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Female, woman and/or girl Athlete Injury pRevention (FAIR) practical recommendations: International Olympic Committee (IOC) consensus meeting held in Lausanne, Switzerland, 2025

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ABSTRACT

Female, woman and/or girl athletes' sport participation rates are rising and associated with high injury rates and burden. Using best-practice consensus methodology, we developed recommendations to guide injury prevention for female/woman/girl athletes. The *Female/woman/girl Athlete Injury pRevention (FAIR)* International Olympic Committee Consensus meeting was held from 31 March to 2 April 2025 (Lausanne, Switzerland).

The FAIR Consensus followed an eight-step hybrid method. 109 authors from six continents conducted: (1) systematic reviews synthesising evidence on injury prevention strategies and modifiable risk factors for lower-extremity and upper-extremity injuries, concussions and spine/chest/abdominal/pelvic injuries/pain, (2) a scoping review synthesising dissemination and implementation (D&I) approaches; and (3) a concept mapping project generating knowledge on gender/sex-related factors for injury prevention. These projects underpinned draft recommendations subsequently voted on by a steering committee (n=24) and an external advisory committee chair over two anonymous survey rounds. Recommendations, Round 1 voting results and suggestions/dissenting comments were discussed between Round 1 and 2 voting. Consensus was defined as 'critical to include' (≥70% scored recommendation as 7–9 (9-point Likert scale, 1=not important; 9=critically important) AND ≤15% scored recommendation as 1–3). The 56 FAIR recommendations address: primary injury prevention (n=16) (policy/rules/laws=6; personal protective equipment=8; training=2); secondary injury prevention (n=4); modifiable risk factors (n=12); approaches to D&I (n=14); and promoting gender/sex-supportive environments (n=10).

The FAIR Consensus informs evidence-based best practices and policy for injury prevention, approaches to implementation and creation of supportive environments for female/woman/girl athletes. Every person at all levels of sport can, and should, take responsibility for actions that positively influence female/woman/girl athlete health and safety.

INTRODUCTION

Female, woman and/or girl (hereafter female/woman/girl) athletes' participation rates are rising,^{1–4} as are the potential social and health benefits. However, for female/woman/girl athletes, sport participation is associated with high and rising injury rates and burden.^{2,5–7} To prevent the consequences of injury—including subsequent or recurrent injury,^{8,9} curtailed sporting career or physical inactivity^{10–12} and the persistent burden and long-term health implications (eg, post-traumatic osteoarthritis)^{13,14}—evidence-informed practical recommendations on what, when and how to prevent female/woman/girl athlete injuries are urgently needed.

This 2025 International Olympic Committee (IOC) consensus statement on Female/woman/girl Athlete Injury pRevention (FAIR) provides evidence-informed expert recommendations for FAIR. To enhance real-world transferability and impact, the FAIR recommendations were developed to be implementable by female/woman/girl athletes and sport partners (also known as Entourage—including coaches, parents/carers, health and exercise practitioners, sport science/high-performance professionals, sport administrators and researchers) involved in their health and safety. We recognise that these recommendations must be responsive to diverse contexts, including uniqueness in experiences, expertise, geography, culture, healthcare access, sport structure, level of participation and sociocultural considerations.

Consensus methods are useful to answer questions where empirical evidence is sparse.¹⁵ IOC consensus statements provide global sport and exercise medicine and health communities with guidance on topics relevant to athlete health, addressing identified gaps in evidence-informed best practices.^{16–19} Consensus methods are evolving with new reporting standards (ACcurate Consensus Reporting Document (ACCORD))^{20,21} available to promote transparency,



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reproducibility and confidence in resulting recommendations/statements. Studies synthesising empirical, experiential or theoretical evidence to underpin recommendations are a key tenet of consensus methodology. While traditionally these studies included systematic reviews and meta-analyses, scoping reviews and novel designs might provide additional, rich data to inform the consensus process. Thus, the FAIR Consensus is informed by seven evidence reviews. We synthesised injury prevention strategies and modifiable risk factor evidence across lower and upper extremity injuries, concussions/head impacts/head acceleration events and spine, chest, abdominal and/or pelvic injuries/pain in five systematic reviews and meta-analyses.^{22–26} To prioritise the need to understand ‘how to’ implement injury prevention strategies, we also conducted a scoping review to describe potential approaches for best practice injury prevention dissemination and implementation (D&I).²⁷ Finally, to garner experts’ perspectives and experiences on the gender/sex-specific factors relevant to injury risk, we undertook a concept mapping mixed-methods project.²⁸ These comprehensive evidence reviews should be read alongside this consensus paper.

Using best-practice consensus methodology, the aim of the FAIR Consensus was to develop recommendations to guide injury prevention strategies and activities for female/woman/girl athletes worldwide.

METHODS

FAIR consensus process

The FAIR Consensus process was developed by Consensus co-leads (KMC and CAE) and the FAIR consensus steering committee (online supplemental file 1), informed by reporting standards,^{20–21} prior sport-related injury consensus statements^{29–31} and journal guidelines. The eight-stage FAIR Consensus process included conducting and reporting on five systematic reviews and meta-analyses,^{22–26} one scoping review²⁷ and one concept mapping mixed-methods study²⁸ and followed a modified RAND/UCLA appropriateness method³² to reach consensus on recommendations (figure 1). Methods for each stage (reported according to the ACCORD), including Steering Committee, Author Group and Review Lead selections, are outlined in box 1. Critical definitions, including female/woman/girl, athlete, gender and sex, primary/secondary prevention and sport partner, are summarised in box 2. The External Advisory

Committee (EAC), Equity, Diversity and Inclusion and Patient and Public Involvement are described in box 3. The IOC supported the FAIR Consensus (partial funding of honoraria for methods support, travel, meeting costs and accommodation for steering committee) but had no influence on study methodology, results or interpretation of findings. Three IOC representatives (RB, TS, KB) provided input during the face-to-face meeting (eg, comments on the wording for recommendations, and suggestions to be consistent with other consensus recommendations) but did not vote on recommendations.

Developing recommendations

Briefly, seven evidence reviews were completed, submitted for publication (February 2025) and published by September 2025.^{22–28} Between February and March 2025 (ie, prior to the face-to-face meeting), practical recommendations were informed by these projects and crafted by the Author Groups, then reviewed and refined by the FAIR Consensus Steering Committee with expert opinions (members of the Author Groups and FAIR EAC). Where there was insufficient data from female/woman/girl athletes, but the author group were aware of evidence, including from other consensus recommendations, or aggregate or male/men/boy-athlete data, these were also considered when developing the recommendations. Hedging words (eg, should, could, may) were used to describe the level of confidence in and the direction of the recommendation.³³ For the injury prevention reviews, recommendations were grouped around: (1) policies, rules or laws such as eliminating body checking or limiting contact practice; (2) personal protective equipment including helmets, mouthguards, protective eyewear, braces and breast protection; and (3) training strategies encompassing exercise or training-based interventions such as neuromuscular warm-up programmes, skill training and load management programming. Recommendations were intended to be implementable by sport partners (see box 1).

Prior to the face-to-face consensus meeting, the FAIR Consensus Steering Committee and EAC chair voted on draft recommendations (Round 1). At the consensus meeting, Round 1 results were discussed (including dissenting viewpoints, suggestions for re-wording and new recommendations) in a facilitated meeting, with sufficient time and opportunity for all members to contribute. Round 2 voting occurred 1 day after the discussion.

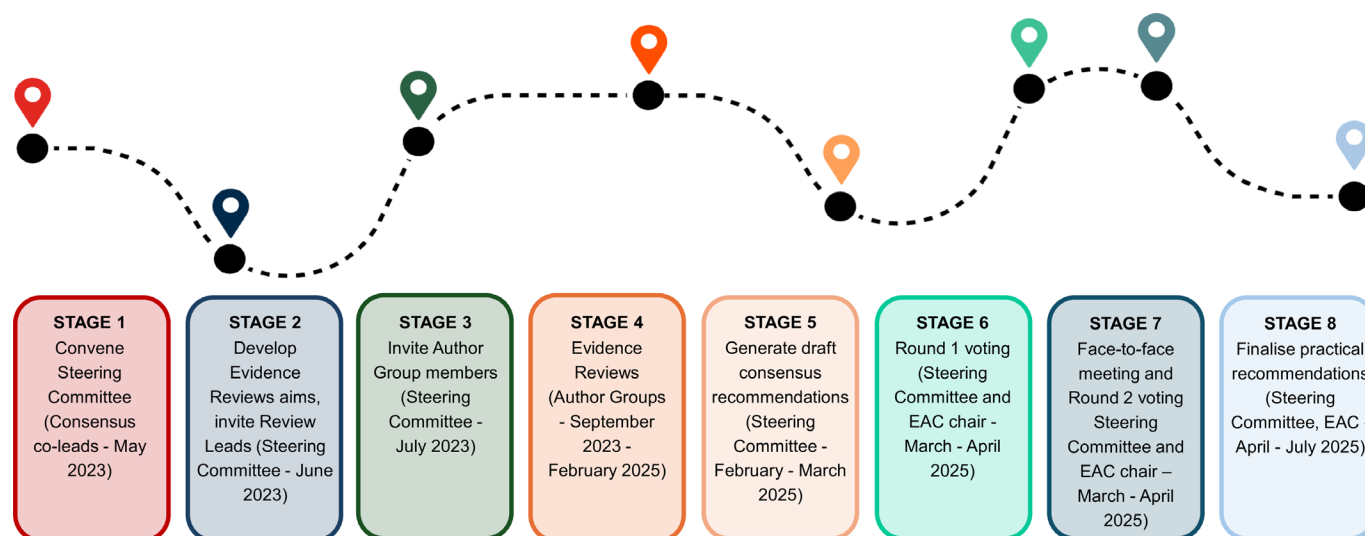


Figure 1 FAIR Consensus steps. EAC, External Advisory Committee, FAIR, Female/woman/girl Athlete Injury pRevention.

Box 1 Methods – FAIR Consensus

1. Convene FAIR Consensus Steering Committee (Consensus leads – May 2023)
 - ⇒ Funding awarded by the International Olympic Committee (IOC) in 2023 to KMC and CAE (co-leads).
 - ⇒ Steering Committee chosen by KMC/CAE (24 members: 5 senior-career, 9 mid-career and 10 early-career researchers, from 4 continents) for their content or method expertise—17 from IOC research centres (online supplemental file 1).
 - ⇒ Steering Committee, with IOC advice, senior librarian (KAH) and statistician (JMG),[#] agreed on definitions and scope (box 2).
2. Develop evidence reviews aims, and invite leads and methods authors (Steering Committee – June 2023)
 - ⇒ For each review, co-leads (from the Steering Committee) and methods authors (coordinated review) were invited.
- Systematic reviews aims (n=5)
 - Identify prevention interventions and modifiable risk factors for injuries in female/woman/girl athletes, for:
 1. Lower extremity (separated into (a) interventions and (b) modifiable risk factors to accommodate the large volume of evidence).
 2. Upper extremity.
 3. Concussion.
 4. Spine, chest, abdominal and pelvic.
- Scoping review aim (n=1)
 - 5. Describe best-practice dissemination and implementation approaches for injury prevention in female/woman/girl athletes.
- Concept mapping aim (n=1)
 - 6. Determine the gender-specific and/or sex-specific factors relevant to injury prevention for female/woman/girl athletes.
3. Invite Author Group members: online supplemental files 2 and 3 (Steering Committee – July 2023)
 - ⇒ Steering Committee nominated Author Group members for review teams from known contacts/evidence searches, based on:
 - ⇒ Academically pursuing research in injury prevention/implementation/female athlete health/gender health equity.
 - ⇒ Health, medical or exercise practitioners working with female/woman/girl athletes.
 - ⇒ Expertise in systematic reviews, scoping reviews or concept mapping methods.
 - ⇒ Author Group nominations were collated, discussed by the Steering Committee and finalised by Consensus co-leads, aiming to expand representation across gender, geography, discipline and career stage. Para sport, female/woman/girl and youth athlete experience was desired. Snowball recruitment and recommendations were encouraged.
 - ⇒ Author Group members were invited by Consensus co-leads via email.
 - ⇒ Authors with lived experience as athletes, coaches, administrators and/or health practitioners were involved in each review.
4. Evidence reviews (Author Groups – September 2023 to February 2025; online supplemental table 2)
 - ⇒ Systematic (PROSPERO – January 2024)^a and Scoping (Open Science Framework – July 2023)^b review protocols were registered. The Cochrane Handbook⁵¹ informed conduct, and the PRISMA guidelines⁵² and extensions informed reporting.
 - ⇒ Search strategies were developed by an expert evidence synthesis librarian (KAH), with consistent ‘Sports’ and ‘Prevention’ concepts, adapted from a prior Consensus statement.³¹ Systematic review searches included concepts related to injury prevention outcomes and modifiable risk factors for specific body regions. The scoping review search included D&I concepts.
 - ⇒ Risk of bias across systematic⁵³ and scoping reviews⁵⁴ was assessed, and certainty of evidence was rated,⁵⁵ when appropriate. Concept Mapping (participatory, mixed-methods) generated, organised and framed global expert participants’ perspectives.²⁸
 - ⇒ Online supplemental table 2 summarises the evidence review’s topic, method, participants and number of recommendations emerging for voting.
 - ⇒ Steering Committee members met (videoconferencing) every 4–6 weeks (~1 hour) during protocol development and execution to ensure consistency, provide methodological support and navigate barriers.
5. Generate draft consensus recommendations (Steering Committee – February to March 2025)
 - ⇒ Co-lead and methods authors, with Author Groups generated draft recommendations and evidence summaries for sharing.
 - ⇒ Steering Committee members reviewed draft recommendations, and if needed, requested additional recommendations based on other evidence (other systematic reviews, expert consensus/opinion or high-quality original studies).
 - ⇒ Co-leads discussed draft recommendations with the EAC (videoconferencing).
 - ⇒ Co-leads, review lead and method authors refined draft recommendations (single items), piloted the voting process and shared with Steering Committee and EAC chair (consensus meeting attendees) along with draft review manuscripts and evidence summaries, 1 week before Round 1 voting.
6. Round 1 voting (Steering Committee and EAC chair: consensus meeting attendees – March to April 2025)
 - ⇒ All attendees were sent a link to a secure, anonymous online (REDCap⁵⁶) survey to vote 5 days before the meeting.
 - ⇒ Voting process and consensus definition were described a priori: attendees voted individually to anonymously rate the importance of each recommendation on a 9-point Likert scale (score of 1–3 were considered not important, 4–6 important but not critical and 7–9 critical³⁴) and record comments/dissenting opinions according to modified RAND/UCLA methodology³⁴ and consistent with previous consensus activities.²⁹
 - ⇒ Scores were pooled and consensus was defined as (1) ‘critical to include’ = ≥70% scored the item 7–9 AND ≤15% scored the item 1–3; (2) ‘not important to include’ = ≥70% scored the item 1–3 AND ≤15% scored the item 7–9; and (3) ‘No consensus’ = those that did not meet the ‘critical to include’ or ‘not important to include’ criteria.
7. Face-to-face meeting and Round 2 voting (Steering Committee, EAC chair – 31 March to 2 April 2025)
 - ⇒ Consensus attendees were reminded of the consensus goals, context (female/woman/girl injury prevention) and guiding principles (inclusive, respectful conversations, solution-focused comments).

Continued

Box 1 Continued

- ⇒ In 10, 2-hour sessions, presentation of recommendations, supporting evidence and Round 1 voting (online supplemental file 3), were followed by facilitated (review leads) discussions focused on recommendation meanings and/or dissenting views.
- ⇒ Sessions were recorded, and key points summarised using a real-time collaborative platform (Padlet).
- ⇒ Attendees contributed to discussions by hand raising, and facilitators ensured ALL had the opportunity to speak/contribute.
- ⇒ After each session, review leads and methods authors integrated feedback to finalise recommendations for Round 2 voting.
- ⇒ All attendees were sent a link to a secure, anonymous online (REDCap⁵⁶) survey to rate the final recommendations as above.
- ⇒ Attendees were not forced to reach consensus, and feedback was provided to attendees following the collation of votes.
- 8. Finalise consensus recommendations (Steering Committee, EAC – April to August 2025)
 - ⇒ Small working groups refined recommendation wording for clarity, concision and consistency (videoconferencing).
 - ⇒ Some recommendations were regrouped (eg, no longer reflected individual 'anatomical regions') for brevity. All Steering Committee members and the EAC approved the final recommendations.

[#]Methods authors, statistician and librarian received small remuneration from the IOC

^aPROSPERO registration IDs: Lower extremity systematic review CRD42024486715; upper extremity systematic review CRD42024494967; concussion systematic review 42023485808; spine/chest/abdominal/pelvis systematic review CRD42024479654

^bOpen Science Framework registration: <https://osf.io/eskz7>

D&I, dissemination and implementation; EAC, External Advisory Committee; FAIR, Female/woman/girl Athlete Injury pRevention; IOC, International Olympic Committee; n, number; PRISMA, Preferred Reporting Items for Systematic reviews and Meta-Analyses. REDCap (Research Electronic Data Capture)

During face-to-face discussions, new recommendations could be introduced. For new recommendations, Round 1 voting occurred at the end of the meeting, and Round 2 voting was conducted 3 days later. Consensus attendees voted individually and anonymously using an online survey (REDCap (Research Electronic Data Capture)) to rate the importance for including the recommendation in the consensus (using a 9-point Likert scale: 1=not important; 9=critically important), and record comments/dissenting opinions according to modified RAND/UCLA methodology,³² consistent with past consensus activities.²⁹ No attempt was made to force consensus. Consensus was defined a priori³⁴ as: (1) 'critical to include': $\geq 70\%$ scored the item 7–9 AND $\leq 15\%$ scored the item 1–3; (2) 'not important to include': $\geq 70\%$ scored the item 1–3 AND $\leq 15\%$ scored the item 7–9; and (3) 'No consensus' was those recommendations that did not meet the 'critical to include' or 'not important to include' criteria. Recommendations not included in the consensus were added to a research priority list.

RESULTS

FAIR Consensus activities commenced in May 2023 and continued until August 2025 (figure 1, box 1). The authors (n=109; demographics see online supplemental files 2 and 3) completed seven evidence reviews incorporating quantitative, qualitative and/or mixed methods evaluation (table 1). Across the five systematic reviews, a total of 182 original research studies focused on injury prevention strategy evaluation (including female/woman/girl athletes), of which 60 (33%) reported female/woman/girl-specific estimates. In total, 365 papers addressed potentially modifiable risk factors, with 188 (51.5%) reporting female/woman/girl-specific estimates. The scoping review of D&I approaches for injury prevention identified 220 studies, with 55 (25%) reporting female/woman/girl-specific data. Finally, the concept mapping study included 56 (85% of 66 participants) female/women/girl participants.

Developing draft recommendations

Author groups (with EAC input) crafted a total of 118 draft recommendations spanning injury prevention strategies (primary and secondary), potentially modifiable risk factors,

D&I approaches and gender/sex considerations for Round 1 voting and discussion at the consensus meeting. A detailed summary of the supporting evidence linked to each recommendation provided to author groups and the EAC is in online supplemental file 4.

Voting for recommendations

The FAIR Consensus Steering Committee (n=24; see online supplemental file 1 and box 3 for details) and the EAC chair were invited to attend the face-to-face consensus meeting in Lausanne, Switzerland (31 March to 2 April 2025). Three were unable to attend. All 24 Steering Committee members and the EAC chair (n=25) were invited to vote on two occasions for all recommendations. Before the meeting, 23 people completed Round 1 voting on the draft recommendations from the seven Projects. A working group of Consensus co-leads and methods authors collated Round 1 results (64%, n=75/118, reached consensus to include), and open textbox feedback (including dissenting views, suggestions for rewording or new recommendations) (online supplemental file 5) to inform the in-person discussion. Following discussions, 111 recommendations were re-worded, 14 new recommendations were created and 14 recommendations were categorised as 'overarching' based on informal qualitative feedback (eg, meeting notes, Padlet). 13 recommendations from individual projects were considered to be 'overlapping' (ie, emerged from more than one project) and condensed to 5 recommendations for voting (table 1). The final list of 142 recommendations was voted on by 23 people, with 93/142 (65%) and 118/142 (83%) reaching consensus as 'critical to include' for Round 1 and Round 2 voting, respectively. No recommendations met consensus for 'not important to include' and there was 'no consensus' for 24 recommendations. Those with 'no consensus' were excluded and will be included in our planned Delphi exercise on research priorities for female/woman/girl athletes.

Finalising recommendations

All recommendations and the voting results for each round are included in online supplemental file 5. The Steering

Box 2 Definitions and scope for the FAIR Consensus

Female, woman, girl: We refer to 'female, woman and/or girl' athletes (abbreviated to female/woman/girl) and 'male, man and/or boy' athletes (male/man/boy). We recognise that these terms are not synonymous and can mean different things to different people. We also use the term 'gender and/or sex' (gender/sex), recognising that these constructs are not distinct and often intersect. We acknowledge the active conversation on the meaning and definitions of gender and sex, noting that the term female(s) is not intended to reduce humans to their biological sex, and the terms women and girls are not intended to reduce humans to their gender. Across all FAIR activities, we recognise the variation in the biological and sociocultural attributes that comprise sex and gender respectively, and how those attributes are expressed.

The systematic and scoping reviews include studies with female/woman/girl athletes, teams/clubs/schools, recognising that these can include participants who identify as cisgender, transgender and gender diverse. We acknowledge that transgender women and girls, women and girls with variations of sex development and individuals who identify across the gender spectrum may have participated in these studies and contributed to the data. Most findings in the reviews and recommendations are assumed to apply to woman/girl athletes without sex variations who were identified as female at birth, while recognising that this is a heterogeneous group with diverse injury risk factors and experiences.

Athletes: Individuals participating in sports competition (including Para sport), and/or performance (eg, dance) at all levels (professional, amateur or grassroots, any nationality, adult ≥ 18 years or paediatric < 18 years).

Sport: physical activity involving physical exertion and skill, with competition events under a set of rules. Exclusions include activity without competition (eg, hiking, walking, running, recreational skiing) and active transportation (eg, cycling, walking, scooter).

Gender and sex (https://www.who.int/health-topics/gender#tab=tab_1; <https://cihr-irsc.gc.ca/e/48642.html>)

Gender: refers to socially constructed characteristics of people—for example, norms, behaviours and roles associated with being a woman, man, girl or boy, and interactions. As a social construct, gender identity is not binary (girl/woman, boy/man) or static; it varies from society to society, exists along a continuum and can change over time.

Sex: refers to biological attributes. It is primarily associated with physical and physiological features including chromosomes, gene expression, hormone levels and function, and reproductive/sexual anatomy. Sex is usually categorised as female or male, but there is variation in the biological attributes that comprise sex and how those attributes are expressed.

While there is often an analytical distinction made between gender and sex, this consensus statement recognises that they are inextricably linked in the injury experiences of female, women and girls.

Gendered socioecological factors: the complex interplay between individual, relationship, community and societal factors. For the FAIR consensus, we consider the range of gender-related factors across all levels of the socioecological model³⁵ that influence the need for, access to and response to injury prevention.

Prevention generally refers to primary prevention strategies aimed at stopping injury occurrence. Secondary prevention refers to early detection and diagnosis, and strategies to limit subsequent/recurrent injury and/or reduce injury severity.

Sport partners (also known as *Entourage*): refer to consumers/individuals, across the whole sport system* who are likely to be able to use research results to make informed decisions about injury prevention or health policies, programmes and/or practices (<https://cihr-irsc.gc.ca/e/49505.html>).

*Whole sport system includes sport partners at all levels of the socioecological model:²⁸ individual (athlete), interpersonal (eg, teammate, coach, parent/carer, support staff); local/state/regional/international sport or community (eg, sport administrators, media, researchers); or society (eg, general public).

FAIR, Female/woman/girl Athlete Injury pRevention.

Committee reviewed the wording of the 118 recommendations, condensed any expanded recommendations (ie, those where multiple components had been voted on separately) and combined any duplicates. For the final step, several recommendations were moved, re-ordered or synthesised and/or re-worded for clarity. The injury prevention strategies and potentially modifiable risk factors were synthesised to reflect the type of intervention and risk factor, rather than the body region. For example, an exercise-based intervention might reduce injuries across a number of body regions, and playing surface might be a risk factor for injuries across multiple body regions. The overarching, D&I and gender/sex considerations were also synthesised so that all recommendations related to D&I, or related to creating an equitable environment, were grouped together. The Steering Committee and EAC approved all changes. This process resulted in 56 final recommendations.

RECOMMENDATIONS

The 56 recommendations include: 20 injury prevention strategies (16 primary prevention: 6 policy/rules/laws; 8 personal

protective equipment; 2 training; 4 secondary prevention) (figure 2a); 12 modifiable risk factors (figure 2b); 14 D&I (figure 2c); and 10 supporting gender/sex-environments (figure 2d). A detailed summary of voting results and dissenting viewpoints is provided in online supplemental file 5.

DISCUSSION

This FAIR Consensus yielded 56 practical recommendations. When applied by anyone involved in athlete health (eg, athletes, coaches, parents, teachers, managers, administrators, health and exercise practitioners), these recommendations could reduce the rate, severity and burden of injuries in female/woman/girl athletes. The world-first FAIR Consensus recommendations were informed by five systematic reviews and one scoping review that synthesised >600 papers with >600K participants, original research (concept mapping with 66 participants) and expert opinion.^{22–28} The recommendations consider all ages, sports, abilities, injury types (by anatomical region) and injury prevention strategies (policy/rules/laws, personal protective equipment, training and secondary prevention). The 56 FAIR Consensus recommendations span the 'whole sports system'

Box 3 Equity, Diversity and Inclusion and Patient and Public Involvement for the FAIR Consensus

Equity, Diversity and Inclusion

Review planning and design: the FAIR Consensus Steering Committee (n=24) planned and designed this project. This group (80% women; (n=17, 71% affiliated with IOC research centres for prevention of injury and protection of athlete health)), includes academics and health, medical or exercise practitioners (n=19; 79%) with broad expertise ranging from epidemiology (n=18; 75%), injury prevention (n=21; 88%), sport sciences (n=4; 17%), health promotion (n=2; 8%) and career stage (n=7 senior, n=9 mid-career, n=8 early-career) from 4 continents, who are mostly white, and from well-resourced countries (online supplemental file 1).

Author Group (online supplemental files 2 and 3): authors (n=109, across all studies) were chosen by the FAIR Consensus Steering Committee based on relevant and diverse expertise. 54 members (50%) have experiences and/or expertise as athletes; 43 (40%) as coaches; and 79 (73%) as health, medical or exercise practitioners. Members serve on committees related to sporting organisations (44, 40%); government (14, 13%); industry (13, 12%); and healthcare (28, 26%). All gender identities, sexes and abilities were welcomed. Authors self-identified as mostly female (74, 68%) and reported their ethnicity as white (88, 81%), Asian (7, 6%), black (African)/African American (6, 6%), Hispanic/Latino (3, 3%), Middle Eastern/North African (2, 2%) and other/prefer not to answer (7, 6%). Of the 109 authors, 53 (49%) had Para-sport experience, 98 (90%) had female/woman/girl youth athlete experience and 91 (84%) adult athlete experience. Authors had broad representation across research career stages: 18% late-career, 28% mid-career, 32% early-career and 15% PhD/master's students. Countries of birth and residence were classified as high- or low- or middle-income based on the World Bank country classifications by income level for 2024–2025.⁵⁷ 86% of authors were born in high-income countries across 6 continents (14% from low- or middle-income countries) and 93% were residing in high-income countries (5 continents). Author data were collected electronically in English to facilitate access, which required computer and internet access.

Patient and Public Involvement

FAIR Consensus External Advisory Committee: The FAIR Consensus Steering Committee nominated EAC members with diverse lived experiences as athletes, coaches, health/exercise practitioners, including Para sport and youth athlete experiences. Potential members with diverse ethnicities and abilities, and from less-resourced countries/communities were prioritised. The EAC was convened in December 2024 and consisted of 8 people (8 women) with lived experiences as elite (n=1 Olympian, n=1 Paralympian) and youth (n=1) athletes, team physicians/physiotherapists (n=3), coaches (n=2), sport scientists (n=1), professional qualifications in parasport (n=4), leadership roles in sport (n=5), government (n=2), industry (n=1) and healthcare (n=5) organisations and spanning multiple ethnicities (n=5 white) and birth countries (n=4 from low- or middle-income).

The EAC provided strategic oversight and expert guidance to ensure the FAIR consensus represented global views and best practice in the field. Specifically, the EAC was asked to review the summaries of our Evidence Reviews, and provide advice on the recommendations, and contribute to the Consensus meeting via the EAC Chair (T-LM). EAC members reviewed the consensus paper and were invited to be coauthors on papers as appropriate, based on BMJ authorship guidelines. The EAC level of engagement is consistent with the International Association for Public Participation 'consult' or 'involve' level.⁵⁸ The EAC will also participate in future knowledge translation activities. Some EAC members are also participants in projects (eg, Review 6).

EAC, External Advisory Committee; FAIR, Female/woman/girl Athlete Injury pRevention; IOC, International Olympic Committee.

(an interpretation of the socio-ecological model),^{35–37} where all sport partners/Entourage—individual (athlete), interpersonal (eg, teammate, coach, support staff), local/regional/national/international sport or community (eg, sport administrators, media, researchers) or society (eg, general public)—can and should be involved in athlete injury prevention and health.^{35–37} The recommendations should be considered within the athlete-specific context and available resources.

WHAT injury prevention strategies are recommended for female/woman/girl athletes?

Recommendations to prevent female/woman/girl athletes' injuries span policy/laws/rules, personal protective equipment, training and secondary prevention. Lack of specific recommendations for many strategies, or athlete groups and settings mean that for all scenarios, the person(s) responsible for injury prevention/athlete health protection must work with sport partners to adapt recommendations.

Policy/laws/rules

Policy/law/rule changes primarily target sport organisations, with behaviour change required by athletes, coaches and referees/officials. Despite sparse female/woman/girl-specific data, the FAIR Consensus recommendations reflect that policies/laws/rules created from male/man/boy-specific or aggregate data^{22–24 26 30}

should equally apply to female/woman/girl athletes, in line with past consensus statements.^{29 38} For example, we recommended implementing a policy disallowing body checking in child and adolescent ice hockey, Para ice hockey and ringette games, and unlawful body and/or head contact to prevent all injuries. We also considered that policies/laws reducing head-to-head and head-to-shoulder contact (eg, lowering the legal tackle height below the sternum base) in rugby might also be applied to all collision sports.²⁴ There was insufficient evidence to support recommendations to ban heading in child and adolescent soccer to prevent concussion or potential unintended consequences (eg, delayed development of heading skills, with higher future concussion risk)²⁴ (figure 2a).

Personal protective equipment

Personal protective equipment is a tangible strategy to improve female/woman/girl athlete safety, while considering potential associated costs. However, the strategies can differ between body regions/injuries. For example, ankle braces are recommended to prevent first-time and recurrent sprains and taping is recommended to prevent recurrent sprains, while knee braces are only recommended to prevent recurrent knee injuries. Knee braces should not be considered to prevent first-time knee injuries.²² Consistent with previous Consensus Statements,^{30 38} mouthguards should be mandated in child and adolescent ice hockey

Table 1 Overview of FAIR Consensus Evidence Reviews and resulting recommendations for voting

Topic (and method)	Papers included N (n*)	Recommendations†
1a. Lower extremity injury prevention strategies (systematic review and meta-analyses)	82 (31) – prevention	Primary prevention: Policy/rules: 1 PPE: 3 Training: 3 Secondary prevention: 6
1b. Lower extremity injury modifiable risk factors: Systematic review and meta-analyses	195 (115) – MRF	MRF: 29
2. Upper extremity injury prevention strategies and modifiable risk factors (systematic review and meta-analyses)	20 (5) – prevention 35 (20) – MRF	Policy/rules: 2 PPE: 0 Training: 4 Secondary prevention: 0 MRF: 6
3. Concussion (including head impacts and head acceleration event outcomes) prevention strategies and modifiable risk factors (systematic review and meta-analyses)	67 (19) – prevention 41 (21) – MRF	Policy/rules: 4 PPE: 9 Training: 2 Secondary prevention: 2 MRF: 5
4. Spine, chest, abdominal and/or pelvic injury and pain (Spine*) prevention strategies and modifiable risk factors (systematic review and meta-analyses)	13 (5) – prevention 94 (32) – MRF	Policy/rules: 1 PPE: 2 Training: 2 Secondary prevention: 0 MRF: 10
5. Dissemination and implementation of injury prevention interventions (scoping review)	220 (55) dissemination and implementation	D&I: 15
6. Gender-specific and/or sex-specific injury prevention considerations (concept mapping)	66 participants (85% female/woman/girl)	Gender/sex: 17
Recommendations not specific to an individual Evidence Review		
7. Overarching: relevant across all reviews	–	Total 14
8. Overlapping: recommendation is appropriate to more than one review‡	–	Total 5
Total		142
Recommendation 'consensus to include'		118 (83%)
*Number of studies with female/woman/girl-specific estimates. †142 recommendations that underwent Round 1 and 2 voting (see online supplemental file 5). Primary prevention strategies (aimed to stop injury occurrence) unless otherwise indicated. Secondary prevention strategies = aimed to optimise early detection, diagnosis and stop subsequent/recurrence injury and/or reduce subsequent/recurrent injury severity. ‡Some recommendations addressed more than one injury type. D&I, dissemination and implementation; FAIR, Female/woman/girl Athlete Injury pRevention; MRF, modifiable risk factors; PPE, personal protective equipment.		

and may be considered across all collision sports to prevent concussions and/or orofacial injuries.²⁵ Appropriately fitting helmets³⁹ should be worn in cycling, skiing, snowboarding, skateboarding and equestrian, and could be considered in sports where mandated to prevent fractures and more severe traumatic brain injury (eg, ice hockey, tackle football) to prevent concussions.²⁴ Specific to female/woman/girl athletes, appropriately fitted and supportive bras are recommended in all sports to reduce movement-induced breast pain and chafing (figure 2a).

Training strategies

Training strategy recommendations are the responsibility of sport organisations, coaches and athletes. There is compelling evidence to support the mandating of exercise-based injury prevention, including neuromuscular training warm-up (eg, strength, stability/movement control, sport-specific exercises for a minimum of 10 min two times per week) across all female/woman/girl sports to prevent first-time and recurrent lower extremity injuries.^{22–27} Sufficient evidence supports exercise-based programmes to prevent shoulder injuries in handball, volleyball, overhead sports and adaptations to overhead/paddling/wheelchair Para sports to prevent upper extremity injuries.²³ Training strategies could also prevent first-time and recurrent concussions in contact/collision sports, and spine, chest, abdominal and/or pelvic injury and pain, and their recurrence in

all sports.^{24–26} Contact training skill development (eg, tackling, body checking) is an emerging intervention that may prevent first-time and recurrent concussions across all ages in contact/collision sports, including Para sport²⁴ (figure 2a).

Secondary prevention

Secondary prevention strategies (eg, injury management protocols/policies) are critical to limit subsequent/recurrent injury and/or injury severity (eg, time loss). Despite limited female/woman/girl specific data, evidence-informed injury management in all sports is recommended to prevent recurrent injuries/concussion.^{22–24} Policies/rules/laws and referee training to enable concussion recognition (eg, blue card, additional substitution) in contact/collision sports may prevent recurrent head impacts and/or concussions²⁴ (Figure 2a).

Possible strategies based on potentially modifiable risk factors

Multiple modifiable risk factors were associated with female/woman/girl athlete injuries, but most require further examination before informing the development and evaluation of injury prevention strategies. Problematic low energy availability is associated with bone stress injuries, requiring appropriate awareness, recognition and management of female/women/girl specific health considerations.^{19–25–26} Three modifiable risk factors that

a

Injury prevention strategies for female/woman/girl athletes^a

Primary prevention: Policy/Rules/Laws

- IP1 **Policies/rules/laws that penalise unlawful body and/or head contact** SHOULD be implemented and enforced (including referee training) to prevent all injuries^b.
- IP2 **Policy disallowing body checking:**
 a. SHOULD be implemented and enforced in all child and adolescent ice hockey games to prevent all injuries^b.
 b. MAY be implemented in all child and adolescent Para ice hockey and ringette games to prevent all injuries^b.
- IP3 **Policies/rules-limiting contact practice** in American football SHOULD be implemented to prevent concussions, head impacts, and/or head acceleration events.
- IP4 **Policies/laws reducing head-to-head and head-to-shoulder contact** (e.g. lowering legal tackle height below base of sternum) COULD be implemented in rugby and considered in other collision^c sports to prevent head impacts.
- IP5 **The 'no-pocket in pants' rule:**
 a. SHOULD be implemented and enforced in American flag football to prevent finger injuries.
 b. COULD be implemented in other sports to prevent finger injuries.
- IP6 It is UNCLEAR if **policy banning heading** in child and adolescent soccer prevents concussions or has unintended consequences (e.g. delayed development of heading skills with higher future concussion risk).

Primary prevention: Personal protective equipment

- IP7 **Mouthguards:**
 a. SHOULD be mandated in child and adolescent ice hockey to prevent concussions and orofacial injuries.
 b. MAY be used in adult and Para ice hockey to prevent concussions and orofacial injuries.
 c. MAY be used in all collision^c sports to prevent orofacial injuries.
- IP8 **Helmets:**
 a. SHOULD be worn in cycling, skiing, snowboarding, skateboarding and equestrian to prevent concussions.
 b. In sports where helmets are mandated to prevent skull fractures and severe traumatic brain injury (e.g. collision^c/contact^d sports, ice sports, motorsport, tackle football), they COULD also prevent concussions.
- IP9 **Neck guards/protectors** SHOULD be worn in collision^c/contact^d ice sports to prevent neck lacerations.
- IP10 **Appropriately fitted and supportive bras** SHOULD be worn in all sports to reduce movement induced breast pain and chafing.
- IP11 **Hard-shell headgear** COULD be worn to prevent concussions in adolescent lacrosse.
- IP12 **Face shields in helmeted sports** MAY be worn to prevent orofacial injuries.
- IP13 **Semi-rigid ankle braces** COULD be used to prevent first-time and recurrent (secondary prevention) ankle sprains.
- IP14 **Knee braces** SHOULD NOT be used to prevent first-time knee injuries, including anterior cruciate ligament tears.

Primary prevention: Training

- IP15 **Exercise-based programs including neuromuscular training warm-up^a**
 a. SHOULD be mandated across all sports and age groups to prevent first-time and recurrent (secondary prevention) LE injuries.
 b. SHOULD be used across all sports, a minimum of 10 minutes 2X/week.
 c. SHOULD be used in handball/volleyball/overhead sports to prevent shoulder injuries.
 d. MAY be used in overhead/paddling/wheelchair Para sports to prevent upper extremity injuries.
 e. COULD be used in rugby/team and Para sports, to prevent first-time and recurrent (secondary prevention) concussions.
 f. MAY be used across all sports to prevent first-time and recurrent (secondary prevention) spine^e injuries.
- IP16 **Contact training skill development** (e.g. tackling, body checking) across all ages and collision sports, including Para sport, MAY be used to prevent first-time and recurrent (secondary prevention) concussions.

Secondary prevention

- IP17 **Evidence-based injury management** SHOULD be mandated in all sports to prevent recurrent concussions.
- IP18 **Policies/rules/laws and referee training that enable concussion recognition** (e.g. blue card, additional substitution) in rugby/other contact/collision sports MAY prevent recurrent head impacts and/or concussions.
- IP19 **Ankle taping** MAY be used into prevent recurrent ankle sprains.
- IP20 **Semi-rigid knee braces** MAY be used to prevent recurrent knee injuries.

b

Potentially^a modifiable^b risk factors for female/woman/girl athletes' injuries and/or painMAY be related to all athletes,^a injuries/pain^b

- MRF1 **Absolute load** (e.g. weekly competitions, daily throws) and **relative changes in load^d** (e.g. training spikes or gaps).
- MRF2 Early (premature) **sport specialisation^f**.

MAY be related to specific injuries

- MRF3 **LE muscle strength** for LE joint (e.g. knee), ligament (e.g. anterior cruciate ligament tears), muscle and tendon injuries.
- MRF4 **Shoulder external to internal rotation strength** ratios for shoulder injuries in handball, swimming, cricket and overhead sports, and elbow injuries in overhead sports.

Mixed relationship with specific injuries/pain or conditions

- MRF5 **Problematic low energy availability^g** IS a modifiable risk factor for bone stress injuries (e.g. spine, rib, sacrum), and MAY be a modifiable risk factor for urinary incontinence.
- MRF6 **Neck muscle strength** MAY be a modifiable risk factor for head acceleration events, but it is UNCLEAR if it is a modifiable risk factor for concussions.
- MRF7 **Trunk and hip muscle strength** MAY be a modifiable risk factor for low back pain, but it is UNCLEAR if it is a modifiable risk factor for knee injuries.
- MRF8 **Artificial turf** (compared to natural grass):
 a. MAY NOT be a modifiable risk factor for match and training concussions or LE, hip/groin, thigh, knee and ankle injuries.
 b. MAY be a modifiable risk factor in soccer and other field sports for UE injuries.

UNCLEAR relationship with specific injuries

- MRF9 **Menstrual cycle irregularities** or disturbances for LE injuries.
- MRF10 **Psychological readiness to return to sport** for recurrent anterior cruciate ligament tears.
- MRF11 **Movement screen scores, LE biomechanics** (during various movement tests) or **off-season training** for LE injuries.
- MRF12 **Shoulder passive range of motion** (total, internal rotation, and external rotation motion), or **scapular dyskinesis** for overhead sport (e.g. handball, swimming, and softball) UE injuries.

C

How to implement injury prevention strategies for female/woman/girl athletes

Injury prevention planning in all athletes,^a injuries/pain^b

- D&I 1 **START EARLY IN LIFE** with injury prevention practices to promote lifelong injury prevention behaviours.
- D&I 2 **CO-CREATE** adaptations and implementation strategies for injury prevention by collaborating with athletes and sport partners^c involved in athlete health (e.g. coaches, health/exercise practitioners, sport administrators, entourage).
- D&I 3 **USE RECOMMENDED** injury prevention strategies that are evidence-based or evidence-informed.
- D&I 4 **PRIORITISE** female/woman/girl-specific recommendations to guide implementation. When not available, consider recommendations from combined female/woman/girl and male/man/boy data, or male/man/boy-specific data.
- D&I 5 **PRIORITISE** female/woman/girl-specific recommendations that consider target group needs or adapt injury prevention recommendations when specific data are unavailable. In particular:
- Para sport-specific considerations.
 - low resourced settings considerations.
 - individual considerations (e.g. gender diversity and/or transition, sexual orientation, sociocultural, religious practices).
- D&I 6 **TAILOR** injury prevention strategies to the athlete, their experiences, environments, and interactions:
- demographics** (e.g. sex/gender, age, ability, economics, ethnicity, culture, religion, healthcare access), co-morbidities, psychological factors, social environment.
 - athlete and coach factors** (e.g. knowledge, beliefs, skills, preferences).
 - context** (e.g. competition-level, time constraints).
 - sport** (e.g. team vs individual; Para sport) and sport environment (e.g. staff resources, facilities).
 - female health factors**, inclusive of lived experiences, physiological, psychological and social processes (e.g. menstrual cycle, life stage transitions, pregnancy and postpartum, including breastfeeding).
- D&I 7 **DEVELOP** the motivation, **capability** and **confidence** of sport partners^c to implement injury prevention through individual (e.g. learning modules) and collaborative (e.g. workshops) education.
- D&I 8 **ESTABLISH** policies for regular injury prevention education (e.g. coach accreditation) and equipment use (e.g. mouthguards), at all levels of sport organisations.
- D&I 9 **PLAN** to **evaluate the awareness, adoption and acceptability** of injury prevention strategies over time.
- D&I 10 **PRIORITISE** using **valid gender/sex specific surveillance systems**, with standard injury definitions, across all levels of sport to accelerate understanding of female/woman/girl athlete injury/pain prevention.

Injury prevention education in all sports for all injuries:

- D&I 11 **SHOULD** include:
- context-, sport-, and gender/sex-specific information** (e.g. risk factors, intervention benefits and delivery methods, available resources).
 - opportunities to engage in implementation planning** (e.g. how to tailor, who will lead implementation) to support behaviour change.
- D&I 12 **SHOULD** be **delivered** to **ALL** who play a role in implementation, including:
- coaches, teachers, and athletes as a priority.
 - other sport partners^c (e.g. parents, health/exercise professionals, administrators), with adaptations.
- D&I 13 **SHOULD** be **introduced** in the off-season, with in-season education, supervision or support strategies.
- D&I 14 **SHOULD** be **co-created with and/or delivered** by individuals with injury prevention expertise, skills, and knowledge.

d

Creating supportive injury prevention environments for female/woman/girl athletes^a

CREATING and fostering ENVIRONMENTS to prevent injury and promote health

- GS1 **CREATE** and **ENFORCE** policies and procedures to address gender/sex-based **interpersonal violence** (harassment, abuse), including providing:
- safe spaces for reporting.
 - trauma-informed competency training to facilitate recognition, response and remedy.
- GS2 **CREATE safe spaces** free from body shaming or the promotion of ideal body types, or gendered norms.
- GS3 **CREATE environments** with appropriate care for, and where athletes **feel safe to discuss without judgement**:
- female/woman/girl-specific health considerations (e.g. pregnancy, bone health, breast care).
 - injuries (and fear of injuries).
- GS4 **RAISE awareness** of, and develop and implement policies to address, the impact of unconscious and **explicit social and cultural biases** on females/women/girls' sport participation and athlete health.
- GS5 **CREATE** and **FOSTER environments** that implement **athlete-centred** and gender/sex-informed **communication**.

CREATING access to equitable FUNDING and RESOURCES

- GS6 **ADOPT** a **whole sports system**^m approach – from community club to international governing body – for equitable funding and resources (e.g. injury prevention implementation and evaluation, equipment, coach/support staff, gender/sex-preferred uniforms and needs (e.g. period care)). Including at:
- local and state sports levels, create **equitable access to available funding and resources** (e.g. access to the best training grounds and support staff).
 - international, regional, national sport levels, **set equitable standards for resource quality and quantity** (e.g. travel and accommodation arrangements).

ACCESSING appropriate EXPERTISE and KNOWLEDGE

- GS7 Funding agencies, sport, universities, and research centres **SHOULD PRIORITISE funding** and/or **research**:
- evaluating **gender/sex-specific injury prevention** and athlete health interventions.
 - evaluating **gender/sex-specific considerations** (e.g. access to resources, menstrual cycle) influence on athlete health.
 - conducted by female/woman researchers** (to achieve equity) on female/woman/girl athletes injury prevention.
- GS8 The **whole sports system**^m **SHOULD**:
- DEVELOP, DISSEMINATE** and **EVALUATE** gender/sex-specific injury prevention information (e.g. debunking myths about fragility, menstrual cycle impacts on injury risk) to athletes and coaches/support staff.
 - DEVELOP** and/or **DISSEMINATE** implementation guidelines/resources to athletes and coaches/support staff.
 - HIRE** and **DEVELOP** female/woman/girl coaches/support staff.
 - HIRE** and **DEVELOP** coaches/support staff with female/woman/girl athlete expertise.
- GS9 Coaches/support staff **SHOULD** be knowledgeable about, and deliver, injury prevention that:
- TARGETS gender/sex-specific needs** (e.g. developing strength and skills).
 - REFLECTS physiological, psychological, and social changes** associated with menstrual cycle, lifestyle transitions, pregnancy, breast and pelvic health.
- GS10 Athletes **SHOULD** have **accessible evidence-based information** about relevant gender/sex-specific topics.

Figure 2 Recommendations for the 2025 FAIR Consensus: (a) injury prevention strategies; (b) potentially modifiable risk factors; (c) implementing injury prevention; (d) creating environments for injury prevention **SHOULD**=we are very confident in our recommendation, and the evidence matches with expert opinion. **COULD**=we are moderately confident in our recommendation, and the evidence matches with expert opinion. **MAY**=the evidence is weak (could be interpreted in different ways), and expert opinion supported the recommendation. **MAY NOT**=where the evidence was

Figure 2 (Continued)

weak, AND expert opinion did not support this as a risk factor. **athletes^a**=in any sport competition, including Para sport, and/or performance (eg, dance, performing arts) at any level (eg, professional, amateur)—unless indicated; **all injuries^b**=concussion, UE, LE and spine+injuries; **collision^c sport**=athlete-to-athlete tactics include legal and intentional forceful contact to stop or remove a player from progression of play, or gain points in play (eg, body checking in ice hockey, tackle in rugby, wrestling); **contact^d sports**=athlete-to-athlete contact is allowed within the rules of the game but illegal and intentional forceful contact is disallowed; **neuromuscular training warm-up^e**=warm up programme including aerobic, balance, agility, strength±head on neck exercise components; **spine+^f**=inclusive of spine, chest, abdominal and/or pelvis; **potential risk factor^g**=factor associated with injury; **potentially modifiable risk factor^h**=might be changed or influenced through prevention strategy; **loadⁱ**=the absolute or relative amount of physical work an athlete experiences during training or competition (eg, balls pitched, distance run, number of kicks); **sport specialisation^j**=participating in a single sport for >8 months/year in training or competition; **problematic low energy availability^k**=exposure to low energy availability (mismatch between dietary intake and energy expended during exercise) is associated with potentially persistent disruption of various body systems; **sport partners^l**=anyone involved in athlete health and safety, or can make informed decisions about injury prevention or health policies, programmes and/or practices—for example, teammates, coaches, parents/carers, health and exercise practitioners, sport science/high-performance professionals, sport administrators, media, researchers or community members; **whole sports system^m**=sport partners at all levels, from interpersonal level (eg, coaches, teachers, peers) to international, national, regional and local sport organisations. FAIR, Female/woman/girl Athlete Injury pRevention; LE, lower extremity; UE, upper extremity; 2X, two times.

could be considered within specific contexts (eg, experiences, competition, sport) as a target for injury prevention include: (1) absolute and relative changes in training/competition loads; (2) early sport specialisation; and (3) muscle strength and function deficits.^{23 25 26} While it might be intuitive to address these factors, more evidence is required to guide female/woman/girl-specific approaches. Recommendations on field surface are challenging as the association between injury and turf type (artificial vs grass) appears to be injury-specific.^{22 24 25 30 38} Artificial turf is associated with higher rates of upper extremity injuries in soccer and other field sports,²⁴ but is not associated with lower extremity injuries or concussion^{22 24 25} (Figure 2b).

HOW to implement injury prevention strategies

We provide 14 practical recommendations to guide sport partners on how to implement injury prevention strategies. At the outset, implementation planning should include all sport partners, so that the evidence-informed injury prevention strategies can be adapted and tailored to individual contexts and sport. Tailoring may be particularly important to enhance implementation for female/woman/girl athletes (eg, considering sex/gender factors in figure 2d) and other distinct groups (eg, Para sport, sub-elite athletes, children) and regions (eg, Asia, Africa, South America),²⁷ but further research may be required to inform changes to evidence-informed strategies.^{27 28 40 41} (figure 2c).

Implementation success is driven by building motivation, capability and confidence to support behaviour change through education, and establishing and enforcing policies.^{27 42} Education, usually through learning modules and/or workshops, can be delivered in-person or online in the pre-season, with ongoing in-season support as feasible and appropriate. Training the 'trainer' is critical,⁴³ with effective approaches mostly using injury prevention experts/researchers to provide injury prevention education to coaches, teachers and athletes.²⁷ Less is known about the role of other sport partners (eg, coach educators, health/exercise professionals, sport/school/government administrators) and approaches (eg, dissemination via social media)²⁷ who might facilitate greater implementation outcomes, such as reach, adoption and sustainment. Administrators may have greater ability to establish policies (eg, compulsory mouthguards, or coach accreditation), practices/guidelines (eg, audits, annual education) or incentives (eg, awards, funding) and prioritise/advocate for resources related to injury prevention.

HOW to create a supportive gender/sex-specific environment

Injury prevention strategies cannot work if female/women/girl athletes do not have access to resources, knowledge or training/competition environments that support implementation of best practice injury prevention, health and performance strategies that consider their needs. The FAIR recommendations to facilitate a supportive environment include creating equitable funding and resource allocation (eg, injury prevention implementation, equipment, coach/support staff, gender/sex-preferred uniforms and surveillance systems with female/woman/girl-specific health codes) and access to expertise and knowledge through education, targeted research and hiring practices. We highlight immediate actions for coaches/teachers and sport organisations. The recommendations traverse important safe sport considerations, highlighting the necessity for all who work in sport to ensure safe and inclusive spaces. Recommendations such as 'Create safe spaces free from body shaming or promoting ideal body types, or gendered norms' might appear sensible, but they are NOT always part of female/woman/athletes' reality.^{28 44} They should be front-of-mind and non-negotiable. At all levels of sport, responsibility must be taken for actions that can influence female/woman/girl athlete health⁴⁴ (figure 2d).

Strengths of the FAIR consensus process

This FAIR Consensus, guided by current reporting standards,^{20 21} intentionally used rigorous methods to (1) gather and synthesise the available empirical evidence, including 'how to' implement injury prevention strategies; (2) generate and collate new experiential evidence where gaps existed, including the perspectives of those with lived/living female/woman/girl sport and injury experiences; (3) meaningfully discuss, shape and decide practical recommendations; and (4) consider the voices of the EAC including athletes, coaches and practitioners to contextualise and inform practical recommendations.

The five systematic reviews comprehensively evaluated female/woman/girl athlete prevention strategies and potentially modifiable risk factors. With a priori methodology registered in PROSPERO, and a librarian scientist guiding search strategies, we undertook duplicate independent record screening, data extraction and risk-of-bias assessment, biostatistician-led meta-analyses, semiquantitative synthesis and certainty of evidence rating. The scoping review is a world-first synthesis of all primary research designs detailing how injury prevention strategies (all

types) are implemented, how D&I is measured and what factors influence D&I activities across the whole sport system—critical to bridging the evidence-practice gap and tailoring implementation efforts for female/women/girl athletes. To redress the absence of female/woman/girl athletes, carers (parents or guardians), coaches, administrators, health practitioners and researchers from diverse sports, geographical, socioeconomic, cultural and religious backgrounds voices,^{45–47} we supplemented the empirical evidence reviews with an original, mixed methods study.²⁸ In this Concept Mapping project, 66 participants (with experience and/or expertise as an athlete, and/or current roles within sport as a: coach, practitioner, administrator or researcher) provided perspectives rarely considered in consensus activities.

To reach consensus on our practical recommendations, we employed a two-round voting process that required the FAIR Consensus Steering Committee to review the evidence summaries and recommendations before the face-to-face meeting and included facilitated meaningful discussions that integrated the Round 1 voting results and dissenting viewpoints. Following discussions, the number of recommendations reaching consensus advanced from 65% (Round 1) to 83% (Round 2). The anonymous voting followed a priori procedures. The EAC Chair represented the perspectives of our EAC at the face-to-face meeting and participated in all voting. Three IOC representatives provided highly valuable input at the consensus meeting, with the perspectives of the sport injury prevention fields and prior consensus meetings.

Small, thoughtful steps towards researcher/author diversity and inclusion

The FAIR Steering Committee (80% women) deliberately included people across all career stages from a range of academic and sports medicine/health professional backgrounds, with expertise across injury prevention, epidemiology, rehabilitation, sport science, health promotion, health psychology, biomechanics, physiology and medicine. Although this allowed for diverse perspectives on injury prevention, future consensus activities should go further. The Author Group (n=109, across all FAIR evidence reviews) were chosen by the Steering Committee based on relevant and diverse experiences or expertise as athletes/coaches, or health/exercise practitioners. Members have served on committees related to sporting organisations, government, industry and healthcare. Of the 109 authors, 53 (49%) had Para sport experience, and most (80–90%) had female/woman/girl youth and senior athlete experience. Authors had broad representation across research career stages: 18% senior, 28% mid-career; 32% early-career and 15% PhD/master's students supported the next generation of researchers in the field. [Box 3](#)

Limitations

Lack of athlete diversity and inclusion—where are all the female/woman/girl athletes?

For the six systematic/scoping reviews, there were relatively few studies (<40% of all included studies) with female/woman/girl athlete-specific, or disaggregated female/woman/girl athlete data. This necessitated considering aggregate or male-only data when creating and refining recommendations. It also contributes to the limited high certainty evidence supporting best practices and policies for FAIR. The significant heterogeneity among studies informing the FAIR consensus highlights variability in methods, sample populations, examined outcomes, prevention strategies and injury mechanisms. The unintended consequences of injury

prevention strategies for unique female/women/girl subgroups across age, ability, sport, geography and equity-deserving female/woman/girl-athlete communities (eg, Para sport, rural/remote, LGBTQIA+, racialised, Indigenous) remain unknown.

Lack of consensus member diversity and inclusion

Our FAIR Steering Committee includes academics and sports medicine/health professionals with expertise across injury prevention sport sciences, health promotion and career stage from four continents. Despite this heterogeneity, the Committee members were mostly white and from well-resourced countries. Recommendations might differ if the committee had greater diversity and perspectives from lower-income countries or different cultural and religious settings where the intersection of gender norms, socioeconomic status, ethnicity and limited healthcare access create additional barriers to injury prevention.^{48 49}

Research implications: next steps, and call to action

To raise the standard of female/women/girl athlete sport-injury prevention research, the Practical Recommendations will be complemented by Research Recommendations with a Delphi Research Priority study currently underway. Nonetheless, there are immediate steps that the sport injury research community can undertake. First, research should involve MORE female/woman/girl athletes AND prioritise disaggregated data to allow for effect estimates specific to these groups. Second, research should support valid injury surveillance in sport based on the IOC Consensus methods for recording and reporting of epidemiological data on injury and illness in sport,¹⁶ and supplemental female health considerations.⁵⁰ Third, research should use reporting guidelines to facilitate transparent and complete reporting of interventions, injury definitions and evaluation methods to optimise prevention strategy evaluation. Fourth, research design should consider hybrid or full implementation experimental designs with sufficient power to control for confounding factors, consider effect modifications, adjustment for cluster (eg, team, individual, city) in analyses and reporting of potential unintended consequences. Finally, research should consider focussing on Para athletes and other equity-deserving athlete groups (eg, lower- and middle-income countries, age-groups and sport participation levels, rural/remote, LGBTQIA+, racialised, Indigenous communities).

Consensus sustainability

Rapid increases in the number of scientific publications over the past 25 years, including female/woman/girl athletes with a focus on injury prevention, led to a significant author workload across systematic/scoping reviews informing this 2025 FAIR Consensus Statement. In future, 'living' recommendations (based on updated systematic reviews at regular intervals) could support optimal translation to athletes and sport partners for best injury prevention practice and policy considerations. These recommendations reflect the state of evidence at the time of the FAIR Consensus and will require updating as new evidence emerges.

CONCLUSION

The FAIR Consensus provides evidence-informed best practices to guide injury prevention strategies and policy, potential approaches to implement them and to create a supportive environment for female/woman/girl athletes. It should be read in conjunction with the seven published evidence reviews that accompany this FAIR Consensus. To bolster female/woman/

girl athlete health and safety, every person (at all levels of sport participation and in their own specific context) can, and should, take responsibility to carefully consider and action these recommendations.

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