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Steroids and Image Enhancing Drugs

2014 Survey Results

Jim McVeigh, Geoff Bates and Martin Chandler

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CPH, Faculty of Education, Health and Community, Liverpool John Moores University, Henry Cotton Campus, 15-21 Webster Street, Liverpool, L3 2ET
0151 231 4511 | j.mcveigh@ljmu.ac.uk | www.cph.org.uk | ISBN: 978-1-910725-10-8 (web)

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Introduction

The use of performance-enhancing substances by athletes is as old as sport itself. However, over the past decade, concern has grown as the use of a wide variety of drugs being used — in particular anabolic steroids and growth hormone — has transcended the elite sporting arena to the general population where they are used for both performance- and image-enhancing reasons. However, even for the most commonly used and best known of the substances, anabolic steroids, there is a paucity of reliable information as to the prevalence of use. Current mechanisms for monitoring the levels of use are inadequate (Advisory Council on the Misuse of Drugs, 2010). The Crime Survey for England & Wales (CSEW), the mainstay of identifying levels of drug use in the population, estimates that for England and Wales in 2013/14 were, for lifetime use, 262,000 (range 217,000 – 308,000) and for use in the previous 12 months, 66,000 (range 43,000 - 89,000). However, data over time from CSEW (and its forerunner, the British Crime Survey) would indicate that there has been no increase in anabolic steroid use, in fact a decrease since 1996. In 1996, a lifetime prevalence of 1.1% was identified, decreasing to 0.5% in 2004 before returning to 0.8% in 2013/14. However, data from needle and syringe programmes contradict these findings, with these estimates largely accepted as underestimates (National Institute for Health and Care Excellence, 2014; Bates et al, 2014; McVeigh et al, 2003; McVeigh et al, 2007).

This group of drug users, referred to as steroid and image enhancing drugs (SIEDs) users presents a number of specific challenges for healthcare services; they are injecting drug users who frequently employ very complex drug regimens with no evidential basis. In recent years we have witnessed a rapid expansion of substances used, with an array of prescription only medicines being used in tandem with peptide hormones which are still at the early stages of development. The drugs are predominantly illicitly manufactured and sourced (Larance et al, 2005; Parkinson et al, 2006; Striegal et al, 2006), although legal to possess for personal use. They are of highly variable quality and sterility and pose a significant health risk to the user (Graham et al, 2009; Evans-Brown et al, 2009; Stensballe et al, 2014; Breindahl et al, 2014; Kimergård et al 2014a; Kimergård et al 2014b).

Alongside use of SIEDs, there is also evidence of the concurrent use of psychoactive drugs, especially cocaine and cannabis (Hope et al, 2013; Sagoe et al, 2015). As well as these issues there are many adverse health conditions specifically associated with the use of SIEDs. Anabolic steroids alone have been linked with adverse effects from acne, accelerated balding, gynaecomastia, sexual dysfunction, mood and psychological effects to a growing body of evidence of serious chronic conditions, in particular those associated with cardiac physiology and function (Pope et al, 2014). As new drugs are added to the existing array of pharmacological substances, the potential for harm increases and becomes more diverse.

The most significant threat to this population lies in the risks associated with injecting. Historically, the issue of blood borne virus transmission has largely been dismissed (Crampin et al, 1998), although risk behaviour amongst populations of SIEDs users has been identified (Midgeley et al, 2000; Kimergard & McVeigh, 2014a). Findings from the largest study of blood-borne viruses among

SIED injectors, conducted across England and Wales in 2010-2011 (Hope et al, 2013) illustrated HIV prevalence at a similar level to those injecting psychoactive drugs such as heroin and cocaine. These findings were confirmed in the unlinked anonymous HIV and viral hepatitis monitoring among people who inject drugs in 2012-13. Of the 249 participations in the 2012-13 survey across England and Wales, 2.0% (95% CI, 0.74%-4.9%) had HIV, 2.8% (95% CI, 1.2%-5.9%) anti-HBc and 3.6% (95% CI, 1.8%-7.9%) anti-HCV. Although the prevalence of antibodies to both hepatitis B and C were lower than levels observed amongst participants in the main survey, targeted at people who inject psychoactive drugs, the prevalence of HIV is similar in both of the surveys. The survey also identified a highly sexually active population with low rates of condom use (Public Health England, 2014). Additionally, injection site problems were common, being reported by over a third of participants in the study conducted in 2010-2011 (Hope et al, 2015).

The public health concerns related to this population are exacerbated by an apparent reluctance of many SIED users to engage with health and support services, in particular primary care. Injectors experiencing injecting related injuries are most likely to self-treat conditions as they arise, resorting to attendance at Accident & Emergency Departments in the event of increasing severity (Hope et al, 2015). During in depth interviews SIED injectors have cited a lack of trust and confidence in the treatment that they would expect within primary care settings (Kimergard & McVeigh, 2014b).

In order to better understand and evidence the public health issues acknowledged above, Public Health Wales commissioned an online survey of SIED users in the UK, in collaboration with academic colleagues at the Centre for Public Health, Liverpool John Moores University. This document summarises key findings from the second year of the SIEDs survey, with a particular focus of the report being on the specific drugs of use. The report also outlines the further dissemination of results from the 2014 data sweep of the survey and describes developments for enhanced data collection in 2015. These summary findings from the 2014 survey should be viewed in conjunction with the 2013 survey results (Chandler & McVeigh, 2014), which can be downloaded at: http://www.cph.org.uk/wp-content/uploads/2014/06/Steroids-and-Image-Steroid-Image-Enhancing-Drugs-2013-Survey-Results-FINAL.pdf

Survey Methods

The original survey, conducted in 2013, comprised 51 questions exploring the use of SIEDs. In response to issues raised within the first survey; 6 questions exploring the participants' most recent cycle in greater detail were added for 2014. The 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). Ethical approval for the survey was obtained via the Liverpool John Moores University Research Ethics Committee.

The survey was drafted by the Centre for Public Health at Liverpool John Moores University and subsequently refined following feedback from research partners. Following completion of ethical approval and review, the survey link initially went live on 10th July 2013 and was closed at midnight

on the 12th November 2013. This second run of the survey went live on the 6th June 2014 and formally closed at midnight on the 30th September 2014.

The online survey was disseminated via the most popular UK–based online forums dedicated to weight training and/or the use of SIEDs (UK-Muscle, Testosterone Muscle, Muscle Talk and Underground Muscle) and via NSPs engaging with SIED users. We also provided paper versions of the survey for participants to complete when visiting NSPs, for those people who did not wish to complete them online.

Key findings

Description of the sample

A total of 108 people from the UK took part in the survey; of which 8 (7%) were female. A third (33%) of respondents were from Wales, with 59% from England and 7% from Scotland and the vast majority (89%) described their ethnicity as White British. All published work dating back to the early to mid-1990s has supported the assertion the majority of SIED users are White British (Korkia & Stimson, 1993; Lenehan et al, 2006; Lenehan & McVeigh, 1998). However, recently published qualitative work in the United Kingdom has identified a significant group of British South Asian SIED users with specific needs and requiring purposeful engagement (van Hout & Kean, 2015). Participants in this survey were aged between 17 and 64 years of age, with a mean age of 33 years, a considerably younger cohort than those injecting psychoactive substances such as heroin and crack cocaine (Whitfield et al. 2014) (see Table 2 for data relating to age of first use of SIEDS).

SIED use

Participants described their primary purpose and other motivations for using SIEDs (Table 1). The most commonly reported motivations included gaining muscle and strength together with losing fat. For over half of participants (59%) the primary goal of their SIED use was to gain muscle, with a further 15% citing fat loss as the main motivation for use. Superficially, these primary motivations have remained largely unchanged from the early exploratory research of the 1990s. A total of 386 anabolic steroid users interviewed in the North West of England stated their main purposes of use as *improve bodybuilding* and *increase muscle* (Lenehan et al, 2006). However, there are significant differences between anabolic steroid users identified in the 1990s compared to the population of SIED users today who are not a homogenous group. The characteristics of SIED users are more diverse than in the past and the perceived benefits of using enhancement drugs are equally disparate. This is reflected in the vast array of substances which fall under the category of SIEDs.

For a quarter of those sampled, an increase in sex drive was a motivation for use, while relatively high numbers of individuals highlighted the benefits of a getting a suntan or enhancing the skin (for those injecting melanotan I and melanotan II). While few individuals highlighted these as their

primary purpose of use, it reflects the complex drivers related to this broad category of drug use and the issue of polypharmacy. The issue of polypharmacy, both in terms of enhancement drugs (see tables 3 and 4) and recreational or psychoactive substance use (see table 5), is not restricted to the United Kingdom and is seen as a growing global public health concern (Sagoe et al, 2015).

Table 1: Motivations for SIED use (n=108)

	n (%)	Main goal n (%)
To gain muscle	98 (90.7)	64 (59.3)
To lose fat	78 (72.2)	16 (14.8)
To get stronger	89 (82.4)	12 (11.1)
To get fitter	52 (48.1)	2 (1.9)
To get faster	31 (28.7)	0
To improve endurance or stamina	39 (36.1)	2 (1.9)
To get a tan	22 (20.4)	2 (1.9)
To reduce wrinkles or improve skin	12 (11.1)	1 (0.9)
To increase sex drive	28 (25.9)	1 (0.9)
Did not answer	-	8 (7.4)

The vast majority of participants reported taking SIEDs both orally (n=99, 92%) and through an injection (n=94, 87%), with this finding being common to most SIED related research. There were some differences in reported age of first SIED use, depending on method of use (Table 2). More specifically, findings suggest that onset of oral consumption of SIEDs is likely to be slightly earlier than use of injectable substances. One third (33%) of the sample reported first use of oral SIEDs by 21 years of age, including 9% initiating use by age 18. In comparison approximately one quarter (27%) of participants reported first injecting SIEDs by 21 years of age including 6% by age 18. Age of initiation of SIED use is typically reported to be before age 30 and may be as early as age 14 (Sagoe et al, 2014). The difference in age of initiation of SIED use by method of administration is smaller than has been identified in a number of previously published United Kingdom research studies (for example, Korkia & Stimson, 1993; Lenehan et al, 1996). The explanation for this is unproven as yet but could be associated with a greater knowledge of liver damage caused by oral anabolic steroids or the increasing number of products that are only available in injection formula, for instance melanotan II and a number of anabolic peptide hormones.

Table 2: Age of SIED initiation by method of use (n=108)

	Injection n (%)	Oral n (%)
21 and under	29 (26.9)	36 (33.3)
22 – 25	24 (22.2)	26 (24.1)
26 – 30	19 (17.6)	15 (13.9)
31 and over	22 (20.4)	19 (17.6)
Did not answer	14 (13.0)	12 (11.1)

Participants described their average and most recent SIED cycles. Almost all cycles reported employed both injectable and oral anabolic steroids simultaneously, sometimes in conjunction with a range of other SIEDs, including weight loss agents, peptide hormones and cosmetic enhancers (e.g. tanning agents). The average cycle length for injectable steroids was 20 weeks; however 29 (27%) stated they used a "Blast and Cruise" approach, whereby a smaller dose is injected for a period of weeks (the 'Cruise') alternated with larger doses as per a normal cycle (the 'Blast'). The longest injectable cycle reported was four years and ongoing. The average cycle length for oral anabolic steroids was 9 weeks; the longest was three years and ongoing.

For the 2014 survey, a section was introduced asking detailed questions about the most recent (or current) cycle; including questions around dose. The mean dose for injectable anabolic steroids was approximately 1.5 grams per week, with the largest dose being 7.5 grams per week. A total of 77 participants reported their weekly dose and of these, 46 were employing doses of 1 gram or more. To put this in perspective; natural testosterone production is approximately 49-77 milligrams per week (Llewellyn, 2009).

Substances used

People who use SIEDs commonly report use of a range of other substances typically used to enhance the impact of their steroid use, to counter side effects, for recreational or relaxation and sexual enhancement (Sagoe et al, 2015). Additional substances used by people who use anabolic steroids have been classified into 13 groups: analgesics/non-steroidal anti-inflammatory drugs/opioids, anti-oestrogens, cardiovascular drugs, central nervous system depressants, central nervous system stimulants, cosmetic drugs, dietary/ nutritional supplements, diuretics, fat burning/weight loss drugs, muscle/strength-enhancement hormones, non-hormone muscle/strength-enhancement drugs, recreational substances/drugs, and sexual enhancement drugs (Sagoe et al, 2015).

Table 3: Recent and lifetime use of oral SIEDs (n=99)

	Past year n (%)	Lifetime n (%)
Anabolic steroids	64 (64.6)	93 (93.9)
Nolvadex	57 (57.6)	75 (75.8)
Aromatase Inhibitor	46 (46.5)	54 (54.5)
Viagra/ Cialis	44 (44.4)	58 (58.6)
Clomid	33 (33.3)	57 (57.6)
Clenbuterol	28 (28.3)	45 (47.8)
Thyroid hormones	27 (27.2)	35 (35.3)
Ephedrine	23 (23.2)	49 (49.5)
Prohormones/ designer steroids	16 (16.2)	28 (28.3)
Diuretics	11 (11.1)	14 (14.1)
DNP	8 (8.1)	15 (15.2)

Oral SIEDs

Use of oral SIEDs amongst 99 participants who consumed their SIEDs orally (n=99) is reported in Table 3. The most commonly used substances taken orally in the past year were anabolic steroids (65%), Nolvadex (58%), Aromatase Inhibitor (47%) and Viagra/Cialis (44%).

Injectable SIEDs

Amongst participants who injected SIEDs (n=94), nearly two thirds (64%) stated that they had injected testosterone enanthate in the past year with use of a range of other anabolic steroids reported by smaller proportions of the sample (Table 4). Approximately one fifth of these participants reported recent use of Human Growth Hormone (19%) and 16% reported they had used tanning agents Melanotan I or II (16%).

Table 4: Recent and lifetime use of injectable SIEDs (n=94)

	Past year n (%)	Ever n (%)
Testosterone enanthate	60 (63.8)	75 (79.8)
Sustanon	43 (45.7)	67 (71.3)
Testosterone propionate	38 (40.4)	53 (56.4)
Deca-Durabolin	36 (38.3)	64 (68.1)
Underground lab blend	34 (36.1)	46 (49.9)
Trenbolone acetate	33 (35.1)	44 (46.8)
Testosterone cypionate	30 (31.9)	49 (52.1)
Masteron	27 (28.7)	35 (37.2)
Trenbolone enanthate	25 (26.6)	39 (41.5)
Equipoise	25 (26.6)	37 (39.4)
hCG	22 (23.4)	29 (30.9)
Human growth hormone	18 (19.1)	35 (37.2)
Melanotan I or II	15 (16.0)	21 (22.3)
Winstrol	11 (11.7)	24 (25.5)
Testosterone suspension	9 (9.6)	14 (14.9)
Insulin	9 (9.6)	14 (14.9)
GHRP	6 (6.4)	17 (18.1)
IGF	3 (31.9)	12 (12.8)
MGF	2 (2.1)	6 (6.4)

Other substance use

Participants were asked about their use of psychoactive drugs (Table 5) and alcohol consumption. While substantial proportions of participants reported lifetime use of a range of psychoactive drugs, less than one third of the sample (32%) reported use of any psychoactive drug in the previous year; the most commonly reported substances being cannabis (15%) and cocaine (10%). This is a considerably lower level of cocaine use compared to other studies of psychoactive drug use amongst users of SIEDS. In Hope et al's study (2013), 46% of the 395 male SIED users had snorted cocaine in

the previous 12 months. This difference may be caused by the different recruitment approach, with a high proportion of Hope's sample derived from needle and syringe programmes compared to significant recruitment from online forums in this current study. A small minority reported injecting any psychoactive drug in the past year (4%) or in their lifetime (7%). People who use SIEDs report lifetime use of a range of other recreational substances, prominently including alcohol, amphetamines, cannabis and cocaine, and frequently report use of a variety of these substances alongside their SIED use (Sagoe et al, 2015). On average, alcohol consumption was relatively low in this sample with nearly two thirds (64%) reporting that they consumed alcohol on a monthly or less basis. Heavier drinking, including consuming six or more drinks in one day on a weekly basis and consuming alcohol on two or more days a week, was reported by around 15% of the sample.

Similar to findings from the previous year (Chandler & McVeigh, 2014), a minority of participants are using these substances to potentially harmful levels and therefore increasing the risks associated with both SIEDs and drugs and alcohol. For example, the use of alcohol (Rehm et al, 2010) and oral anabolic steroids (Pope et al, 2013) are associated with adverse effects within the liver and both psychoactive drugs (Fletcher et al, 2010) and anabolic steroids (Pope et al, 2013) are associated with the onset of mental health issues, although the evidence for this relationship between anabolic steroids and psychological issues is inconclusive.

Table 5: Recent and lifetime use of psychoactive substances

	Past year n (%)	Lifetime n (%)
Cannabis (n=94)	27 (14.8)	68 (63.0)
Cocaine (n=92)	26 (10.2)	55 (51.0)
Ecstasy (n=92)	13 (.3)	54 (50.0)
Speed (n=92)	11 (9.3)	48 (44.4)
Ketamine (n=80)	5 (3.7)	20 (18.5)
Mephedrone (n=77)	5 (2.8)	16 (14.8)
Poppers (n=83)	4 (3.7)	35 (42.2)
Crack (n=77)	2 (1.9)	7 (6.5)
GHB (n=79)	1 (0.9)	12 (11.1)
Heroin (n=75)	1 (0.9)	6 (5.6)

Polypharmacy associated with SIED use has been linked to a range of negative outcomes, including violence, criminal behaviour, illness and mortality (Sagoe et al, 2015). The use of illicit drugs exposes individuals to a range of harms associated with substance misuse, including from contaminated drugs, psychological and physiological effects and, where substances are injected, injection site injuries and infections and potential transmission of blood-borne viruses.

Adverse effects from SIED use

A range of harmful physiological and psychological effects have been linked to use of anabolic steroids. There is some evidence that steroid use may be associated with increased risk of cardiovascular effects, including cardiomyopathy, myocardial infarction and other harms such as

metabolic, neurologic, renal and musculoskeletal disorders (Pope et al, 2014). Use of steroids amongst younger people may have long-term harms due to their impact on patterns of growth. Amongst females there is also an increased risk of a range of significant and potentially permanent physical effects including the development of male characteristics, such as deepening of the voice and abnormal hair growth (Advisory Council on the Misuse of Drugs, 2010). Steroid use has additionally been linked with psychological impacts, including aggression, depression and mania (Advisory Council on the Misuse of Drugs, 2010). However there is a lack of conclusive evidence and while studies suggest that individuals using steroids may display a range of symptoms relating to mood disorders, these vary greatly by individual cases and symptoms are rarely severe (Pope et al, 2014).

Table 6: Injuries and adverse side-effects associated with SIED use (n=108)

	Past Year n (%)	Ever n (%)
Testicular atrophy	54 (50.0)	65 (50.6)
Pain at injection site	47 (43.5)	55 (50.9)
Swelling, redness or heat at injection site	29 (26.9)	39 (36.1)
Raised blood pressure	28 (25.9)	41 (38.0)
Gynaecomastia	21 (19.4)	35 (32.4)
Increased aggression/ irritability	21 (19.4)	33 (30.6)
Mood swings	20 (18.5)	28 (25.9)
Unwanted facial or body hair	15 (13.9)	20 (18.5)
Hair loss	13 (12.0)	17 (15.7)
Nausea	11 (10.2)	13 (12.0)
Deepening of voice	6 (5.6)	6 (5.6)
Abscess, sore or open wound at injection site	1 (0.9)	11 (10.2)

Survey participants described adverse side-effects that they attributed to their SIED use (Table 6) with 70% reporting experiencing any injury or side-effects in the previous year. The most commonly reported lifetime adverse effects were physical symptoms, including testicular atrophy (51%), pain at the injection site (51%), raised blood pressure (38%) and swelling, redness or heat at the injection site (36%). A smaller but substantial proportion of participants reported ever experiencing adverse psychological effects such as increased aggression or irritability (31%) and mood swings (26%). When asked how they responded to these adverse effects, 49 participants (45%) reported waiting for some side-effects to go away on their own and 46 (43%) reported treating some themselves. Frequently the self-treatment employed either natural remedies and/or other pharmaceutical drugs (for example, the use of tamoxifen to reduce gynaecomastia or the use of celery seed to reduce high blood pressure). A minority of participants (6%) reported being treated by their GP or in other healthcare settings including A&E (5%).

Injecting behaviours and Blood Borne Viruses

Table 7: Frequency of injecting SIEDs by injection method (n=94)

	Intramuscular injection n (%)	Subcutaneous injection n (%)
More than once per day	2 (2.1)	2 (2.1)
Daily	7 (7.4)	11 (11.7)
Every other day	28 (29.8)	4 (4.3)
Twice per week	34 (36.2)	2 (2.1)
Once per week	16 (17.0)	3 (3.2)
Less than once per week	2 (2.1)	5 (5.3)
Never	0	62 (68.1)
Did not answer	5 (5.3)	5 (5.3)

Frequency of injecting SIEDs is reported in Table 7. Participants were most likely to inject intramuscularly on approximately 2-4 days per week with small numbers injecting on a daily basis or greater. Over two thirds of those injecting SIEDs reported that they did not inject subcutaneously, but 14% stated that they did so on a daily basis or greater. Place of injection is reported in Table 8; the most frequently reported places to inject were the gluteus, quadriceps and deltoid sites.

Table 8: Injection sites by injection method (n=94)

	Intramuscular injection n (%)	Subcutaneous injection n (%)
Gluteus	70 (74.5)	0
Quadriceps	51 (54.3)	2 (2.1)
Deltoid	42 (44.7)	0
Triceps	11 (11.7)	0
Biceps	9 (9.6)	0
Pectoral	7 (7.4)	0
Abdomen	4 (4.3)	19 (20.2)
Latissimus dorsi	2 (2.1)	0

Evidence from a study in England and Wales suggests a similar prevalence rate for HIV (2%) amongst individuals injecting SIEDs to those injecting psychoactive drugs (Public Health England, 2014). Findings also suggest that less than half of SIED users may have undergone testing for HIV (41%) or hepatitis C (32%), or reported uptake of the hepatitis B vaccine (40%). Similar findings were identified in our survey where all participants were asked about their blood borne virus (BBV) testing history, with over half the sample reporting that they had never undergone testing for any BBV (table 9). Additionally, fewer than half (44%) had received vaccinations for Hepatitis B.

Of 94 survey participants who had ever injected SIEDs, two thirds (67%) reported using a needle and syringe programme to obtain injecting equipment in the previous year and over one quarter (28%) reported acquiring their injecting equipment over the internet. Other methods included obtaining equipment from a SIED supplier (3%) or friend (4%). Of all ever injectors, 10% reported ever re-using

their own equipment and generally not at all or infrequently in the previous 12 months; no injectors reported ever using equipment ever used by another individual. A small proportion (7%) reported ever sharing a multi-dose vial with another individual. The low rate of sharing equipment is in line with other research with SIED users, for example findings from PHE's unlinked anonymous survey suggest lifetime injection equipment sharing at 13% (Public Health England, 2014) and previous studies suggest rate of sharing amongst this population at between 0 and 20% (Advisory Council on the Misuse of Drugs, 2010).

Table 9: Blood borne virus vaccination and testing status (n=108)

	n (%)
Ever vaccinated Hep B	47 (43.5)
Ever tested Hep B	46 (42.6)
Ever tested Hep C	47 (43.5)
Ever tested HIV	41 (38.0)

Conclusion

The findings from this survey build upon the results described in the 2013 survey report (Chandler and McVeigh, 2014). There is a clear need to routinely investigate the drug use and related behaviours and health outcomes amongst SIED using populations. The SIEDs market is dynamic and fast moving, with the practices and preferences of the population constantly changing along with the associated risks to health. Evidence suggests that SIED users form a heterogeneous population, with different motivations, needs and drug use behaviours, for example as highlighted by the range of SIEDs injected and taken orally reported here. Further research and increased understanding of the sub groups that make up SIED using population is essential for the development of effective prevention, harm reduction and treatment interventions. For example, the findings reported here suggest that it is important to understand how to better engage SIED users with health services for the treatment of adverse health effects associated with their SIED use, and to identify effective approaches to increase testing for blood borne viruses amongst this population.

Next steps

To raise the profile of this survey to aid dissemination of findings and to promote the 2015 survey, an additional output in the form on an infographics poster will be produced. The poster will highlight key findings discussed within this report in a visually compelling and easily accessible format.

To build upon and expand the data already collected, the next version of this survey will run from August to December 2015. To substantially increase the number of participants, additional methods of recruitment will be utilised for the 2015 data collection. This will include a greater focus on SIED users who may not be engaged with health and drug related services, or those participating via online discussion forums. For example, data collection in gym and fitness settings will be take place.

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