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Addressing the unique needs for anti-doping and clean-sport education of para-athletes and athlete-support personnel: an international Delphi study

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ABSTRACT

Background: There has been a lack of consideration of the specific needs of para-athletes and athlete-support personnel (ASP) when designing anti-doping and clean-sport education. To this, we developed recommendations for anti-doping and clean-sport education addressing the specific needs of these groups.

Methods: The Delphi method was used. Stakeholders with relevant expertise were invited to be panel members. In Round 1, the expert panel suggested novel elements for anti-doping and clean-sport education with para-athletes and ASP. These suggestions were integrated within a survey assessing the importance of 28 potential elements. In Round 2, the expert panel completed this survey. In Round 3, panel members ranked the relative importance of each topic area rated highest in Round 2. Based on these rankings, a draft set of recommendations was created. In Round 4, panel members rated the degree to which they accepted these recommendations and the feasibility of their delivery.

Results: The results of Round 2 and Round 3 were used to create education recommendations for para-athletes and ASP. In Round 4, most panel members fully accepted the para-athlete and ASP recommendations.

Conclusions: Adoption and implementation of the recommendations created should lead to greater engagement, enhanced learning, and more effective education for para-athletes and ASP.

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Introduction

The use of prohibited substances and methods in sport and associated behaviours – often referred to as doping – remains a significant global issue. Whilst doping is prohibited in all sports that sign up to the World Anti-Doping Code ([WADC]; World Anti-Doping Agency [WADA], 2021), research shows prevalence rates for doping continue at concerning levels (Faiss et al., 2020; Gleaves et al., 2021). Evidence that the proposed deterrent effect of testing and sanctions is insufficient to reduce doping to levels that are acceptable for the anti-doping community has led to an increased investment in anti-doping education by WADA (Woolf, 2020). This increased focus on education culminated in the inclusion of an International Standard for Education (ISE) in the most recent version of the WADC (WADA, 2021). This shift in focus towards prevention over detection is highlighted in the guidelines for the ISE, which indicate education should now be a central priority for anti-doping programmes, and athletes' first experiences of anti-doping should be through education and not doping controls (WADA, 2021). However, whilst it is hoped the ISE will lead to a step-change in the quality and

effectiveness of the education delivered by Anti-Doping Organizations (ADOs), education design is not always tailored specifically towards the needs of those targeted by it.

For anti-doping and clean sport education to be effective, it is important to design education delivery that specifically addresses the needs of the recipient. Research has shown that athletes who receive more comprehensive anti-doping education show greater support for anti-doping policies compared to those who do not (Barkoukis et al., 2022). Athletes, especially at higher competitive levels, are reasonably well-served when it comes to anti-doping education, at least about crucial information about the rules, testing procedures, Therapeutic Use Exemption (TUE) and results management (Gatterer et al., 2020). For coaches and sport physicians, WADA's Anti-Doping Education and Learning (ADEL) platform offers generic online education programmes. For coaches, 'Coaches of High Performance' on WADA's ADEL platform has 14 modules in its syllabus, covering topics including anti-doping rules, the prohibited list, medications, supplements, testing, speaking up, and the consequences of doping. In turn, the ADEL programme for physicians is called 'Medical

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Professionals' and has four modules in its syllabus, covering the physician's role in clean sport (e.g. rights and responsibilities), medical practice in sport (e.g. Prohibited List, TUEs), supporting athletes in anti-doping (e.g. strict liability and anti-doping rules), and preventing doping (e.g. knowing your athlete, consequences of doping). For both the coaches' and physicians' courses, the modules are self-paced and completed in a specific order, with elements of interactivity and periodic assessments. Whilst programmes such as these are undoubtedly helpful, because they were designed to serve a wide audience (e.g. all international level athletes, all coaches, etc. regardless of sport or culture), they cannot address the unique needs of specific subgroups (Petróczy & Boardley, 2022). Thus, there is a need for education recommendations to be developed that address the particular needs of specific underserved groups.

Para-athletes represent one group with specific educational needs that are not currently considered in anti-doping and clean sport education design. According to the World Health Organisation (2011), people with impairments constitute over 15% of the world's population. Further, more than 4,000 para-athletes competed at the Tokyo 2021 Paralympic Games. These athletes are represented by the International Paralympic Committee (IPC), which is a rights-based movement pursuing inclusion and equality in sporting opportunities for para-sport athletes (Blauwet & Willick, 2012). Whilst the IPC recognises doping as a significant issue at all levels of competition in para-sport and is a signatory of the WADC, use of illicit performance-enhancing substances by para-athletes continues to be a concern (Van de Vliet, 2012; Webborn & Van de Vliet, 2012; Weber et al., 2022a). More specifically, Van de Vliet (2012) reported that between 2000 and 2011, 60 Anti-Doping Rule Violations (ADRVs) were detected in sports which were overseen by the IPC. Then between 2013 and 2018 the number of ADRVs was more than double this figure for a shorter time period, with 159 ADRVs reported (WADA, 2015, 2016, 2017, 2018, 2019, 2020a, 2020b). These statistics suggest not only that doping is an issue within para-sport, but that if anything its use is increasing.

Importantly, there are several factors that suggest there is a need to design and implement anti-doping and clean sport education specifically for para-athletes. For example, many para-athletes depend on the chronic use of medications to help treat and manage their health conditions (Mauerberg-deCastro et al., 2016). For example, an examination of medication use in elite Paralympic athletes at the 2018 Pyeongchang Paralympic Games found 21% of para-athletes who underwent doping control declared use of analgesic medication (Alexander et al., 2022). This can introduce the need to frequently update biological profiles and an increased use of the TUE system for para-athletes in comparison to non-disabled athletes. Thus, it is possible that education specifically focused on the TUE system may be warranted for para-athletes. This is particularly the case given concerns around systematic use of medication, with evidence suggesting some athletes use medications to enhance performance rather than for their intended purpose (Holgado et al., 2018), and supporting overuse of medication in elite disability sport (Broman et al., 2017). Further, the wide range of impairments

in para-sport (e.g. amputation, cerebral palsy, visual impairment, intellectual disability) further complicates the types of support athletes may require during anti-doping and clean sport education. Para-athletes may benefit from targeted education covering their rights and the support systems available to them within the testing process. Thus, there is clear evidence of a need to identify the specific needs of para-athletes within anti-doping and clean sport education.

Another important stakeholder group who may benefit from tailored clean-sport education are Athlete Support Personnel (ASP; Dodge & Robertson, 2004; Engelberg et al., 2019; Laure et al., 2001; Ntoumanis et al., 2017). For instance, whilst 98% of graduate professional coaches in France believed they have a role to play in preventing doping, 80% considered themselves inadequately trained in doping prevention (Laure et al., 2001). Also, a small percentage (males 3%; females 2%) of varsity athletes playing basketball, soccer, hockey, or volleyball in Canada agreed that doping can be justified if the coach suggests it (Dodge & Robertson, 2004). Further, recent research interviewing ASP, including elite-level coaches from a range of sports, found many coaches showed very poor knowledge on key anti-doping topics, including doping control systems (Allen et al., 2017; Boardley et al., 2019; Engelberg et al., 2019; Patterson & Backhouse, 2018). This often leaves them ill-equipped and unwilling to take a proactive stance against doping (Mazanov et al., 2015; Patterson & Backhouse, 2018). Further, specific to coaches working in parasport, Weber et al. (2022b) interviewed coaches from Germany and the UK working at an elite level in parasport and found that whilst coaches saw doping as an issue in parasport, they largely viewed anti-doping not to be the responsibility of coaches. Thus, whilst the extant literature highlights the considerable potential coaches possess to promote clean sport and facilitate doping prevention, it seems current education is not as effective as it could be in preparing them to serve these important functions or to take personal responsibility for addressing doping.

The ASP personnel network extends beyond coaches though, and people in other ASP roles may also benefit from specialized anti-doping and clean sport education tailored to their needs. For instance, team physicians may at times have to navigate issues around use of prohibited substances to enhance performance (Slocum et al., 2015). Similarly, healthcare professionals working in sport (e.g. physiotherapists) can experience conflict between the expectations placed upon them through their professional codes and what is expected of them in the WADC (WADA, 2009), leading to ambiguity over appropriate doping-prevention behaviours for these support personnel (McNamee & Phillips, 2011). Further, recent research in rugby showed that medical staff and nutritionists were responsible for educating others, thus highlighting the importance that they are educated themselves (Patterson et al., 2022). Finally, a range of support personnel including those mentioned above and others (e.g. nutritionists) have shown deficits in anti-doping knowledge that raise concerns regarding their ability to optimally support clean sport and doping prevention (Engelberg et al., 2019). These examples show that ASP beyond coaches may also benefit from anti-doping and

clean-sport education that includes elements addressing their particular needs.

Beyond anti-doping, there may be other para-sport specific topics that should be addressed in clean-sport education for para-athletes and ASP. Here, we adopt Petroczi and Boardley's (2022) rule-based definition of clean sport that views it as cheating-free sport, defining it with respect to rule compliance with clean sport encompassing all forms of cheating, not just doping. By adopting this definition, we are inclusive of para-sport specific forms of cheating. One example of this is classification cheating – or Intentional Misrepresentation – which although not represented in the WADC, is viewed by many para-athletes as a form of doping (Weber et al., 2022a). The classification system operates under the governance of the IPC and aims to determine which para-athletes can compete against one another to allow fair competition in para-sport, based upon their specific impairment/s. However, anecdotal evidence suggests some para-athletes exaggerate their level of impairment during the classification process so that they can compete in a category in which they will have a competitive advantage and therefore a greater chance of success (Tweedy & Vanlandewijck, 2011). Although there is a dearth of research in this area, a recent study found para-athletes in the UK and Austria view classification cheating as the greatest integrity issue in para-sport (Weber et al., 2022a).

Another integrity issue specific to para-sport is colloquially known as boosting¹. Autonomic dysreflexia represents an uninhibited sympathetic nervous system response to a noxious stimulus in people with spinal cord injury at the thoracic six (T6) level and above (Mazzeo et al., 2015). Although autonomic dysreflexia can occur inadvertently, purposeful triggering of autonomic dysreflexia for the purposes of performance enhancement ('boosting') is thought to be used by some athletes as a performance-enhancement technique, and involves inflicting self-harm (e.g. winding leg straps too tightly; delivering electric shocks to muscles; constriction of the feet, legs, scrotum, or testicles; bone fracture; catheter locking) to trigger a potent autonomic reflex that can benefit performance through increases in blood pressure and heart rate (Krassioukov & West, 2014; Legg & Mason, 1997). Although boosting is outlawed in para-sport on health grounds and is often assimilated with doping (Mazzeo et al., 2015), it is not included in WADA's Prohibited List.

Given the specific needs of para-athletes and ASP do not appear to be routinely considered within programme design and delivery, there are potential benefits in developing specific recommendations for anti-doping and clean-sport education for these two groups. Such recommendations could help inform the work of those who educate para-athletes and ASP on anti-doping and clean sport (e.g. Anti-Doping Organisations [ADOs]). In addition, they could help academics who may be evaluating the effectiveness of anti-doping and clean sport interventions targeting these groups by highlighting relevant indicators of effectiveness. Finally, such recommendations could inform the work of policy makers who might want to include specific reference to education for para-athletes and ASP in policy documents. For example, WADA could consider including coverage of the specific needs of para-athletes and

ASP in the next iteration of the ISE. Thus, a set of specific recommendations for anti-doping and clean-sport education for para-athletes and ASP – co-created and agreed by experienced anti-doping researchers/practitioners and key representatives of ADOs – could benefit the work of practitioners, academics, and policy makers globally. As such, the primary aim of the current study was to co-create a set of recommendations to inform WADA guidelines for designing and delivering anti-doping and clean-sport education, specifically considering the needs of para-athletes and ASP that would inform future anti-doping and clean-sport education efforts, as well as the work of those evaluating its effectiveness and developing relevant policy. To achieve this aim, we sought input from experienced anti-doping practitioners, para-athletes/ASP, key representatives of funding organizations, researchers with a strong record of accomplishment in empirical work on doping prevention and/or work with para-athletes/ASP.

Methods

Design and data collection

To achieve our aims, we employed the Delphi consensus method (Dalkey, 1969; Jones & Hunter, 1995), identifying and recruiting a panel of experts in the fields of anti-doping and clean-sport education, ASP, and para-sport to identify specific characteristics for the design and delivery of anti-doping and clean sport education unique to para-athletes and ASP. Characteristics rated as being of greatest importance formed the basis of a set of recommendations for the design and delivery of anti-doping and clean-sport education for para-athletes and ASP, and consensus was then sought on the experts' acceptance of these recommendations. Experts were practitioners, policy makers, ASP, para-athletes, and academics with considerable experience working in the fields of anti-doping, clean-sport, ASP, and/or para-sport. Our co-creation approach was also supported through the Clean Sport Alliance (CSA) members who were leading the Erasmus+ Collaborative Partnership research project, RESPECT-P that this research was part of. The CSA consists of academics and education managers from National Anti-Doping Organisations (NADOs) representing five European countries. CSA members were not part of the expert panel, but they contributed to the research design, its implementation, and the data analysis.

Before the study commenced, ethical approval for the study was obtained through the ethics committee of the first author's institution. During the recruitment process, potential participants were informed that their identity and data would remain confidential through use of pseudonyms and group data, and that they were free to withdraw from the study up to two weeks after their final participation. They confirmed they understood this when providing informed consent, which was provided by clicking a link to proceed to the first survey.

Data were collected across four rounds using online questionnaires (see questionnaire development subsection). The first round took place during May and June 2022, with 66 experts providing information on their credentials as experts,

as well as providing possible design and delivery characteristics for anti-doping and clean sport education with para-athletes and ASP to be considered in later rounds in an open text format. In total, 134 experts were invited, giving an acceptance rate of 49.3%. Subsequently, the second round occurred between September and October 2022, whereby 44 (67%) of the Round 1 experts completed a questionnaire assessing the importance of 28 characteristics for clean sport design and delivery. Then, the third round took place in November 2022, whereby 38 (57%) of the Round 1 experts ranked the 27 design and delivery characteristics rated most important in Round 2 for relative importance within their specific categories. Finally, the fourth round was completed during December 2022, with 29 (44%) of the Round 1 experts rating the degree to which they accepted a set of recommendations for the design and delivery of clean sport education for para-athletes and ASP. In addition, they rated the feasibility of delivering these recommendations and identified possible barriers and facilitators to the delivery of the recommendations.

Recruitment and characteristics of expert panel

Our expert panel consisted of suitably qualified individuals, with specific selection criteria for experts from different backgrounds. Experts from an academic background had to have a minimum of five years' experience researching doping, clean sport, classification, and/or boosting (Yap et al., 2014), and have been the lead author on at least one relevant peer-reviewed publication (Addington et al., 2013). In turn, those from a practice-based background were required to have at least five years' experience working in anti-doping and/or clean-sport education and contributed to the development and implementation of a minimum of one clean-sport education programme for an organisation. Finally, those from a governance background had to have at least one year of experience working in anti-doping/clean sport governance in a senior governance position. For para-athletes, they had to have a minimum of five years of experience competing at an

international level in para-sport, plus relevant research experience (e.g. postgraduate-level study involving research; working as a researcher). Finally, ASP had to have had a minimum of five years of experience working as an ASP at an international level, as well as relevant research experience (e.g. PG-level study involving research; working as a researcher). Suitably qualified potential panel members were contacted via email to enquire whether they were interested in participating. Those expressing interest were sent information providing study details and asked to respond confirming whether they would like to participate. Volunteers were then sent a link to the Round 1 questionnaire. All members of our expert panel volunteered their time to contribute to the project, and no compensation was provided. The front page of the questionnaire informed participants that by proceeding to the survey they were consenting to participate in the study. The demographic characteristics of our expert panel evidenced heterogeneity with respect to profession, age, gender, ethnicity, and geographical location across all three rounds (see Tables 1 and 2). In total, 32 countries were represented in Round 1, 30 in Round 2, 28 in Round 3, and 17 in Round 4.

Questionnaire development

Each round of the Delphi involved completion of a specifically designed online questionnaire created by the research team, who have relevant expertise both in survey design and Delphi methods. For the first round, the online questionnaire consisted of two main sections. The first asked questions to determine the demographic background and expertise of the expert member, and the second asked experts to provide what they considered to be the five most important unique (i.e. distinct from anti-doping and clean sport education delivered to non-disabled athletes) needs for anti-doping and clean sport education delivered to (a) para-athletes and (b) ASP. Twenty-eight potential unique needs were derived from a combination of the experts' suggestions from Round 1, the findings from a review of the para-sport research literature, a study involving nine focus groups with elite para-athletes

Table 1. Gender and main roles of expert panel members.

Round	Sex (%)		Main Role (%)						
	Male	Female	Academic	NADO	Governance	ASP	Athlete Researcher	Sport Federation Role	Other
1 (n=66)	50.0	48.5	34.8	27.3	7.6	4.5	3.0	9.0	10.6
2 (n=44)	45.6	50.0	36.4	27.3	6.8	4.5	2.3	9.1	11.4
3 (n=38)	50.0	44.7	39.5	26.3	7.9	5.3	2.6	5.3	10.5
4 (n=29)	51.7	41.4	41.4	31.0	6.9	3.4	3.4	3.4	6.9

Note. Not all percentages add up to 100% because some participants did not provide a response to certain questions.

Table 2. Ethnicity and continent of residence of expert panel members.

Round Number	Ethnicity (%)						Continent of Residence (%)					
	White European	White Non-European	Mixed	Asian	Black Caribbean	Other	Europe	North America	South America	Australasia	Asia	Africa
1 (n=66)	81.1	0.0	3.0	3.0	1.5	3.0	66.6	16.7	7.6	3.0	1.5	1.5
2 (n=44)	84.1	0.0	2.3	4.6	2.3	2.3	68.2	15.9	4.5	4.5	2.3	2.3
3 (n=38)	84.2	0.0	2.6	2.6	2.6	2.6	68.4	15.8	5.2	5.2	0.0	2.6
4 (n=29)	86.2	0.0	0.0	3.4	0.0	3.4	75.9	17.2	3.4	0.0	0.0	3.4

Note. One participant in Round 1 and Round 2 did not report their ethnicity or country of residence. Not all percentages add up to 100% because some participants did not provide a response to certain questions.

across six European countries, and a study involving 41 individual interviews with ASP from six European countries (Patterson et al., n.d.). The review and two studies were part of the same research project as the Delphi study, and the Round 1 survey was designed as an ideas generation phase to complement the potential unique needs derived through these other parts of the project. Respondents were also asked to provide open-text comments at the end of each of the six sub-sections.

In the second round, the questionnaire comprised of two main sections. The first was entitled *Educational Content* and presented 20 items of potential education content across four sections (i.e. anti-doping and clean sport education for para-athletes; non-doping clean sport education for para-athletes; anti-doping and clean sport education for ASP; non-doping clean sport education for ASP) and asked respondents to rate each of these for importance using a scale from 1 (*No Importance*) to 5 (*Maximum Importance*). The second section was entitled *Education Design and Delivery* and presented eight items representing potential aspects of education design and delivery across two sections (i.e. education for para-athletes; education for ASP) for respondents to again rate for importance using a scale from 1 (*No Importance*) to 5 (*Maximum Importance*).

Consistent with the Delphi approach, the Round 3 questionnaire was designed based upon the results from Round 2. There were the same two major sections in this questionnaire, with the first involving rank-order assessments of the *Educational Content* that was rated as being important in Round 2. Specifically, within the same four sub-sections as Round 2, content items rated as important in Round 2 were presented to respondents, who were then asked to rate their relative order of importance. The anchors (i.e. *MOST Important* and *LEAST Important*) were identical across the four sub-sections, but the number of response options differed based upon the number of content items presented. This number ranged from two (i.e. non-doping education for ASP) to eight (i.e. anti-doping and clean sport education for para-athletes). The second major section centred on rank-order assessments of the *Education Design and Delivery* items rated as being important in Round 2. The format replicated that of the first major section, except the number of response options ranged from two (i.e. education design & delivery for ASP) to five (i.e. education design & delivery for para-athletes). As with Round 2, respondents were provided the opportunity to provide open-text comments at the end of each sub-section. In addition, following each of the six ranking exercises, respondents were asked to indicate whether – despite their rankings – they would consider all items within the ranking exercise of equal importance. This was to allow us to capture any instances where experts considered the rank-order assessments forced upon them, and equal importance was their preferred response.

In the final round (Round 4), the questionnaire was framed by a set of recommendations for anti-doping and clean sport education for para-athletes and ASP developed using the Round 3 importance rankings. Specifically, the education recommendations (see Figure 1) consisted of the 27 aspects of anti-doping and clean-sport education content and design and delivery

identified as important in Round 2. These were categorised into the six sub-sections used in Round 2 and Round 3 and prioritised based upon the rankings derived during Round 3. During Round 4, these recommendations were presented to respondents, who were asked to rate aspects of them and provide comments. First, they indicated the degree to which they accepted the recommendations on a scale from 1 (*I do not accept it at all*) to 4 (*I accept it fully*), for para-athlete and ASP recommendations separately. Next, they indicated how feasible they thought it was for

PRIORITY	SECTION A: ANTI-DOPING EDUCATION CONTENT FOR PARA-ATHLETES
HIGH	Tailored education content for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs (e.g., athletes with learning difficulties)
	Para-Athletes' rights during the doping control process (e.g., the right to request modification to the process of sample collection with respect to their physical abilities)
	Details of the doping control process for para-athletes (e.g., how samples are collected, when they might be tested, etc.)
	How the TUE process works and what is required of the athlete throughout this process
MEDIUM	Where and how para-athletes can find support for the TUE process
	Content covering special provision within the doping control process for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs (e.g., providing a sample via catheter)
	The assistance that is available to para-athletes during the doping control process (e.g., chaperones)
LOW	Input from athletes with ADRVs on their experience/story
PRIORITY	SECTION B: NON-DOPING EDUCATION CONTENT FOR PARA-ATHLETES
HIGH	Details of the classification process (how it happens, who is responsible, etc.)
	What intentional misrepresentation is and how the classification process attempts to guard against it
MEDIUM	How to identify when a coach/other ASP may be trying to coerce an athlete into intentional misrepresentation
LOW	Risks/consequences of autonomic dysreflexia (i.e., boosting) for para-athletes with spinal cord injuries
PRIORITY	SECTION C: EDUCATION DESIGN AND DELIVERY FOR PARA-ATHLETES
HIGH	Anti-doping education provided as early as possible in a para-athlete's career to accommodate rapid transitions to higher competitive levels
	Educational materials provided in multiple formats to meet varying disability needs
MEDIUM	Para-sport specific TUE modules to address complex needs (e.g., addressing potential issues caused by complex medication schedules)
	Education provided both in person and online (where appropriate), to facilitate engagement and help address issues around accessibility (e.g., issues with using computers due to disabilities, or mobility issues)
LOW	In-person discussions with experienced para-athletes incorporated in education design (e.g., discussions how to deal with issues during the sample collection process)
	Contribution from medical experts with experience in para-sport included in education development for para-athlete's TUE education
PRIORITY	SECTION D: ANTI-DOPING EDUCATION FOR ATHLETE SUPPORT PERSONNEL
HIGH	How to manage the risks of medication and supplement use by athletes
	The roles and responsibilities of athlete support personnel in preventing doping in sport
	Risk factors for doping in athletes (e.g., team culture, motivational climate) and how athlete support personnel can influence them
MEDIUM	Tailored modules for specific ASP roles that make the education relevant (e.g., how coaches can influence athlete's decisions around doping)
LOW	The role of specific ASP (e.g., coach, team doctor) in the doping control process (e.g., supporting athletes during sample collection)
PRIORITY	SECTION E: NON-DOPING EDUCATION FOR ATHLETE SUPPORT PERSONNEL
HIGH	The role of specific athlete support personnel (e.g., coach, physiotherapist) in the classification process
MEDIUM	Risks/consequences of autonomic dysreflexia (boosting)
PRIORITY	SECTION F: EDUCATION DESIGN AND DELIVERY FOR ATHLETE SUPPORT PERSONNEL
HIGH	Increase the inclusion of interactive educational programmes rather than relying on online courses and brief seminars (e.g., group discussions, case studies, athlete support personnel first voice experiences)
	Include the voice of experienced athlete support personnel in the development of their clean sport education (e.g., a panel representing different athlete support roles providing design input)

Figure 1. Clean sport education recommendations presented in Round 4.

these recommendations to be implemented given current funding levels, using a scale from 1 (*Completely Unfeasible*) to 7 (*Completely Feasible*). Finally, open comments were invited on main barriers and facilitators to the successful delivery of the recommendations.

Data analysis

We analysed the qualitative responses from Round 1 through thematic analysis as described by Riessman (2008), whereby the focus is primarily on the content (i.e. what is said). We chose this approach because it is useful for identifying patterns of meaning (i.e. themes) within qualitative data and interpreting their importance (Braun et al., 2016). This involved the first author engaging critically with the data through reflexive thematic analysis to identify themes/patterns of shared meaning that represented key concepts within the data (Braun & Clarke, 2019). This first involved reading the responses to create initial reflections and annotating them to generate a surface-level description of the data. The second author acted as a critical friend, commenting on these annotations. Based on the annotations, initial codes were then created and refined into a set of codes utilising comments and feedback from the second author. Data themes were then categorised under the five themes described in the results and findings for Round 1.

For quantitative data, analysis involved comparisons of mean ratings and rankings of importance from experts using descriptive statistics.

Results and findings

Round 1

As well as providing information regarding their demographic background and credentials as an expert-panel member (see methods section), in Round 1 experts were asked to suggest unique anti-doping and clean-sport education needs for para-athletes and ASP. Regarding unique needs for clean-sport education delivered to para-athletes, experts suggested a wide range of potential needs that could be collated under five themes. These themes were *Accessibility and Inclusivity* (e.g. 'Include the voice of para-athletes in the development, design and implementation of education programmes'), *Therapeutic Use Exemption (TUE) Issues* (e.g. 'Support available for para-athletes when applying for a TUE'), *Broader Integrity Issues* (e.g. 'Para-sport specific violations of sport integrity [e.g. Boosting, classification manipulation]'), *Working with ASP* (e.g. 'How to manage strict liability when para-athletes are supported by carers'), and *The Doping Control Process* (e.g. 'Assistance para-athletes can request [e.g. chaperons/aides] and their rights during the doping control process').

With respect to unique needs for clean-sport education delivered to ASP, experts suggested potential needs that could be collated under four themes. These themes were *Representing (Para-)Athletes* (e.g. 'Knowledge of medications and the TUE process so ASP can support (para-)athletes appropriately'), *Para-Sport Specific Needs* (e.g. 'The

classification process and potential issues with it'), *Specificity and Timing of Education* (e.g. 'ASP education should include elements directly relevant to their role'), and *Awareness of Risk and Protective Factors* (e.g. 'How the training environment can create risk/protective factors for doping').

As well as representing these nine themes, these suggestions could also be categorised under two overarching categories of *clean-sport education content* and *design and delivery of anti-doping and clean-sport education*. As described in the methods, these suggestions were combined with others derived from the other parts of the broader project this research was part of (i.e. a literature review, individual interviews with ASP, and focus groups with para-athletes). When combined with themes from these other three sources, we had a list of 28 possible unique needs for anti-doping and clean-sport education for para-athletes and ASP that were then rated for importance in Round 2.

Round 2

Table 3 presents the mean expert ratings of importance relating to clean-sport education for para-athletes. For the eight items relevant to anti-doping and clean sport, mean ratings ranged from 3.7 (i.e. Input from athletes with ADRVs on their experience/story) to 4.8 (i.e. The anti-doping control process for para-athletes [e.g. how samples are collected, when they might be tested etc]). In general, mean scores were very similar for all items apart from the lowest scoring item. As a result, the top seven of the eight items were retained for Round 3. For the five items relevant to non-doping clean sport education for para-athletes, mean ratings ranged from 3.4 (i.e. How to identify when a coach/other ASP may be trying to coerce an athlete into intentional misrepresentation) to 3.7 (i.e. Tailored modules for specific classifications [i.e. avoid a one size fits all approach]). In general, mean scores were very similar for all items, so all five items were retained for Round 3. Finally, for the six items relevant to design and delivery of clean sport education for para-athletes, mean ratings ranged from 4.2 (i.e. In-person discussions with experienced para-athletes incorporated in education design [e.g. discussions on how to deal with issues during the sample collection process]) to 4.6 (i.e. educational materials provided in multiple formats to meet varying disability needs). In general, mean scores were very similar for all items, so all six items were retained for Round 3.

Table 4 presents the mean expert ratings of importance relating to anti-doping and clean-sport education for ASP. For the five items relevant to anti-doping and clean sport, mean ratings ranged from 4.5 (i.e. Tailored modules for specific ASP roles that make the education relevant (e.g. How coaches can influence athlete's decisions around doping)) to 4.7 (i.e. The roles and responsibilities of athlete support personnel in preventing anti-doping in sport). Mean scores were very similar for all items, so all items were retained for Round 3. For the two items relevant to non-doping clean sport education for ASP, mean ratings for the two items were similar, so both items were retained for Round 3. Finally, for the two items relevant to design and delivery of anti-doping and clean

Table 3. Mean expert ratings of importance for items relevant to para-athletes.

Items for Anti-Doping Clean Sport Education Content for Para-Athletes	Mean
The anti-doping control process for para-athletes (e.g. how samples are collected, when they might be tested etc)	4.8
Para-Athlete's rights during the doping control process (e.g. the right to request modification to the process of sample collection with respect to their physical abilities)	4.8
What support is available for the Therapeutic Use Exemption (TUE) process	4.7
What assistance is available to para-athletes in the doping control process (e.g. chaperones)	4.6
How the TUE process works and what is required of the athlete	4.6
Tailored education content for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs	4.5
Content covering special provision within the doping control process for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs	4.3
Input from athletes with ADRVs on their experience/story	3.7
Items for Non-Doping Clean Sport Education Content for Para-Athletes	Mean
Tailored modules for specific classifications (avoid a one size fits all approach)	3.7
What intentional misrepresentation is and how the classification process attempts to guard against it	3.6
Details of the classification process (how it happens, who is responsible etc)	3.5
Risks/consequences of boosting (for para-athletes to whom it is applicable)	3.5
How to identify when a coach/other ASP may be trying to coerce an athlete into intentional misrepresentation	3.4
Items for Design and Delivery of Education for Para-Athletes	Mean
Educational materials provided in multiple formats to meet varying disability needs	4.6
Anti-doping education provided as early as possible in a para-athlete's career to accommodate rapid transitions to higher competitive levels	4.5
Para-sport specific TUE modules to address complex needs (e.g. addressing potential issues caused by complex medication schedules)	4.4
Education provided both in person and online (where appropriate), to facilitate engagement and help address issues around accessibility (e.g. issues with using computers due to disabilities, or mobility issues)	4.3
Contribution from medical experts with experience in para-sport included in education development for para-athlete's TUE education	4.3
In-person discussions with experienced para-athletes incorporated in education design (e.g. discussions how to deal with issues during the sample collection process)	4.2

Note. Anchors for rankings were 1 (*No Importance*) to 5 (*Maximum Importance*).

Table 4. Mean expert ratings of importance for items relevant to ASP.

Items for Anti-Doping Clean Sport Education for ASP	Mean
The roles and responsibilities of athlete support personnel in preventing anti-doping in sport	4.7
How to manage the risks of medication and supplement use by athletes	4.6
Athlete support personnel role in the doping control process (e.g. supporting athletes during sample collection)	4.5
Athlete support personnel role in clean sport (e.g. recognition of risk factors for doping such as team environment and ASP's role in those factors, recognition that all ASP have a role to play)	4.5
Tailored modules for specific ASP roles that make the education relevant (e.g. how coaches can influence athlete's decisions around doping)	4.5
Items for Non-Doping Clean Sport Education for ASP	Mean
The role of specific athlete support personnel (e.g. coach, physiotherapist) in the classification process	3.5
Risks/consequences of autonomic dysreflexia (boosting)	3.1
Items for Design and Delivery of Education for Para-Athletes	Mean
Include the voice of experienced athlete support personnel in the development of their clean sport education (e.g. a panel representing different athlete support roles providing design input)	4.5
Increase the inclusion of interactive educational programmes rather than relying on online courses and brief seminars (e.g. group discussions, case studies, athlete support personnel first voice experiences)	4.5

Note. Anchors for rankings were 1 (*No Importance*) to 5 (*Maximum Importance*).

sport education for ASP, mean ratings for the two items were again similar, so both items were retained for Round 3.

Round 3

Mean rankings for the items relating to clean-sport education for para-athletes can be found in Table 5. For the eight

anti-doping and clean-sport education items, we found a mean ranking of 3.40 for the item ranked as most important (i.e. 'Tailored education content for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs [e.g. athletes with learning difficulties]') and of 5.60 for the item ranked as least important (i.e. 'Input from athletes with ADRVs on their experience/story'). In turn, for the four items relating to non-doping clean-sport education, we obtained a mean ranking of 1.60 for the item ranked as most important (i.e. 'Details of the classification process [how it happens, who is responsible etc]') and of 3.30 for the item ranked as least important (i.e. 'Input from athletes with ADRVs on their experience/story'). Finally, for the six items relating to education design and delivery for para-athletes, we attained a mean ranking of 2.70 for the item ranked as most important (i.e. 'Educational materials provided in multiple formats to meet varying disability needs') and of 4.30 for the item ranked as least important (i.e. 'Contribution from medical experts with experience in para-sport included in education development for para-athlete's TUE education').

Table 6 illustrates the mean rankings for the items relating to clean-sport education for ASP. For the five anti-doping and clean-sport education items, we found a mean ranking of 2.60 for the item ranked as most important (i.e. 'How to manage the risks of medication and supplement use by athletes') and of 3.70 for the item ranked as least important (i.e. 'The role of specific ASP [e.g. coach, team doctor] in the doping control process [e.g. supporting athletes during sample collection]'). For the two items relating to non-doping clean-sport education, we obtained a mean ranking of 1.2 for the item ranked as most important (i.e. 'The role of specific athlete

Table 5. Mean expert rankings for items relevant to para-athletes in Round 3.

Items for Anti-Doping Clean Sport Education for Para-Athletes (1-8 Ranking)	Mean Ranking
Tailored education content for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs (e.g. athletes with learning difficulties)	3.40
Para-Athletes' rights during the doping control process (e.g. the right to request modification to the process of sample collection with respect to their physical abilities)	3.60
Details of the doping control process for para-athletes (e.g. how samples are collected, when they might be tested, etc)	3.80
How the TUE process works and what is required of the athlete throughout this process	4.40
Where and how para-athletes can find support for the TUE process	4.90
Content covering special provision within the doping control process for para-athletes with particular issues in relation to the doping control process that highlights aspects relevant to their needs (e.g. providing a sample via catheter)	5.10
The assistance that is available to para-athletes during the doping control process (e.g. chaperones)	5.20
Input from athletes with ADRVs on their experience/story	5.60
Non-Doping Clean Sport Education Content for Para-Athletes (1-4 Ranking)	
Details of the classification process (how it happens, who is responsible etc)	1.60
What intentional misrepresentation is and how the classification process attempts to guard against it	2.10
How to identify when a coach/other ASP may be trying to coerce an athlete into intentional misrepresentation	3.00
Risks/consequences of autonomic dysreflexia (boosting) for para-athletes with spinal cord injuries	3.30
Education Design & Delivery for Para-Athletes (1-6 Ranking)	
Educational materials provided in multiple formats to meet varying disability needs	2.70
Anti-doping education provided as early as possible in a para-athlete's career to accommodate rapid transitions to higher competitive levels	2.70
Para-sport specific TUE modules to address complex needs (e.g. addressing potential issues caused by complex medication schedules)	3.60
Education provided both in person and online (where appropriate), to facilitate engagement and help address issues around accessibility (e.g. issues with using computers due to disabilities, or mobility issues)	3.70
In-person discussions with experienced para-athletes incorporated in education design (e.g. discussions how to deal with issues during the sample collection process)	4.00
Contribution from medical experts with experience in para-sport included in education development for para-athlete's TUE education	4.30

Note. Anchors for rankings were 'Most important' and 'LEAST important'.

Table 6. Mean expert rankings for items relevant to ASP in Round 3.

Items for Anti-Doping Clean Sport Education for ASP (1-5 Ranking)	Mean Ranking
How to manage the risks of medication and supplement use by athletes	2.60
The roles and responsibilities of athlete support personnel in preventing anti-doping in sport	2.70
Risk factors for doping in athletes (e.g. team culture, motivational climate) and how athlete support personnel can influence them	2.80
Tailored modules for specific ASP roles that make the education relevant (e.g. how coaches can influence athlete's decisions around doping)	3.10
The role of specific ASP (e.g. coach, team doctor) in the doping control process (e.g. supporting athletes during sample collection)	3.70
Non-Doping Clean Sport Education Content for ASP (1-2 Ranking)	
The role of specific athlete support personnel (e.g. coach, physiotherapist) in the classification process	1.20
Risks/consequences of autonomic dysreflexia (boosting)	1.80
Education Design & Delivery for ASP (1-2 Ranking)	
Include the voice of experienced athlete support personnel in the development of their clean sport education (e.g. a panel representing different athlete support roles providing design input)	1.50
Increase the inclusion of interactive educational programmes rather than relying on online courses and brief seminars (e.g. group discussions, case studies, athlete support personnel first voice experiences)	1.50

Note. Anchors for rankings were 'most important' and 'LEAST important'.

support personnel [e.g. coach, physiotherapist] in the classification process' and of 1.8 for the item ranked as least important (i.e. 'Risks/consequences of autonomic dysreflexia [boosting]'). Finally, both items relating to education design and delivery for ASP had a mean ranking of 1.5 and were therefore considered to be of equal importance.

Round 4

Regarding the degree to which they accepted the recommendations for education for para-athletes, 69.0% (i.e. $n=20$) of

the panel members accepted them fully, 27.6% ($n=8$) accepted them mostly but would like some small changes and 3.4% (i.e. $n=1$) accepted them partly. With respect to the degree to which they accepted the recommendations for education for ASP, 72.4% (i.e. $n=21$) of panel members accepted them fully, 27.6% ($n=8$) accepted them mostly but would like some small changes, 10.3% (i.e. $n=3$) accepted them partly, and 3.4% (i.e. $n=1$) did not accept them at all.

In terms of those who partly accepted the recommendations for para-athletes, there was no common theme to the suggested revisions. Some comments related to a lack of agreement with priorities rather than missing content, but there was no consensus on how the priorities should be changed. For example, one expert suggested 'Boosting should be high priority', whereas another said '...prioritizing intentional misrepresentation still seems odd to me. What is the scale of this problem versus, say, athletes not being accommodated or supported adequately?' Two experts felt non-doping items should not be included because the matters they related to (e.g. boosting, classification fraud) did not fall within the current jurisdiction of their ADO. For instance, one said: 'we do not educate on non-anti-doping items, so I am unsure why they are included', whereas another said 'non-doping education content for para-athletes is not within our anti-doping organizations responsibility'. As most experts accepted the recommendations as presented and there was no consensus on required revisions, we accepted the recommendations for para-athletes (see Figure 1).

Regarding those who partly accepted the recommendations for ASP, again there was no common theme to the suggested revisions. Comments that were made again related to a lack of agreement with priorities rather than missing content, but as with the para-athlete recommendations there was no consensus on how the priorities should be changed. For example, one expert suggested 'I would have ranked

'How to manage the risks of medication and supplement use by athletes' with a medium priority', whereas another said, 'How ASP can support athletes who require modifications or accommodations should be high priority'. Again, the same two experts felt the non-doping items should not be included because the issues they address are not currently part of the anti-doping and clean sport education they deliver. For instance, one said: 'We generally don't address non-anti-doping related issues', whereas the other said 'non-doping education for athlete support personnel is not within our anti-doping organization's responsibility'. As most experts accepted the recommendations as presented and there was no consensus on required revisions, we accepted the recommendations for ASP (see Figure 1).

With respect to the feasibility of delivering the recommendations for para-athletes given current funding levels, there was limited consensus on this (see Figure 2). Specifically, only five of the 24 experts who provided a rating felt it was completely feasible. Our analysis of the qualitative data on why delivery is not feasible given current levels of funding identified lack of resources as the strongest theme. For some this related 'especially to human resources', others identified a need for 'sources of income for this project', whereas for others it was both, 'I don't see where the resources (I am not only talking about money) should come from'. The need for further financial resources was emphasised, and one expert identified the additional financial investment needed for designing education for those with diverse needs, suggesting '...additional investment is always required to develop, test, and distribute [e.g. braille, screen reader compatibility, more in-person or individualized education, large text versions of print materials, alternate wording for athletes with intellectual impairments, etc.]'. Similarly, another stated, 'The big challenge is creating accessible materials, programs, and courses that meet the needs of all abilities, socioeconomic perspectives, and regions. This will need significant consideration'.

Interestingly, several experts suggested many organisations are already under-funded, and creating bespoke resources would place an additional burden on them. Another felt more of the funding allocated to ADOs would need to be allocated to education, explaining,

Education funding as a proportion of overall anti-doping spend per ADO remains low across world sport. This is improving since the ISE mandated education compliance, but it will still take time before this provides a better funding balance and more funding for specialist education. Training is also required to deliver this specialist content, which again requires more resources (and specialist trainers).

Experts raised two additional barriers to delivery around a lack of time ('I think to educate para-athletes on the whole curriculum needs quite a lot of time. As the education is not mandatory at the moment, I do not think that athletes see the education as important as training sessions, etc.') and a lack of clarity around who should be responsible for engaging para-athletes ('Unfortunately, very few stakeholders (other than the IPC) seem to feel responsible for the education of para-athletes').

In terms of the feasibility of delivering the guidelines for ASP given current funding levels, again there was limited consensus regarding the feasibility of delivering 100% of the guidelines (see Figure 2). Notably, there was a tendency for experts to perceive that delivery of the guidelines with current funding was more feasible for the ASP guidelines than for the para-athlete guidelines. The qualitative comments supported this finding, with one expert saying, 'Not as demanding as the recommendations for athletes' and another stating, 'This is a smaller, professionalized audience to accommodate and would likely not require the same outlay of capital to develop for'. With regards to capital, a lack of resource was identified as the main barrier to implementing the ASP guidelines (much like the para-athlete guidelines). Specific to ASP, another barrier to implementation related to engagement of ASP. One expert said,

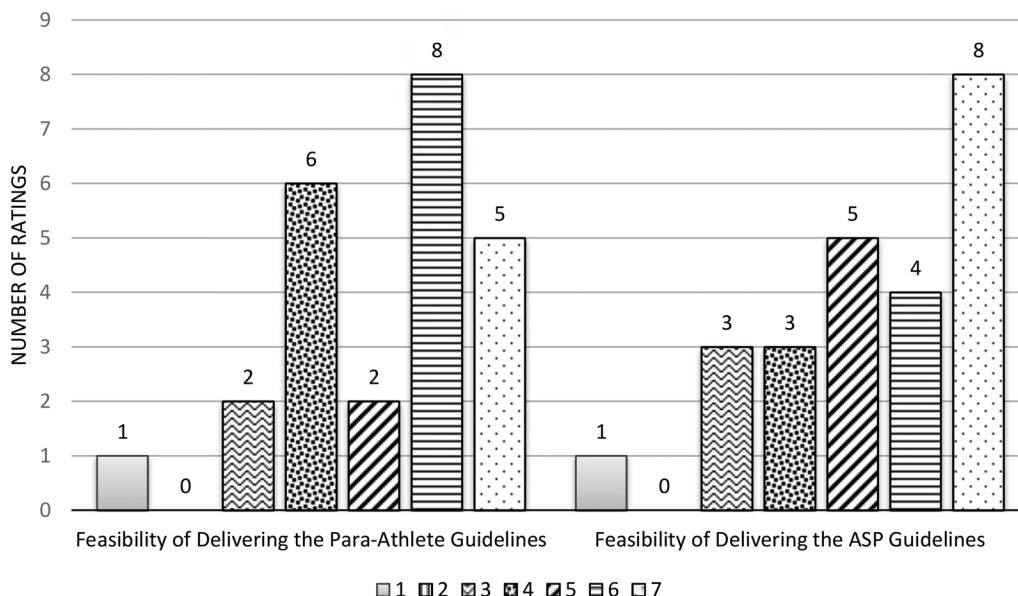


Figure 2. Feasibility ratings for delivering the recommendations given current levels of funding in Round 4. Note. Ratings were provided on a scale of 1 (completely unfeasible) to 7 (completely feasible).

In addition to access to resources, a challenge will be the availability and motivation of ASP to participate. Section F (i.e. ASP guidelines) will be much harder to implement because it will rely on having sufficient resources and the willingness and ability of ASP to participate. The focus of Section F includes a lot of in-person and detailed activities and conversations. While some, maybe many ASP, will find these sessions beneficial, I'm not sure that we'd see the vast majority participate unless obstacles to participation are identified and removed.

Regarding facilitators to implementation, the overarching theme related to engagement with and support from key organisations such as WADA, the IPC, International Federations (IFs), and ADOs. For instance, one expert stated, 'Having real support from WADA for this task, and not just transferring responsibility out'. Some did suggest that mere engagement with some organisations may not be enough if there is no real appetite for enacting certain aspects of the recommendations. Specifically, one respondent said, 'There needs to be a desire, particularly at [the] IPC level to approach the topic of IM [Intentional Misrepresentation] in a different way than previously'.

Some experts also described actions by some key organisations that could help facilitate delivery of the recommendations. Most of these actions related to adjustments to – or creation of – relevant policy or recommendations. For instance, one expert suggested 'Some centralized and authoritative guidance, like the Guidelines to the International Standard for Education, would help standardize approaches across the international community'. Similarly, others said the recommendations we created should be '...anchored in the Anti-Doping Code and relevant standards'. It was also suggested that 'The WADA compliance framework is a good 'stick' to start moving the provision of anti-doping education on from the proportionally low level of funding and attention it has typically received from ADOs'. Interestingly, the latter expert went on to say,

WADA's work on anti-doping role descriptors will also standardise education roles within the anti-doping industry and should help drive (and incentivise) high standards of professional to work within the field. This has also had an effect in starting to build an education community across ADOs, and shared practices and tools are now increasingly disseminating around the world.

Although, nobody mentioned specific organisations, those seen as 'fund holders' were singled out as being important facilitators of delivery of the recommendations we have created, and other experts referred to 'adequate funding' and 'translation tools and budgets' as being essential to ensuring implementation.

Beyond engagement with – and support from – key stakeholders, a few experts referred to the importance of training educators more effectively, mentioning 'Proper training of the educators' and '...well-trained trainers/promoters/educators'. 'The commitment of the athletes and ASP' was also mentioned, suggesting the need for both groups to 'buy in and consider this not as necessity but as intrinsically important to them'. Related to this, one expert highlighted the need for 'A focus on the benefits to athletes and ASP. This shouldn't be framed as an issue of compliance - that is, something that must be done or completed. Instead, the focus should be on

how this will help and be of interest to athletes and ASP'. Thus, focusing on 'intrinsic motivation' to promote 'willingness to engage, interest in the topic area and agreement with key anti-doping values' was viewed as another potential facilitator of the recommendations' successful implementation.

Discussion

By engaging anti-doping experts in a Delphi study, we achieved our aim of co-creating a set of recommendations for designing and delivering anti-doping and clean-sport education considering the specific needs of para-athletes and ASP. As well as potentially informing future anti-doping and clean-sport education efforts, this work has relevance to those evaluating the effectiveness of education programmes and developing relevant policy. Implementation of these recommendations has the potential to improve anti-doping and clean sport education for para-athletes and ASP, and in turn to reduce doping and promote clean sport behaviours. The recommendations we developed include 18 recommendations across three categories (i.e. anti-doping education content; non-doping education content; education design and delivery) for para-athletes, with high priority items including (a) *Details of the doping control process for para-athletes (e.g. how samples are collected, when they might be tested, etc.)*, (b) *Details of the classification process (how it happens, who is responsible, etc.)*, and (c) *Education materials provided in multiple formats to meet varying disability needs*. For ASP, the recommendations incorporated nine recommendations across the three categories (i.e. anti-doping education content; non-doping education content; education design and delivery), with high-priority items including: (a) *How to manage the risks of medication and supplement use by athletes*, (b) *The role of specific athlete support personnel (e.g. coach, physiotherapist) in the classification process*, and (c) *Increase the inclusion of interactive educational programmes rather than relying on online courses and brief seminars (e.g. group discussions, case studies, athlete support personnel first voice experiences)*. In addition, we collected data on feasibility of delivering the recommendations and key barriers and facilitators to their delivery. In the upcoming sections, we discuss the main findings of this research and make recommendations on how to maximise the likelihood of the implementation of the clean-sport education recommendations for para-athletes and ASP.

Education content

To be meaningful and valid, anti-doping education should be clear on what is to be achieved through education (Petróczi & Boardley, 2022). Of the four high-priority items for anti-doping content in the para-athlete recommendations, three of the four related to the doping control process. As such, the experts felt the doping control process – which can be quite different for para-athletes compared to non-disabled athletes – is an important topic to address in anti-doping education for para-athletes. Recently, the IPC published a doping control guide for testing athletes in parasport (IPC, 2021). For example, the IPC recommends that athletes with a vision or intellectual impairment have a representative with

them throughout the sample collection session, and that for athletes who use urine drainage systems the witnessing doping control officer/chaperone should check that the catheter is connected to the athlete's body and that the urine sample is coming from the athlete. Although this guide is available, if the information on modifications to the doping control process and the rights and responsibilities of para-athletes detailed within it is not covered in education delivered to para-athletes, this could lead to para-athletes not benefiting from the adjustments that have been made to consider particular impairments. This could lead to para-athletes having less than optimal experiences with doping control, and such perceived shortcomings in doping control procedures have been linked with distrust of the system and anxiety in athletes (Martinelli et al., 2023; Overbye, 2016; Petróczi et al., 2021; Woolway et al., 2020).

Whilst the specific content for para-athletes identified by the experts focused on the doping control process – and to a lesser degree support for TUE applications – it is important to recognise para-athletes should still receive other types of anti-doping and clean sport education specified in the ISE, beyond information provision. Past research has shown anti-doping education that focuses only on information provision can lead to inferior outcomes compared to multifaceted education (Gatterer et al., 2021). Specifically, Gatterer et al. (2021) evaluated perceptions of anti-doping education in over 2000 young elite athletes participating at Youth Olympic events between 2018 and 2020 and found athletes who received information only scored the content of their education as less useful and had lower trust in it compared to those who received multifaceted education. Thus, although education programmes for para-athletes should include the content identified in the recommendations we developed, this should be delivered alongside other aspects of education specified in the ISE (e.g. anti-doping education, awareness raising, values-based education; WADA, 2021).

Regarding anti-doping content for ASP, proposed content had relevance for both inadvertent ADRVs and intentional doping. With respect to inadvertent ADRV, the focus was on supporting athletes in managing the risks associated with medication and supplement use, whereas for intentional doping it centred on the roles and responsibilities of ASP in preventing doping and recognising and influencing risk factors for doping (e.g. team culture; motivational climate; WADA, 2022). Research to date examining ASP and doping prevention would suggest there may be a difference in how receptive ASP will be to education focused on inadvertent versus intentional doping. More specifically, work in this area suggests coaches – potentially the most influential category of ASP – are often more aware and appreciative of the risks of inadvertent doping than they are for intentional doping. For instance, Allen et al. (2017) conducted interviews with Scottish high-performance coaches, finding whilst many downplayed the potential for intentional doping, all 17 interviewees acknowledged the risk posed by inadvertent doping. However, whilst coaches appear aware of the threat posed by inadvertent doping, further work with football and rugby coaches indicates coaches are often reactive rather than proactive when addressing inadvertent doping, only responding when

athletes approach them with queries rather than proactively addressing how to minimise risks associated with medication and supplement use (Patterson & Backhouse, 2018). In contrast, recent research in rugby has shown medics and nutritionists tend to be more proactive in addressing inadvertent doping than coaches, probably because their day-to-day duties frequently cross into the areas of medications and supplements (Patterson et al., 2022). Thus, when delivering education on inadvertent doping, educators should consider the degree to which the specific ASP they are working with need prompting to address this topic proactively. With respect to intentional doping, there may need to be an initial focus on identifying the relevance of this topic to the specific role(s) of the ASP being educated before starting to cover content relating to risk factors for intentional doping. This is because past research has shown ASP often downplay the relevance of intentional doping, suggesting it is not an issue in their sport (e.g. Engelberg & Moston, 2016). Such attitudes are likely to be problematic from an engagement perspective, if education is not perceived as relevant, ASP may not engage sufficiently during education nor then apply it in their everyday practice (Patterson et al., 2014). Thus, educators working with ASP may need to approach content relating to inadvertent and intentional doping differently, accounting for differing levels of pre-existing interest in – and appreciation of the relevance of – the two topics.

In addition to the content relating to anti-doping, the experts also endorsed the inclusion of content that addressed broader integrity issues in para-sport for clean sport education for para-athletes and ASP. This content specifically related to the classification process and attempts to manipulate it to gain an advantage, as well as self-induced autonomic dysreflexia (i.e. boosting), with the former generally seen as being a higher priority. The inclusion of this content, especially with respect to classification issues such as intentional misrepresentation, is consistent with recent research that has found para-athletes consider classification cheating as synonymous with doping and as the most significant integrity issue in para-sport at present (Weber et al., 2022a). Even more recently, semi-structured interviews with 41 ASP from six European countries identified classification fraud as a major integrity issue for ASP working in para-sport (Patterson et al., 2023). Similarly, Weber et al. (2022b) found coaches from Germany and the UK also saw classification cheating as a major integrity issue in para-sport, with individual coaches stating it is the 'doping of disabled sport' and a 'bigger issue than doping'. The classification system is fundamental to parasport, as it provides a framework to determine who is – and is not – a para-athlete, and without it legitimate parasport competitions are not possible (Mann et al., 2021). However, because impairment-related performance limitations differ across sports, different classification systems are needed for each sport. Importantly, the development of evidence-based methods of classification has been challenging for several sports, which means for some sports there is potential to take advantage of weaknesses in the classification system through intentional misrepresentation (Tweedy et al., 2014). Para-athletes and ASP therefore need to receive education that provides them with the knowledge and skills to

understand the classification process and comply with it appropriately. They also need to appreciate its limitations and identify when others may be intentionally misclassifying athletes to gain an advantage. Thus, the educational recommendations for para-athletes and ASP presented here are consistent with the latest evidence relating to major integrity issues in para-sport and support calls for investment in anti-doping and broader clean sport education in disabled sport (Weber et al., 2022a; Van de Vliet, 2012).

Education design and delivery

As well as identifying the content to be included, the recommendations developed here have also provided specific recommendations for the design and delivery of education for para-athletes and ASP. For para-athletes, there were a total of six recommendations, with *anti-doping education provided as early as possible in a para-athlete's career to accommodate rapid transitions to higher competitive levels* and *educational materials provided in multiple formats to meet varying disability needs* being the highest priority items. The first recommendation is consistent with research with para-athletes in which it was suggested education comes too late and needs to start much earlier in a para-athletes career, before they start competing at higher levels (Weber et al., 2022a). Values-based education provides a good opportunity to deliver education earlier in para-athletes' careers within the framework provided by the ISE (WADA, 2021), as it suggests values-based education is likely to be most effective early in an athlete's career, when relevant targets for such education (e.g. moral values and attitudes) are more amenable to change (Backhouse et al., 2012; Ntoumanis et al., 2014). Implementing such approaches with young para-athletes may help them cope better with pressure situations that they subsequently experience in their sporting careers (Gatterer et al., 2020). For instance, a para-athlete may be encouraged to intentionally misrepresent by a member of their support team, and strong moral values could help them resist such encouragement. Alongside starting education early, the experts identified and prioritised the need to provide educational materials in multiple formats to meet varying disability needs. For instance, para-athletes with impairments in vision may need materials delivered in auditory rather than written form. Such changes to delivery would require investment. This would especially be the case for some ADOs, as there are currently significant perceived disparities between the funding for – and quality of – anti-doping education delivered to para-athletes across countries (Weber et al., 2022a).

For ASP, there were two items relating to the design and delivery of education (i.e. *Increase the inclusion of interactive educational programmes rather than relying on online courses and brief seminars [e.g. group discussions, case studies, athlete support personnel first voice experiences]; Include the voice of experienced athlete support personnel in the development of their clean sport education [e.g. a panel representing different athlete support roles providing design input]*), with both considered to be high priority. Both items have the potential to increase engagement with anti-doping and clean sport education amongst ASP. Taking coaches as an example, although WADA and individual ADO's (e.g. United Kingdom Anti-Doping) have

developed and promoted targeted education programmes for this category of ASP, to date such programmes have largely been delivered online (Patterson et al., 2014). It is possible that the reliance on online delivery explains – at least in part – the low levels of engagement with such programmes identified by Patterson et al. (2014). Thus, the increased use of interactive educational programmes with direct design input from experienced ASP as advocated presently could help increase levels of engagement from ASP. Research with coaches has previously signalled the need for interactive education opportunities some time ago (e.g. Patterson et al., 2019). Such design and delivery approaches could not only make the educational experience more enjoyable, but also increase the apparent relevance of anti-doping and clean sport education to ASP, which has been highlighted as a major barrier to engagement previously (Mazanov et al., 2014). It is possible that this development in ASP clean sport education has not yet been enacted by organisations because delivering education in person requires more financial investment than online delivery, and as with para-athletes, ASP have previously identified significant disparities in investment in anti-doping education across countries (Weber et al., 2022b). The importance of addressing barriers to delivery such as resource issues will be addressed in the ensuing section.

Barriers and facilitators

Whilst consensus was reached amongst the expert panel on the education recommendations for para-athletes and ASP, there was far less agreement on the feasibility of delivering the recommendations given current levels of funding. Whilst this may not seem commensurate with the apparent need for investment in the development of new programmes and materials, qualitative responses revealed several experts believed a greater proportion of overall funding for ADOs should be redirected from other areas (e.g. testing) to education. Such redirection of funding could therefore allow the development of new educational resources for para-athletes and ASP without additional funding.

Whilst, as described above, some experts suggested the redirection of funding to improve delivery of education for para-athletes and ASP, a lack of financial and human resources was outlined by several experts as a barrier to delivery. This barrier to delivery is consistent with past research examining the status of anti-doping education for coaches, that concluded that future provision of effective anti-doping education for coaches was limited by the resources available to the organisations responsible for its design and implementation (Patterson et al., 2016). Similarly, with respect to delivery of anti-doping and clean sport education more generally, Gatterer et al. (2020) found limitations in financial and personnel resources was the most frequently reported barrier to the delivery of effective education. As further limitation to effectiveness, Petróczi and Boardley (2022) highlighted the need to have clearly set educational goals the anti-doping/clean sport educational programmes wish to achieve, which also requires resources in terms of having staff with suitable expertise, skills and experience, or funds to engage external experts or service providers. Such constraints were viewed as

an explanation for why many NADOs mainly focus on knowledge-based prevention programs, and face difficulties when it comes to the design and delivery of multifaceted values-based approaches. Thus, whilst the redirection of funds from other areas of anti-doping may help with the development and implementation of specific education programmes for para-athletes and ASP, additional financial and human resources may be needed to deliver everything included in these recommendations. Effective prevention education is both time- and resource-intensive (see Backhouse et al., 2012), and as such there is a need to dedicate sufficient funds if we want to maximise the effectiveness of clean sport and anti-doping education.

Beyond redirection of funds, experts suggested additional facilitators for the delivery of the recommendations. One of these further suggestions related to the development of centralized and authoritative guidance and policy that stipulated a requirement for ADOs to design and deliver the clean sport and anti-doping education described in the recommendations. As suggested by one expert, a future iteration of the ISE would appear to be one relevant policy through which this suggestion could be implemented. Incorporating such requirements in the ISE – with support from WADA's compliance framework – would not only ensure all ADOs deliver such education but should also help standardize approaches across the international community globally and make certain its delivery is monitored and evaluated. To help facilitate delivery of their international standards, WADA produce and publicise official Level 3 guidelines (see 2021) such as those created for the ISE. An ideal outcome would be for WADA to adopt the recommendations presented here and incorporate them within the next set of official guidelines supporting delivery of the ISE. Engagement with – and support from – stakeholders was also suggested as a potential facilitator. Beyond WADA, other key stakeholders include the IPC, IFs, and ADOs. For elements of the recommendations not related to anti-doping (i.e. classification fraud and autonomic dysreflexia), the IPC could develop guidance and policy for IFs and National Olympic Committees to create education programmes to ensure para-athletes and ASP receive appropriate education relating to these topics.

Another suggested facilitator – specific to ASP – was to make education delivery for ASP more intrinsically motivating to promote engagement with it. Based on the main tenets of self-determination theory (Deci & Ryan, 2000; Ryan & Deci, 2000), to do this we need to enhance ASP's competence around clean sport through effective education, augment their autonomy by giving them choices and decision-making capacity around how education is delivered, and promote relatedness through community-based activities that highlight connections between ASP related to clean sport promotion. Relatedly, recent anti-doping research has shown it is possible to train coaches to adopt a more motivationally supportive communication style when discussing doping-related issues with athletes (Ntoumanis et al., 2021). As such, it may be possible to train anti-doping educators to deliver education to ASP with a more motivationally supportive style, which based on the tenets of self-determination theory would have the potential to make anti-doping and clean sport education more intrinsically motivating.

Limitations and future directions

Whilst the current research successfully achieved its stated aims, the findings should be considered alongside a small number of limitations. One limitation was the degree of geographical representation we achieved in our expert panel. Whilst we were successful in recruiting panel members from six continents, most of our panel members resided in Europe and North America, with the lowest rates of representation from Asia and Africa. This could mean that we missed some content, design, or delivery elements that are preferred or prioritised in those regions, as well as missing some cultural subtleties. Thus, whilst our coverage of a wide range of geographical regions was consistent with the relevant strategic priority of WADA's social science research strategy (WADA, 2023), future research is encouraged in the regions where we did not have good coverage to ensure any important elements of cultural distinctions were not missed. Similarly, it is possible that by constraining expert membership to those experts who could communicate in English, we may have missed additional input from experts who are not able to communicate in this language. However, given English is one of the major languages used by WADA, we believe it is reasonable to assume that the majority of those with the relevant expertise to be part of our panel can communicate in written English.

Next, whilst attrition between adjacent rounds was not too extensive, across the four rounds of the Delphi study we did experience attrition of over 50%. Although this is not unusual in Delphi studies due to the iterative nature of the method (Gargon et al., 2019), it does mean the consensus we achieved in Round 4 was achieved without the input of many of the initial panel members. On the positive side, however, the relative representation of males and females and across the various occupational roles was quite stable across the four rounds, meaning attrition was not more pronounced for one sex or occupational role.

Finally, there have been calls to follow Delphi studies with follow-up qualitative research to generate depth and a more complete understanding of the experts' views (Monforte et al., 2022). Following the current study with a qualitative study could aid our understanding of some of the issues raised, especially those relating to barriers to implementation and how to overcome them. As well as potentially contributing to the development of effective educational programmes and policies, such a follow-up study could help recognise and tackle dissent that may be masked by the consensus building approach of the Delphi method (Shrier, 2021).

Conclusion

Through a rigorous line of research involving a global panel of experts over four rounds of data collection, we established a set of recommendations for anti-doping and clean sport education specifically for para-athletes and ASP. Not only do these recommendations provide immediate benefits for practitioners designing and delivering anti-doping and clean sport education for these two groups, they also have the potential to inform the work of policy makers looking to improve and standardise educational practice in these areas. To facilitate

the implementation of the recommendations, we also identified key barriers to delivery as well as ways to overcome them. Whilst lack of resource was viewed as a potential barrier, the development of appropriate policy and implementation of compliance frameworks were identified as ways to ensure organisations reallocate funding to these areas and ensure the needs of para-athletes and ASP are suitably addressed. Such policy could also allow organisations to lobby for increased funding to allow them to address new areas of education delivery. To date, it could be argued that para-athletes and ASP have been underserved in the design and delivery of anti-doping and clean sport education. Hopefully, the recommendations developed and presented here go some way to ensuring this is not the case in the future.

NoteNotes

1. Boosting is specific to wheelchair athletes with spinal cord injuries, characteristically at or exceeding the spinal level of T6 (Karlsson, 1999).

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