

Section A: NICE to complete	
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Guidance title:	Drug Misuse Prevention
Committee:	PHAC C
Subject of expert testimony:	The use of image and performance enhancing drugs in the United Kingdom
Evidence gaps or uncertainties:	[Please list the research questions or evidence uncertainties that the testimony should address]
Who is affected by image and performance enhancing drugs, and in what way(s)?	
What current interventions seem to work for preventing or reducing the misuse of image and performance enhancing drugs? With whom and in what ways do these work? Is there UK-based work on these interventions?	
What interventions would you like to see in place and why? Is learning from other settings or drugs relevant?	
Who (as in type of organisation) is best placed to intervene, and are there any implications with recent move of public health to local authorities?	
What are the key evidence gaps and what is a priority for research?	

Section B: Expert to complete	
Summary testimony:	[Please use the space below to summarise your testimony in 250 – 1000 words – continue over page if necessary ]
<p>The use of image and performance enhancing drugs (sometimes referred to as human enhancement drugs) is by no means a new phenomenon. While use can be traced back to ancient times, the modern era of drug use commenced in the early part of the 20<sup>th</sup> Century. This was largely due to both pharmacological developments, with the isolation of testosterone (de Kruif, 1945) and socially, with the rapid expansion of <i>patent and secret remedies</i> (1909). During the last decade, with advances in pharmacology, technology and most significantly, the introduction and expansion of the Internet, there has been an unprecedented increase in interest and use of enhancement drugs. These drugs can be categorised based on their main reason for use::</p> <ul style="list-style-type: none"> <li>• structure and function of muscle e.g. anabolic steroids and growth hormones to increase lean muscle mass;</li> <li>• weight loss e.g. rimonabant and sibutramine to suppress appetite, 2,4-dinitrophenol (DNP) to burn fat;</li> <li>• cosmetic appearance of the skin and hair e.g. mercury containing creams for skin lightening, melanotan II for skin darkening;</li> <li>• sexual behaviour and function e.g. sildenafil to improve erection and bremelanotide to increase desire;</li> <li>• cognitive function e.g. methylphenidate and modafinil to improve concentration and learning; and,</li> <li>• mood and social behaviours e.g. paroxetine and fluoxetine to be ‘better than well’ (McVeigh, Evans-Brown, &amp; Bellis, 2012).</li> </ul> <p>There is limited information about the spread of these types of ‘enhancing’ drugs. (Evans-Brown, McVeigh, Perkins, &amp; Bellis, 2012). However, some, such as anabolic steroids, have been subject to more detailed investigation. Their use is relatively widespread, although it is difficult to determine exactly how many people use them. It has been estimated that the global lifetime prevalence for anabolic steroids is 3.3% with higher levels across Europe (Sagoe et al, 2014). The Crime Survey for England and Wales (2014/15) suggests much lower levels of 0.9%, although a statistically significant rise over the previous decade, with approximately 73,000 having used in the previous year (ONS, 2015). Needle and syringe programme (NSP) monitoring systems, such as the <i>IMS</i> in Cheshire &amp; Merseyside, illustrate the increasing numbers of IPED injectors from the early 1990s when less than 1% of clients reported the use of IPEDs, to currently over 80% of clients at some agencies. This situation is repeated across the North of England (Kimergard &amp; McVeigh, 2014).</p> <p>All evidence in the United Kingdom indicates that the majority of anabolic steroid users are male with the highest levels of use in those aged between 20 – 40 years of age. This remains unchanged since the 1990s (Lenehan, Bellis &amp; McVeigh, 1996). Most studies show that between 25% and 30% initiated use during their teens. Anecdotally, many services have seen an increase in younger users in recent years (pedforum, personal communications, 2016).</p> <p>A key issue associated with use of anabolic steroids is the extent of polypharmacy. Additional anabolic substances are taken as part of a “stack”, together with drugs to combat side effects. The use of other substances for additional enhancement purposes including melanotan for tanning, DNP for weight loss and sexual enhancers</p>	

such as sildenafil are commonplace (Hope et al, 2013; Sagoe et al, 2015).

United Kingdom studies have also shown high levels of psychoactive drug use, in particular cocaine use, with up to half of anabolic steroid users having used cocaine in the previous 12 months. There appears to be a minority of users consuming alcohol at hazardous levels with a relatively small number drinking at extremely high levels.

The use of anabolic steroids and associated drugs is associated with a range of deleterious effects, from the cosmetic and transient to the life-threatening (ACMD, 2010). Much of the data relating to health harms are derived from case reports/series and cross-sectional studies that are observational in nature, however there is increasing evidence related to cardiovascular effects, haematologic effects, psychiatric and neuropsychologic effects including dependence and behaviour change, and hormonal and metabolic effects (Pope et al, 2014). There are two additional major concerns. The majority of available anabolic steroids and associated substances are illicitly manufactured (Kimergard et al, 2014b; Evans-Brown, Kimergard & McVeigh, 2009; ACMD, 2010; Graham et al, 2009). This is not unique to the United Kingdom market (Cohen et al., 2007; Larance et al., 2005; Parkinson & Evans, 2006; Striegel et al, 2006). Without the requisite quality assurance of legitimate manufacture, products are often contaminated with biological, chemical or foreign matter, variable in strength or substituted with a different active ingredients. This has clear implications for health in relation to infection, over dosage and unexpected adverse consequences (Thevis et al, 2008; MHRA, 2007) This is not just an issue related to anabolic steroids but effects all illicitly manufactured image and performance enhancing drugs (Kimergard et al, 2014b; Stensballe et al, 2015; Abbate et al, 2015; McVeigh, Germain & van Hout, 2016).

Secondly, and of greatest concern, is the transmission of blood borne viruses. Until relatively recently IPED users were generally not considered to be vulnerable to blood borne viruses such as HIV, although injection site injuries and localised infections were a recognised risk. Recent findings have identified a similar prevalence of HIV amongst injecting IPED users to that among those injecting psychoactive drugs in England and Wales. With an HIV prevalence between 1.5% and 2% and hepatitis B and C prevalence significantly higher than the general population (Hope et al, 2015a; Hope et al b; Hope et al 2013), this issue is a clear emerging public health concern (McVeigh et al, 2016).

Currently, there are no formally evaluated drug prevention interventions in relation to the use of image and performance enhancing drugs in the United Kingdom. Furthermore, there is scant evidence internationally. UK Anti-Doping has responsibility for the prevention of anabolic steroids use and a number of other drugs in sport (UK Anti-Doping, 2009). Interventions to prevent and deter the use of substances on the World Anti-Doping Agency (WADA) prohibited list have traditionally targeted elite athletes but now have an increased emphasis on younger sports participants, but their impact, if any, at a population level is unknown (European Commission, 2014). The main evaluations for the effectiveness of doping prevention, with relevance to the use of IPEDs is limited to the following:

ATLAS - Adolescents Training and Learning to Avoid Steroids - focuses on preventing anabolic steroid use among male US high school athletes. The programme, based on social learning theory, targets a range of psycho-social issues including body image and self-esteem and promotes healthy nutritional principles and

safe alternatives to drug use. Run over several months the programme demonstrated positive changes in attitude towards anabolic steroid use (Goldberg et al 1996; 2000). A more recent evaluation in 2005 failed to show any significant results in relation to these benefits (Fritz et al, 2005). A similar intervention with Iranian bodybuilders (6 x 1 hour sessions) failed to show changes in steroid behaviour but resulted in a significant decrease in nutritional supplement use (Jalilian et al, 2011).

ATHENA - Athletes Targeting Healthy Exercise and Nutrition Alternatives – is a United States programme focused on the prevention of disordered eating and body-shaping drugs amongst female students. It has been shown to deter disordered eating, performance enhancing drug use, and other health-harming behaviours in the short term (Elliott et al, 2004). At 1-3 years following high-school graduation, these benefits had been lost but significantly less lifetime use of cigarettes, marijuana, and alcohol use were reported (Elliott et al, 2008). Further analysis of the programme identified that the effects were strongly mediated by social norms and self-efficacy (Ranby et al, 2009).

The SATURN programme of drug and alcohol testing for high school athletes in the US had no impact on illicit drug or alcohol use and actually created negative attitudes amongst subjects regarding the value or efficacy of the testing programme (Goldberg et al, 2007).

In Sweden, a 2-year health promotion intervention focused on stimulating discussion amongst adolescents to promote negative attitudes to anabolic steroids and increase self-confidence demonstrated some benefits. In the 16-year old males, the injection of anabolic steroids significantly decreased from 5.3% before, to 1.2% after the intervention. Among 17-year-old boys, no significant changes in use occurred after the intervention (Nilsson et al., 2004).

In some parts of Scandinavia, most notably Denmark, a different approach is in place. Drug testing of gym members, with banning in accordance with WADA doping controls, combined with labelling of participating venues has been in operation for a number of years. While there is no evidence of efficacy of the intervention, participating venues are reported as viewing the “Danish Smiley Scheme” in a positive light (Anti-Doping Denmark et al., 2012).

Caution is required in relation to overseas interventions, even in the presence of comprehensive evaluation. The generalizability, particularly in those studies relating to US high school athletes is questionable.

In the United Kingdom, based on the NICE Guidance PH52, there is a growing number of steroid clinics. These vary widely, with some including a range of drug prevention interventions such as advice on alternatives to drug use (for example, nutrition and physical training as an alternative to anabolic steroids). To date, none of these approaches have been formally evaluated.

While there is a growing drug prevention evidence base in general, these principles have yet to be adopted and robustly evaluated in the field of image and performance enhancing drugs. This is despite some marked similarities between this form of drug use and novel psychoactive substance use. This includes aspects such as the illicit market, diffusion of beliefs and behaviours, the role of key influencers and a closed culture that does not identify with many of the characteristics of other drug users. Additional areas for consideration should focus on Internet education and resilience training, in particular, in relation to the trust placed in both the information that may

be accessed together with the quality and provenance of available products. Approaches related to self-esteem, skills training and resilience to manipulation through media advertising, cultural pressure regarding appearance and self-efficacy are all areas of consideration when developing potentially effective interventions.

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