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Steroids and Image Enhancing Drugs 2013 Survey Results

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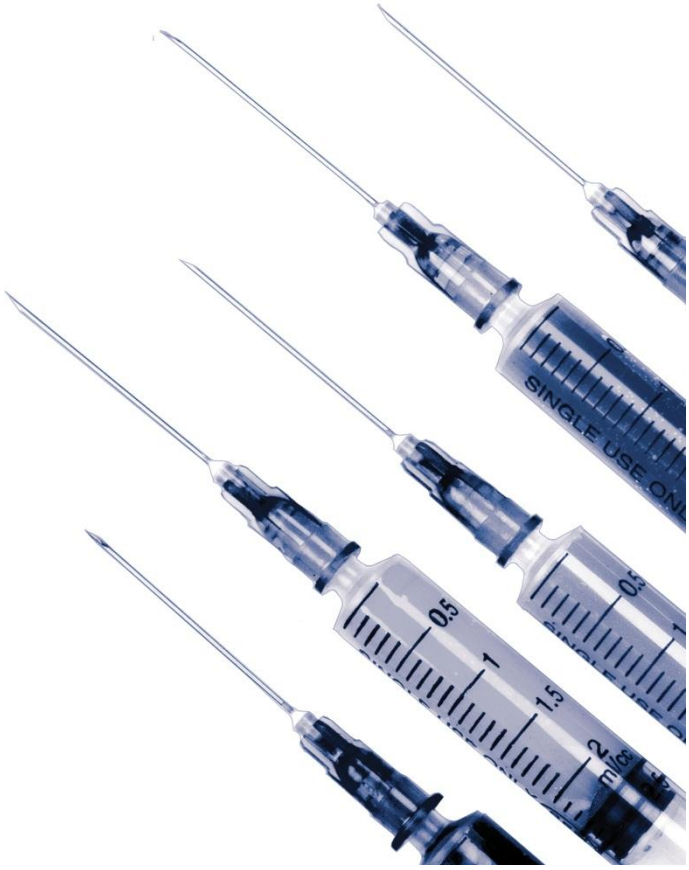

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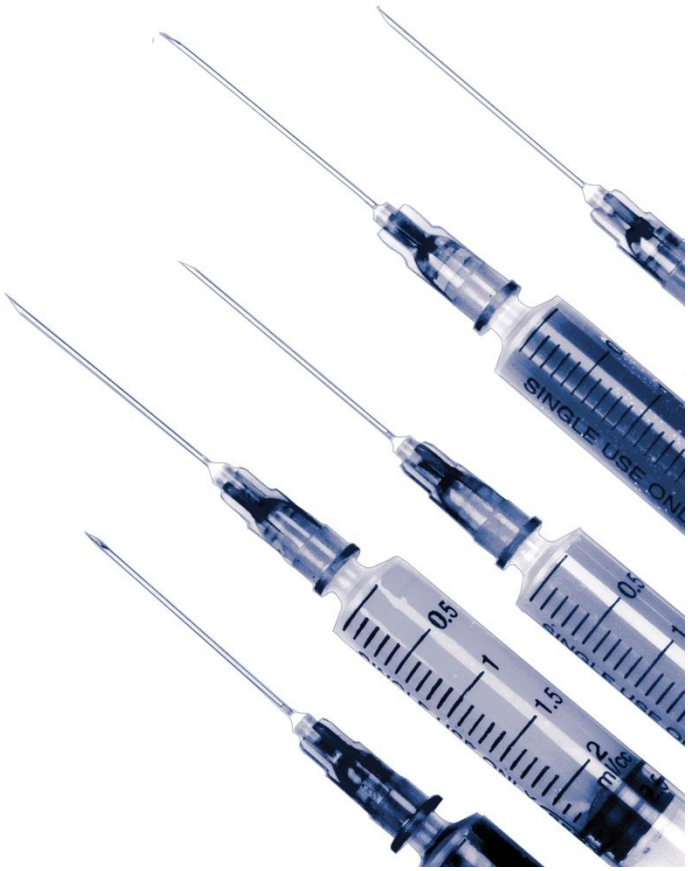


1: Background

1.1: Introduction

The use of Steroids and Image Enhancing Drugs (SIEDs) for the purposes of physical enhancement is not new. Historical evidence shows the use of both herbal preparations and extracts from animal sources across all cultures since the beginning of civilisation[14]. From the ingestion of animal testis to treat impotence in 140 BC[28] to the more recent use of peptide hormones to stimulate changes in skin pigmentation[12]; the use of enhancement drugs by people seeking to improve their physique or appearance has long been an integral part of human culture.

In particular, the use of anabolic steroids, for the purpose of enhancing both physical appearance and athletic performance, has a long history, allegedly going back to the Berlin Olympics in 1936[28]. Whilst the early investigations into the synthesis of anabolic steroids focused largely on therapeutic use for a variety of conditions such as male hypogonadism, the use of these drugs to enhance athletic performance followed quite quickly[28]. Since that time; there has been a marked increase in the number of drugs that purport to offer some form of human enhancement. The use of anabolic steroids has been supplemented *inter alia* with the use of peptide hormones (ie: human growth hormone, Melanotan), diuretics (ie: Spironolactone), 'fat burners' (ie: clenbuterol) and anti-oestrogens (ie: Tamoxifen, Letrozole)[14]. Many of these drugs were developed for therapeutic use and subsequently re-purposed for their supposed human enhancement qualities, or to combat some potential side-effects from other drugs. The current market for these drugs is vast and growing. The range of available SIEDs now includes new and emerging drugs, such as novel peptide hormones, for which there is little clinical evidence on efficacy or safety. This burgeoning market attracts people who do not see themselves as drug users and manufacturers, including illicit 'Underground Laboratories' (UGLs) happy to serve this market for profit[14]. The illicit manufacture of these drugs raises serious issues of quality and sterility, with many products found to contain substances and/or dose strengths, other than those listed on the label, as well as bacterial contamination; a particular concern with injectable preparations[14].

It is difficult to determine precisely how this market has grown in the UK, there is a paucity of reliable data and much of the existing evidence is equivocal.

"*Determining when steroid use became commonplace within the general population of the United Kingdom is problematic, because, until 1992, reports were largely anecdotal or informal and limited in scope. It appears, however, that by the mid-1960's the use of steroids was an accepted practice in weightlifting and bodybuilding (including those at an amateur level). During the 1980's a number of reports began to appear about the use of these drugs in "health and fitness clubs", supplemented by a small informal survey in a gym in the West of Scotland along with a series of investigative reports in The Times newspaper that highlighted a "thriving" black market in "buying and selling of anabolic steroids … in British gymnasiums and health and fitness centres*" (Evans-Brown & McVeigh, 2009a).

Robust evidence around the current prevalence of self-directed SIED use in the UK is poor. The best available evidence nationally, lies in the Crime Survey for England & Wales (formerly the British Crime Survey)[10]. The most recent data for 2012/13 reports 271,000 people having used anabolic steroids 'ever' in their lifetime and 59,000 in the past year[10]. Further evidence from established local monitoring systems in needle and syringe programmes (NSPs), as well as anecdotal information from NSPs across the UK, suggests a rise in new client presentations for the use of SIEDs[1,32]. However, it is difficult to determine the true prevalence of self-directed SIED use based on the available data. The Crime Survey suffers methodological issues as it relies wholly on self-report via interviews, with the drug use section being a self-completed questionnaire at the end of the interview. Whilst the questionnaire is completely confidential, it remains debatable how open people will be about their own drug use[37]. Local monitoring systems may offer more robust data, but extrapolating that data to the wider population is difficult and may not produce reliable estimates.

Whilst it is difficult to estimate the prevalence of SIED use nationally in any reliable manner, it would still appear that more people are presenting to NSPs for SIED use than in previous years[1,32]. This apparent change in client-base represents a significant challenge for healthcare practitioners in NSPs. Frontline staff are often ill-equipped to respond to the needs of this group as the use of SIEDs typically involves drugs that NSP practitioners have little formal knowledge about. There is evidence to suggest that many people are using drugs that are not genuine pharmaceutical preparations[14], often with complex drug regimens involving the use of several drugs simultaneously[28,36], in complex drug regimens for which there is no clinical evidence. There exists a robust body of clinical evidence, for the therapeutic use of genuine pharmaceutical preparations of these drugs, with demonstrable efficacy and safety when used at therapeutic doses and under clinical supervision. However, studies have shown that self-medicating SIED users may use doses far in excess of therapeutic guidelines[24,35,36].

The available clinical and academic evidence-base around the self-directed use of SIEDs is extremely limited and, in isolation, is often of little practical value when designing enhanced services for this client group. There is a paucity of robust baseline evidence on typical patterns of use and the pharmacological effects of high doses or the complex, polydrug, regimens. Whilst it is known there are potential health risks associated with these drugs[1] and with the injecting process[21], there is little evidence to show how many people who self-medicate with SIEDs actually experience specific adverse effects, what those adverse effects are and how users seek to avoid or resolve them. Without this baseline information, it is difficult to develop healthcare services to respond to the needs of SIED users. Recent studies have highlighted potential cardiovascular risks in long-term users[35] and a potential risk of blood borne virus (BBV) transmission within this group, similar to that found in opiate injectors[21]. Anecdotal information suggests a growing cohort of younger people using SIEDs and in some cases, also using psychoactive drugs such as cocaine, ecstasy, ketamine and the newer emerging drugs such as mephedrone, as well as alcohol.

In order to better understand and evidence these public health issues and better equip individual users and relevant health services to reduce risks and harm, Public Health Wales, with the support of Welsh Government, commissioned collaborative work with the Authors at Centre for Public Health, Liverpool John Moores to develop the SIEDs online survey. This is an ongoing collaboration and survey which aims to develop our understanding over time.

1.2: Methodology

A 51 question survey was constructed using the Bristol Online Survey Tool (BOS). This is an online resource made available to Universities across the UK and widely used in research (http://www.survey.bris.ac.uk). The BOS tool allows for a variety of question formats and data can be downloaded in several formats to suit widely used analytical software.

Ethical approval for the survey was obtained via the Liverpool John Moores University Research Ethics Committee.

The survey was drafted by Martin Chandler at the Centre for Public Health at Liverpool John Moores University and subsequently refined following feedback from Health Protection Division, Public Health Wales. Following completion of ethical approval and review the survey link went live on 10th July 2013 and was closed at midnight on the 12th November 2013.

The survey was disseminated via online forums dedicated to weight training and/or the use of SIEDs (UK-Muscle, Testosterone Muscle, Muscle Talk) and via NSPs engaging with SIED users. We developed simple business cards with links to both the online survey and to the SIEDSINFO information website, developed by Public Health Wales. Some SIED users are known to keep their SIED use from family, friends or colleagues; for this reason survey and website links were provided as both simple URLs and as QR codes, to enable participants to respond or access the website via smartphones. The business cards did not advertise the nature of the study or the

website as they were to be handed out via NSPs following personal discussion with the client by NSP staff.

Telephone Interviews

Follow-up telephone interviews were conducted with some participants during March 2014, following consent provided via the online survey. Interviews were conducted by Martin Chandler and recorded. The interviews provided additional information around the patterns of use, reasons for initiating use and around any adverse effects experienced by participants as a result of their SIED use.

1.3:Participants

A total of 101 people took part in the survey; 7 participants were from outside the UK/Eire and therefore removed from analyses. Participants were aged between 16-56 years old, with a mean age of 32.5 years. Of the 94 UK and Eire participants analysed; 15 (15.9%) were female and 79 (84.0%) were male.

Telephone Interviews

Initially, 31 participants indicated consent to follow-up interviews via the online survey. In total, 8 participants completed the follow-up interviews, with the remainder having subsequently declined or failed to respond to any communication.

2: Results: Key Public Health Issues

(Based on 94 UK and Eire participants)

2.1: Age of first use

What do we know?

There is a lack of research around the epidemiology of SIED use, especially with regard to use amongst younger people. Anecdotal information from NSPs across the UK suggests an increase in presentations for SIED use amongst 18-24 year olds but there is little evidence to support this nationally. A Home Office survey reports an estimated 17,000 people between the ages of 16-24 using anabolic steroids in the year 2012/13[10] but does not report age of first use. The same study reports no change in the proportion of 16-24 year olds reporting use of anabolic steroids 'in the last year' from 2002/03 to 2012/13. Limited UK research from 20 years ago showed approximately a third of study participants initiating steroid use in their teens[28]. Further data from the NatCen survey, "Smoking, drinking and drug use among young people in England in 2011" shows 0.6% of boys aged 11-15 (from a sample of 3,138) reporting use of anabolic steroids in that year[17]. It should be noted that the NatCen survey is a self-report questionnaire delivered through schools and as such may not be a truly accurate reflection. Further evidence suggests the median age of first use is between 22 and 24 years old[36].

User opinion, as reported through discussion groups and forums, frequently suggests waiting until natural testosterone levels start to drop (typically suggested as being over the age of 21), in order to maximise use of naturally occurring testosterone which, in males, peaks around the late teens and early twenties, before initiating anabolic steroid use. Typically, the same user groups suggest that using anabolic steroids at an early age could potentially disrupt sexual function or natural testosterone production in the future. However, whilst there is evidence to show disruption of sexual function and testosterone production following use of anabolic steroids[19] there is no clinical evidence to show any increased effect dependent on age of first use. However, it should be noted that this is likely due to a lack of studies being performed, rather than a suggestion that age of first use is not a concern.

Anecdotal information further suggests people typically use oral anabolic steroids before moving on to injectable preparations, so we would expect to see younger participants reporting a younger age of first use for oral preparations, although this is not reliably supported by the literature.

What does the survey show?

The survey shows that, for both oral and injectable anabolic steroids; the majority of participants first started using between the ages of 18-29, with approximately a third starting their first cycle by the age of 24. However, in both cases, there are a small number of participants reporting first use below the age of 18.

Seventy participants (74.5%, n=94) reported having used both oral and injectable anabolic steroids (the data do not show whether this was simultaneously), nine (9.6%, n=94) reported only having used orals and four reported only having used injectables. Twenty-eight (40%, n=70) participants who reported ever using both oral and injectable anabolic steroids, reported a younger age of first use for oral anabolic steroids. However, three participants reported a younger age of first use for injectable anabolic steroids (4.3%, n=70).

Telephone interviews with older SIED users revealed a common theme of concern about younger people using SIEDs. Several participants commented on conversations they had with younger users, in which they attempted to explain the potential harms or to lead the younger person away from cycles they felt were ill-advised. However, many commented that younger people were not receptive to advice and simply wanted to get results as fast as possible.

One participant commented;

"I think kids take too much without putting the work ethic in, if you can't grow muscle naturally you won't grow muscle with steroids"

Another participant commented:

"I know a young guy, 18, who nearly lost his liver – two years on Dianabol. What do you say to someone like that?"

These statements were typical of older users, all of whom felt that there exists a population of younger users, willing to take much larger doses, for longer periods, with scant knowledge or understanding of, or concern for, the potential side-effects.

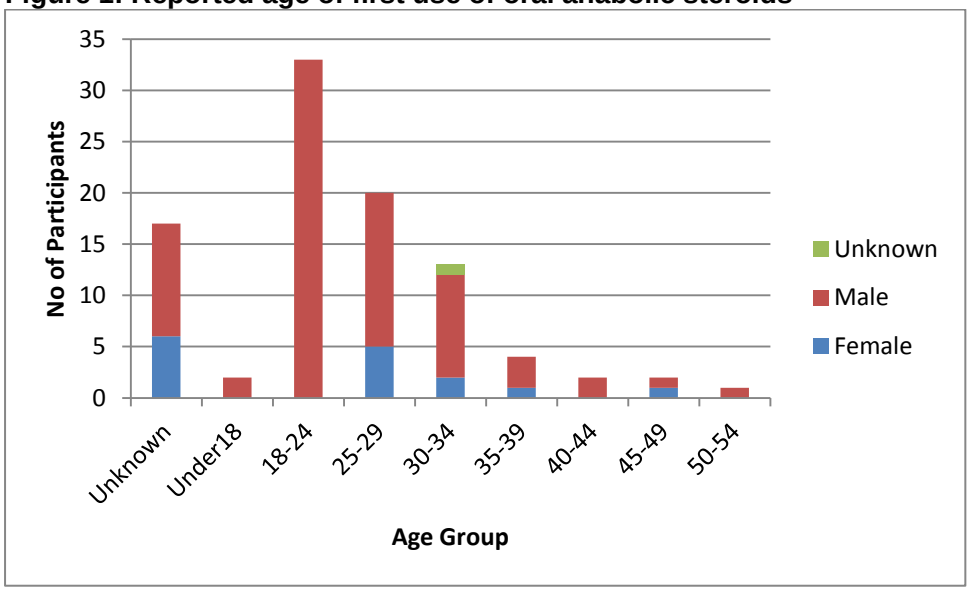
Key Points:
Whilst there is no direct clinical evidence to support greater harms as a result of initiating anabolic steroid use at a younger age (below 24), it should be noted that there is a lack of studies on younger people using the supra-physiological doses typical of self-directed anabolic steroid users. What studies there are examining the use of anabolic steroids in younger populations, relate to their therapeutic use to treat specific conditions, such as hypogonadism. It is difficult to extrapolate from clinical studies using a limited and therapeutic pharmacopeia, in populations with pre-existing medical conditions to a wider population of (presumably) healthy people using much higher doses and often using several drugs simultaneously. However, the human body is still developing at this stage and the indiscriminate use of powerful hormonal drugs, usually illicitly sourced and of highly variable quality and sterility, does at least offer the potential for long-term harm based on the limited evidence available for older anabolic steroid users[1].

Based on user group information from forums and user literature, it is commonly accepted amongst this population that it is important to develop naturally as much as possible before turning to anabolic steroids and associated drugs. This is frequently defined as training and dieting appropriately for a period of two years or more before considering SIED use, with many sources suggesting it is best to wait until testosterone levels start to drop (commonly cited as 23 years or older). But it is common to find user discussions in which younger users express a desire to use anabolic steroids in order to reach a desired goal faster, despite advice from more experienced users suggesting that the desired results will take longer than expected, even with anabolic steroid use. Some younger users then, may have expectations of their drug use that will not be met and in some cases this leads to increased use, both through higher doses and longer cycles, rather than focusing on the more important aspects of training and nutrition.

Oral Anabolic Steroids

A total of 80 people (85.1%, n=94) admitted using oral anabolic steroids. Of these, 18 (19.1%, n=94) were 20 years old or younger at first use, with 9 of these 18 or under. The youngest reported age of first use of oral anabolic steroids was 14.

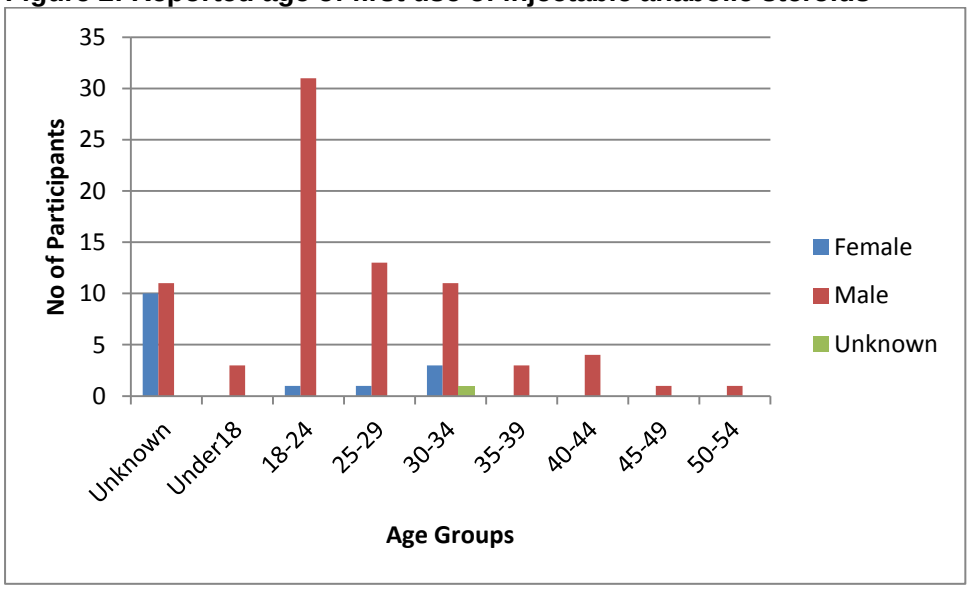
Figure 1: Reported age of first use of oral anabolic steroids



Injectable Anabolic Steroids

Seventy-four participants (78.7% of the total cohort) reported having used injectable anabolic steroids. Of these, 11 (11.7% n=94) were 20 years old or younger at first use, with 6 of these 18 or under. The youngest reported age of first use of injectable anabolic steroids was 15.

Figure 2: Reported age of first use of injectable anabolic steroids



2.2: Types of SIED used

What do we know?
There is evidence to show extensive polydrug use amongst SIED users[36,14]. Typical drug regimens can include the use of two or more anabolic steroids (often a mixture of both oral and injectable preparations), as well as a range of ancillary drugs to provide further enhancement properties (ie: human growth hormone) or to combat side-effects (ie: aromatase inhibitors or Selective Estrogen Receptor Modulators – SERMs). User forums devote a great deal of space to lengthy discussions on the relative merits of various drug combinations and user literature provides many examples of complex drug regimens. This is despite the absence of any reliable and comprehensive evidence to support any enhanced effect from the simultaneous use of several drugs. The use of ancillary drugs besides anabolic steroids is an area of concern; there are a number of relatively new drugs emerging, primarily injectable peptide hormones, many of which have limited clinical evidence on their safety and efficacy in humans. Some of these drugs are sold exclusively as "research chemicals", not intended for human use. There are therefore legitimate concerns that some people are taking drugs with little or no available knowledge on the potential adverse effects[14]. In particular, we have little or no data on the potential long-term effects or the effects of long–term use, nor do we have any data on the effects or side-effects of using several SIEDs together simultaneously.

What does the survey tell us?
Anabolic steroids are clearly the primary drug used, with 85.1% (n=94) of participants reporting ever using oral anabolic steroids and 79.8% (n=94) reporting ever using injectable anabolic steroids. However, a significant proportion of participants reported the use of other drugs, including injectable peptide hormones such as growth hormone and insulin, as well as a variety of oral preparations, including the use of DNP, a drug taken for its fat loss properties which has been associated with several deaths[14].

Key points
Typically, SIED users employ a range of drugs simultaneously (known as 'stacking') in, often complex, drug regimens extending over a period of weeks or months (the 'cycle'). Whilst there are limited data to show the efficacy of specific drugs being used together, for instance the use of Tamoxifen and/or clomiphene to combat the onset of gynaecomastia caused by the use of anabolic steroids[5,23]; there are several drugs available that have little or no evidence of their effects in humans. Where evidence does exist, it is usually in relation to specific clinical trials with small populations of people suffering specific conditions. It is not possible to adequately extrapolate such data to a non-clinical population and in any case, limited clinical trial evidence is not sufficient to demonstrate how safe a product may be. Furthermore, many of these products are sold as research chemicals, not intended for human use. There exists the possibility that such products may not be sterile or may be adulterated, either deliberately with other chemicals, or inadvertently as a result of poor manufacturing processes[14]. This is a particular concern with injectable preparations as they bypass many of the body's natural defences.

The use of a wide range of ancillary drugs is therefore a public health concern; further research is required to examine patterns of use and what adverse effects, if any, people are suffering as a result of their use. This survey did not specifically examine the range of drugs used in specific cycles, but this will be addressed in future iterations of the survey. Further research is required into patterns of use and the potential harms of SIED polydrug regimes.

Table 1: Peptide Hormones : 'Used in the last 12 months' (n=94)

	No.	%
Human Growth Hormone (HGH)	21	22.3
Insulin-like Growth Factor (IGF-1)	4	4.3
Mechano Growth Factor (MGF)	2	2.1
Growth Hormone Releasing Peptide (GHRP)	11	11.7
Insulin	9	9.6
Melanotan	16	17.0

Table 2: Ancillary Oral 'Anti side-effect' Drugs: 'Used in the last 12 months' (n=94)

	No.	%
Tamoxifen (Nolvadex)	42	44.7
Clomiphene (Clomid)	25	26.6
Aromatase Inhibitors	35	37.2
Human Chorionic Gonadotropin (HCG)	7	7.4

Table 3: Other Ancillary Drugs: 'Used in the last 12 months' (n=94)

	No.	%
Clenbuterol	34	36.2
DNP	20	21.3
Thyroid Hormones (T3, T4)	23	24.5
Ephedrine	30	31.9
Diuretics	8	8.5
Viagra/Cialis	27	28.7

2.3: Length of cycles

What do we know?
Cycles are defined as a period of time in which steroids are used, usually with a very specific dosing regimen and frequently employing both oral and injectable anabolic agents, as well as ancillary drugs to combat potential side-effects. Frequently, cycles are passed on via internet forums or user literature and are designed to maximise the perceived benefits of the drugs, whilst minimising the potential perceived harms. However, there are no studies that provide support for this practice. The rationale for cycles appears to be largely based on previous user experience, published via internet forums, user-produced information websites and a limited range of user literature. Clinical evidence for the combinations of drugs employed is lacking, but some users will cite evidence drawn from studies of therapeutic use to support their rationale, despite anabolic steroid users commonly employing doses well in excess of therapeutic guidelines[24,25].

Analysis of typical sources of information for anabolic steroid users (internet forums, guidebooks on steroid use etc) reveals a number of apparently common practices, some of which would appear to act as a standard within the bodybuilding community in particular. For instance, the use of oral anabolic steroids is frequently advised in forums and other publicly available anabolic steroid information sources, to not exceed 6-8 weeks in duration, in order to minimise the potential hepatotoxicity of oral anabolic steroids. However, suggested cycle lengths from the same sources that include injectable anabolic steroids can be highly variable and frequently cause lengthy debates in anabolic steroid-related internet forums as to the optimal 'time on'. William Llewellyn's 'Anabolics', considered by many users to be a definitive guide, lists a number of example cycles. The 9th Edition of Anabolics lists several ranging from 5-6 weeks using oral anabolic steroids alone to an 11 week cycle using a combination of both oral and injectable steroids[30], however earlier iterations have listed cycles using both oral and injectable anabolic steroids, as well as other drugs, lasting up to 33 weeks[29].

Clinical evidence on the potential harms associated with anabolic steroid use is largely drawn from studies of therapeutic use and case studies of anabolic steroid users who have required medical intervention as a result of specific adverse effects. There are limited studies to show the potential hepatotoxicity of oral anabolic steroids[16,38], but it is not clear whether the relative hepatotoxicity is dependent on dose, length of time on cycle, cumulative period of use, the specific anabolic steroid, underlying health problems or other external factors. More recent studies have suggested that longer periods of use of either injectable anabolic steroids or combinations of oral and injectable preparations, are more likely to produce serious side-effects but it is not clear whether these effects are reversible upon cessation of the drugs[35].

Llewellyn [9th edition page 67] states that cycles should last no more than 10-12 weeks (with a recommendation of 8 weeks as preferable)[30], but does not offer a clinical evidence base for this. Previous research has suggested typical cycle lengths of 6-8 weeks in duration[28], although this was twenty years ago.

What does the survey tell us?
The majority (69.7%, n=76) of participants reporting oral anabolic steroid use, reported cycles of 8 weeks or less, with 31.5% (n=76) of participants reporting 6 week cycles. This is in keeping with accepted practice as discussed through user groups, forums and user literature. However, there are a small number of participants who reported longer cycles, with three participants reporting cycles of 20 weeks (or more) of oral anabolic steroid use.

Half of participants who reported using injectable anabolic steroids (50%, n=74) reported cycles of 12 weeks or less. The remaining participants reported a range of cycle lengths, including one participant who reported their most recent cycle as being 150 weeks. However, 27 participants reported using a "Blast & Cruise" approach, a protocol that intersperses high dose cycles, the 'Blast' with relatively low dose 'Cruise' periods between cycles. People employing this approach

are therefore continually using anabolic steroids. It should be noted that the 'cruise' doses are often reported as being in the region of 100-200mgs of testosterone per week. This is potentially several times in excess of natural production (approximately 7-11mg per day or 49-77mg per week)[30].

Key Points:
There is evidence to show a potential for adverse effects on the liver from the use of oral anabolic steroids[1,16,38] and intuitively, longer periods of use are more likely to elicit adverse effects. However, it should be noted that much of the evidence around the use of oral anabolic steroids is in therapeutic use, often with patients suffering chronic conditions. These studies typically involve doses far below those taken by anabolic steroid users who self-medicate for body enhancement purposes. There are case-studies showing serious adverse effects of oral anabolic steroid use, but again, it is difficult to extrapolate these to the non-clinical population[1,38].

The longer cycles reported for injectable steroids are a concern. Limited evidence from over 20 years ago shows typical cycle lengths to be in the region of 8 weeks[28] and notable user literature advises no more than 10-12 weeks on cycle[30]. The large proportion of participants in this survey reporting cycles in excess of this, especially those reporting continuous use extending to several years, may therefore be exacerbating the potential adverse side-effects of their anabolic steroid use. There is limited evidence, to show that many of the adverse effects experienced by males can recover naturally following cessation of the drugs[26]. However, there is no evidence to show whether this is the case following excessively prolonged periods of using. The situation is somewhat complicated by the lack of baseline health measures for people using anabolic steroids reported through case studies. It is therefore not known whether existing health issues may have contributed to, or exacerbated, the subsequent adverse effects reported.

This survey suggests that people may be using anabolic steroids for longer periods than have previously been reported in the literature. Whilst there is a scant clinical evidence base for any increased potential harm as a result of using anabolic steroids for longer, what evidence there is should suggest advising anabolic steroid users to limit the length of their cycles and allow adequate time off in order to minimise the potential harms. This particularly applies to the use of oral anabolic steroids, especially when used at supra-therapeutic doses.

Figure 3: Reported Cycle Length for Oral Anabolic Steroids

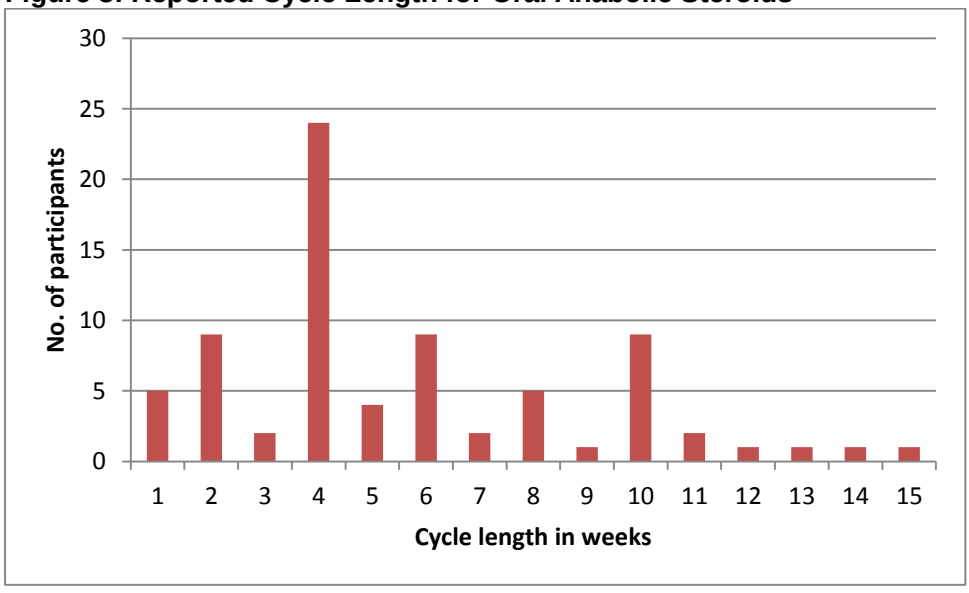
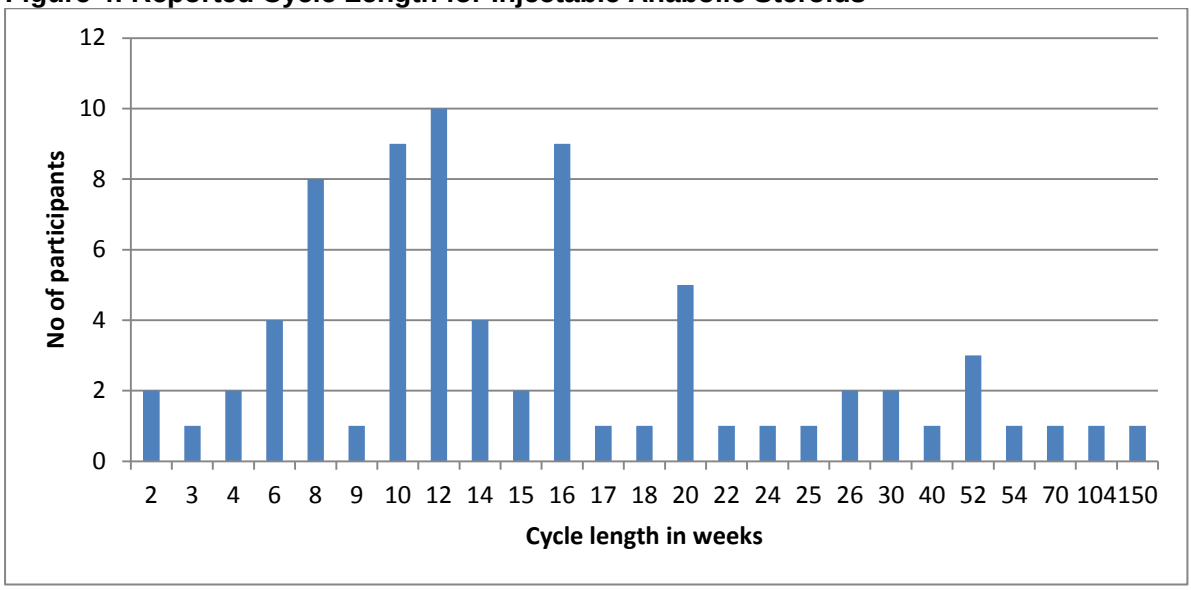


Figure 4: Reported Cycle Length for Injectable Anabolic Steroids



2.4: Use of Alcohol and Psychoactive Drugs

What do we know?
There is limited evidence examining the use of psychoactive drugs amongst anabolic steroid users, however there is evidence showing recent use amongst a cohort of SIED users, with 46% reporting non-injecting cocaine use and 12% reporting the use of amphetamines[21]. Further anecdotal information from NSPs suggests that some services are encountering clients who present for SIED use, whilst also reporting the use of other drugs, particularly cocaine, ecstasy and cannabis. Evidence from local monitoring systems in the north-west of England shows a small number of people who have presented at NSPs for SIED use, have also presented for treatment for cocaine abuse[22].

The physical harms associated with psychoactive drug use are well-documented[15] and there are several areas that are potentially of concern. In particular, the use of stimulants can have a deleterious effect on both liver function and the cardiovascular system, both of which are also a concern with the use of anabolic steroids. Alcohol is also associated with adverse effects in the liver[20] and this is therefore of particular concern for those using oral anabolic steroids given the potential impact of oral anabolic steroids on hepatic function[16].

What does the survey tell us?

Alcohol
In order to assess participants' alcohol use, the Audit C tool was embedded within the survey. The Audit C is a validated 3-item screening tool that can help identify people who have risky or hazardous alcohol drinking practices[7]. Whilst it is not a complete diagnostic tool, people who score 5 or more are generally considered to be more likely to drink at unhealthy levels.

The majority of participants (74.5%, n=94) had an Audit C score of 4 or less, suggesting the majority did not drink to harmful levels, although some participants had scores of 10, suggesting extremely risky levels of alcohol use.

Psychoactive Drugs
A large proportion of participants (78.7%, n=94) reported having ever used drugs, whilst 28.7% reported having used drugs in the last month, with 14.9% reporting using two or more drugs in the last month. The most popular drugs of use 'in the last month' were cannabis (18.1%, n=94), cocaine (14.9%, n=94) and ecstasy (7.4%, n=94).

Key Points
It would appear the majority of participants do not use psychoactive drugs or drink to harmful levels. User opinion on forums tends to suggest that most people using SIEDs prefer not to add potential harm from recreational drugs or to disrupt carefully planned nutritional programmes with excessive alcohol use.

However, it is clear that some participants are indulging in potentially harmful practices by using a mixture of recreational drugs and/or drinking to harmful levels. There were no consistent demographics (such as age) that identified this group. The use of psychoactive drugs and alcohol, at potentially dangerous levels, carries a range of potential harms, some of which can be significant[15]. People using SIEDs, who also use psychoactive drugs and in particular, those who drink alcohol to harmful levels, are likely to be substantially increasing the risks associated with both the SIEDs and the drugs and alcohol. In particular; both anabolic steroids[36] and cocaine[15] are associated with adverse cardiovascular effects, alcohol[15] and oral anabolic steroids[16] are associated with adverse effects within the liver and both psychoactive drugs[15] and anabolic steroids[35] are associated with the onset of mental health issues, although it is important to note the evidence for psychological issues associated with anabolic steroids remains equivocal.

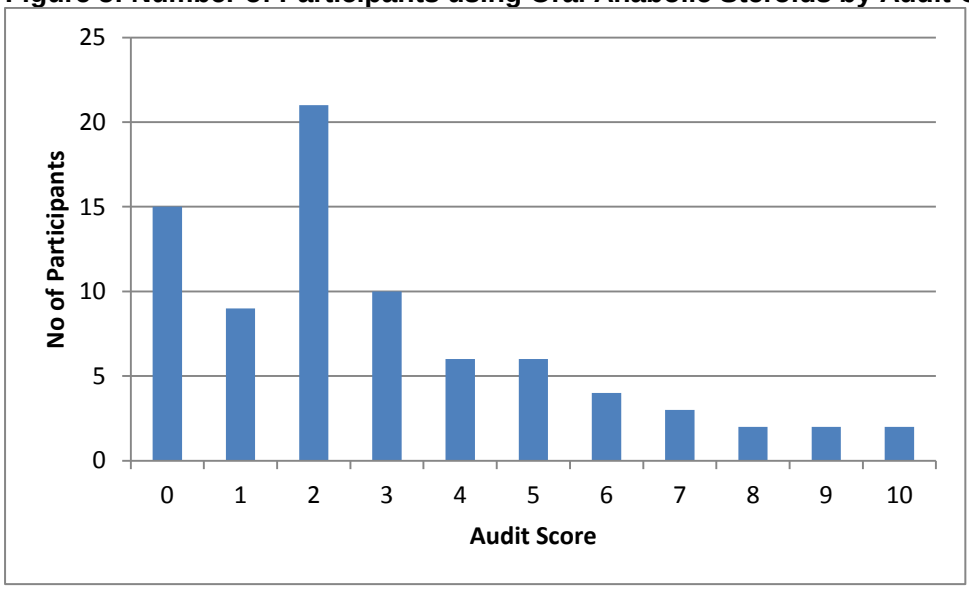
Case Study

One participant, with an Audit C score of 10 (the highest possible) reported the use of both cannabis and cocaine within the last month, as well as both oral and injectable anabolic steroids. The anabolic steroids were sourced via the internet and therefore of unknown quality and sterility and he did not access a needle and syringe programme for sterile equipment or advice. His reported main goal with his SIED use was fat loss. Given the likely contribution of alcohol to increases in body fat, this would suggest a poor understanding of the drugs used, or alternatively, a desire to make changes to his physique purely via drug use rather than by diet and exercise. Furthermore, his responses did not suggest he was accessing information on the drugs used or safer injecting practices from any reliable sources. Collectively, this would suggest a high risk of adverse physical effects with no ongoing contact with health services.

It is important to note that such behaviours do not appear to be the norm within this group; however it is equally important to note that some individuals are undertaking such risky practices. It would therefore be advisable for healthcare professionals working with SIED users to also explore any other drug or alcohol use and advise against it, particularly with reference to the use of stimulant drugs and/or excessive alcohol use.

Alcohol

Figure 5: Number of Participants using Oral Anabolic Steroids by Audit C Score*



*N=80, 19 participants had a score of 5 or more.

Psychoactive Drugs

Table 4: Number of participants reporting psychoactive drug use (n=94) (As reported in earlier table)

	No.	%
Ever used drugs	74	78.7
Used drugs in the last year	23	24.5
Used drugs in the last month	27	28.7
Used more than 2 drugs in the last month	14	14.9

Figure 6: Psychoactive drug use reported, by drug

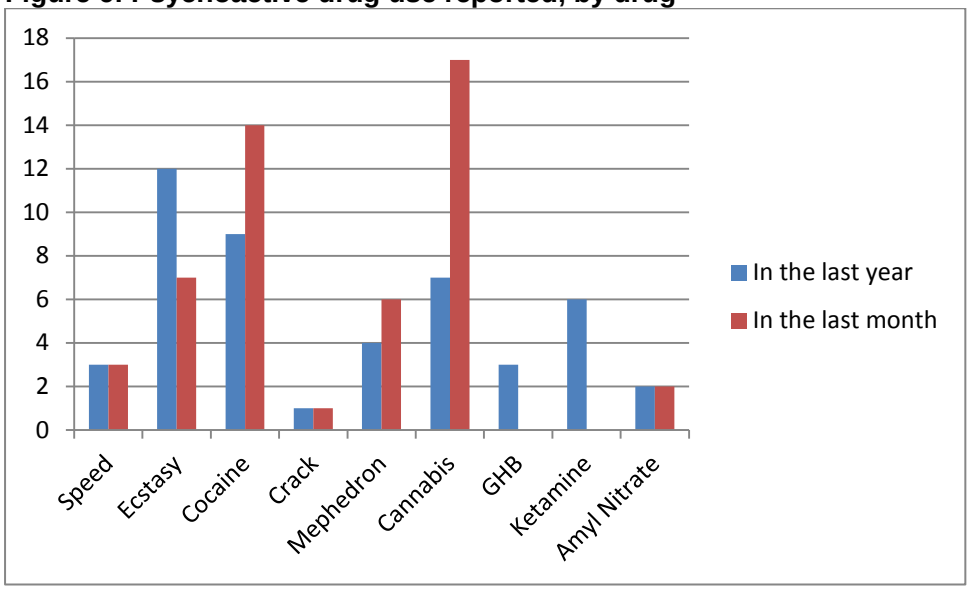
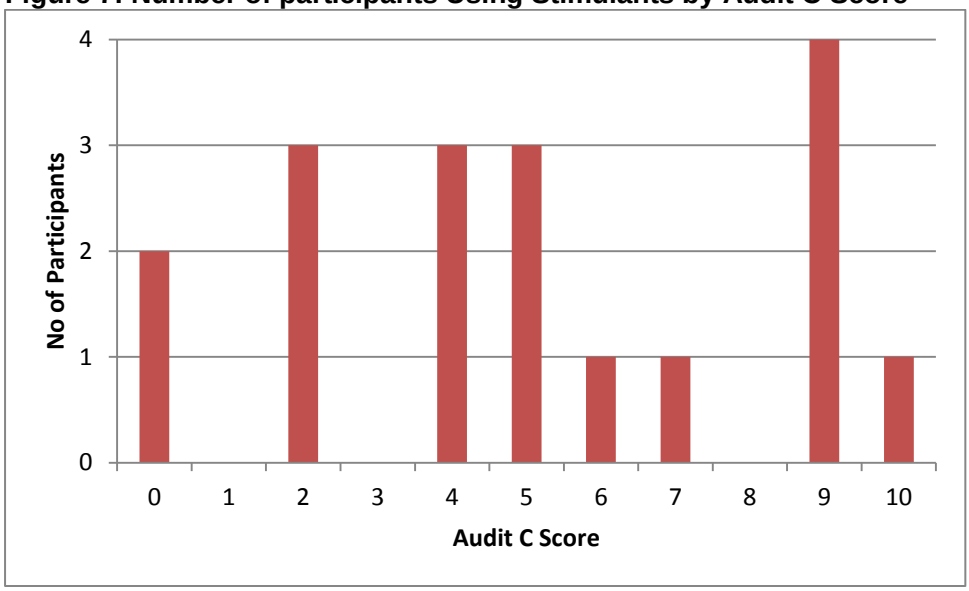


Figure 7: Number of participants Using Stimulants by Audit C Score



2.5: BBV and the Sharing and Reuse of Injecting Paraphernalia

What do we know?
Evidence from the UK suggests the majority of anabolic steroid users inject[1]. Injecting drugs carries a number of potential risks, including damage at the injection site, bacterial infection as a result of contamination (either from poor injecting practices or contamination within the product) and the possibility of BBV infection via shared equipment[1,21].

Bacterial Infection
There are limited data on the specific injecting practices of SIED users within the UK. There is some evidence, primarily case reports, to show users experiencing bacterial and fungal infections at injection sites[1], although it is unclear whether this is due to poor injecting practice or non-sterile products[11].

Sharing Injecting Equipment
There are limited studies on specific injecting practices by SIED users within the UK. What evidence there is shows substantial variation in reports of sharing used injecting equipment and it is unclear why this is the case. However, a number of studies have demonstrated that some sharing of used equipment takes place.

Table 5: Reported sharing in previous studies[1]

	Korkia & Stimson (1993)[25]	**Lenehan *et al* (1996)[28]**	**Pates & Barry (1996)[34]**	**Burton (1996)[6]**	**Crampin *et al* (1999)[9]**	**Bolding *et al* (1999)[3] +++**	**Midgely *et al* (2000)[33]**	**Grace *et al* (2001)[18]**	**Bolding *et al* (2002)[4] +++**
Ever shared	5.7%	0.3%	1.74%[+]	16%	6%	0%	2.1%	20%	0%
Shared last month	N/A	N/A	N/A	N/A		N/A	N/A	N/A	N/A
Ever shared multi-dose vials (a)	N/A[++]	N/A	N/A	59%	N/A	9.9%	23.4%	N/A	2.4%
Ever re-use injecting equipment (b)	N/A	N/A	N/A	37%	N/A	7.4%	4.2%	N/A	8.2%
Reporting both behaviours (a+b)	N/A	N/A	N/A	N/A	N/A	3.7%	4.2%	N/A	1.2%

[+]Admitted to sharing, borrowing or passing on needles and syringes"
[++] There were anecdotal reports about sharing of equipment and of multi-dose vials
[+++] Examined the use of anabolic steroids by gay/bisexual men

Blood Borne Viruses (BBV)
There are only two published studies examining the BBV exposure amongst SIED users presenting to NSPs in the UK. Data from the Unlinked Anonymous HIV Prevalence Monitoring Survey and reported 2% of participants with previous or current hepatitis B infection. No HIV was detected and hepatitis C was not examined[9]. Further data from an unlinked-anonymous survey of 395 men accessing NSPs across England & Wales, reported 1.5% with HIV, 9% with antibodies for hepatitis B and 5% with antibodies for hepatitis C. Excluding those participants reporting male sexual partners, 0.8% had HIV, 8% had antibodies for hepatitis B and 5% had antibodies for hepatitis C. This group then, had a similar prevalence rate for HIV to that found in injectors of psychoactive drugs. They also reported low levels of uptake for diagnostic testing (31% for HIV and 22% for hepatitis C) and only 23% having had vaccination for hepatitis B[21].

What does the survey tell us?
The survey reveals relatively little sharing of equipment, suggesting the majority of SIED users are aware of the potential harms associated with this practice. SIED users typically source large amounts of injecting equipment at a time, either via NSPs or via online medical suppliers. All of the follow-up interview participants sourced their equipment directly from online sources and used NSPs only for disposal of used equipment. However, this also suggests an understanding of the potential harms. Only 39 people (41.5%, n=94) reported using a needle exchange service to obtain equipment in 2012. Needle and syringe programmes are frequently viewed with mistrust by this group. They often do not perceive themselves as drug users and many see needle and syringe programmes as being predominantly for heroin users.

The majority (56.4%, n=94) of participants did not report having received BBV testing. A small number had undergone testing for at least one BBV; specifically, Hepatitis B or C or HIV (See Table 7). The survey did not ask the outcome of any tests, but did ask whether participants had sought treatment following the test. None of the participants reported seeking treatment.

Key Points
Despite the apparently low levels of needle and syringe sharing within this group, there remains evidence of HIV prevalence rates amongst SIED users, similar to that found in injectors of psychoactive drugs[21]. It is possible that this prevalence rate is a result of sexual transmission. The same study reported 20% of their cohort having had 5 or more female partners in the preceding year and 3% having had male partners, but only 13% always using condoms. A common side-effect of anabolic steroid use is a marked increase in libido; this, in some cases, may be coupled with the use of psychoactive drugs (especially cocaine and alcohol) which may increase the possibility of high risk sexual practices. It is encouraging that approximately a third of participants had been tested for blood borne viruses however the majority had not and this is cause for concern. Health professionals working with SIED users are advised to provide information on the sexual transmission of BBVs and offer testing.

Table 6: Reported sharing of injecting equipment

	Needle and syringe together	Needles only	Syringe only
Used needles/syringes previously used by someone else?	1 (1.1%)	1 (1.1%)	2 (2.1%)
Given someone needles/syringes you have previously used?	2 (2.1%)	1 (1.1%)	0
Re-used your own needles/syringes?	11 (11.7%)	1 (1.1%)	5 (5.3%)

Table 7: Reported Blood Borne Virus Testing (n=94)

	No. of participants	Percent
No testing reported	53	56.4%
Hepatitis B	31	32.9%
Hepatitis C	28	29.8%
HIV	35	37.2%

Three participants reported being tested for both Hepatitis B and C.
Twenty-five participants reported being tested for Hepatitis B, Hepatitis C and HIV

2.6: Reported Adverse Effects of SIED Usage

What we know?
There exists a substantial body of evidence around the potential harms associated with the use of SIEDs[1,35,36]. However, it should be noted much of that evidence comes from case studies of self-medicating SIED users who have presented with specific adverse effects, or from clinical studies with medical patients undergoing treatment, often for chronic conditions that may complicate any interpretation, or extrapolation, of the results.

Analysis of user forums reveals a large number of discussions relating to side-effects, however these tend to be focused on those conditions for which there are obvious physical symptoms, such as acne, hair loss, gynaecomastia, testicular atrophy and emotional disturbances, characterised as 'mood swings'. Many of these discussions involve advice from experienced users on drugs to combat the side-effects, almost invariably based on experience rather than clinical evidence. Whilst many people in such forums do, apparently, manage to treat the obvious conditions, they do so by adding further drugs, often sourced from the same places as their other SIEDs. This adds further complexity to what is already a complex pharmacopeia, often involving the simultaneous administration of several drugs with complex dosing protocols.

There are limited studies showing potentially serious adverse effects experienced whilst using anabolic steroids, including disruption to sexual function[19], hepatotoxicity[16,38] , cardiovascular issues[36] and mental health issues[35,36]. Much of the evidence is equivocal. There is no reliable evidence from studies to show how likely it is that a particular individual will suffer any of the potential adverse effects typically associated with SIED use and little to show the efficacy of specific treatments suggested through user forums and literature. Equally, few studies have examined the prevalence of specific reported side-effects across a large sample of SIED users. It should be noted that such studies face a number of methodological challenges, due in particular to the illicit nature of the market[13].

There is limited evidence to suggest that some of the adverse effects suffered by males are reversible upon cessation of the drug (and sometimes with adjunctive treatment, such as surgery to remove gynaecomastia)[26].

What does the survey tell us?
Not all participants reported adverse effects and those that were reported did not, generally, cause participants great distress. Participants reported self-treatment in almost all cases, sometimes by simply waiting for symptoms to go away following cessation of the drug and sometimes by self-medicating with further drugs. Only one participant reported a serious adverse effect:

"I went to hospital with a heart rate of 153bpm and red swollen leg from injection, was put on iv antibiotics as a precaution but a specialist believed it was just an allergic reaction to the carrier oil, next day was back to normal"

Whilst this would appear to have been a serious event and certainly carried the potential to become more serious without medical intervention; it would appear that it was largely an allergic reaction. Subsequent interview with this participant revealed continued use of the same substance, but without incident.

The only long-term adverse effect reported was from a female bodybuilder. She reported cessation of her menstrual cycle following oral anabolic steroid use (she did not use injectable preparations) which lasted for several months after discontinuing her anabolic steroid use.

Participants were given the opportunity to report the treatments they undertook for any adverse effects in more detail, via free text fields within the survey. Analysis of the responses reveals a majority of those responding treating themselves, rather than seeking professional medical help,

except in those instances where professional help was largely unavoidable; notably the treatment of advanced gynaecomastia.

Gynaecomastia, when identified at an early stage, was frequently treated with the use of ancillary drugs such as Selective Estrogen Receptor Modulators (SERMs), commonly Tamoxifen, or Aromatase Inhibitors such as Letrozole. Only when the gynaecomastia failed to respond to such treatments and developed further, did participants seek professional medical help via their GP and subsequent surgical intervention.

Some participants reported temporary emotional or psychological side-effects (mild depression, mood swings, increased irritability or aggression) which they treated by simply reducing or discontinuing use of the drug believed to be causing it.

Participants frequently identified specific substances as being responsible for their side-effects and commented that they would avoid those substances in future, or reduce the dosage.

One participant reported adverse psychological reactions as a result of using 800mg of Trenbolone per week, but also reported that lowering the dose removed all apparent side-effects.

"I would snap, verbally a lot quicker than I do now. My sense of paranoia went through the roof. I thought my wife was cheating on me….whist I was on this high dose of Trenbolone I just believed she was up to something all the time. My last cycle of trenbolone, I lowered the dose and had no problem"

Key Points

Assessing potential liver or cardiovascular damage was beyond the scope of this study and as such, we are limited to user self-report which therefore removes some potential harms which may only be detected by clinical investigation. Despite the apparent evidence for potential harms from SIEDs, the survey does not support the idea that large number of SIED users will experience adverse effects as a matter of course. However, it is apparent that, whilst some individuals may appear resistant to the potential adverse effects, some people may experience severe side-effects, occasionally requiring medical intervention.

It was notable during the telephone interviews; that participants expressed a lack of confidence or trust in primary healthcare and did not feel they could comfortably talk to their GP about their SIED use.

One participant commented:

"Anything I go to the doctor's with is put down to that [steroid use]….doesn't matter what it is. Why would I bother talking to them after that?"

And another commented:

"I don't trust them [doctor's] as far as I can throw them and neither does anyone else I know in this game [bodybuilding]"

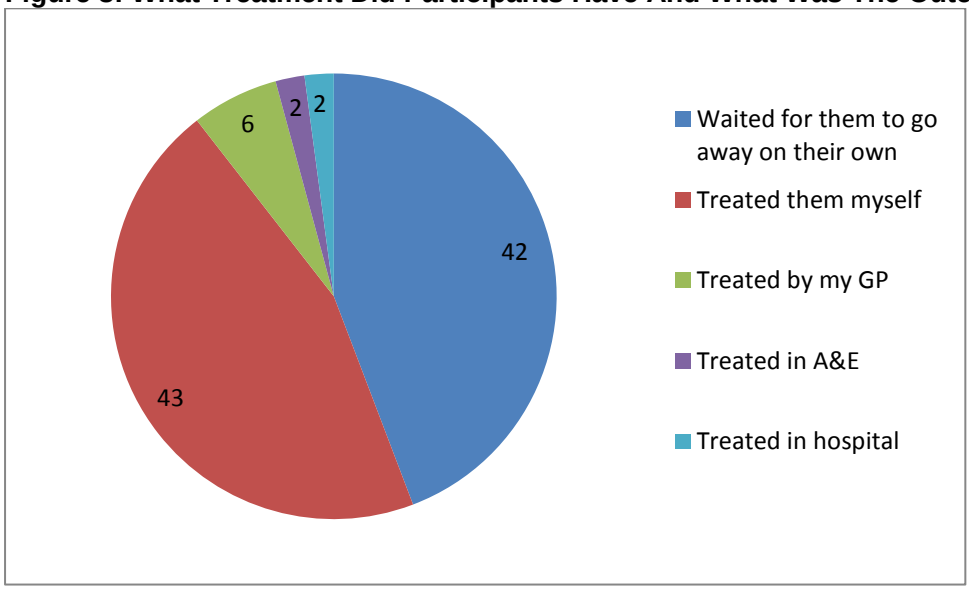
SIED users should be encouraged to engage with medical professionals in order to address potential health issues arising from their SIED use, including those that require investigation to determine, such as liver function and cardiovascular issues. However, some participants reported that they preferred not to engage with health professionals; in particular, with their GPs; citing a lack of understanding of their SIED use and examples of GP's being dismissive of their health concerns because they were caused by self-medication. It is important therefore, when designing and implementing services for SIED users, that health professionals are appropriately trained to understand the potential issues and needs of this group.

Table 8: Number of participants reporting specific adverse effects (n=94)

Physical Symptoms	More than 12 months ago	In the last 12 months
Gynaecomastia	13 (13.8%)	11(11.7%)
Testicular Atrophy	17 (18.1%)	38 (40.4%)
Injection Site Swelling /Redness /Heat	16 (17.0%)	22 (23.4%)
Injection Site Pain	14 (14.9%)	41 (43.6%)
Psychological/Emotional Symptoms		
Mood Swings	16 (17.0%)	12 (12.7%)
Raised Aggression /Irritability	13 (13.8%)	19 (20.2%)

Other symptoms reported included seven people reporting acne across their back and shoulders, insomnia (1 person) and one female participant reporting no menstrual cycle for a year, despite discontinuing oral anabolic steroid use for several months (she did not use injectable anabolic steroids).

Figure 8: What Treatment Did Participants Have And What Was The Outcome?



Waited for them to go away on their own	42 (44.7%)
Treated them myself	43 (45.7%)
Treated by my GP	6 (6.4%)
Treated in A&E	2 (2.1%)
Treated in hospital	2 (2.1%)

Conclusion

This survey represents a first step in quantifying patterns of self-directed SIED use in the general population. Whilst there is much made of the potential harms associated with the use of these drugs, it would appear that, whilst there are cases of individuals exhibiting extremely risky behaviours, many users do at least attempt to take a measured and informed approach to their drug use and to minimise the potential adverse health effects.

However, it is important to note that there remain a number of key public health issues around SIED use.

Engagement with healthcare services

Whilst users seek to be well informed on their drug use, the fact remains that there exists no robust evidence base around the simultaneous use of multiple types of SIED at supra-therapeutic doses on which they can draw. Equally, healthcare professionals do not have a robust clinical evidence base which they can exploit in treatment decisions. Participants in this survey did not generally report significant adverse health effects, but importantly, they did not generally seek professional medical help for those side-effects they did experience; preferring to treat themselves or wait for symptoms to go away on their own. This lack of engagement with healthcare services is a particular concern. It is possible that people are presenting to healthcare services for issues related to their SIED use, but not reporting their SIED use and as a consequence, potentially missing opportunities to address key issues with the physiological effects of their drug use. Furthermore; there is evidence of potential adverse side-effects that do not offer immediate physical symptoms, such as cardiovascular issues, that would require screening by medical professionals. The lack of engagement with healthcare services could suggest that these effects may go unnoticed until they become much more serious and difficult to treat.

Young people

The issue of younger people turning to SIED use is complex. It would appear that many SIED users initiate use in their late teens and early twenties and whilst there does not exist any specific, robust evidence to demonstrate greater harms associated with a younger initiation of SIED use, it must be noted that the studies have simply not been performed. Intuitively; it is possible that disruptions caused by the use of hormonal products as well as ancillary drugs may disrupt normal development. However, it is not currently possible to quantify how much of a risk this may present.

Younger people are generally more likely to indulge in the use of psychoactive drugs and alcohol, in particular the 18-24 age group identified as also being the age group in which many people initiate the use of SIEDs.

It is therefore important to engage with younger users and explore both their SIED use and any recreational drug and alcohol use. It seems likely that taking more substances simultaneously will exacerbate any potential adverse health issues. This particularly applies to issues around liver health.

Length of Use

Whilst many participants reported relatively moderate cycle lengths, it is important to note that some reported extremely long cycles, sometimes running to several years in length. It is important that this is explored further in order to determine whether this is a growing trend. In particular, whether more young people are turning to extremely long cycles. It seems likely that longer periods may exacerbate the potential adverse effects however more research is needed here.

Sexual Health

It is a concern that the majority of users had not been tested for BBVs; this is of particular concern with the finding that HIV prevalence rates in this group are equal to those of opiate

injectors. It is important therefore to do more to highlight this health issue with SIED users and offer testing and treatment, ideally via a confidential service.

The provision of healthcare services for this group needs to be developed to allow greater engagement with SIED users and to address some key basic issues. In the first instance, this does not necessarily require greater investment or new services. Specialist NSP sites are already well-equipped to offer advice and services around BBV's. Training can be provided for frontline NSP workers and GPs to improve engagement with SIED users and to improve their understanding of the drugs used and the potential issues arising from them. Education programmes can be developed to address the use of SIEDs by younger people. However, whilst this survey represents a first step in quantifying the issues, it is apparent that more research is needed to understand the prevalence, epidemiology and potential adverse effects of SIED use.

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