by Sport England and Dr Mike Brannan at Public Health England.

## Executive Summary

This report presents an update to the 2011 physical activity guidelines issued by the four Chief Medical Officers (CMOs) of England, Scotland, Wales and Northern Ireland. The UK CMOs draw upon global evidence to present guidelines for different age groups, covering the volume, duration, frequency and type of physical activity required across the life course to achieve health benefits.

Since 2011, the evidence to support the health benefits of regular physical activity for all groups has become more compelling. In children and young people, regular physical activity is associated with improved learning and attainment, better mental health and cardiovascular fitness, also contributing to healthy weight status. In adults, there is strong evidence to demonstrate the protective effect on physical activity on a range of many chronic conditions including coronary heart disease, obesity and type 2 diabetes, mental health problems and social isolation. Regular physical activity can deliver cost savings for the health and care system and has wider social benefits for individuals and communities. These include increased productivity in the workplace, and active travel can reduce congestion and reduce air pollution.

Our understanding of the relationship between physical activity and health has grown. In general, the more time spent being physically active, the greater the health benefits. However, we now know that even relatively small increases in physical activity can contribute to improved health and quality of life. As such, although we recommend that all individuals work towards achieving these guidelines, they are not absolute thresholds and we recognise the benefits that can be achieved at levels both above and below the thresholds.

This report emphasises the importance of regular activity for people of all ages, and for the first time presents additional guidance on being active during pregnancy, and after giving birth, and for disabled adults. These new guidelines are broadly consistent with previous ones, while also introducing some new elements and allowing for more flexibility in achieving the recommended levels of physical activity for each age group.

This report underlines the importance of all age groups participating in a range of different activities. Considering the importance of strength for physical function, particularly later in life, we did not feel the 2011 recommendations on strengthening activities were given the merit they deserve. In childhood, strengthening activities help to develop muscle strength and build healthy bones, while in adults and older adults they help to maintain strength and delay the natural decline in muscle mass and bone density which occurs from around 50 years of age. The new guidelines reinforce the importance of these types of activities for all age groups and highlight the additional benefit of balance and flexibility exercises for older adults.

The report also highlights the risks of inactivity and sedentary behaviour for health. There have been notable developments in the evidence base for the health effects of sedentary time in adults, with research suggesting sitting time is associated with all-cause and cardiovascular mortality, and cancer risk and survivorship. Similar effects are seen in children where sedentary behaviour is associated with cardiovascular fitness and obesity. In all groups, the relationships of sedentary behaviour and health occur independently of moderate-to-vigorous physical activity (MVPA) for some health outcomes. Prolonged sitting is harmful, even in people who achieve the recommended levels of MVPA. Despite this, the evidence does not currently support including a specific time limit or minimum threshold of sedentary time within these guidelines.

This report recognises an emerging evidence base for the health benefits of performing very vigorous intensity activity performed in short bouts interspersed with periods of rest or recovery (high intensity interval exercise, HIIT). The available evidence demonstrates that high intensity interval exercise has clinically meaningful effects on fitness, body weight and insulin resistance, and can be as or more effective than MVPA. This option has therefore been incorporated into the recommendation for adults.

These new guidelines allow greater flexibility for how and when children and young people can achieve the recommended levels of physical activity across the week. Contrary to 2011, the current evidence does not support a specific minimum daily threshold of 60 minutes of MVPA for health benefits, and instead recommends an average number of 60 daily minutes to be achieved across the week.

Evidence now demonstrates that there is no minimum amount of physical activity required to achieve some health benefits. The previous requirement for a 10-minute bout of activity is no longer valid and is no longer included. However, specific targets - such as aiming to do at least 10 minutes at a time - can be effective as a behavioural goal for people starting from low levels of activity

We present the new guidelines following a life course approach with a separate chapter for the age groups covered in the report: Under-5s, Children and Young people (5-18 years), Adults (19-64 years), and Older Adults (65+). Each chapter includes an introduction, sets out the guidelines for that age group, summarises the evidence to support the new guidelines, and outlines any changes made since 2011.

We hope these guidelines will be read by health professionals, policy makers and others working to promote physical activity, sport, exercise and active travel. The guidelines are designed to aid health professionals and others to provide individuals and communities with information on the type and amount of physical activity that they should undertake to improve their health.

## Summary of Guidelines by age group

### Under-5s

#### Infants (less than 1 year):

- Infants should be physically active several times every day in a variety of ways, including interactive floor-based activity, e.g. crawling.
- For infants not yet mobile, this includes at least 30 minutes of tummy time spread throughout the day while awake (and other movements such as reaching and grasping, pushing and pulling themselves independently, or rolling over); more is better.

NB: Tummy time may be unfamiliar to babies at first, but can be increased gradually, starting from a minute or two at a time, as the baby becomes used to it. Babies should not sleep on their tummies.

#### Toddlers (1-2 years):

- Toddlers should spend at least 180 minutes (3 hours) per day in a variety of physical activities at any intensity, including active and outdoor play, spread throughout the day; more is better.

#### Pre-schoolers (3-4 years):

- Pre-schoolers should spend at least 180 minutes (3 hours) per day in a variety of physical activities spread throughout the day, including active and outdoor play. More is better; the 180 minutes should include at least 60 minutes of moderate-to-vigorous intensity physical activity.

### Children and Young People (5 to 18 years)

- Children and young people should engage in moderate-to-vigorous intensity physical activity for an average of at least 60 minutes per day across the week. This can include all forms of activity such as physical education, active travel, after-school activities, play and sports.
- Children and young people should engage in a variety of types and intensities of physical activity across the week to develop movement skills, muscular fitness, and bone strength.
- Children and young people should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of not moving with at least light physical activity.

## **Adults (19 to 64 years)**

- For good physical and mental health, adults should aim to be physically active every day. Any activity is better than none, and more is better still.
- Adults should do activities to develop or maintain strength in the major muscle groups. These could include heavy gardening, carrying heavy shopping, or resistance exercise. Muscle strengthening activities should be done on at least two days a week, but any strengthening activity is better than none.
- Each week, adults should accumulate at least 150 minutes (2 1/2 hours) of moderate intensity activity (such as brisk walking or cycling); or 75 minutes of vigorous intensity activity (such as running); or even shorter durations of very vigorous intensity activity (such as sprinting or stair climbing); or a combination of moderate, vigorous and very vigorous intensity activity.
- Adults should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of inactivity with at least light physical activity.

## **Older Adults (65 years and over)**

- Older adults should participate in daily physical activity to gain health benefits, including maintenance of good physical and mental health, wellbeing, and social functioning. Some physical activity is better than none: even light activity brings some health benefits compared to being sedentary, while more daily physical activity provides greater health and social benefits.
- Older adults should maintain or improve their physical function by undertaking activities aimed at improving or maintaining muscle strength, balance and flexibility on at least two days a week. These could be combined with sessions involving moderate aerobic activity or could be additional sessions aimed specifically at these components of fitness.
- Each week older adults should aim to accumulate 150 minutes (two and a half hours) of moderate intensity aerobic activity, building up gradually from current levels. Those who are already regularly active can achieve these benefits through 75 minutes of vigorous intensity activity, or a combination of moderate and vigorous activity, to achieve greater benefits. Weight-bearing activities which create an impact through the body help to maintain bone health.
- Older adults should break up prolonged periods of being sedentary with light activity when physically possible, or at least with standing, as this has distinct health benefits for older people.

Despite the widely reported benefits of physical activity, most adults and many children across the UK are insufficiently active to meet the full set of recommendations. We want this report to act as a catalyst for a change in our attitudes to physical activity.

These guidelines present a UK-wide consensus on the amount and type of physical activity that is needed to benefit health across the life course. The guidelines have been updated using the best available evidence and reflect what we know now about the relationship between physical activity and health. The guidelines apply across the population, irrespective of gender, age or socio-economic status. We know there are clear health inequalities in relation to physical inactivity and therefore interventions to promote physical activity must consider this.

We want as many people as possible to make use of these guidelines to work towards and achieve the recommended activity levels. With that in mind, we have developed the updated infographics included in this report to help bring the guidelines to life and make them easy for everyone to use. We hope these guidelines help all individuals to become more active. The good news is that even small changes can make a big difference over time. As we say in these guidelines: some is good, more is better.

# Introduction

## **What is the aim of this report?**

This report is a UK-wide document presenting the UK Chief Medical Officers' (CMO) new Physical Activity Guidelines for different age groups, covering the volume, duration, frequency and type of physical activity required across the life course to achieve general health benefits. The guidelines present thresholds for the achievement of optimal health benefits at the recommended levels of physical activity in terms of strength, moderate and vigorous physical activity, and balance activities.

## **Who is this report for?**

The main intended audience for this report is professionals, practitioners and policymakers from a wide range of organisations concerned with formulating and implementing policies and programmes that promote physical activity, sport, exercise and active travel to achieve health gains. These groups will want to adapt the messages and recommendations in this report to suit the specific needs and interests of those they are working with and the context they are working in.

A UK Communications Working Group is being established to provide advice on approaches to communicating these messages and recommendations to the wider public, and on disseminating the guidelines to a wide range of stakeholders.

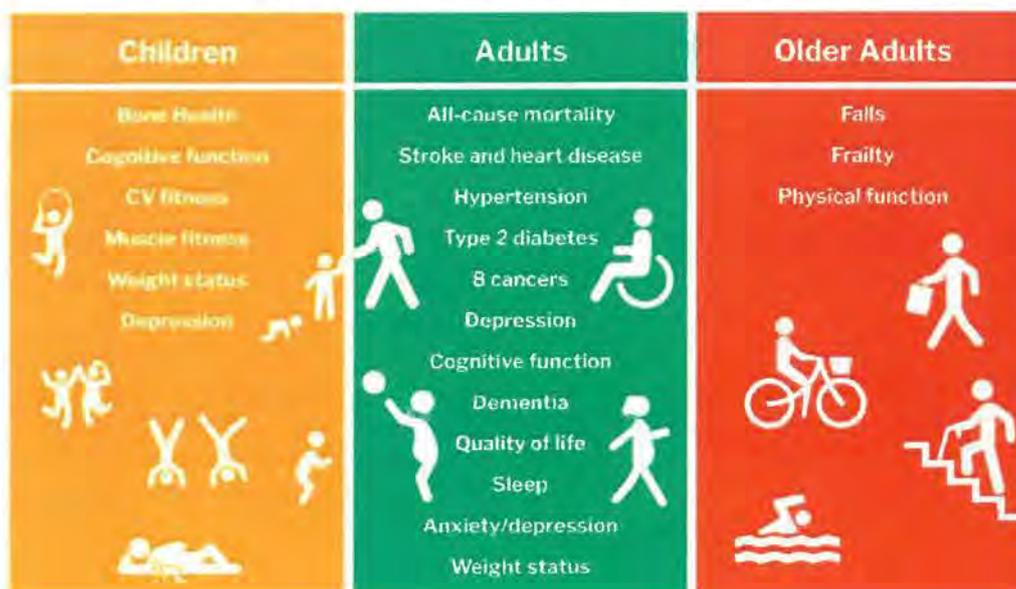
## **Principles**

### **Physical activity for good health and wellbeing**

Regular physical activity provides a range of physical and mental health benefits. These include reducing the risk of disease, managing existing conditions, and developing and maintaining physical and mental function.

The UK CMOs' guidelines provide recommendations on the frequency, intensity, duration and types of physical activity at different life stages, from early to later years. Benefits are accrued over time, but it is never too late to gain health benefits from taking up physical activity.

**Moderate or strong evidence for health benefit**

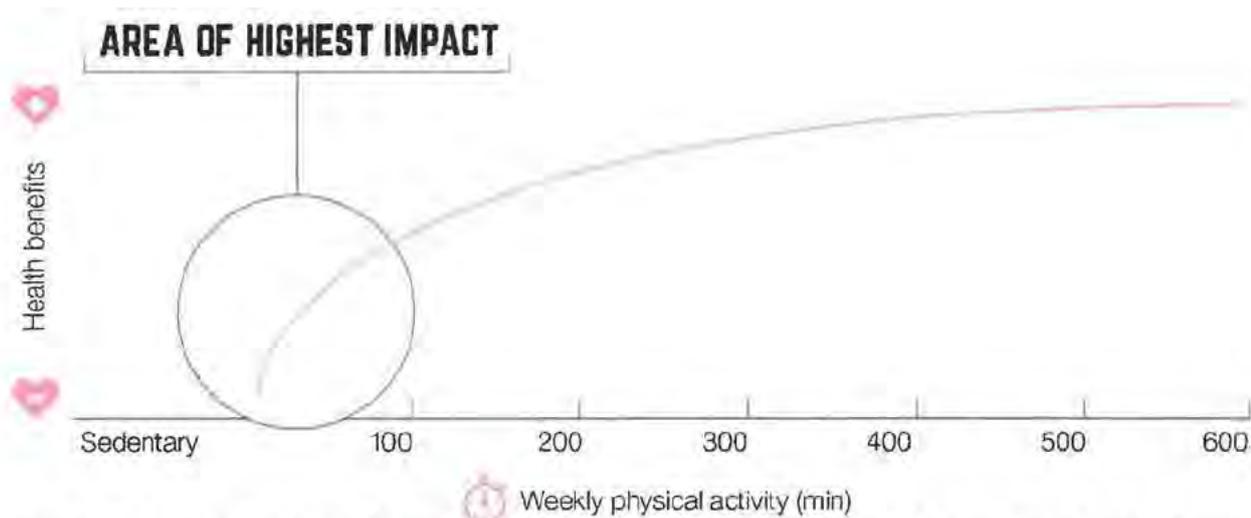


**Figure 1: Cumulative health benefits of physical activity across ages. Adapted from (1)**

**Some is good, more is better**

Although we recommend that all individuals work towards achieving these guidelines, there are no absolute thresholds: benefits are achieved at levels both below and above the guidelines.

In general, the more time spent being physically active, the greater the health benefits. However, the gains are especially significant for those currently doing the lowest levels of activity (fewer than 30 minutes per week), as the improvements in health per additional minute of physical activity will be proportionately greater.



**Figure 2: Dose-response curve of physical activity and health benefits. Adapted from (2)**

There is no minimum amount of physical activity required to achieve some health benefits. Specific targets below the recommended levels – such as aiming to do at least 10 minutes at a time – can be effective as a behavioural goal for people starting from low levels of activity (3) (including disabled adults and those with long-term conditions), and as a step on the journey towards meeting the recommended levels set out in the UK CMOs' guidelines. Small bouts (i.e. of fewer than 10 minutes) accumulated over the day and week will also provide benefits (4).

It is recommended that people are active every day. Spreading activity across the day or week can help make the guidelines achievable within daily living; for example, walking, wheeling or cycling for daily travel is often the easiest way to get physically active.

### **Health benefits of different types of physical activity**

Physical activity is defined as any bodily movement produced by skeletal muscles that requires energy expenditure. It takes many forms, occurs in many settings, and has many purposes (e.g. daily activity, active recreation, and sport).

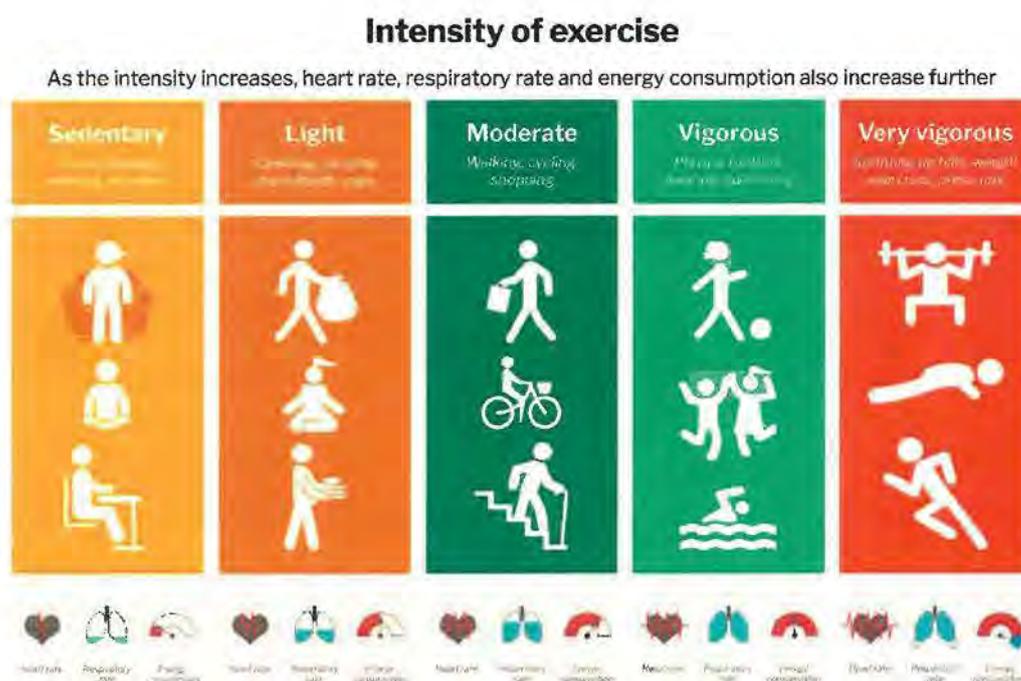
Health-enhancing physical activity includes multiple types of activity: cardiovascular; muscle and bone strengthening; and balance training.

### **Cardiovascular activity**

Cardiovascular activity, sometimes called aerobic activity, increases breathing rate and makes the heart and muscles work harder. It can be of low, moderate or vigorous intensity and is relative to an individual's fitness. Therefore, what could be light intensity for a young

person (who is very fit and active) could be moderate or vigorous intensity for an older adult or a younger individual who is inactive and unfit.

Although activity of any intensity provides health benefits, greater intensity provides more benefit for the same amount of time. Activities need to be of at least moderate-to-vigorous intensity to achieve the full breadth of health benefits.



**Figure 3: Types of physical activity and their intensities with examples of everyday activities and exercises - adapted from Netherlands Physical Activity Guidelines 2017 & Ainsworth et al 2017 (5)**

Moderate and vigorous activity can be differentiated by the ‘talk test’: being able to talk but not sing indicates moderate intensity activity, while having difficulty talking without pausing is a sign of vigorous activity.

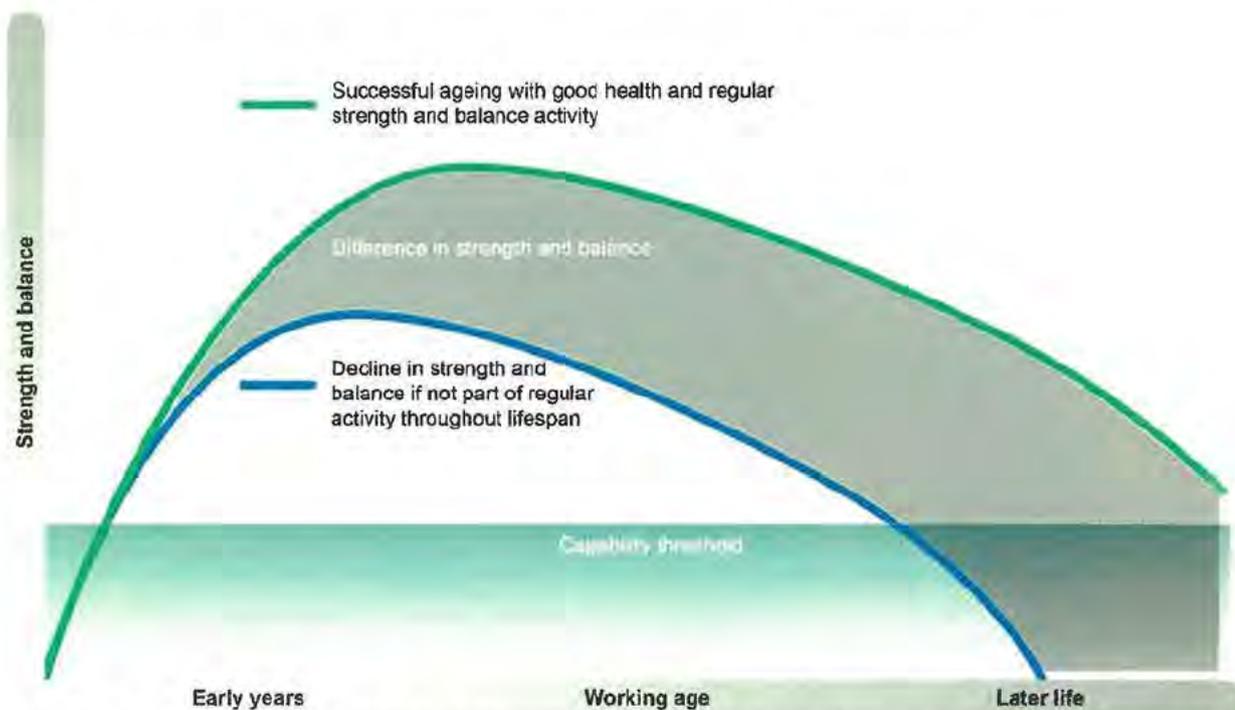
Very vigorous physical activities performed in short bursts interspersed with rest or lower intensity activity breaks, sometimes referred to as High Intensity Interval Training (HIIT), have been shown to bring health benefits (6). Data on HIIT is still emerging, but evidence so far suggests benefits for a range of physiological health outcomes. Further work is needed to identify an optimal amount and form of HIIT to recommend, but overall there are clear benefits from these types of activity.

### Muscle and bone strengthening and balance training activities

Muscle strength, bone health and the ability to balance underpin physical function, particularly later in life. Each attribute contributes independently to overall health and functional ability, and in combination they provide lifelong benefits.

Muscle and bone strength play a critical role in ensuring good muscular and skeletal health, and in maintaining physical function. When undertaking muscle strengthening activities, it is important to work all the major muscle groups. Bone strengthening involves moderate and high impact activities to stimulate bone growth and repair.

Strengthening activities are important throughout life for different reasons: to develop strength and build healthy bones during childhood and young adulthood; to maintain strength in adulthood; and to delay the natural decline in muscle mass and bone density which occurs from around 50 years of age, maintaining function in later life.



**Figure 4: Physical activity for muscle and bone strength across the life course (7, 8)**

Balance training involves a combination of movements that challenge balance and reduce the likelihood of falling (114).

Different activities have differential effects on muscle and bone strength and balance.

Type of sport, physical activity or exercise	 Improvement in muscle function	 Improvement in bone health	 Improvement in balance
 Running	★	★★	★
 Resistance Training	★★★	★★★	★★
 Aerobics, circuit training	★★★	★★★	★★
 Ball Games	★★	★★★	★★★
 Racquet Sports	★★	★★★	★★★
 Yoga, Tai Chi	★	★	★
 Dance	★	★★	★
 Walking	★	★	☆
 Nordic Walking	★★	?	★★
 Cycling	★	★	★

★★★ Strong effect    ★★ Medium effect    ★ Low effect    ☆ No effect    ? Not known

**Table 2: Types of activities that can help maintain or improve aerobic capacity, strength, balance and bone health and contribute to meeting the physical activity guidelines (8)**

### Inactivity and sedentary behaviour

Inactive and sedentary behaviours are those which involve being in a sitting, reclining or lying posture during waking hours, undertaking little movement or activity and using little energy above what is used at rest (9). Examples of sedentary behaviours include sitting in a chair while using a screen or reading, or a child sitting in a car seat or buggy. They do not include being active while in a sitting or reclining posture, e.g. wheeling, chair exercises, or seated gym work.

Periods of inactivity or sedentary behaviour are an independent risk factor for poor health outcomes and should be minimised when possible. Extended periods should be broken up by at least light physical activity. The term 'when possible' is emphasized as certain groups of people who depend daily on a wheelchair, unavoidably sit for long periods of time and sitting may therefore be the norm.

The relationship between sedentary behaviour and some health outcomes varies by the amount of MVPA also undertaken. Currently there is insufficient evidence to make specific recommendations on threshold levels of activity that would mitigate the negative impacts of sedentary time.

### **Physical activity and weight**

As the most effective way of increasing our daily energy expenditure, physical activity plays a role in maintaining a healthy weight – including the prevention of weight gain and reduction in body fat – by balancing energy intake from our dietary intake. It also plays a role in the prevention of weight regain after substantial weight loss. However, irrespective of any change in weight, people who are overweight or obese will reduce their risk of cardiovascular disease and improve their health by being physically active.

In combination with dietary change, physical activity can support weight loss.

### **Risks of physical activity**

The risk of adverse events from physical activity is relatively low, and the health benefits accrued from such activity outweigh the risks (1). This evidence also extends now to disabled adults, with the available evidence suggesting there are no major risks of engaging in physical activity when it is performed for an appropriate duration and at an appropriate level of intensity for the individual.

Musculoskeletal injury is more common during activities which involve impact and is inversely associated with total volume of physical activity, but the relative contribution of frequency, intensity and duration are unknown. Adverse cardiac events are rare and are inversely associated with volume of regularly performed vigorous activity. Some impairment groups who use a wheelchair and who participate in upper extremity activity or overhead-sports are at risk of rotator cuff tears. Therefore, although greater exercise intensity also brings greater levels of cardiorespiratory fitness, it also carries a greater risk of injury, especially in individuals who are unaccustomed to exercise.

Fear of injury or exacerbating a health issue can be a barrier to undertaking activity, especially for those who are not regularly active, are disabled, have a health condition, are pregnant, or are older or frail. However, there is little evidence to suggest that physical activity is unsafe for anyone when performed at an intensity and in a manner appropriate to an individual's current activity level, health status and physical function (4, 10). Starting

at low durations and intensities and building up over time as the body adjusts is the safest way to progress from inactivity to meeting the guidelines.

As the frequency and intensity of physical activity increases, there are small increases in health risk (e.g. accidents and injuries). However, the health benefits of activity far outweigh the risks of being active.

### **Gender and ethnicity**

Although most of the evidence underlying the association between physical activity and health has been derived from studies of men, more recent evidence has confirmed similar relationships in women. At this stage there is no reason to vary the guidelines according to sex. Data for non-white populations remain more limited, but do not suggest that the relationship between physical activity and health varies by ethnicity. Therefore, there is no reason to vary the guidelines according to ethnicity.

### **Disability**

There is growing evidence on the volume, duration, frequency and type of physical activity required to achieve general health benefits for disabled adults. The evidence is, however, largely based on studies involving people with physical impairments (mostly spinal cord injury) or intellectual impairments. In comparison, the evidence base for people with sensory impairments is limited. Nevertheless, there is no reason to vary the guidelines according to impairment type.

### **Wider benefits of being active**

Physical activity not only promotes good health and functioning and helps prevent and manage disease; it also contributes to a range of wider social benefits for individuals and communities.

The relevance and importance of the wider benefits of physical activity for individuals vary according to life stage and various other factors but include: improved learning and attainment; managing stress; self-efficacy; improved sleep; the development of social skills; and better social interaction.

In addition to the health benefits, increasing physical activity across a population also has social, environmental and economic benefits for communities and wider society. These come primarily from physical activities undertaken in a community setting, such as walking, cycling, active recreation, sport and play.

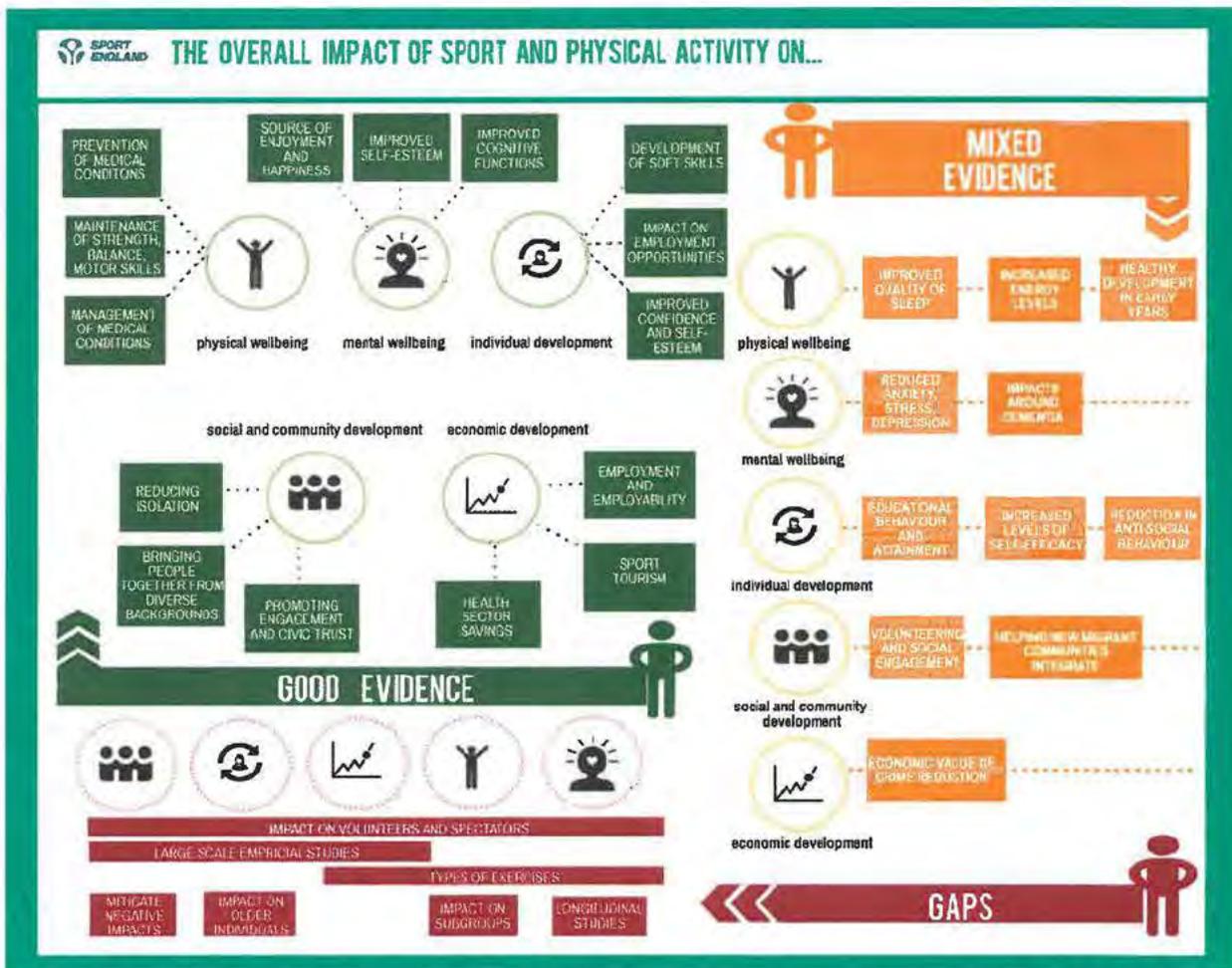


Figure 5: Individual and societal health and wellbeing benefits of physical activity (11)

# Under 5s Physical Activity Guidelines

## Introduction

The Under-5s age group encompasses a very wide range of developmental stages and physical capabilities. These new guidelines for the Under 5s follow the approach taken in the 2011 guidelines of considering three distinct developmental stages and age groups: infants (less than 1 year); toddlers (1-2 years); and pre-schoolers (3-4 years).

The evidence-base on physical activity in the Under-5s has expanded substantially since the development of the previous set of guidelines (12). There is now a large body of evidence that the amount of physical activity in the Under-5 period influences a wide range of both short-term and long-term health and developmental outcomes (13,14). For example, low levels of physical activity have been recognised as a contributor to increasing rates of child obesity in this age group (15, 16). It has become very clear that higher levels of physical activity are better for health, and lower levels worse, and that there are benefits to increasing levels of physical activity across the distribution of starting physical activity level (13, 14).

The evidence-base used to develop guidelines for the Under-5s has largely been restricted to studies of apparently healthy, typically developing, individuals. However, individuals with a medical condition or disability are also likely to benefit from higher levels of physical activity. The same may be said of disabled children, but the current evidence is limited to support any specific guidelines for this group.

Despite concern over levels of physical activity in the Under-5s, in both boys and girls the average level of physical activity reaches a lifetime peak around the age of school-entry (5 years old) and declines thereafter (17-19 years old). Achieving higher levels of physical activity in the early years should therefore help maintain higher levels later in childhood and adolescence (13, 14, 20, 21).

## Physical activity guidelines for Under-5s

### Infants (less than 1 year):

- Infants should be physically active several times every day in a variety of ways, including interactive floor-based activity, e.g. crawling.
- For infants not yet mobile, this includes at least 30 minutes of tummy time spread throughout the day while awake (and other movements such as reaching and grasping, pushing and pulling themselves independently, or rolling over); more is better.

NB: Tummy time may be unfamiliar to babies at first, but can be increased gradually, starting from a minute or two at a time, as the baby becomes used to it. Babies should not sleep on their tummies.

### **Toddlers (1-2 years):**

- Toddlers should spend at least 180 minutes (3 hours) per day in a variety of physical activities at any intensity, including active and outdoor play, spread throughout the day; more is better.

### **Pre-schoolers (3-4 years):**

- Pre-schoolers should spend at least 180 minutes (3 hours) per day in a variety of physical activities spread throughout the day, including active and outdoor play. More is better; the 180 minutes should include at least 60 minutes of MVPA.

## **Summary of scientific support for the new guidelines**

The last decade has seen an expansion in the evidence base on the health and developmental impact of variation in time spent in physical activity in the Under-5s. Whilst still lacking evidence regarding disabled children, new evidence shows the importance of time spent in physical activity of any intensity (for infants, toddlers, and pre-schoolers); time spent in MVPA (for pre-schoolers); and time spent in various specific types of physical activity (for infants, toddlers, pre-schoolers). As a result, these new guidelines for the Under-5s reflect these different exposures.

New recommendations for 2019 include time spent in physical activity ('tummy time') in infants, in MVPA in pre-schoolers, and new specific guidance on time spent in physical activity and outdoor play in pre-schoolers. These conclusions were based on evidence on the following health and developmental outcomes: adiposity; motor development; psychosocial health (e.g. wellbeing, quality of life); cognitive development; cardiovascular and musculoskeletal fitness; skeletal health; cardiometabolic health; and harms.

The evidence-base on the health and developmental impact of time spent in physical activity in the Under-5s was reviewed systematically and appraised critically using the Grading of Recommendations, Assessment, Development and Evaluation (GRADE) methodological approach in 2016-2018 (22). Full details for methods are available in Annex B.

As summarised in the following infographic, the evidence demonstrated that higher levels of time spent in physical activity were associated consistently with improved: adiposity (infants); motor development (infants, toddlers, pre-schoolers); cognitive development (infants, pre-schoolers); fitness (pre-schoolers); bone/skeletal health (pre-schoolers); and cardiometabolic health (pre-schoolers).

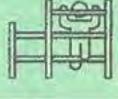
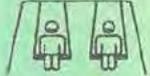
# Physical activity for early years (birth – 5 years)

Active children are healthy, happy,  
school ready and sleep better

 <b>BUILDS RELATIONSHIPS &amp; SOCIAL SKILLS</b>	 <b>MAINTAINS HEALTH &amp; WEIGHT</b>	 <b>CONTRIBUTES TO BRAIN DEVELOPMENT &amp; LEARNING</b>
 <b>IMPROVES SLEEP</b>	 <b>DEVELOPS MUSCLES &amp; BONES</b>	 <b>ENCOURAGES MOVEMENT &amp; CO-ORDINATION</b>

## Every movement counts

Aim for at least  
**180**  
Minutes per day  
for children 1-5 years

<b>Under-1s</b> at least 30 minutes across the day  <b>TUMMY TIME</b>	 <b>OBJECT PLAY</b>	 <b>DANCE</b>	 <b>GAMES</b>	 <b>PLAY</b>
	 <b>JUMP</b>	 <b>CLIMB</b>	 <b>MESSY PLAY</b>	 <b>THROW/CATCH</b>
	 <b>PLAYGROUND</b>	 <b>SKIP</b>	 <b>WALK</b>	 <b>SCOOT</b>
	 <b>BIKE</b>	 <b>SWIM</b>		

**Get Strong. Move More. Break up inactivity**

# Children and Young People Physical Activity Guidelines

## Introduction

The physical activity guidelines for children and young people are relevant to those aged from 5 to 18 years. Physical activity is associated with better physiological, psychological and psychosocial health among children and young people (23, 24). Global and UK-specific evidence has shown that boys are more active than girls at all ages and that physical activity levels decline through childhood into adolescence (17, 25, 26). There is also some evidence to suggest that physical activity levels track from childhood into adulthood (27). As such, ensuring that all children are as active as possible throughout childhood is important for current and future population health.

In recent years, there has been increasing awareness of the impact that inactivity and sedentary behaviour may have on health. As set out in the Introduction, sedentary behaviour is not simply the absence of moderate or vigorous physical activity. It includes behaviours such as watching television, reading, working with a computer, sitting while playing video games, or travelling in a motor vehicle. The most common measures of sedentary time used in the literature are self-reported time spent sitting, screen time, and the volume of device-based measures of sedentary time (accelerometer/inclinometer). For young people, evidence suggests that higher levels of sedentary behaviour are weakly associated with greater levels of obesity and lower physical fitness.

It is important to note that this chapter does not include specific recommendations for disabled children and disabled young people. Specific guidelines need to be developed for this group, but this speciality was beyond the remit and expertise of the group undertaking the review of the children and young people guidelines.

## Physical activity guidelines for Children and Young People

- Children and young people should engage in MVPA for an average of at least 60 minutes per day across the week. This can include all forms of activity such as physical education, active travel, after-school activities, play and sports.
- Children and young people should engage in a variety of types and intensities of physical activity across the week to develop movement skills, muscular fitness, and bone strength.
- Children and young people should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of not moving with at least light physical activity.

## **Summary of scientific support for the new guidelines**

The recommendations are based on the best available current evidence and are intended to provide guidance for children and young people, parents, and health professionals, but it is important to recognise that the benefits of physical activity operate on a continuum. Thus, for children and young people who are inactive, any increase in physical activity or any reduction in sedentary time is likely to provide health benefits and should be encouraged.

To develop these guidelines, the expert panel reviewed scientific evidence published from 2010 to 2018. The purpose of this review was to identify any new evidence justifying a change to the previous guidelines from 2011. Where insufficient additional evidence was available, the 2011 guideline was retained. The searches primarily focused on review-level evidence for longitudinal cohort studies examining the relationship between physical activity and health outcomes. Systematic reviews and meta-analyses were also examined, along with randomised controlled trials, to identify what types and volume of physical activity were used in effectiveness studies. Full details of methods are available in Annex B.

The three revised recommendations presented below are a refinement of the previous CMOs' guidelines from 2011 (12). The evidence leading to the updated recommendations is outlined below.

### **Children and young people should engage in MVPA for an average of at least 60 minutes per day across the week**

The review of evidence indicated that it would be helpful to change this guideline to an average of at least 60 minutes of MVPA per day. This was because the current evidence base does not support a specific minimum daily threshold of 60 minutes of MVPA for health benefits. Current studies have broadly used an average of 60 minutes per day to assess the benefits of physical activity on health outcomes. The expert panel was unable to assess whether a 60-minute minimum daily threshold is required for health benefits. Recommending an average number of daily minutes more closely reflects the evidence and as such this is the new recommendation.

### **Children and young people should engage in a variety of types and intensities of physical activity across the week to develop movement skills, muscular fitness, and bone strength**

The review of the evidence found broad support for health benefits of vigorous intensity physical activity and activities that would strengthen bone being undertaken by children and young people but found no strong evidence for specific numbers or durations of bouts of moderate-to-vigorous or vigorous intensity physical activity per day.

A recent analysis of nearly 30,000 children suggests that time spent in physical activity with increasing intensity was favourably associated with risk markers of future adult disease in youth, irrespective of bout duration (28). Furthermore, a recent paper has shown that children rarely accumulate physical activity in long bouts, and that the total time in MVPA, rather than time spent in specific bouts, was important for health outcomes (28, 29).

The evidence reviews identified moderate quality evidence that physical activity in children and young people is positively associated with increased proficiency in motor/movement skills (sometimes referred to as a component of physical literacy), and that this relationship is reciprocal (30). Moreover, exposure to different types of activities is implicated in higher perceptions of competence, which are also associated with higher physical activity levels (31). Physical education is likely to play a key role in the development of movement skills and supporting the promotion of high-quality physical education provision is therefore important for the development of children's skills and confidence to be physically active. Nevertheless, there is insufficient evidence to specify the intensity or amount of activity required to accrue such benefits, nor for specifying movements that contribute to fitness improvements.

The current evidence, does, however, suggest that developing a broader, more diverse range of movement skills, providing variety in the types of physical activity that children and young people engage in, is likely to be beneficial, although more high-quality evidence in this area is required (30, 32). The evidence therefore supports a guideline advocating a range of different types and intensities of physical activity across the week, in order to develop movement skills, muscular fitness, and bone strength.

**Children and young people should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of not moving with at least light physical activity**

In relation to sedentary time, the review of the evidence base highlighted that there is little evidence to suggest modification of the previous guidelines, other than adding a statement recommending that young people reduce periods of inactivity, and replace these with a variety of activities, including light as well as MVPA. This clarification has therefore been made to the wording of the previous guidelines.

**Types of physical activity for children and young people**

As described above, a key finding from the evidence review is the benefits for children and young people of engaging in different forms of physical activity across the week. Children and young people should engage in a range of activities to improve their skills such as jumping, running and catching, as well as building the confidence to be active. There is therefore no single way in which children and young people should be active; the focus

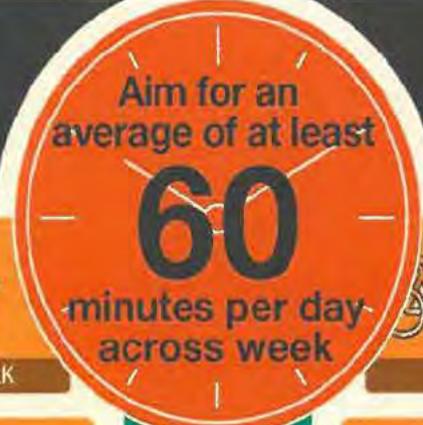
should be on identifying activities that they find enjoyable, and on creating opportunities to be active. Equally, children and young people should aim to limit sedentary time and replace this with light intensity physical activity wherever possible. The following infographic suggests activities that could be key components of helping children and young people to be physically active.

# Physical activity for children and young people (5 – 18 Years)

 <b>BUILDS CONFIDENCE &amp; SOCIAL SKILLS</b>	 <b>MAINTAINS HEALTHY WEIGHT</b>
 <b>DEVELOPS CO-ORDINATION</b>	 <b>STRENGTHENS MUSCLES &amp; BONES</b>
 <b>IMPROVES CONCENTRATION &amp; LEARNING</b>	 <b>IMPROVES HEALTH &amp; FITNESS</b>
	 <b>IMPROVES SLEEP</b>
	 <b>MAKES YOU FEEL GOOD</b>

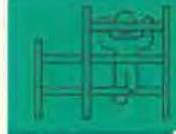
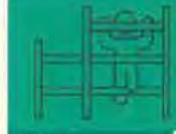
## Be physically active

Spread activity  
throughout  
the day



Aim for an  
average of at least  
**60**  
minutes per day  
across week

All activities  
should make you  
breathe faster  
& feel warmer

 <b>PLAY</b>	 <b>RUN/WALK</b>	 <b>BIKE</b>	 <b>ACTIVE TRAVEL</b>
 <b>SWIM</b>	 <b>SKATE</b>	<p>Include muscle and bone strengthening activities</p> <p><b>3 TIMES PER WEEK</b></p>	
 <b>SKIP</b>	 <b>CLIMB</b>	 <b>SPORT</b>	 <b>PE</b>
 <b>SKIP</b>	 <b>CLIMB</b>	 <b>WORKOUT</b>	 <b>DANCE</b>

**Get strong**



**INACTIVITY**

**Move more**

**Find ways to help all children and young people accumulate an average of at least 60 minutes physical activity per day across the week**

# Adults Physical Activity Guidelines

## Introduction

This chapter presents revised physical activity guidelines for adults from 19 to 64 years of age. It also covers new guidelines and infographics developed for disabled adults (4, 33) and for pregnant (10) and post-partum women within this age group.

Regular physical activity is associated with decreased mortality and lower morbidity from several non-communicable diseases (34). Adults who are physically active report more positive mental and physical health (1). Since publication of the previous physical activity guidelines in 2011, the scientific evidence on the relationships between physical activity and health has continued to accumulate, including new evidence on the volume, duration, and frequency of physical activity for substantial health benefits for disabled adults.

The previous guidelines recommended that adults should undertake 150 minutes per week of moderate intensity physical activity (MPA) or 75 minutes of vigorous intensity physical activity (VPA) or a combination of the two, and resistance training two or more times per week, to gain a range of physical and mental health benefits, and to reduce the risk of many non-communicable diseases. They recommended that physical activity should be spread throughout the week by being active on most days and accumulated in bouts of 10 minutes or more.

However, more recent evidence suggests that these 150 minutes can in fact be accumulated in bouts of any length (35), and/or achieved in one or two sessions per week while still leading to health benefits. In addition, it suggests that health benefits may also be derived from lower volumes, intensities and frequencies of activity, particularly for individuals with low levels of physical fitness and for disabled adults. Further new evidence suggests that short duration, very vigorous exercise (at or close to all-out or maximal effort) at lower volumes than 75 minutes per week may bring equivalent health benefits to those derived from adherence to the previous guidelines, in a more time-efficient manner. Improving fitness also further reduces the risk of cardiovascular disease beyond the reduction associated with regular physical activity.

The evidence continues to suggest that at least twice a week, all adults should undertake activities which increase or maintain muscle strength (resistance training). The activities chosen should use major muscle groups in the upper and lower body. This can include activities such as using bodyweight, free weights, resistance machines or elastic bands, as well as activities of daily living such as stair climbing, wheeling your wheelchair, carrying shopping bags, lifting and carrying children, and gardening.

The evidence reviewed suggests that greater than 150 minutes of physical activity along with dietary restriction may be required for weight loss. Given the interdependency of

energy intake and expenditure, it is not possible to specify how much of an increase in physical activity is likely to result in weight loss. The evidence continues to support the role of physical activity in maintaining weight following weight loss, as well as the health benefits of physical activity in overweight and obese individuals even in the absence of weight loss.

## Physical activity guidelines for Adults

- For good physical and mental health, adults should aim to be physically active every day. Any activity is better than none, and more is better still.
- Adults should do activities to develop or maintain strength in the major muscle groups. These could include heavy gardening, carrying heavy shopping, or resistance exercise. Muscle strengthening activities should be done at least two days a week, but any strengthening activity is better than none.
- Each week, adults should accumulate at least 150 minutes (2 1/2 hours) of moderate intensity activity (such as brisk walking or cycling); or 75 minutes of vigorous intensity activity (such as running); or even shorter durations of very vigorous intensity activity (such as sprinting or stair climbing); or a combination of moderate, vigorous and very vigorous intensity activity.
- Adults should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of inactivity with at least light physical activity.

## Summary of scientific support for the new guidelines

To develop these guidelines, the expert panel reviewed scientific evidence published from 2010 to 2018. The purpose of this review was to identify any new evidence justifying a change to the previous guidelines from 2011. Where insufficient additional evidence was available, the 2011 guideline was retained. Evidence from recently published evidence reviews used to update international physical activity guidelines came from pooled analyses, meta-analyses and systematic reviews from prospective and randomised controlled trials (RCTs), and, in the case of disabled adults, also qualitative research. Full details of methods are available Annex B.

**For good physical and mental health, adults should aim to be physically active every day. Any activity is better than none, and more is better still.**

The scientific evidence continues to support 150 minutes of MVPA per week spread across the week, with a recent evidence review on disability adding weight to this. However, there is now evidence that lower volumes (less than 150 minutes per week),

lower intensities (i.e. light physical activity) and lower frequencies (one or two sessions per week) of physical activity may nevertheless confer health benefits.

This lower range for health benefits was also reported in the physical activity evidence review on disability. Setting a minimum dose of physical activity is a challenge given the broad spectrum of health outcomes. Different volumes and intensities of physical activity are likely to induce different physiological changes and health benefits among people with different conditions.

The curvilinear dose–response relationship between physical activity and health outcomes suggests that the proportionately greatest benefits come from progressing from being inactive to achieving moderate levels of activity which are still below the threshold of the guidelines. The evidence reviewed suggests that even light intensity physical activity is associated with a range of health benefits, including lower risk of obesity and all-cause mortality, and improved markers of lipid and glucose metabolism (36). Moreover, threshold recommendations (i.e. 150 minutes of MPA or 75 minutes of VPA) may appear as a barrier to many, particularly those starting from low levels of physical activity, and discourage them from seeking to become more active. This barrier was also identified in the recent evidence review of physical activity for disabled adults. As a result, the statement that 'some is good, more is better' included in the previous physical activity guidelines for Older Adults has now been incorporated into these revised guidelines for all adults by recognising that any activity is better than none, and more is better still.

Although recent evidence suggests that the way in which the recommended amount of physical activity is distributed across the week does not alter its health benefit, there is both previous (37-39) and new evidence (40-42) of short-term (acute) responses in the 24 to 48 hour period after physical activity, supporting the recommendation for being physically active every day.

**Adults should also do activities to develop or maintain strength in the major muscle groups. Muscle strengthening activities should be done at least two days a week, but any strengthening activity is better than none.**

The available evidence continues to support the recommendation that all adults should undertake activities which increase or maintain muscle strength at least twice a week. The activities chosen should ideally use major muscle groups in both the upper and lower body and be repeated to failure (i.e. until the muscles feel temporarily 'tired out' and unable to repeat the exercise until rested for a short period). Activities to meet this guideline could include using bodyweight, free weights, resistance machines or elastic bands. However, activities of daily living such as stair climbing, wheeling a wheelchair, carrying shopping bags, lifting and carrying children, and gardening will all contribute to developing and maintaining strength. Emerging evidence suggests that such activities performed just once a week at a higher volume of work can also provide similar health effects, but at this stage the evidence is insufficient to justify changing the frequency recommended.

Although not the intention, the recommendation in the previous guidelines regarding resistance training appears to have been interpreted as secondary to the primary message of achieving 150 minutes of MVPA, and there is some evidence that the strength guideline is both less well known and less often achieved. Given the importance of maintaining or increasing muscle strength, particularly for adults at the upper end of the 19-64 age range, this guideline should be given equal emphasis. The order in which the guidelines are presented has therefore been changed accordingly.

**Each week, adults should accumulate at least 150 minutes (2 1/2 hours) of moderate intensity activity; or 75 minutes of vigorous intensity activity; or even shorter durations of very vigorous intensity activity; or a combination of moderate, vigorous and very vigorous intensity activity.**

Although there is no consistent new evidence to suggest that the 150 minutes of moderate intensity activity per week threshold should be changed, it is nevertheless recognised that the specific figure of 150 minutes is somewhat arbitrary. This threshold has been widely adopted internationally, and therefore has good research evidence supporting the benefits of accruing that amount of activity. Furthermore, 150 minutes of moderate intensity activity per week is likely to be achievable for many people, when environments are accessible and inclusive. However, there is new evidence that these 150 minutes can be accumulated in bouts of any length, and/or achieved in one or two sessions per week, while still retaining the beneficial effects. Wording in the previous guidelines specifying that this physical activity should be in bouts of 10 minutes or more and distributed across most days of the week has therefore been removed in these new guidelines.

Dose-response relationship varies by disease risk. Often increases in the volume of physical activity bring additional reductions in risk. For example, for hypertension, the evidence suggests that 150 minutes (10 MET-h) of 'leisure time PA' reduces the risk of hypertension by 6%, with further reductions of a similar magnitude for every additional 150 minutes (43). For type 2 diabetes, dose-response analysis indicates that risk reduction can be achieved below 150 minutes of MVPA per week, but that substantially greater benefits can be achieved by being more active (44). For cardiovascular disease (CVD), recent evidence suggests that achieving the current guidelines is associated with reduced risk, but that moving from inactive to moderately active (6 MET-h per week, or less than half of the guideline amount) brings proportionately the greatest benefit.

Several meta-analyses and systematic reviews published since 2010 have demonstrated that very vigorous intensity activity performed in short bouts interspersed with rest or recovery (high intensity interval exercise) has clinically meaningful effects on fitness, adiposity, body weight and insulin resistance (6). There is limited evidence of the benefits of high intensity interval exercise for disabled people. The available evidence suggests that short duration, very vigorous intensity activity can be as or more effective than MVPA, and this option has therefore been incorporated into the recommendation.

**Adults should aim to minimise the amount of time spent being sedentary, and when physically possible should break up long periods of inactivity with at least light physical activity.**

There have been notable developments in the epidemiological evidence base for adults, particularly regarding associations between sedentary behaviour and cancer risk and survivorship (45-49). Recent meta-analytical data from 34 studies, including over one million unique individuals (50), concluded that for adults, above 6 to 8 hours per day of total sitting time and 3 to 4 hours per day of TV viewing time are associated with greater risk of all-cause and CVD mortality, independently of levels of MVPA. Despite these new studies, there currently remains insufficient evidence to determine a dose–response relationship or a threshold for clinically relevant risk. At present the evidence therefore does not support including a specific time limit or minimum threshold of sedentary time within this recommendation. New evidence on the health benefits of shifting from sitting to standing was insufficient to support including a recommendation to interrupt sedentary time by standing.

## **Weight loss and weight maintenance**

Physical activity expends energy, and therefore makes a valuable contribution to weight management by reducing adiposity. The evidence reviewed suggests that greater than 150 minutes of physical activity, together with dietary restriction, may be required for weight loss. Given the interdependency of energy intake and expenditure for weight loss, it is not possible to specify how much more physical activity alone would be likely to result in weight loss. However, given the scale of the problem of overweight and obesity, the importance of physical activity and the need to simultaneously restrict energy intake should be emphasised. Moreover, the role of physical activity in maintaining weight following weight loss should be highlighted. It is also worth emphasising that the health benefits associated with physical activity are experienced by adults irrespective of weight status, and in the absence of weight loss.

## **Physical activity for disabled adults**

A rapid evidence review was carried out of the evidence base on physical activity for general health benefits for disabled adults (4). It found that, with respect to safety, no evidence exists that suggests appropriate physical activity is a risk for disabled adults and analogous health benefits for disabled adults of engaging in physical activity as for the rest of the adult population. It concluded that any myths about physical activity being inherently harmful for disabled people should be dispelled.

## **Physical activity during pregnancy & during postpartum**

Evidence-based recommendations for physical activity and pregnancy and physical activity and postpartum have also been produced, following standard methods examining pooled analyses, meta-analyses and systematic reviews from prospective and randomised controlled trials (RCTs), and qualitative research on experiences of physical activity of health professionals and women (10). Based on these, the infographics included in this section have been co-produced and tested with health professionals and women.

The benefits of physical activity during pregnancy identified by the review were reduction in hypertensive disorders; improved cardiorespiratory fitness; lower gestational weight gain; and reduction in risk of gestational diabetes. The benefits of physical activity in the postpartum period (up to one year) were identified as a reduction in depression; improved emotional wellbeing; improved physical conditioning; and reduction in postpartum weight gain and a faster return to pre-pregnancy weight.

Physical activity can safely be recommended to women during and after pregnancy and had no negative impact on breastfeeding postpartum. Physical activity choices should reflect activity levels pre-pregnancy and should include strength training. Vigorous activity is not recommended for previously inactive women. After the 6 to 8 week postnatal check, and depending on how the woman feels, more intense activities can gradually resume, i.e. building up intensity from moderate to vigorous over a minimum period of at least 3 months.

# Physical activity for adults and older adults

Benefits health	Reduces your chance of	Type II Diabetes	-40%
Improves sleep		Cardiovascular disease	-35%
Maintains healthy weight		Falls, depression etc.	-30%
Manages stress		Joint and back pain	-25%
Improves quality of life		Cancers (colon and breast)	-20%

Some is good, more is better	Make a start today: it's never too late	Every minute counts
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**Be active**

at least

# 150

minutes  
moderate intensity  
per week

increased breathing  
able to talk

OR

or a combination of both

at least

# 75

minutes  
vigorous intensity  
per week

breathing fast  
difficulty talking

to keep muscles, bones and joints strong

## Build strength

on at least

days a week

**Minimise sedentary time**

Break up periods of inactivity

**Improve balance**

For older adults, to reduce the chance of frailty and falls

2 days a week

# Physical Activity for Disabled Adults

Make it a daily habit



Do strength and balance activities on at least two days per week

For substantial health gains aim for at least 150 minutes each week of moderate intensity activity

Remember the talk test:



Can talk, but not sing = moderate intensity activity

Difficulty talking without pausing = vigorous intensity activity



# Physical activity for pregnant women

Helps to control weight gain	Helps reduce high blood pressure problems	Helps to prevent diabetes of pregnancy
Improves fitness	Improves sleep	Improves mood

**Not active?**  
Start gradually

**Throughout pregnancy**  
aim for  
at least  
**150**  
minutes  
of moderate intensity activity  
every week

**Already active?**  
Keep going

<p>Do muscle strengthening activities twice a week</p>	<p>Every activity counts, every minute counts, more is better</p>
<p>No evidence of harm</p>	<p>Listen to your body and adapt </p>
<p>Don't bump the bump</p>	

UK Chief Medical Officers' Physical Activity Guidelines, 2019

# Physical activity for women after childbirth (birth to 12 months)

Time for yourself - reduces worries and depression	Helps to control weight and return to pre-pregnancy weight	Improves tummy muscle tone and strength
Improves fitness	Improves mood	Improves sleep



It's safe to be active. No evidence of harm for post partum women	Depending on your delivery listen to your body and start gently	You can be active while breastfeeding
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# Older Adults Physical Activity Guidelines

## Introduction

Regular physical activity contributes to the key determinants of healthy ageing: good physical and mental function; opportunities for social interaction; a sense of control over, and responsibility for one's own health and well-being; and managing or coping with disease symptoms and functional limitations (51, 52). There is now also emerging evidence that increasing physical activity contributes to improving social functioning and reducing loneliness and social isolation.

Although age alone does not determine physical condition or capacity, older age (65 years and over) is associated with a greater risk and prevalence of many health conditions including coronary heart disease, stroke, type 2 diabetes, cancer and obesity, as well as depression and dementia. Older adults are also at greater risk of falling, often resulting in the avoidance of activity, and consequent fractures and impairments.

There is strong evidence that physical activity contributes to increased physical function, reduced impairment, independent living, and improved quality of life in both healthy and frail older adults. Physical activity in later life can help treat and offset the symptoms of a range of chronic conditions (e.g. depression, CVD, Parkinson's disease). Since the first UK physical activity guidelines specifically for older people were published in 2011, new evidence has strengthened and reinforced the main elements of those.

However, some changes have been made to the previous guidelines to take account of new evidence. Given the lower levels of physical activity amongst the population of older adults (53, 54), small increases in the volume of daily physical activity can produce important health and functional benefits. Growing evidence supports the importance of light intensity activity to health (55, 56), a message that is particularly important to communicate to those who are currently inactive and/or frailer. These revised guidelines for older adults therefore give greater emphasis to regular light activity. This can be a means of breaking up prolonged periods of sedentary time, and of building up gradually to the recommended weekly amount of MVPA. The previous recommendation that moderate intensity activity should be in bouts of 10 minutes or more is no longer considered necessary and has therefore been removed.

The value to older adults of activities which improve strength, balance and flexibility cannot be overstated, and therefore receive greater prominence in these revised guidelines. These components of fitness help maintain physical function, reduce the risk of falls, and help people feel more confident and able to meet the MVPA guidelines. It is now emphasised that activities to improve strength, balance and flexibility can be incorporated into sessions that also involve MVPA, rather than necessarily being in addition.

## **Physical activity guidelines for Older Adults (65 years and over)**

- Older adults should participate in daily physical activity to gain health benefits, including maintenance of good physical and mental health, wellbeing, and social functioning. Some physical activity is better than none: even light activity brings some health benefits compared to being sedentary, while more daily physical activity provides greater health and social benefits.
- Older adults should maintain or improve their physical function by undertaking activities aimed at improving or maintaining muscle strength, balance and flexibility on at least two days a week. These could be combined with sessions involving moderate aerobic activity or could be additional sessions aimed specifically at these components of fitness.
- Each week older adults should aim to accumulate at least 150 minutes of moderate intensity aerobic activity, building up gradually from current levels. Those who are already regularly active can achieve these benefits through 75 minutes of vigorous intensity activity, or a combination of moderate and vigorous activity, to achieve greater benefits. Weight-bearing activities which create an impact through the body help to maintain bone health.
- Older adults should break up prolonged periods of being sedentary with light activity when physically possible, or at least with standing, as this has distinct health benefits for older people.

## **Summary of scientific support for the new guidelines**

To develop these guidelines, the expert panel reviewed scientific evidence published from 2010 to 2018. The purpose of this review was to identify any new evidence justifying a change to the previous guidelines from 2011. Where insufficient additional evidence was available, the 2011 guideline was retained. Full details of methods are available in Annex B.

Physical activity plays a changing role in the lives of older adults, as for some it becomes more about the maintenance of independence and the management of symptoms of disease, rather than primary disease prevention. There is enough knowledge of the benefits associated with physical activity in older adults to categorically state that they outweigh the risks. In older adults with frailty, moderate-to-severe dementia, or a history of vertebral fractures or regular falls, it might be more appropriate for any new exercises to be initially supervised by a trained professional, to ensure efficacy and safe techniques to avoid injury.

**Older adults should participate in daily physical activity to gain health benefits. Some physical activity is better than none: even light activity brings some health benefits compared to being sedentary.**

The use of wearable devices to objectively measure the physical activity of older individuals during the activities of daily life, in addition to structured activity programmes, has provided a growing evidence base that supports the health benefits of light-intensity physical activity, independently of those provided by MVPA (57-60). Light activity is associated with a range of health benefits, including lower risk of obesity, CVD, cancer, and all-cause mortality (61); improved markers of lipid and glucose metabolism (56); and reductions in unplanned hospital admissions and future prescriptions for health conditions (62). Although still extremely limited in number, studies show a link between inactivity and loneliness and social isolation, and that increasing physical activity can reduce loneliness and social isolation, as well as improving social functioning (63, 64).

**Older adults should break up prolonged periods of being sedentary with light activity when physically possible, or at least with standing, as this has distinct health benefits for older people.**

Prolonged sedentary behaviour is associated with many poor health and functional outcomes in older adults (65). There is emerging evidence that for inactive older adults, replacing sedentary behaviour with light-intensity activity is likely to produce some health benefits. Specifically, for individuals who perform no or little MVPA, replacing sedentary or inactive behaviours with light-intensity activity (such as walking at 2 miles per hour, dusting or polishing furniture, or easy gardening) reduces the risk of all-cause mortality, cardiovascular disease incidence and mortality, and type 2 diabetes (57). In those transitioning to frailty and who find light activity difficult, there is emerging evidence that short periods of standing repeated hourly provides some benefits to physical function (66).

These revised guidelines therefore highlight the potential of light-intensity activity to benefit the health of older adults, and that increasing the volume of light-intensity movement in daily routines can bring important health benefits at a population level. This is particularly valuable for those older adults unable to perform moderate-intensity activity. Other evidence supports the benefits of being active throughout the day, such as better maintenance of bone health with higher volumes of light intensity activity spread throughout the day (67).

**Older adults should maintain or improve their physical function by undertaking activities aimed at improving or maintaining muscle strength, balance and flexibility on at least two days a week.**

A loss of muscle strength in advancing age is the primary limiting factor for functional independence (68). Physical function has a linear relationship with mortality, and those with poor physical function have a higher risk of all-cause mortality, even from mid-life (69). Multi-component strength and balance activities, including flexibility, are key to improving physical function (70). Poor balance also predicts a higher rate of cognitive decline, as well as higher all-cause mortality (71). Good balance and mobility are essential to the successful performance of most activities of daily living, as well as the ability or confidence to take part in recreational activity.

Evidence-based strength and balance exercise programmes reduce falls rate and risk (72), are cost-effective (73), increase confidence, and can increase habitual moderate physical activity towards meeting the guidelines (74). They can be group or home-based, and strength and balance activities can be embedded within everyday activities.

**Each week older adults should aim to accumulate at least 150 minutes (2½ hours) of moderate intensity aerobic activity, building up gradually from current levels.**

The evidence that at least 150 minutes of moderate intensity activity per week contributes significantly to the prevention of chronic disease has strengthened (1). In addition, the risk of progression of disabilities affecting the basic activities of daily living is almost halved in those who undertake regular moderate intensity physical activity, compared to those who do not (75). Bone mineral density is greater in those who meet the MVPA guidelines (67). There is strong support for the role of physical activity in reducing the risk of cognitive impairment and dementia (76), and bouts of 30 minutes of moderate activity per day almost halve the odds of experiencing depression (77).

Alternative ways of recording exercise, such as using pedometers or step counters, may be helpful to some older adults in tracking progress towards the MVPA guidelines. Evidence suggests that 30 minutes of daily MVPA accumulated in addition to habitual daily activities in healthy older adults is equivalent to taking approximately 7,000 to 10,000 steps per day (78-80). This evidence suggests 4500 to 5500 steps a day for improved health related quality of life, above 7000 steps a day for better immune function, and 8000 to 10000 steps a day for an effect on metabolic syndrome and maintenance of weight (81).

For those who are already regularly active, a combination of moderate and vigorous aerobic activity brings greater benefit (1). 75 minutes of vigorous aerobic activity spread across the week can produce comparable benefits to 150 minutes of moderate intensity activity (1). High intensity interval training is one approach to accumulating vigorous

intensity physical activity, but there is currently very limited evidence on its benefits and harms among older populations.

Emerging evidence from cross-sectional and prospective studies indicates that bouts of any length of MVPA contribute to the health benefits associated with accumulated volume of physical activity (1, 55, 59). The previous recommendation of a minimum bout length of 10 minutes is therefore no longer necessary for the optimal health message. This seems particularly relevant to older adults, given the sporadic nature of accumulated activity in this population.

## **Types of physical activities for this group**

Older adults are more likely to have already been diagnosed with disease, and also experience different life events to middle-age adults, such as retirement, helping with grandchildren, and the increased likelihood of becoming a carer. These circumstances bring a new set of challenges in terms of physical activity participation and may temporarily halt people's ability to be active. Nevertheless, a few strategies can help to re-engage in physical activity and build activity levels up gradually. For those who are limited by disease or impairment, there is value in even small increases in activity, which can also help to slow or prevent further decline. This section provides examples of how a combination of different activities addressing the different components of the guidelines can be tailored to the range of circumstances encountered in older age, from those who are already active, to those who are losing function but otherwise healthy, to those who are frail (78-80).

### **Active Older Adults**

Active older adults are those who are already active through daily walking, an active job, and/or who engage in regular recreational or sporting activity. For many, this may just involve aerobic activity such as brisk walking, whereas significant additional benefits can be achieved from incorporating activities to improve strength, balance and flexibility. Undertaking a programme of activity at least twice per week that includes resistance activities (lifting weights, using resistance bands or other equipment to provide resistance, etc.), some impact activities (running, jumping, skipping etc.), and balance activities (standing on one leg, backwards walking, activities that involve 3-dimensional movement etc.) would provide these benefits (8). A mix of sporting activities, Tai Chi, dance and aqua-aerobics, for example, would contribute to both the aerobic and the strength and balance guidelines.

### **In transition**

Older people in transition describes people whose function is declining due to low levels of activity and too much sedentary time, who may have lost muscle strength and/or be overweight but otherwise remain reasonably healthy. 'Walk and rest for a minute' may be a useful strategy for adults in this age group to manage fatigue, particularly while building up