Identifying the Unique Needs for Clean-Sport Education for Para-Athletes and Athlete-Support Personnel: An International Delphi Study

Ian D. Boardley[a], Martin Chandler[a], Andrea Petróczi[b,c], Laurie Patterson[d], & Susan H. Backhouse[d]

[a]University of Birmingham, Edgbaston, Birmingham, United Kingdom. B15 2TT. I.d.boardley@bham.ac.uk; M.chandler@bham.ac.uk

[b]Kingston University London, Kingston, London, United Kingdom. KT1 2EE. A.petroczi@kingston.ac.uk

[c]Eötvös Lóránd Tudományegyetem (ELTE), Budapest, Hungary

[d]Leeds Beckett University, Headingley, Leeds, United Kingdom. LS16 5LF. S.backhouse@leedsbeckett.ac.uk; L.patterson@leedsbeckett.ac.uk

Corresponding author: Ian D. Boardley (I.d.boardley@bham.ac.uk)

This is a preprint version of the article, prior to submission for publication.

Please cite as: Boardley, I. D., Chandler., M., Petróczi, A., Patterson, L., & Backhouse, S. H. (2023). Investigating anti-doping roles of athlete support personnel working with international disabled athletes in six European nations using the COM-B Model and Theoretical Domains Framework. *SportRχiv*.

Submitted: 26th February 2023

Identifying the Unique Needs for Clean-Sport Education of Para-Athletes and Athlete-Support Personnel: An International Delphi Study

Abstract

Background: To date, clean-sport education has not been purposefully designed to address the needs of para-athletes and athlete-support personnel (ASP). To maximize the effectiveness of clean-sport education for these important groups, this study co-created the first set of recommendations for clean-sport education identifying their specific needs.

Methods: The Delphi method was used to develop the education recommendations. 134 stakeholders representing anti-doping, para-sport, and ASP with relevant expertise were invited to be panel members. In Round 1, the expert panel (n = 66) suggested potential items for clean-sport education delivered to para-athletes and ASP. The findings from Round 1 were then integrated with items from a review of relevant literature, interviews with 41 ASP, and nine focus groups with para-athletes across six countries to form a survey assessing the importance of 28 potential items for inclusion in the recommendations. In Round 2, an expert panel (n = 44; 67.7% response rate) completed this questionnaire. In Round 3, panel members (n = 38; 57.6% response rate) ranked for relative importance the topic areas rated highest in Round 1. Based on these rankings, a draft set of recommendations was created. In Round 4, panel members (n = 29; 43.9% response rate) rated the degree to which they accepted these recommendations and the feasibility of their delivery, as well as identifying possible barriers and facilitators to their implementation.

Results: The results of Round 2 and Round 3 were used to create a set of educational recommendations consisting of 18 items for para-athletes and nine items for ASP. In Round 4, the para-athlete recommendations were either fully (n = 18), mostly (n = 8) or partly accepted (n = 1) by the panel, whereas those for ASP were either fully (n = 19), mostly (n = 4) or partly accepted (n = 3). One panel member did not accept the ASP recommendations at all.

Conclusions: Para-athletes and ASP have been underserved in the design and delivery of anti-doping and clean sport education. Directly addressing their specific educational needs in relevant policy (e.g., WADA ISE) would help ensure their needs are effectively and consistently addressed in future education delivery.

Key words: anti-doping, policy, clean sport, athlete, doping behavior, prevention, education.

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], 2020a), research evidence still shows prevalence rates that illustrate doping continues at concerning levels (Faiss et al., 2020; Gleaves et al., 2021). Evidence that the proposed deterrent effect of testing and sanctions is insufficient to eradicate doping or at least reduce it to acceptable levels has led to increased attention being paid to anti-doping education by WADA (Woolf, 2020). This increased focus on education culminated in the inclusion of an International Standard for Education (ISE) in conjunction with the most recent version of the World Anti-Doping Code (WADA, 2020a). This shift in focus 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 control testing (WADA, 2022). However, whilst it is hoped the ISE will lead to a step-change in the quality and effectiveness of education delivered by Anti-Doping Organizations (ADOs), education design is not always tailored specifically towards the needs of those who receive anti-doping and clean sport education.

Para-athletes represent one group with specific educational needs that are not currently considered in clean sport education design. According to the World Health Organisation, an estimated 1.3 billion people – or 1 in 6 people worldwide – experience significant disability (World Health Organisation, 2022). The International Paralympic Committee (IPC) 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, as with non-disabled sport use of illicit performance-enhancing substances by para-athletes continues to be a concern (Weber et al. 2022a; Webborn & Van de Vilet, 2012; Van de Vilet, 2012). Importantly, there are several factors that suggest there is a need to design 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). This can introduce the need to frequently update biological profiles and increased use of the Therapeutic Use Exemption (TUE) system for para-athletes in comparison to non-disabled athletes. Systematic use of medication is a particular concern given evidence that some athletes use medications to enhance performance rather than for their intended purpose (Holgado et al, 2018), and research showing overuse of medication in elite disability football (Broman et al., 2017). Thus, it is possible that education specifically focused on the TUE may be warranted for para-athletes. 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 the testing process. Para-athletes may therefore benefit from targeted education covering their rights and the available 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 education.

Another important 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., 2014). 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, athletes sometimes justify doping based upon coaching behaviours (Dodge & Robertson, 2004). Further, recent research interviewing ASP, including performance elite-level coaches from a range of sports, found many coaches showed evidence of very poor knowledge on key anti-doping topics, including doping control systems (Allen et al., 2017; Boardley et al., 2019a; 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., 2014; Patterson & Backhouse, 2018). 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.

The ASP personnel network extends beyond coaches though, and people in other ASP roles may also benefit from specialized 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 (Blauwet, 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, 2020a), leading to ambiguity over appropriate doping-prevention behaviours for these support personnel (McNamee & Phillips, 2009). 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 clean-sport education the includes elements that address 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. 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 International Paralympic Committee (IPC) and aims to determine which para-athletes can compete against one another to allow fair competition in para-sport. However, there is evidence that some para-athletes may 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 great chance of success. 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). As such, there may be a need to incorporate education on this topic in clean-sport education for para-athletes.

Another integrity issue specific to para-sport that could be incorporated into clean-sport education for para-athletes is colloquially known as boosting. Intentionally induced autonomic dysreflexia – the official term for boosting – 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 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, sitting on pins) to trigger a potent autonomic reflex that can benefit performance through increases in blood pressure and heart rate (Krassioukov, 2014; Legg & Mason, 1998). Although boosting is outlawed in para-sport on health grounds and is often assimilated with doping (Mazzeo et al., 2015), it is not currently included in WADA's list of prohibited methods. Despite this, given its ethically questionable nature and known health risks (i.e., hypertension, cerebral haemorrhage, stroke, and sudden death), there could be a benefit of including boosting in clean-sport education for para-athletes and ASP working in para-sport.

Given the specific needs of para-athletes and ASP within clean-sport education are not routinely considered within education design and delivery, there are potential benefits in developing specific recommendations for clean-sport and anti-doping education for these two groups. Such recommendations could help inform the work of practitioners with the responsibility to educate para-athletes and ASP on clean sport and anti-doping (e.g., ADOs). In addition, they could help academics who may be evaluating the effectiveness of clean sport and anti-doping interventions targeting these groups. 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. Thus, a set of specific recommendations for clean-sport and anti-doping education for para-athletes and ASP – co-created and agreed by experienced anti-doping researchers/practitioners and key representatives of anti-doping organizations – could benefit the work or practitioners, academics, and policy makers across the globe. As such, the primary aim of the current study was to co–create a set of recommendations for designing and delivering clean-sport education specifically considering the needs of para-athletes and ASP that would inform future 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, key representatives of funding organizations, researchers with a strong record of accomplishment of empirical work on doping prevention and/or work with para-athletes/ASP, and para-athletes/ASP.

Methods

Research context

This research was conducted as part of a large EU-funded project incorporating three additional pieces of research. These three studies consisted of a review of the literature on doping and anti-doping-related issues in parasport, a study involving nine focus groups with elite para-athletes across six European countries, and a study involving 41 individual interviews with ASP from the same six European countries (Patterson et al., 2023). Whilst these studies were independent of the Delphi study, their findings did inform aspects of the Delphi study (see *Questionnaire Development* sub-section).

Design and Data Collection

To achieve our aim to identify the unique clean sport education needs of para-athletes and ASP, we employed the Delphi consensus method (Dalkey, 1969; Jones & Hunter, 1995). This involved identifying and recruiting a panel of experts in the fields of clean-sport education and para-sport to identify specific characteristics for the design and delivery of 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 clean-sport educations 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 field of clean-sport 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 and its implementation.

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 clean sport education with para-athletes and ASP to be considered in later rounds. 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 of the original 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 of the original 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 of the original 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 based upon the scores from Round 3. 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, 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 clean-sport education and contributed to the development and implementation of a minimum of one clean-sport education programme for their organisation. Finally, those from a governance background had to have at least one year of experience working in anti-doping 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 (evidenced by 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 (evidenced by postgraduate-level study involving research; working as a researcher). Suitably qualified potential panel members were contacted via email to enquire whether they may be interested in participating. Those expressing interest were sent information providing study details and asked

to respond confirming whether they would like to participate. Consenting experts 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 for their services. 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 Table 1 and Table 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 by a panel of experts. For the first round, the online questionnaire consisted of two main sections. The first section asked questions to determine the demographic background and expertise of the expert panel, and the second asked experts to provide what they considered to be the five most important unique (i.e., distinct from clean sport delivered to non-disabled athletes) needs for clean sport education delivered to (a) para-athletes and (b) ASP. In the second round, the questionnaire comprised of two main sections. The first section was entitled *Educational Content* and presented 20 items of potential education content across four sections (i.e., anti-doping clean sport education for para-athletes; non-doping clean sport education for para-athletes; anti-doping 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 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*). The 28 research topics were derived from a combination of the experts' suggestion from Round 1, the findings from a review of the literature on doping and anti-doping-related issues in parasport, a study involving nine focus groups with elite para-athletes across six European countries, and a study involving 41 individual interviews with ASP from six European countries (Patterson et al., in review). Within each of the main sections, respondents were also asked to provide open-text comments at the end of each of the six sub-sections.

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 being rank-order assessments of the education content as being important in Round 2. Specifically, within the same four sub-sections as Round 2, between two and eight 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 clean sport education for para-athletes). The second major section of the questionnaire 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 again provided the opportunity to provide open-text comments and the end of each sub-section. In addition, following each of the six ranking exercises, respondents were asked to indicate whether they would consider all items within the ranking exercise of equal importance.

In the final round, the questionnaire was framed by a set of recommendations for 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 clean-sport education design and delivery identified as important in Round 2 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 it 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 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

For quantitative data, data analyses involved comparisons of mean ratings and rankings of importance from experts. In turn, we analysed our qualitative data 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, Clarke, & Weate, 2016). This involved the first author conducting multiple readings of the responses to become familiar with their content and making notes to document the key themes across the experts' responses.

Results

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 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"), *TUE (Therapeutic Use Exemption) 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 Anti-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 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 those from these other three sources, we had a list of 28 possible unique needs for 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 clean sport education for para-athletes, mean ratings ranged from 3.7 (i.e., Input from athletes with DRVs 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 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 clean-sport education for ASP. For the five items relevant to anti-doping clean sport education for ASP, 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 clean 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-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 (Anti-Doping Rule Violations) 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-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]”). In turn, for the two items relating to non-doping-clean-sport education, we obtained a mean ranking of 1.20 for the item ranked as most important (i.e., “The role of specific athlete support personnel [e.g., coach, physiotherapist] in the classification process”) and of 1.80 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 1.50 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 one accepted them partly. In turn, 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 one 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?”. Also, two experts felt the non-doping items should not be included because it is not currently part of anti-doping education. 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, two experts felt the non-doping items should not be included because it is not currently part of anti-doping education. For instance, one said: “We generally don't address non-anti-doping related issues"”, whereas another said “non-doping education for athlete support personnel 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 also 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 a lack of resources as the main theme. The strongest theme was insufficient resources. 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 the strongest theme though, 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 this 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 (Anti-Doping Organisation) 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 also raised two additional barriers to delivery. For instance, one felt, “Unfortunately, very few stakeholders (other than the IPC) seem to feel responsible for the education of para-athletes”. Another saw time and other priorities as barriers, “I think to education 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.”.

In terms of the feasibility of delivering the recommendations for ASP given current funding levels, again there was limited consensus regarding the feasibility of delivering 100% of the research agenda (see Figure 2). In general, there was a tendency for experts to perceive that delivery of the recommendations with current funding was feasible for the ASP recommendations than for the para-athlete recommendations, but most of the experts still felt it was not completely feasible. In terms of the qualitative comments on why delivery is not entirely feasible given current levels of funding suggested the same barriers were relevant here as were identified for the para-athlete recommendations, with a lack of resources being the major impediment. However, a small number of experts felt the recommendations for ASP were less challenging than those for para-athletes. For instance, one said “Not as demanding as the recommendations for athletes.”, whereas another stated, “This is a smaller, professionalized audience to accommodate and would likely not require the same outlay of capital to develop for.”. Another alternative comment related to the motivation of ASP to engage with such education. Specifically, this expert said, “In addition to access to resources, a challenge will be the availability and motivation of ASP to participate. Section F (i.e., ASP recommendations) 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, data analysis the overarching theme related to engagement with – and support from - stakeholders. With respect to engagement with stakeholders, WADA, the IPC, International Federations, and ADOs were mentioned by several experts as key organisations to work with. 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 though, and that there needs to be the desire and appetite for 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 of these stakeholders that could help facilitate delivery. Many of these actions related adjustments to – or creation of – relevant policy or guidelines. 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 should be “…anchored in the Anti-Doping Code and relevant standards.” And “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, and other experts referred to “adequate funding” and “translation tools and budgets”.

Beyond engagement with – and support from – key stakeholders, experts also suggested one or two further facilitators. For instance, 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 delivery.

Discussion

By engaging expert anti-doping practitioners, senior governance officers and experienced researchers in a Delphi study, we achieved our aim of co–creating a set of recommendations for designing and delivering clean-sport education specifically considering the needs of para-athletes and ASP that would inform future clean-sport education efforts, as well as the work of those evaluating its effectiveness 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. The recommendations we

developed include 18 recommendations across three categories 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, 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. Over the upcoming paragraphs we discuss the main findings of this research, as well as making recommendations on how to maximise the likelihood of the delivery of these recommendations.

Education Content

From the highly prioritised recommendation, it is clear that 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. What this shows is that our expert panel saw educating para-athletes on the various modifications to the doping control process for athletes with a disability as a high priority. Recently, the IPC published a doping control guide for testing athletes in para sport (IPC, 2021). However, if the information on modifications to the doping control process and the rights and responsibilities of para-athletes detailed within this guide is not covered in education delivered to para-athletes, this could lead to para-athletes not being able to capitalise on the adjustments that have been made to take into account 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 (Overbye, 2016).

Whilst the specific content for para-athletes identified by the experts focused on the doping control process – and to some extent support for TUE applications – it is important to recognise para-athletes should still receive anti-doping education beyond information provision (e.g., values based, awareness raising). 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 only received information only scored the content of their education as less useful and had lower trust in it compared 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 such as specified in the ISE (WADA, 2020b).

Regarding anti-doping content for ASP, proposed content had relevance for both inadvertent and intentional doping. With respect to inadvertent doping, the focus was on helping athletes manage 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). 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). Thus, when delivering education on inadvertent doping, educators should focus on motivating ASP as to why they should address this topic proactively alongside ensuring ASP have the knowledge required to advise athletes appropriately. With respect to intentional doping, there may need to be an initial focus on convincing ASP as to why this topic is relevant to their practice 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, as 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 autonomic dysreflexia, 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, too (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", a "bigger issue than doping" and that "ten to twenty percent" of athletes are classified erroneously. 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 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 also provided specific recommendations for the design and delivery of education for para-athletes and ASP. The utmost recommendation for early anti-doping education 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 (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, 2020b), 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 the sporting careers (Gatterer et al., 2020). Alongside starting education early, the experts identified and prioritised the need to provide educational materials 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 though. 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).

Both high priority items (interactive education and inclusion of athletes) 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., UKAD) 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 and colleagues (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. To explain, such design and delivery approaches could not only make the educational experience more enjoyable, but also increasing 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). However, 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).

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. Overall, the quantitative ratings of feasibility indicated a tendency towards some degree of feasibility. Whilst there was little consensus on the specific degree of feasibility, most agreed that it was at least in part feasible to deliver both sets of recommendations with current 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.

Whist, 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. Such constraints were viewed as an explanation for why many NADOs mainly focus on knowledge-based prevention programs, and face difficulties in 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 delivery everything included in the recommendations developed presently.

Beyond redirection of funds, experts suggested additional facilitators for the delivery of the recommendations. One of these 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. WADA could consider including coverage of the specific needs of para-athletes and ASP in the next iteration of the ISE. 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. Engagement with – and support from – stakeholders was also suggested as a potential facilitator. Beyond WADA, other key stakeholders include the IPC, IFs (International Federations), 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 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. 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 possible 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 program and strategy (WADA, 2021a, 2021b), future research is encouraged in the regions (and WADA Tiers) 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 and is also adopted by most international academic journals, 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.

Finally, 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 with a high number of items 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 original 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 gender or any particular occupational role/s.

Conclusion

Para-athletes and ASP to date have been underserved in the design and delivery of anti-doping and clean sport education. Through a rigorous line of research involving a global panel of experts over four rounds of data collection, we established the first ever recommendations for anti-doping and clean sport education 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, but they 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 these recommendations, we also identified key barriers to delivery as well as ways to overcome these barriers. 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. Directly addressing the specific educational needs of para-athletes and ASP in the next iteration of the ISE and development of similar policies by the IPC is strongly encouraged to ensure these needs are effectively and consistently addressed in future clean sport and anti-doping education delivery.

Acknowledgements

This study benefitted from funding through the ERASMUS+ Collaborative Partnership project 613671-EPP-1-2019-1-UK-SPO-SCP

Our gratitude goes to the Delphi poll participants who generously shared their views and time with us for this project.

References

Allen, J., Morris, R., Dimeo, P., & Robinson, L. (2017). Precipitating or prohibiting factor: Coaches' perceptions of their role and actions in anti-doping. *International Journal of Sports Science & Coaching, 12*(5), 577-587. doi:10.1177/1747954117727653

Backhouse, S. H., Patterson, L., & McKenna, J. (2012). Achieving the Olympic ideal: Preventing doping in sport. *Performance Enhancement & Health, 1*(2), 83–85. doi:10.1016/j.peh.2012.08.001

Blauwet, C., & Willick, S. E. (2012). The Paralympic Movement: using sports to promote health, disability rights, and social integration for athletes with disabilities. *Pm&r, 4*(11), 851-856. Doi:10.1016/j.pmrj.2012.08.015

Boardley, I. D., Grix, J., Ntoumanis, N., & Smith, A. L. (2019a). A qualitative investigation of coaches' doping confrontation efficacy beliefs. *Psychology of Sport and Exercise, 45*, 101576. doi:10.1016/j.psychsport.2019.101576

Dalkey, N. C. (1969). *The Delphi Method: An Experimental Study of Group Opinion* (RM-5888-PR). Santa Monica, CA, USA: The RAND Corporation.

Dodge, A., & Robertson, B. (2004). Justifications for unethical behaviour in sport: The role of the coach. *Canadian Journal for Women in Coaching, 4*(4), 1-17.

Engelberg, T., & Moston, S. (2016). Inside the locker room: A qualitative study of coaches' anti-doping knowledge, beliefs, and attitudes. *Sport in Society, 19*(7), 942-956. doi:10.1080/17430437.2015.1096244

Engelberg, T., Moston, S., & Blank, C. (2019). Coaches' awareness of doping practices and knowledge about anti-doping control systems in elite sport. *Drugs: Education, Prevention and Policy, 26*(1), 97-103. doi:10.1080/09687637.2017.1337724

Faiss, R., Saugy, J., Zollinger, A., Robinson, N., Schuetz, F., Saugy, M., & Garnier, P. Y. (2020). Prevalence estimates of blood doping in elite track and field athletes during two major international events. *Frontiers in Physiology, 11*, 160. doi:10.3389/fphys.2020.00160

Gargon, E., Crew, R., Burnside, G., & Williamson, P. R. (2019). Higher number of items associated with significantly lower response rates in COS Delphi surveys. *Journal of Clinical Epidemiology, 108*, 110-120. https://doi.org/10.1016/j.jclinepi.2018.12.010

Gatterer, K., Gumpenberger, M., Overbye, M., Streicher, B., Schobersberger, W., & Blank, C. (2020). An evaluation of prevention initiatives by 53 national anti-doping organizations: achievements and limitations. *Journal of Sport and Health Science, 9*(3), 228-239. doi:10.1016/j.jshs.2019.12.002

Gatterer, K., Streicher, B., Petróczi, A., Overbye, M., Schobersberger, W., Gumpenberger, M., ... & Blank, C. (2021). The status quo before the International Standard for Education: Elite adolescent athletes' perceptions of anti-doping education. *Performance Enhancement & Health, 9*(3-4), 100200. http://dx.doi.org/10.1016/j.peh.2021.100200

Gleaves, J., Petróczi, A., Folkerts, D., De Hon, O., Macedo, E., Saugy, M., & Cruyff, M. (2021). Doping prevalence in competitive sport: evidence synthesis with "best practice" recommendations and reporting guidelines from the WADA Working Group on Doping Prevalence. *Sports Medicine, 51*(9), 1909-1934. http://dx.doi.org/10.1007/s40279-021-01477-y

International Paralympic Committee (2021). Doping Control Guide for Testing Athletes in Para Sport. Retrieved from: ihttps://www.paralympic.org/sites/default/files/2021-07/202107%20Doping%20Control%20Guide%20for%20Testing%20Athletes%20in%20Para%20Sport%20%28FINAL%20PUBLISHED%20V2%29.pdf

Wan, D., & Krassioukov, A. V. (2014). Life-threatening outcomes associated with autonomic dysreflexia: a clinical review. *The Journal of Spinal Cord Medicine, 37*(1), 2-10. http://dx.doi.org/10.1179/2045772313Y.0000000098

Legg, D., & Mason, D. S. (1997). Autonomic dysreflexia in wheelchair sport: a new game in the legal arena. *Marquette Sports Law Journal, 8*, 225.

Mazanov, J., Backhouse, S., Connor, J., Hemphill, D., & Quirk, F. (2014). Athlete support personnel and anti-doping: Knowledge, attitudes, and ethical stance. *Scandinavian Journal of Medicine & Science in Sports, 24*(5), 846-856. http://dx.doi.org/10.1111/sms.12084

Mazzeo, F., Santamaria, S., & Iavarone, A. (2015). "Boosting" in Paralympic athletes with spinal cord injury: doping without drugs. *Functional Neurology, 30*(2), 91.

McNamee, M., & Phillips, N. (2011). Confidentiality, disclosure and doping in sports medicine. *British Journal of Sports Medicine, 45*(3), 174-177.

Ntoumanis, N., Quested, E., Patterson, L., Kaffe, S., Backhouse, S. H., Pavlidis, G., ... & Gucciardi, D. F. (2021). An intervention to optimise coach-created motivational climates and reduce athlete willingness to dope (CoachMADE): A three-country cluster randomised controlled trial. *British Journal of Sports Medicine*, *55*(4), 213-219. http://dx.doi.org/10.1136/bjsports-2019-101963

Ntoumanis, N., Ng, J. Y., Barkoukis, V., & Backhouse, S. (2014). Personal and psychosocial predictors of doping use in physical activity settings: A meta-analysis. *Sports Medicine, 44*(11), 1603-1624.

doi:10.1007/s40279-014-0240-4

Overbye, M. (2016). Doping control in sport: An investigation of how elite athletes perceive and trust the functioning of the doping testing system in their sport. *Sport Management Review, 19*(1), 6-22. http://dx.doi.org/10.1016/j.smr.2015.10.002

Patterson, L. B., & Backhouse, S. H. (2018). "An important cog in the wheel", but not the driver: Coaches' perceptions of their role in doping prevention. *Psychology of Sport and Exercise, 37*, 117-127. doi:10.1016/j.psychsport.2018.05.004

Patterson, L. B., Backhouse, S. H., & Duffy, P. J. (2016). Anti-doping education for coaches: Qualitative insights from national and international sporting and anti-doping organisations. *Sport Management Review*, 19(1), 35-47. http://dx.doi.org/10.1016/j.smr.2015.12.002

Patterson, L. B., Duffy, P. J., & Backhouse, S. H. (2014). Are coaches anti-doping? Exploring issues of engagement with education and research. *Substance Use & Misuse, 49*(9), 1182-1185. http://dx.doi.org/10.3109/10826084.2014.912469

Patterson, L. B., Bentley, M. R., N., , Williams, T. L., Boardley, I. D., Petróczi, A., Backhouse, S. H., (2023). Investigating anti-doping roles of athlete support personnel working with international disabled athletes in six European nations using the COM-B Model and Theoretical Domains Framework. *SportRχiv.*

Van de Vliet, P. (2012). Antidoping in paralympic sport. *Clinical Journal of Sport Medicine: Official Journal of the Canadian Academy of Sport Medicine, 22*, 21–25. http://dx.doi.org/10.1097/JSM.0b013e31824206af

Webborn, N., & Van de Vliet, P. (2012). Paralympic medicine. *The Lancet, 380*(9836), 65-71. http://dx.doi.org/10.1016/S0140-6736(12)60831-9

Weber, K., Patterson, L. B., & Blank, C. (2022a). An exploration of doping-related perceptions and knowledge of disabled elite athletes in the UK and Austria. *Psychology of Sport and Exercise, 58*, 102061. http://dx.doi.org/10.1016/j.psychsport.2021.102061

Weber, K., Patterson, L. B., & Blank, C. (2022b). Doping in disabled elite sport: Perceptions, knowledge, and opinions from the perspective of German and UK coaches. *Psychology of Sport and Exercise, 62*, 102233. http://dx.doi.org/10.1016/j.psychsport.2022.102233

World Anti-Doping Agency (2020a). *The World Anti-Doping Code*. Montreal, Canada: WADA.

World Anti-Doping Agency (2020b). *WADA International Standard for Education*. Retrieved from https://www.wada-ama.org/sites/default/files/resources/files/international_standard_ise_-_redline_-_november_2019_v_may_2020.pdf.

World Anti-Doping Agency (2021a). 2020-2024 Social Science Research Strategy. Retrieved from https://www.wada-ama.org/en/resources/education-and-prevention/social-science-research-strategy-2020-2024.

World Anti-Doping Agency (2021b). *WADA Social Science Research Program*. Retrieved from https://www.wada-ama.org/en/social-science-research.

World Anti-Doping Agency (2022). *Guidelines for the International Standard for Education*. Retrieved from https://www.wada-ama.org/en/resources/education-and-prevention/guidelines-for-the-international-standard-for-education-ise.

World Health Organisation (2022). *Factsheet on global disability*. Retrieved from https://www.who.int/news-room/fact-sheets/detail/disability-and-health.

Yap, M. B., Pilkington, P. D., Ryan, S. M., Kelly, C. M., & Jorm, A. F. (2014). Parenting strategies for reducing the risk of adolescent depression and anxiety disorders: A Delphi consensus study. *Journal of Affective Disorders, 156*, 67-75. doi:10.1016/j.jad.2013.11.0

Table 1. Gender and Main Roles of Expert Panel Members

Round	Gender (%)		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.

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 AD 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 TUE process	4.7
What assistance is available to para-athletes in the AD 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

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 anti-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

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

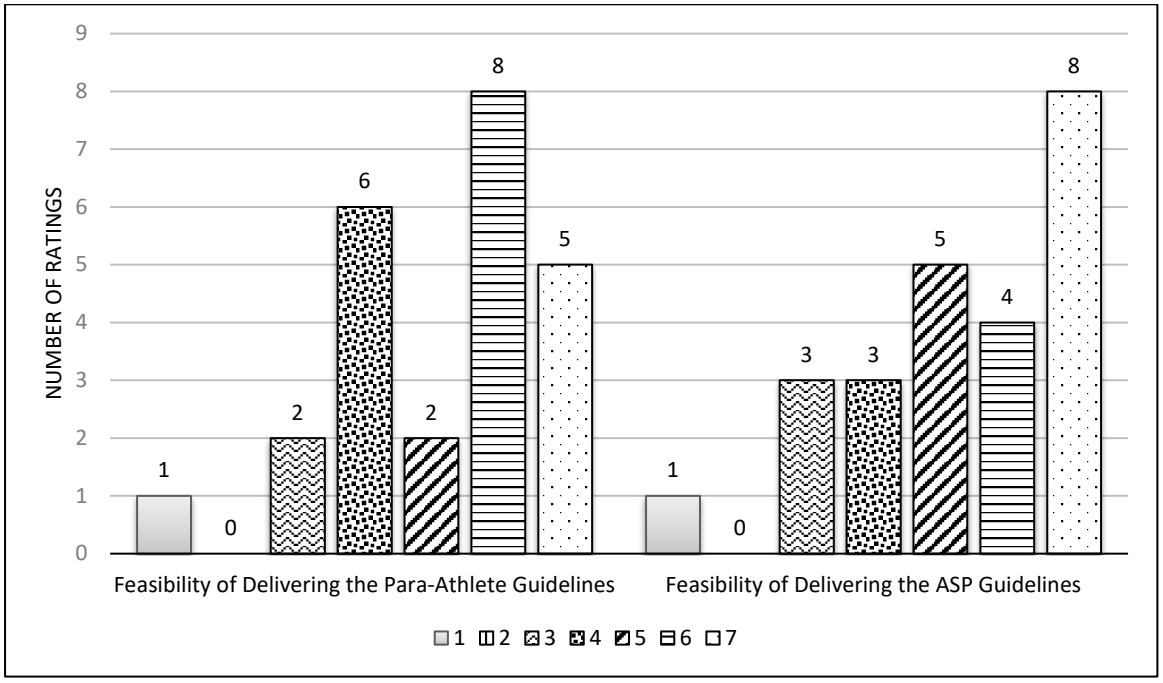
Note. Anchors for rankings were 'Most important' and 'LEAST important'.

Figure 1. Clean Sport Education Recommendations Presented in Round 4

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 2. Ratings of Feasibility of 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*)