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Factors associated with hepatitis C and HIV testing uptake among men who inject image & performance enhancing drugs.

Running title: HCV & HIV testing: men who inject IPEDs

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Abstract

Introduction and Aims: Historically, people who inject image and performance enhancing drugs (IPEDs) were not perceived as being at high risk of HIV or hepatitis C virus (HCV) infection. However, recent studies indicate HCV and HIV prevalences are elevated, with many HCV infections undiagnosed.

Method: Men who inject IPEDs recruited from community settings and specialist services, including needle-syringe programmes, across UK during 2016 self-completed a questionnaire. Multivariate analyses examined factors associated with HCV/HIV testing.

Results: The participants' (N=562; 24% service recruited) median age was 31 years, 4% identified as gay or bisexual, 18% had ever been imprisoned, and 6% had ever injected a psychoactive drug. Those community recruited more often reported sharing drugs vials (16% vs 8%, $p=0.021$) and, among those with 2+ sexual partners, poor condom use (50% vs. 36%, $p=0.063$), than those service recruited. Overall, one-third had ever been tested for HCV (31%) and/or HIV (34%). Testing uptake was associated with other risk factors for HCV/HIV, being recruited through services, and having received metabolic tests. Participants motivations for using IPEDs were associated with recruitment setting and HIV/HCV testing uptake.

Discussion and Conclusions: The majority were untested for HCV/HIV. HCV/HIV testing and risks were associated with recruitment through services. Previous NSP based studies have potentially overestimated testing uptake and underestimated risk. Targeted interventions are needed, particularly for those not accessing services. The association between HCV/HIV testing uptake and receipt of metabolic tests suggests that developing a combined offer of these tests as part of health monitoring could improve uptake.

Keywords: Hepatitis C, HIV, Performance-Enhancing Substances

Introduction

People who inject image and performance enhancing drugs (IPEDs), such as anabolic androgenic steroids (AAS), have historically been perceived as having a similar risk for blood-borne viral (BBV) infections, such as HIV and hepatitis C virus (HCV), as the general population[1,2]. However, since 2011 several studies, principally from the United Kingdom (UK), have indicated that the prevalence of both HIV and HCV infection is elevated among those who inject IPEDs when compared to the general population[3,4,5]. In the UK, although the prevalence of antibodies to HCV in this group is around one-tenth of that seen among those who inject psychoactive drugs, such as heroin and cocaine, it is about 10-times that in the general population[3]. Whilst the prevalence of HIV among those injecting IPEDs is similar to that among those injecting psychoactive drugs (around 1%), it is estimated to be more than five-times higher than that in the UK general population[3]. Concerningly, the majority of HCV infections among those who only inject IPEDs remain undiagnosed[5].

Historically, the use of AAS and allied drugs for athletic purposes, such as for sporting performance and body building, was probably the predominate form of use. Though AAS remain the most common type of IPED, the range and types of drugs being used has increased in recent years[6,7]. Patterns of IPED use vary reflecting the populations diverse reasons and motivations for their use[8]. These include use for aesthetic enhancement, improving sporting performance, and to mitigate the effects of ageing. Evidence suggests that the use of IPEDs has increased in some countries, including the UK[9,10,11]. Many UK needle and syringe programmes (NSPs) now report seeing more people who inject IPEDs than people who inject psychoactive drugs[12]. For example, in Cheshire & Merseyside the number of people accessing NSPs using IPEDs has almost tripled over the past 10 years (from 3,146 in 2007-08 to 8,700 in 2017-18)[13]. Increased NSP attendance for IPED use has been reported in other high-income countries, generating international debate about appropriate service provision[14,15].

IPED use, and particular AAS use, has been associated with a number of health harms, including those related to the physiological effects of these drugs on the body, with indications that IPED use is associated with cardiovascular health issues, damage to the brain and liver problems[16,17,18]. The latter may reflect that many use C17-alpha alkylated steroids; however, studies indicate alcohol consumption is high among some of those using IPEDs [19,20] which can also cause damage to the liver. HCV infection, which is typically asymptomatic for many years, over time can result in severe liver damage and death. It is easily acquired through sharing of injecting equipment and poor injection related hygiene. There are now highly effective directly acting antiviral drugs which can cure HCV infection[21]. However, access to these drugs for those living with HCV infection is dependent

on their infection first being diagnosed, and then entering a care pathway leading to treatment, which requires the uptake of diagnostic testing as an entry point.

Those who inject IPEDs are also at risk of acquiring HIV through reuse and sharing of equipment used for injection. However, sexual risks are also likely to play a substantial role, with some analyses indicating that sexual risks may be the main factor for the elevated HIV prevalence in this group[4]. In part, this reflects the fact that the population groups who inject IPEDs include men who have sex with men (MSM). Unprotected anal intercourse can place these men at very high risk, particularly as MSM have the highest HIV prevalence in the UK and most high-income countries[22]. Evidence indicates that among some people who inject IPEDs there are also significant levels of heterosexual sexual risk, with some men reporting multiple opposite-sex partners with poor condom use, increasing their risk of sexually transmitted infections including HIV[3,23].

Previous work has indicated that among those with no other risk factors, many HCV infections among those injecting IPEDs remain undiagnosed[5]. This is supported by data on self-reported testing uptake among those in contact with services, which indicates that only around one-in-three people injecting IPEDs in the UK have ever had a HCV or HIV diagnostic test[24]. Studies in Australia and USA indicate higher levels of testing uptake (43-71% for HIV and 46-62% for HCV), but also show many of those using IPED remain untested[2,20,25,26]. These studies have recruited samples either exclusively or predominantly of MSM or have recruited through NSPs[2,5,20,25,26,27]. To date, no studies have examined the factors associated with the uptake of diagnostic testing for HCV and HIV among a broad-based sample of individuals who have used IPEDs recruited predominantly from community settings. We analyse data from a national community survey to examine the uptake of HCV and HIV diagnostic testing among those injecting IPEDs in the UK. We identify the factors associated with HCV and HIV testing uptake, explore the relationship between the motivations for using IPEDs and testing uptake, and assess potential missed opportunities for the delivery of diagnostic testing.

Methods

People from across England, Scotland & Wales who had ever injected IPEDs were recruited into the national 'IPEDinfo' survey through community settings (fieldwork and online) and through health services[28].

Trained fieldworkers recruited eligible people from community and service settings in 18 broad locations across England, Scotland and Wales; these locations included both urban and rural areas. The fieldworkers were selected based on their knowledge of the field (e.g. IPED use), credibility and the ability to establish rapport with the target population, and were provided with training on

recruitment in community settings. The fieldworkers approached potential participants in services, that provided either NSP or harm reduction outreach (including specialist IPED services), or in a range of community leisure and fitness settings, such as gyms, sports venues and fitness events. After checking eligibility and obtaining verbal consent from each participant, the fieldworker asked the participant to complete the questionnaire, either electronically or using pen and paper. Additionally, the questionnaire could also be completed online, an option which was promoted in community leisure and fitness settings (such as gyms) using postcards and business cards with details of the survey and through publishing of posts with links to the survey on online forums. Recruitment, both in person and via the online survey, occurred from May to December 2016.

Eligible participants were those aged 16 years or over who had ever used oral and/or injectable IPEDs. The questionnaire was based upon ones used previously with this group[3,5,24] and where possible standard questions were used. After initial drafting, the questionnaire was refined through feedback from research partners and other stakeholders. The questionnaire covered the following topics: demographics; the use of IPEDs, other drugs and alcohol; IPED injection; sexual health; health service utilisation; motivations for using IPEDs; and IPED related side effects experienced. The survey was approved by the Liverpool John Moores University Research Ethics Committee.

Factors associated with self-reports of ever having been tested for HCV or HIV were examined among those who reported ever injecting IPEDs (85%, 580/684 of those recruited). Female participants were excluded due to small numbers (n=18). Separate analyses were conducted for HCV and HIV testing uptake among the male participants, using the same approach. Firstly, bivariate associations between reporting being tested and socio-demographic characteristics, drugs use and sexual risks, and recruitment setting were examined using χ^2 test for categorical variables and the Mann Whitney test for continuous variables. Those characteristics found to be associated in the bivariate analyses ($p < 0.10$) were then entered using the forward stepwise approach into a logistic regression model with inclusion assessed using the likelihood ratio test (with the stepwise probability for inclusion of $p < 0.05$ and exclusion of $p \geq 0.10$).

Additional bivariate analyses explored relationships between testing uptake for either HIV or HCV and motivations for IPED use. Potential missed testing opportunities were explored by examining patterns of recent health service use among those not tested. All analyses were undertaken using SPSS-25.

Results

Participants

There were 562 male participants who had ever injected IPEDs, their median age was 31 years (mean 33, range 17-74). Overall, 4% (n=23) identified as gay or bisexual (GB). The majority were employed (82%, n=461). Around one-in-six (18%, n=101) had ever been imprisoned, and 27 (5%) reported taking IPEDs whilst in prison.

Overall, one quarter (24%, n=136) of the sample had been recruited in services, the rest (n=426) were recruited through community settings. There were no significant differences in age, sexuality or past imprisonment by recruitment setting.

IPED use and motivations

Almost all participants had ever injected AAS (95%, n=533), with the injection of growth hormone and associated peptide hormones reported by half (52%, n=293). Three-quarters (74%, n=414) had also used oral steroids, with 60% (n=336) reporting use of oral oestrogen control or post cycle drugs, and 61% (n=341) reporting use of fat-loss drugs or other oral IPEDs.

Overall, 42% (n=235) reported that they had undergone one or more of the following metabolic/physiological tests in the past 12 months: liver function test (LFT), blood pressure, testosterone levels, electro-cardiograph (ECG), or cholesterol test.

For two-thirds (65%) of the participants, improving their body image was an important reason for using IPEDs. The next most commonly reported important reasons for use were; non-competitive body building (55%), athletic/sporting performance (33%), competitive body building (22%), and occupation performance (16%) (table 1). There were variations in the motivations for IPED use by recruitment setting, with those recruited through community settings significantly more likely to report that athletic/sporting performance was an important reason for use than those recruited in services; whilst those recruited in services were more likely to report hormone replacement therapy (HRT) as not being an important reason (table 1).

BBV related risk

Overall, 17% (n=95) reported ever sharing injecting equipment; 14% (n=79) had ever shared a drugs vial, 4% (n=20) had passed a used needle/syringe on to someone else, and one in 50 (2%, n=10) had ever knowingly used someone else's needle/syringe. Around one in six (17%, n=98) reported that they had ever reused their own needle.

Most of the participants (89%, n=502) were sexually active, with half of these (48%, n=243) reporting two or more vaginal or anal sexual partners during the past 12 months. Overall, 46% (n=112) of those with two or more partners reported never or occasionally using condoms during the past 12 months.

Whilst the use of psychoactive drugs was common (65%, n=363), only 6% (n=33) of the participants reported ever injecting a psychoactive drug. Overall, 71% (n=401) reported drinking alcohol, with 16% (n=65) consuming alcohol on two or more days a week.

BBV related risks & recruitment setting

Those recruited from community settings more frequently reported having ever shared a vial (16%, n=68, of those community recruited vs. 8%, n=11, of those service recruited, $p=0.021$). Ever reusing their own needle or syringe ($p=0.941$) and ever knowingly using someone else's needle or syringe ($p=0.265$) did not differ significantly by recruitment setting.

Among those with two or more sexual partners, never or occasionally using condoms during the past 12 months was more commonly reported among those recruited through community settings than among those recruited in services (50%, 88/177 vs. 36%, 24/66), but this difference was not significant ($p=0.063$).

Ever injecting a psychoactive drug was more commonly reported among those recruited in services (9%, n=12, vs. 5%, n=21), although this difference was not significant ($p=0.093$). There were no differences in ever having taken a psychoactive drug ($p=0.429$) or in alcohol use (categorised as: never, monthly or less, 2-4 times a month, or 2 or more times per week; $p=0.287$) by recruitment setting.

Uptake of HIV and HCV testing

One third (31%) reported ever being tested for HCV (table 2), and those tested were older (mean of 33 years vs. 30 years; $p=0.015$). Similarly, one third (34%) reported ever being tested for HIV (table 2), but uptake did not differ by age. Overall, 28% (n=155) reported uptake of both a HIV and a HCV test.

In multivariable analysis the uptake of HCV testing was associated with: identifying as GB, imprisonment, having injected psychoactive drugs, having had a metabolic/physiological test in the past 12 months, injecting peptides and associated growth hormones, and being recruited in services (table 2). In multivariable analysis the uptake of HIV testing was associated with: identifying as GB, imprisonment, having had a metabolic/physiological test in past 12 months, injecting steroids, sexual activity (either no sex recently or having multiple partners), and being recruited in services (table 3).

Recency of testing & potential missed opportunities

Among those who reported the year of their last HCV test (n=156), the most recent HCV test was during the year of the survey (i.e. 2016) for 28% (n=44), and for a third (31%, n=49) their last test was

in the preceding two calendar years. For those who reported the year of their last HIV test (n=169), for 29% (n=49) it was during the survey year and for a third (34%, n=57) during the preceding two calendar years.

Of those never tested for HCV, 53% (204/385) reported that they had used a self-referral health service for any reason during the preceding year. Similarly, for those never tested for HIV, 51% (189/372) reported use of a self-referral health service for any reason. The health service most commonly reported as having been used by those not tested was primary care (39%, 150/385 of those not HCV tested; 38%, 143/372 of those not HIV tested). Of those using primary care in past year, 62% reported never being tested for HCV and 59% never being tested for HIV (table 4).

Testing uptake and motivations for IPED use.

Those who reported athletic/sporting performance as an important motivation for their IPED use were less likely to report being tested for HCV, although this was not significant ($p=0.065$, table 5). Those who reported retaining/regaining a youthful appearance as an important motivation for their IPED use were more likely to be HCV tested ($p=0.040$, table 5).

Those who reported athletic/sporting performance as an important motivation for their IPED use were also significantly less likely to report being tested for HIV, whilst those who reported retaining/regaining youthful appearance, increasing sex drive, or HRT as being important motivations for their IPED use were significantly more likely to be HIV tested (table 5).

Discussion

Two-thirds of those injecting IPEDs in this UK study had never been tested for HCV or HIV. Uptake of testing for HCV and HIV were both associated with other risks, including the injection of psychoactive drugs, sexual risks and past imprisonment. There were missed opportunities for the offer or uptake of testing, as half of those not tested had recently been in contact with a health service where testing could have been offered.

Firstly, it is important to consider the limitations of our study. As is common for studies of marginalised or hidden populations, there are limited data on the size and nature of the population using and injecting IPEDs, and so we are currently unable to assess the representativeness of those recruited. There is currently no established sampling frame for this population, we therefore tried to minimise bias by using a broad recruitment approach utilising a wide range of settings. The second limitation is that self-reported data on the uptake of diagnostic testing and other behaviours was used, and such data may be subject to recall bias, though studies of people who inject drugs indicate

that self-reports are reliable[29,30]. Considering these issues, our findings need to be generalised with caution.

As previous studies have indicated an elevated prevalence of both HIV and HCV among people who inject IPEDs in the UK[3,4], the low levels of testing uptake reported here are a concern. This study found that only one-third of those men who injected IPEDs had ever been tested for HIV or HCV. These uptake levels are generally similar to those reported in previous UK studies of this population[23]. However, they are below the levels found in the most recent of these surveys, which only recruited through NSP, which reported testing uptake levels of 41% for HCV and 47% for HIV in 2014-15[24]. Unlike this study, none of the previous studies on testing uptake among men injecting IPEDs had explored in detail the factors associated with having been tested.

The HIV and HCV prevalence among people who inject IPEDs is highest among those with other risks, such as past or concomitant injection of psychoactive drugs[4], and we found that those reporting these other risks were more likely to report being tested. However, a previous study has indicated that those people who inject IPEDs and who have been infected with HCV but who do not report other risks, remain largely unaware of their infection[5]; our analysis supports indications from these earlier studies that this lack awareness of their HCV status probably reflects the low levels of testing uptake among this group.

Uptake of testing for both HIV and HCV was associated with having recently had one or more metabolic or physiological tests (that is a LFT, blood pressure, testosterone levels, ECG, or cholesterol test) that can be used to monitor effects of IPEDs, particularly the use of AAS, on the body[31]. Those using IPEDs often seek to utilise such testing as a way to assess if the IPEDs they are using are effective, are having the desired impact and that their use is safe, yet accessing such tests can be difficult. People may be reluctant to use primary care due to stigma and private clinics may not be affordable or easy to access[32]. Offering access to a testing or screening package that includes metabolic or physiological tests as well as BBV testing, could improve uptake of testing for HIV and HCV, as well as provide an opportunity to offer advice to reduce a range of risks (e.g. sexual and drug use risks) and prevent other harms.

Among those who had not been tested for HIV or HCV, around three-fifths had used a health service during the previous year where they could have been offered testing for HIV and/or HCV. It is possible that some of these may have declined an offer of testing, and that others were not offered testing because they did not disclose their IPED use and/or other risks. There may be a range of barriers to testing in these settings, for example, those related to provider and service user knowledge, stigma, and resource issues such as limited time for consultations. Of those not tested,

around two-fifths had used a primary care service during the past year, suggesting a need for interventions to improve awareness of the use of IPEDs, as well as further research to understand the barriers to the effective offer of BBV testing to this group, in primary care settings.

Those recruited at a service, that is NSPs and harm reduction outreach, were more likely to report having been tested. Motivations for use also varied by recruitment setting, in particular those who rated developing sporting/athletic performance (other than body building) as an important motivation for use were less likely to be recruited in a service. Previous studies of people who inject IPEDs have focused their recruitment on NSP[1,3,4,25,26], and so may have over-estimated BBV testing uptake and thus the proportion who are aware of their status. Those samples of people using IPEDs only recruited through NSPs may have also not captured some important sub-populations of people who inject IPEDs, such as those who use is related to improving sporting or athletic performance.

Though not all NSPs provide direct access to testing for BBV, many do, and there is a need to improve these services' engagement of people who inject IPEDs. These services can provide access not only to appropriate sterile injecting equipment, but also advice and referral to other services, and so they play a key role in reducing and preventing possible harms related to IPED use. However, NSP may be being underutilised by people who use AAS and other IPEDs due to concerns about staff knowledge, stigma, and these services often focusing on the use of psychoactive drugs[12,33,34]. Whilst developing NSP services may be challenging in the UK with current budgets constraints, this could be addressed through the development of dedicated NSP workers and specialist IPED clinics or sessions in or attached to NSPs in line with national guidance[35].

The uptake of health services and interventions, including testing for HIV and HCV, by people who use IPEDs will be impacted by the perceived attitudes and knowledge of the staff providing these services[36]. People who use IPEDs often feel that they are well informed about the substance they use – though this knowledge may not always be accurate – with this 'expertise' not always understood or recognised by healthcare providers[32,36]. Studies indicate that a lack of understanding of IPED use by staff and negative attitudes, whether real or perceived, inhibit individuals from disclosing their IPED use or even attending services[32,37,38]. It is thus important to recognise that these barriers can delay or prevent people from engaging with healthcare professionals about health concerns and IPED use. Stigmatisation, and the underpinning attitudes and beliefs of healthcare staff, as well as their knowledge and understanding of IPED use, need to be addressed across the full range of health services if intervention uptake is to be improved.

Our findings indicate that the uptake of testing for HIV and HCV was related to people's motivations for using IPEDs; however, these associations need further investigation. Of note were higher levels of testing uptake amongst those who rated retaining or regaining youthful appearance, HRT, or improving their sex drive as important motivations for their use of IPEDs, though this difference may in part at least be age related. These differences may, for example, relate to varying perceptions or patterns of risk, thus better understanding the impact of motivations could help inform improvements to the design and delivery interventions.

Conclusions.

Targeted BBV testing interventions are needed for those injecting IPEDs. Approaches to increasing uptake of testing need to reach those not using NSPs and those without a history of psychoactive drug injection or imprisonment. These approaches will need to consider how the impact of motivations for IPED use affect service use and so testing uptake, with perceptions of infection risk possibly varying with motivations for use. Further research is needed to inform intervention development and the best approaches for targeting interventions. However, considering the association between BBV testing uptake with having received a metabolic and/or physiological test, and that those using IPEDs often desire to access such tests,[39,40] approaches using the offer of a range of screening tests, include tests for infections, metabolic and physiological issues should be explored.

Table 1: Variation in motivations for IPEDs use by recruitment setting: among men injecting IPEDs, UK 2016

How important is your IPED use to:		Total		Recruitment setting				<i>p</i> †
				Services		Community / online		
Total		562		136		426		
Developing body image/ cosmetic purposes	Not important	126	22%	34	25%	92	22%	<i>0.390</i>
	Neutral	71	13%	13	10%	58	14%	
	Important	365	65%	89	65%	276	65%	
Bodybuilding (non-competitive)	Not important	179	32%	40	29%	139	33%	<i>0.764</i>
	Neutral	73	13%	19	14%	54	13%	
	Important	310	55%	77	57%	233	55%	
Developing sporting/ athletic performance (non-body building)	Not important	284	51%	88	65%	196	46%	<i>0.001</i>
	Neutral	95	17%	16	12%	79	19%	
	Important	183	33%	32	24%	151	35%	
Bodybuilding (competitive)	Not important	397	71%	96	71%	301	71%	<i>0.209</i>
	Neutral	47	8%	7	5%	40	9%	
	Important	118	21%	33	24%	85	20%	
Supporting occupational performance	Not important	412	73%	108	79%	304	71%	<i>0.176</i>
	Neutral	61	11%	12	9%	49	12%	
	Important	89	16%	16	12%	73	17%	
Increasing sex drive	Not important	378	67%	91	67%	287	67%	<i>0.055</i>
	Neutral	98	17%	17	13%	81	19%	
	Important	86	15%	28	21%	58	14%	
Retaining/regaining youthful appearance	Not important	423	75%	106	78%	317	74%	<i>0.234</i>
	Neutral	73	13%	12	9%	61	14%	
	Important	66	12%	18	13%	48	11%	
Hormone Replacement Therapy (HRT)	Not important	484	86%	122	90%	362	85%	<i>0.042</i>
	Neutral	33	6%	2	1%	31	7%	
	Important	45	8%	12	9%	33	8%	

† Pearson Chi-square.

Table 2 Factors associated with uptake of HCV testing among men injecting IPEDs, UK 2016

		HCV Test		Total	<i>p</i>	Adjusted Odds Ratio with 95% Confidence Interval	
		Yes					
Total		177	31%	562			
Age, in years	Median	Tested 33 years, Not tested 30 years			<i>0.015</i>	†	
Sexuality	Heterosexual	159	29%	539		1.00	
	Gay & Bisexual	18	78%	23	<0.001	10.77	3.67 - 31.59
Employment status	Employed	148	32%	461		‡	
	Education/Other	9	26%	35			
	Unemployed	20	30%	66	<i>0.717</i>		
Ever been in a prison or young offenders' institution	Yes	45	45%	101		2.38	1.45 - 3.89
	Not Reported	132	29%	461	<i>0.002</i>	1.00	
Recruitment setting	Service (e.g. a NSP)	69	51%	136		2.89	1.86 - 4.47
	Community (e.g. a gym)	108	25%	426	<0.001	1.00	
Ever taken a psychoactive drug	No	66	33%	199		‡	
	Yes	111	31%	363	<i>0.528</i>		
Ever injected a psychoactive drug	Yes	18	55%	33		2.25	1.03 - 4.93
	No or Not known	159	30%	529	<i>0.003</i>	1.00	
Used injectable steroids	Not reported	13	45%	29		‡	
	Reported use	164	31%	533	<i>0.112</i>		
Used growth hormone and associated peptide hormones	Not reported	63	23%	269		1.00	
	Reported use	114	39%	293	<0.001	1.66	1.11 - 2.49
Have you ever used needles/syringes previously used by someone else?	Yes	6	60%	10		†	
	No / not reported	171	31%	552	<i>0.05</i>		
Have you ever re-used your own needles/syringes?	Yes	32	33%	98		‡	
	No / not reported	145	31%	464	<i>0.786</i>		
Have you ever shared a multi-dose vial with someone else?	Yes	21	27%	79		‡	
	No / not reported	156	32%	483	<i>0.311</i>		
How often do you have a drink containing alcohol?	Never	51	32%	161		‡	
	Monthly or less	64	31%	204			
	2-4 times a month	44	33%	132			
	2 or more times per week	18	28%	65	<i>0.886</i>		
Number of vaginal or anal sex in the last 12 months	None	24	40%	60		‡	
	One partner	72	28%	259			
	Two or more partners	81	33%	243	<i>0.133</i>		
Had one or more of tests* in the last 12 months.	Had a test	106	45%	235		2.91	1.95 - 4.35
	None of these tests	71	22%	327	<0.001	1.00	
Ever had redness, tenderness and swelling at an injection site?	In past year	47	40%	118		†	
	Over a year ago	57	30%	190			
	Not reported	73	29%	254	<i>0.087</i>		

† entered into model, but not in final model; ‡ Not entered into model; * Liver Function Test (LFT), Blood Pressure, Testosterone levels, Electro-cardiograph (ECG), or Cholesterol test

Table 3 Factors associated with uptake of HIV testing among men injecting IPEDs, UK 2016.

		HIV Test Yes	Total	<i>p</i>	Adjusted Odds ratio with 95% Confidence Interval		
Total		190	34%	562			
Age, in Years	Median	Tested 32 years, Not tested 31 years		<i>0.163</i>	‡		
Sexuality	Heterosexual	170	32%	539	1.00		
	Gay & Bisexual	20	87%	23	<0.001	16.62	4.57 - 60.43
Employment status	Employed	160	35%	461	‡		
	Education/Other	9	26%	35			
	Unemployed	21	32%	66	<i>0.520</i>		
Ever been in a prison or young offenders' institution	Yes	44	44%	101		1.82	1.11 - 2.99
	Not Reported	146	32%	461	<i>0.022</i>	1.00	
Recruitment setting	Service (e.g. a NSP)	75	55%	136		3.50	2.27 - 5.39
	Community (e.g. a gym)	115	27%	426	<0.001	1.00	
Ever taken a psychoactive drug	No	71	36%	199	‡		
	Yes	119	33%	363	<i>0.488</i>		
Ever injected a psychoactive drug	Yes	19	58%	33	†		
	No or Not known	171	32%	529	<i>0.003</i>		
Used injectable steroids	Not reported	16	55%	29		2.61	1.09 - 6.22
	Reported use	174	33%	533	<i>0.013</i>	1.00	
Used growth hormone and associated peptide hormones	Not reported	77	29%	269	†		
	Reported use	113	39%	293	<i>0.013</i>		
Have you ever used needles/syringes previously used by someone else?	Yes	6	60%	10	†		
	No / not reported	184	33%	552	<i>0.077</i>		
Have you ever re-used your own needles/syringes?	Yes	39	40%	98	‡		
	No / not reported	151	33%	464	<i>0.168</i>		
Have you ever shared a multi-dose vial with someone else?	Yes	23	29%	79	‡		
	No / not reported	167	35%	483	<i>0.341</i>		
How often do you have a drink containing alcohol?	Never	53	33%	161	‡		
	Monthly or less	69	34%	204			
	2-4 times a month	50	38%	132			
	2 or more times per week	18	28%	65	<i>0.548</i>		
Number of vaginal or anal sex in the last 12 months	None	27	45%	60		2.02	1.06 - 3.85
	One	70	27%	259	1.00		
	Two or more	93	38%	243	<i>0.004</i>	1.57	1.03 - 2.37
Had one or more of tests* in the last 12 months.	Had a test	110	47%	235		2.88	1.94 - 4.26
	None of these tests	80	24%	327	<0.001	1.00	
Ever had redness, tenderness and swelling at an injection site?	In past Year	51	43%	118	†		
	Over a year ago	57	30%	190			
	Not reported	82	32%	254	<i>0.046</i>		

† entered into model, but not in final model; ‡ Not entered into model; * Liver Function Test (LFT), Blood Pressure, Testosterone levels, Electro-cardiograph (ECG), or Cholesterol test

Table 4: Health services usage among those who have and who have not been tested for HIV and hepatitis C: men injecting IPEDs, UK 2016

Service type	Used service, past 12 months		Tested for:				Not tested for:			
			HIV n=190		HCV n=177		HIV n=372		HCV n=385	
			Frequency & proportion of those using the service tested.				Frequency & proportion of those <u>not</u> tested who used service.			
NHS Walk-in clinic	66	12%	29	44%	27	41%	37	10%	39	10%
GP or Family Doctor	242	43%	99	41%	92	38%	143	38%	150	39%
A&E or Casualty Department	60	10%	27	45%	23	38%	33	9%	37	10%
GUM, STD or Sexual Health Clinic	54	10%	49	91%	41	76%	5	1%	13	3%
None of these services	227	40%	44	19%	46	20%	183	49%	181	47%

Table 5: Variation in motivations for IPEDs use by uptake of HIV or hepatitis C testing: among men injecting IPEDs, UK 2016

How important is your IPED use to:		Total	HCV testing uptake			HIV testing uptake		
			Yes	<i>p</i> ‡		Yes	<i>p</i> ‡	
Total		562	177	31%		190	34%	
Developing body image/ cosmetic purposes	Not important	126	38	30%	0.766	40	32%	0.325
	Neutral	71	23	32%		20	28%	
	Important	365	116	32%		130	36%	
Bodybuilding (non-competitive)	Not important	179	58	32%	0.899	65	36%	0.414
	Neutral	73	21	29%		24	33%	
	Important	310	98	32%		101	33%	
Developing sporting/ athletic performance (non-body building)	Not important	284	99	35%	0.065	107	38%	0.048
	Neutral	95	29	31%		30	32%	
	Important	183	49	27%		53	29%	
Bodybuilding (competitive)	Not important	397	121	30%	0.154	131	33%	0.261
	Neutral	47	10	21%		12	26%	
	Important	118	46	39%		47	40%	
Supporting occupational performance	Not important	412	131	32%	0.974	143	35%	0.354
	Neutral	61	17	28%		21	34%	
	Important	89	29	33%		26	29%	
Increasing sex drive	Not important	378	114	30%	0.182	114	30%	0.003
	Neutral	98	30	31%		36	37%	
	Important	86	33	38%		40	47%	
Retaining/regaining youthful appearance	Not important	423	125	30%	0.040	131	31%	0.010
	Neutral	73	24	33%		29	40%	
	Important	66	28	42%		30	45%	
Hormone Replacement Therapy (HRT)	Not important	484	146	30%	0.193	153	32%	0.017
	Neutral	33	15	45%		17	52%	
	Important	126	16	36%		20	44%	

‡ Linear-by-Linear Association

References

- 1 Crampin AC, Lamagni TL, Hope VD, *et al.* The risk of infection with HIV and hepatitis B in individuals who inject steroids in England and Wales. *Epidemiol Infect*, 1998;121(2), 381-386
- 2 Day C, Topp L, Iversen J, Maher L. Blood-borne virus prevalence and risk among steroid injectors: results from the Australian Needle and Syringe Program Survey. *Drug Alcohol Rev*, 2008;27(5), 559-561.
- 3 Hope V, McVeigh J, Marongiu A, *et al.* Prevalence of, and risk factors for, HIV, hepatitis B and C infections among men who inject image and performance enhancing drugs: a cross-sectional study. *BMJ Open*, 2013;3(9), e003207.
- 4 Hope V, Harris R, McVeigh J, *et al.* Risk of HIV and Hepatitis B and C Over Time Among Men Who Inject Image and Performance Enhancing Drugs in England and Wales: Results From Cross-Sectional Prevalence Surveys, 1992-2013. *J Acquir Immune Defic Syndr*, 2016;71(3), 331-337.
- 5 Hope VD, McVeigh J, Smith J, *et al.* Low levels of hepatitis C diagnosis and testing uptake among people who inject image and performance enhancing drugs in England and Wales, 2012-15. *Drug & Alcohol Dependence*, 2017;179, 83-86.
- 6 Salinas M, Floodgate W, Ralphs R. Polydrug use and polydrug markets amongst image and performance enhancing drug users: Implications for harm reduction interventions and drug policy. *Int J Drug Policy*. 2019 May;67:43-51.
- 7 Sagoe D, McVeigh J, Bjørnebekk A, *et al.* Polypharmacy among anabolic-androgenic steroid users: A descriptive metasynthesis. *Substance Abuse Treatment, Prevention, and Policy*, 2015;10(1)
- 8 Zahnow R, McVeigh J, Bates G, *et al.* Identifying a typology of men who use anabolic androgenic steroids (AAS). *Int J Drug Policy*. 2018 May;55:105-112.
- 9 McVeigh J, Begley E. Anabolic steroids in the UK: an increasing issue for public health. *Drugs: Educ. Prev. Policy* 2017;24:278-285
- 10 Advisory Council on the Misuse of Drugs: Consideration of the Anabolic Steroids. Home Office, London (2010)
- 11 Iversen J, Topp L, Wand H, Maher L. Are people who inject performance and image-enhancing drugs an increasing population of needle and syringe program attendees? *Drug Alcohol Rev*. 2013;32;205-207
- 12 Kimergård A, McVeigh J. Variability and dilemmas in harm reduction for anabolic steroid users in the UK: a multi-area interview study. *Harm Reduct J*. 2014 Jul 2;11:19. doi: 10.1186/1477-7517-11-19
- 13 Whitfield M, Reed H, McVeigh J. Integrated Monitoring System: Annual Report, Cheshire and Merseyside 2017/18. PHI, LJMU, Liverpool, 2019. <https://ims.ljmu.ac.uk/PublicHealth/reports/annual/IMS-Annual-Report-2017-18-Part1.pdf>
- 14 van Beek I, Chronister KJ. Performance and image enhancing drug injectors' access to needle syringe programs: Responding to a public policy dilemma. *Int J Drug Policy*. 2015;26(9):868-874.
- 15 Iversen J, Hope VD, McVeigh J. Access to needle and syringe programs by people who inject image and performance enhancing drugs. *Int J Drug Policy*. 2016;31:199-200.
- 16 Pope HG, Wood RI, Rogol A, *et al.* Adverse health consequences of performance-enhancing drugs: an Endocrine Society scientific statement. *Endocr Rev*. 2014;35(3):341-375.
- 17 Westlye LT, Kaufmann T, Alnaes D, Hullstein IR, Bjornebekk A. Brain connectivity aberrations in anabolic-androgenic steroid users. *Neuroimage Clin*. 2017;13:62-69
- 18 Bjornebekk A, Westlye LT, Walhovd KB, *et al.* Cognitive performance and structural brain correlates in long-term anabolic-androgenic steroid exposed and nonexposed weightlifters. *Neuropsychology* 2019;33(4): 547-559.
- 19 Dodge T, Hoagland MF. The use of anabolic androgenic steroids and polypharmacy: A review of the literature. *Drug Alcohol Depend*. 2011;114(2-3):100-9.

-
- 20 Ip EJ, Yadao MA, Shah BM, *et al.* Polypharmacy, Infectious Diseases, Sexual Behavior, and Psychophysical Health Among Anabolic Steroid-Using Homosexual and Heterosexual Gym Patrons in San Francisco's Castro District. *Substance Use & Misuse* 2017;52(7): 959-968.
- 21 EASL. European association for study of the liver clinical practice guidelines: management of hepatitis C virus infection. *J. Hepatol.*, 2014;60:392-420
- 22 Public Health England. Prevalence of HIV infection in the UK in 2018. Health Protection Report 2019:13(39) https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/843766/hpr3919_hiv18.pdf
- 23 Hope V, Iversen J. Infections and risk among people who use image and performance enhancing drugs. Van De Ven K, Mulrooney KJD, McVeigh J. Human Enhancement Drugs 85-100. Routledge. Oxford: 2019. 978-1-138-55279-1
- 24 Public Health England. People who inject drugs: HIV and viral hepatitis unlinked anonymous monitoring survey tables (IPED): 2016 update. Public Health England, London, 2016. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/537597/UAM_Survey_of_PWID_2016_IPED_data_tables_with_2014_15_data__FINAL.pdf
- 25 Rowe R, Berger I, Yaseen B, Copeland J. Risk and blood-borne virus testing among men who inject image and performance enhancing drugs, Sydney, Australia. *Drug Alcohol Rev*, 2017;36(5):658-666.
- 26 Van de Ven K, Maher L, Memedovic S, Jackson E, Iversen, J. Health risk and health seeking behaviours among people who inject performance and image enhancing drugs (PIEDs) who access needle syringe programs in Australia. *Drug Alcohol Rev*, 2018;37(7):837-846.
- 27 Bolding G, Sherr L, Elford J. Use of anabolic steroids and associated health risks among gay men attending London gyms. *Addiction* 2002;97(2):195-203. doi:10.1046/j.1360-0443.2002.00031.x
- 28 Begley E, McVeigh J, Hope VD, *et al.* Image and Performance Enhancing Drugs 2016: National Survey Results. PHI, LJMU, Liverpool, 2017. <https://ims.ljmu.ac.uk/PublicHealth/reports/themed/IPEDs-Survey2016.pdf>
- 29 Latkin CA, Vlahov D, Anthony JC. Socially desirable responding and self-reported HIV infection risk behaviors among intravenous drug users. *Addiction* 1993;88:517-26
- 30 De Irala J, Bigelow C, McCusker J, *et al.* Reliability of self-reported human immunodeficiency virus risk behaviors in a residential drug treatment population. *Am J Epidemiol* 1996;143:725-32
- 31 Hill SA, Waring WS. Pharmacological effects and safety monitoring of anabolic androgenic steroid use: differing perceptions between users and healthcare professionals. *Ther Adv Drug Saf*. 2019;10:2042098619855291. Published 2019 Jun 13. doi:10.1177/2042098619855291
- 32 Hope V, Leavy C, Morgan G, *et al.* Facilitators and barriers to health care access amongst people using image and performance enhancing drugs in Wales: Findings & Outcomes Report. Public Health Wales, 2020. <https://phw.nhs.wales/publications/publications1/facilitators-and-barriers-to-health-care-access-amongst-people-using-ipeds-in-wales-english/>
- 33 Dunn M, McKay FH, Iversen J. Steroid users and the unique challenge they pose to needle and syringe program workers. *Drug Alcohol Rev*. 2014 Jan;33(1):71-7.
- 34 Simmonds L, Coomber R. Injecting drug users: a stigmatised and stigmatising population. *Int J Drug Policy*. 2009;20:121-130.
- 35 National Institute for Health Care and Excellence (NICE) Needle and Syringe Programmes: NICE Public Health Guidance 52 National Institute for Health Care and Excellence, London (2014)
- 36 Fraser S, Fomiatti R, Moore D, Seear K, Aitken C. Is another relationship possible? Connoisseurship and the doctor-patient relationship for men who consume performance and image-enhancing drugs. *Soc Sci Med*. 2020 Feb;246:112720.
- 37 Yu J, Hildebrandt T, Lanzieri N. Healthcare professionals' stigmatization of men with anabolic androgenic steroid use and eating disorders. *Body Image*. 2015;15:49-53.
- 38 Dunn M, Henshaw R, McKay FH. Do performance and image enhancing drug users in regional Queensland experience difficulty accessing health services? *Drug Alcohol Rev*. 2016;35(4): 377-382.

-
- 39 Harvey O, Keen S, Parrish M, van Teijlingen E. Support for people who use Anabolic Androgenic Steroids: A Systematic Scoping Review into what they want and what they access. *BMC Public Health* 2019;**19**(1):1024.
- 40 Jacka B, Larance B, Copeland J, Burns L, Farrell M, Jackson E, Degenhardt L. Health care engagement behaviors of men who use performance- and image-enhancing drugs in Australia. *Substance Abuse*, 2020;**41**:1, 139-145,