Research Paper

“They sent it away for testing and it was all bunk”: Exploring perspectives on drug checking among steroid consumers in Queensland, Australia

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ABSTRACT

Introduction: Research supports the feasibility and acceptance of drug checking among nightlife and festival attendees. Interest in expanding drug checking to other groups of people who use drugs, including those who inject drugs, has grown. However, understanding the acceptability and feasibility of drug checking among specific cohorts, like anabolic-androgenic steroids (AAS) consumers, remains a research gap. This study explores AAS consumers’ perspectives on drug checking and service preferences, aiding the preparation for drug checking delivery in Queensland, Australia. Methods: A purposive sampling technique was used to recruit 15 AAS consumers (9 males, 6 females; Mage = 36.80 years, SD = 6.12) from Australia. One-on-one semi-structured qualitative interviews were conducted with questions exploring participants’ views on drug checking/testing and their preferences for AAS analysis. Thematic analysis was conducted with final themes established through iterative consensus. Results: Consumers expressed frustration with the prevailing stereotypes, social stigma, and the perception of criminality associated with the use of AAS. There was a strong dependence on personal connections and trusted suppliers, with coaches exerting significant influence. Participants expressed concerns about the widespread availability of counterfeit products and underground operations. The act of using unknown AAS was likened to a game of Russian roulette, underscoring the importance of obtaining accurate information and access to reliable drug checking services. Consumers expressed a preference for a web-based platform that enables individuals to access their own test results while contributing to a comprehensive database of brand-specific testing outcomes. Discussion: AAS consumers recognise the significance of monitoring their AAS use and seek a service that can not only assist them in making informed decisions regarding AAS usage but also potentially contribute to the knowledge of the wider AAS-consuming community. These findings underscore the importance of tailored education, drug checking services, and harm reduction measures to address the diverse needs of AAS consumers.

Introduction

One of the consequences of drug prohibition is the lack of knowledge regarding the composition and purity of illicit substances (Miron, 2003; Taylor et al., 2016). This information gap poses significant risks to individuals who consume drugs, as they lack knowledge of the contents which can lead to physical harm (Darke & Farrell, 2014; Unick et al., 2014). In the context of harm reduction, drug checking has emerged as a strategy to address this issue. Drug checking programs aim to provide consumers with accurate and timely information about the content and potential harms associated with the substances they intend to consume (Maghsoudi et al., 2022). Drug checking was traditionally designed to provide harm reduction services and information about illicit substances in party scenes, however, the remit of drug checking has expanded significantly (see Barratt & Measham, 2022). Drug checking programs can be traced back to the late 1960s in the United States (Barratt et al., 2018). According to a recent systematic review, these programs have expanded globally and are now implemented in many countries.

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Drug checking initiatives seek to empower individuals to make informed decisions about their drug use (Weicker et al., 2020). These programs typically involve analysing drug samples using various methods, such as spectrometry or reagent testing, to identify the presence of specific substances and potential adulterants as well as dosage or strength (Barratt & Measham, 2022). The provision of drug testing results to consumers provides some information about the potential risks associated with their drug use (Barratt & Measham, 2022), although it is important to note that these results may not encompass all possible risks due to limitations in testing methodologies and the multifaceted nature of drug-related harms (Masterton et al., 2022). Risks associated with drug use can be influenced by various factors, including the environment and co-substance consumption, which may significantly impact the overall risk profile beyond the specific drug content or purity (Masterton et al., 2022). However, the implementation of drug checking programs has shown positive outcomes and increased safety among drug consumers in jurisdictions where it has been applied (Bardwell & Kerr, 2018; Measham, 2019). Feasibility studies indicate acceptance and willingness among consumer populations to engage with these services (Kennedy et al., 2018; Krieger et al., 2018; Palamar et al., 2019; Sherman et al., 2019). The positive reception among consumer populations to engage with these services align with the call for widely accessible harm reduction measures.

The Global Commission on Drug Policy recently advised governments to make harm reduction measures, including drug checking services, widely accessible (Bewley-Taylor & Tinasti, 2020; Buxton et al., 2020). Although there have been calls for drug checking in Australia for some time (Ritter, 2020), initially there were only two Australian trials of drug checking, both performed in a festival context (Byrne et al., 2018; Olsen et al., 2019). This comprised a fixed site trial service launched in Canberra in 2022, which has been extended and is expected to become a permanent service (Olsen et al., 2022). In February 2023, the government of Queensland (the second largest and third most populous state in Australia) announced support for the introduction of drug checking services (Australian Broadcasting Corporation, 2023). The recent recommendation to make drug checking services widely accessible aligns with the harm reduction approach, which recognises the social context and influences surrounding substance use (Bewley-Taylor & Tinasti, 2020; Buxton et al., 2020). The support for introducing drug checking services by the government of Queensland reflects a step towards implementing population-level interventions aimed at reducing drug-related harms and addressing health inequalities. While previous studies surrounding these services have focused on populations such as the nightlife/festival attendees, particularly ecstasy consumers, there is still a gap in research regarding the perspectives and experiences of those involved in the consumption of performance and image enhancing drugs (PIEDs) such as anabolic-androgenic steroids (AAS). Therefore, in the context of the Queensland government’s commitment to supporting such services, this study specifically aimed to explore AAS consumers’ attitudes, perceptions, and needs regarding drug checking. Doing so aligns service provision with broader goal of enhancing health outcomes for this population given the high representation of AAS consumption in Queensland, accounted for by the overrepresentation of AAS-related arrests compared to other states and territories (Australian Criminal Intelligence Commission, 2021).

The present study

There has been a consistently growing global trade in PIEDs (Magnolini et al., 2022; Paoli & Donati, 2014) with AAS being a prominently used group of these substances (Dunn et al., 2021; Dunn & Piatkowski, 2021; Hope et al., 2021). Despite a growing AAS market, these substances have been often reported to be variable in their quality (Magnolini et al., 2022). Research suggests that illicit AAS generally lack the specified active ingredient entirely or contain a different amount or type of active ingredient than indicated on the labelling, highlighting issues of misrepresentation and inconsistency in product composition (Coimbra et al., 2021; da Justa Neves and Caldas, 2017). For example, a global study of 5,413 samples suggested that the average estimated prevalence of counterfeit AAS within the illicit market was 36%, while an additional 37% were classified as substandard in terms of quality (Magnolini et al., 2022). Coomer et al. (2015) found that the perception of risk for AAS consumers regarding substance analysis cannot be solely determined based on forensic findings. This is because users genuinely believe that they are buying legitimate and effective AAS, and they employ various subjective methods to ensure the authenticity of the products (Coomber et al., 2015). Therefore, for AAS consumers, drug checking can offer crucial information on the presence and purity of a substance. This is particularly significant given the high prevalence of counterfeit AAS products in circulation (Coomber et al., 2015; Turnock & Gibbs, 2023; van de Ven et al., 2020), where unintended use of harsher varieties of AAS, such as Trenbolone (19-Nor AAS), can have severe psychosocial consequences compared to testosterone or DHT-derivatives of testosterone (Piatkowski et al., 2023b). Furthermore, the unpredictable combination of unknown substances or dangerously high or low doses in counterfeit AAS products (Magnolini et al., 2022) adds another layer of risk, increasing the potential for unforeseen and unpredictable health consequences among consumers.

Creating a bridge between public health and drug policy in the context of AAS would be a significant step towards providing adequate healthcare to this, often overlooked, group of substance consumers (Dunn et al., 2023; Piatkowski et al., 2022, 2023a). The risk environment framework provides a theoretical foundation for doing so (Rhodes, 2002), emphasising the importance of enabling contexts and resources in advancing harm reduction (Duff, 2009, 2011). Substance use, including AAS, is influenced by various interacting factors within a social context. Hanley Santos and Coomber (2017) indicate that patterns of AAS use among consumers varied based on their motivations, prior knowledge, and experiences. Many users had limited knowledge about AAS before starting their use, relying on information from peers or suppliers, which was sometimes inaccurate or incomplete (Hanley Santos & Coomber, 2017). As Hanley Santos and Coomber (2017) suggest, when developing interventions targeting AAS use, it is crucial to consider the broader context (e.g., motivations and experiences). Therefore, we extend this study by investigating how individuals’ social contexts and cultural interpretations of risk practices shape their engagement with and perceptions of drug checking services, aiming to enhance our understanding of the complexities surrounding risk behaviours and informing drug policy and practice in the context of drug checking. While there is some integration of AAS consumers in harm reduction, predominantly through needle service provision (Kimergard & McVeigh, 2014; Piatkowski, Hides et al., 2022), ensuring the delivery of sterile injecting equipment should be regarded as a minimal requirement (Bates et al., 2021). Scholars have suggested harm reduction frameworks should expand to encompass a comprehensive range of harm reduction interventions that address the needs of individuals using AAS throughout their entire usage cycle, including those who opt for temporary or permanent cessation of use (Bates et al., 2021; Bates & Vinther, 2021). Therefore, further establishing the position of AAS within harm reduction frameworks can facilitate an alliance between public health policy and AAS consumers. This research is the first study internationally which attempts to investigate AAS consumers’ perspectives on drug checking services, filling a research gap in the existing literature. Drawing on a small group of consumers, this study explored AAS consumers’ perspectives on drug checking services and investigated strategies to meet their needs, aiding the preparation for drug checking delivery in Queensland, Australia.
Methods

Sampling and recruitment

A sample of 15 AAS consumers (>18 years of age) were recruited through purposive sampling techniques, leveraging the personal and professional networks of the research team. These networks include The Loop Australia and Queensland Injectors Voice for Advocacy and Action (QuIVAA). Those interested and eligible completed informed consent procedures. Participants were reimbursed for their time with a gift card. Ethical approval was granted from the Griffith University Human Research Ethics Committee (Approval: 2023/257).

Materials and data collection

Participants were invited to take part in one-on-one semi-structured qualitative interviews. Questions included: Why do you believe testing AAS is important/not important? What do you think about testing/checking AAS? If there was a drug checking/testing service which could analyse AAS, what information would you like to receive? Participants were also asked for demographic information, such as age and their gender. These interviews took place on the MS Teams platform, where audio recordings were transcribed automatically. These transcripts were checked for errors and imported into NVivo (QSR) for further analysis. The mean length of interviews was 39 minutes and 32 seconds (Range = 14-118 minutes).

Data analysis

Data collection and preliminary analysis were conducted concurrently by the first author, allowing for reflexivity and adaptation of the semi-structured interview guide questions with emerging insights (Braun & Clarke, 2023). For instance, participants were specifically prompted to share their previous experiences related to AAS testing, as several individuals in the sample had undergone such testing. Moreover, additional prompts were introduced to encourage participants to provide more detailed responses to specific inquiries, such as “What potential health effects can arise from the use of untested steroids?” The data was analysed through a lens of social constructivism (Adams, 2006). This ontological position was recognised as suitable given that knowledge is co-constructed through the interaction between the researcher and participants, as the research aims and theoretical framework shape the analysis of data and the resulting findings (Pouger et al., 2020). Further, given that the research aimed to explore the perspective of this unique group of substance consumers and facilitate a collaborative research process, this was deemed a suitable framework (Noorbergen et al., 2021). Once all interviews were completed and transcribed, data were imported into NVivo for thematic analysis. Thematic analysis followed Braun and Clarke’s six-step guide (Braun & Clarke, 2019) involving data familiarisation, initial code generation, identification of potential themes, review of themes, defining/naming themes, and writing up findings. Inductive analysis was used to identify codes which were synthesised into themes to summarise the key findings from the interviews (Azumang, 2018). The coding process continued until achieving inductive thematic saturation, a point where the collected data ceased to yield significant novel insights that were pertinent to the research aims (Guest et al., 2020; Saunders et al., 2018). This state of saturation was marked by the absence of newly identified codes, themes, or sub-themes in the incoming data, which could not be accounted for by the existing knowledge and literature in the field (Guest et al., 2020; Lam et al., 2022; Saunders et al., 2018).

Specifically, no additional meaningful information or patterns emerged from the data, indicating that the data analysis reached a point of saturation, where the research aims were sufficiently addressed, and further data collection was unlikely to contribute substantially to the research outcomes. The research team then met to discuss and review this categorisation to arrive at final themes and subthemes and names thereof by an iterative consensus decision-making process (Braun & Clarke, 2021). Participants were assigned with pseudonyms to preserve their anonymity.

The researchers involved in this study brought together diverse expertise from the fields of behavioural science, public health, and social work. The first author acknowledges his lived experience in the strength sport and fitness community. This firsthand involvement provided a comprehensive understanding of the subcultures that emerge among AAS users, and the author’s lived experience served as an asset during interviews, facilitating in-depth exploration and enriching the depth of inquiry (Zampini et al., 2021). The other authors contributed different perspectives and interpretations to the findings, generating novel themes that contributed to the construction of the findings in accordance with established best practice (Braun & Clarke, 2023).

Findings

The participant pool consisted of male ($n = 9$) and female ($n = 6$) participants whose mean age was 36.80 ($SD = 6.12$); see Table 1 for full participant characteristics. All participants in the study were either originally from Queensland or had lived in Queensland for a portion of their lives. However, two participants resided outside of Queensland at the time of data collection. Seven participants had previously or were currently testing their AAS through a private operator. We identified four overarching themes that developed from the data.

Theme 1: Russian roulette: perceptions of unknown substances and interactions with the criminal system

The metaphor of playing ‘Russian roulette’ emerged repeatedly in participant narratives when describing the process of using untested AAS, underscoring the uncertainty and potential harm associated with using unknown substances. Stories of individuals injecting substances that were revealed to be cooking oil or other unintended compounds highlight the risks that consumers face when using product purchased in a marketplace where there is no formal quality control due to its illegal nature. One participant conveyed the potential consequences of uninformed decisions in the context of AAS use:

Albert [37, Male]: It’s like playing Russian roulette isn’t it. You’re putting something into body thinking that it’s something… injecting and having it smell like either rosemary oil or sesame seed oil and ending up with massive sort of wells and acne. It’s infected sort of injection sites because like – “I think it’s, I think it’s testosterone. I’ll use it”.

Many participants considered AAS to be overlooked and receive little attention within the harm reduction space. Participants expressed frustration with the prevailing stereotype that associates AAS use

<table>
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<tr>
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<th>Pseudonym</th>
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<td>Bryce</td>
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<td>2</td>
<td>Paul</td>
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<td>41</td>
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<td>3</td>
<td>Albert</td>
<td>M</td>
<td>37</td>
<td>33:32</td>
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<td>4</td>
<td>Phoebe</td>
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<td>5</td>
<td>Henry</td>
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<td>6</td>
<td>Cubbert</td>
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<td>Jayden</td>
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<td>Paris</td>
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<td>Alexis</td>
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<td>10</td>
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<td>11</td>
<td>Victor</td>
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<td>Samantha</td>
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<td>13</td>
<td>Danielle</td>
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<td>14</td>
<td>Windlow</td>
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Jayden [38, Male]: Steroids is something which is sort of often overlooked in terms of, you know, seeing it as a drug because, you know, people just think oh, you know, it’s these massive bodybuilders that are taking it.

In turn, this frustration appeared to drive consumers into increasingly insular communities. Given the legalities surrounding illicit substance consumption in Australia, there were also criminality factors which heightened participants’ penchant for close-knit groups.

Henry [35, Male]: Yeah, like I said, man, like a lot of people, they’re really shady, but they don’t talk about it [AAS]. And for obvious reasons, they might not want people to know that they’re doing what they’re doing.

For instance, several participants shared experiences that underscored the criminal nature of AAS use. These occurrences ranged from interactions with police, as well as instances of being caught with underground AAS and subsequent legal consequences. These experiences were not uncommon among participants.

Jayden [38, Male]: There’s been a couple times, you know, outside of our gym where? You know, a few of us have sort of been randomly pulled over by police officers, you know, after walking out with bags from the gym.

Cuthbert [35, Male]: I’ve been caught a couple of times. I got raided and the cops found my stuff and I’ve been in court a few times.

Interestingly, in occasions when police seized and tested these compounds, they were reported to be counterfeit.

Albert [37, Male]: I’m all for it [drug checking] because there was there was an incident where I got caught with underground steroids. And they sent it away for testing [forensic analysis] and it was all bunk [fake].

Ultimately, participants believed that the ability to test AAS in a safe manner and receive feedback would reduce the likelihood of encountering counterfeit or harmful substances.

Samantha [42, Female]: I think people being able to test stuff and realise how crap it is, and how much they’re just throwing their money away on shit is more likely to prevent steroid use than harsh laws.

Theme 2: social networks and personal relationships: “it’s all word of mouth”

Social relationships held significant importance in the acquisition of, by the consumer’s standard, reliable AAS. Participants described their preferred strategies for finding reliable sources of AAS. They stressed the importance of personal connections and social validation, relying on suppliers who have established relationships with high-level athletes. Trust was placed in individuals who demonstrated passion and expertise in manufacturing AAS. This social validation helped legitimise the sources and provided consumers with a sense of confidence in the substances they obtained.

Rose [45, Female]: I physically like, I know the person that I’m buying gear [AAS] off, as in have a social relationship with them. This sounds really odd but also to know how passionate they are about what they do in regards to manufacturing performance enhancing drugs. I also know that they supply to a lot of really high-level athletes.

Several participants noted that coaches played a pivotal role in shaping the market by endorsing specific suppliers and vouching for the quality and legitimacy of the products. Participants mentioned instances where coaches themselves used the same substances and assured their athletes about their safety and effectiveness. This dynamic creates a bidirectional effect, as athletes place trust in their coaches’ judgment and follow their recommendations. Coaches, as influential figures within the AAS community, contribute to the establishment of reliable sources and influence the choices made by consumers.

Phoebe [21, Female]: They’re oftentimes buying it off their coach who like their coach is endorsing this particular supplier and probably getting a cut as well and like. The coach is assuring them that the quality is amazing, all the quality’s legit. Like, I take this stuff, blah blah, like, and these are like young girls that they’re doing this to.

The participant narratives underscored that trust is built through ongoing interactions and a sense of familiarity. They express satisfaction in knowing the person they are buying from, believing that this connection ensures greater accountability and decreases the likelihood of being deceived or sold counterfeit substances. This interpersonal dimension of the market fosters a sense of reliability and reduces the perceived risk associated with purchasing and using AAS.

Victor [39, Male]: I have, you know, a good relationship with the person who supplies me.

Danielle [30, Female]: So, the person that I get it off is also in the powerlifting world. So he has used all of those things. I trust him in terms of providing legit stuff.

Social networks were important in obtaining reliable AAS and shaping the market. Participants expressed trust in their personal relationships with suppliers, who were considered to be well-connected within the AAS manufacturing community. They relied on word-of-mouth information and anecdotal evidence, verging on myth, from other consumers to assess the quality and safety of the substances they purchase.

Cuthbert [35, Male]: It’s hard because batches do change so often. The truth is, yeah, you can go on the bodybuilding forums, and you can do as much as you possibly can to research and stuff like that, but it’s all word of mouth.

Theme 3: navigating product legitimacy and quality: “there’s no receipt”

Despite the importance of social networks, reliability and trustworthiness of AAS sources were frequently questioned, given the prevalence of counterfeit and substandard products. Notwithstanding the methods outlined previously that participants used to try and ensure they were using good quality product, they still expressed concerns over the lack of transparency and the potential for unscrupulous actors to manipulate the contents of the purchased products.

Rose [45, Female]: I’ve known suppliers to tell me that they have supplied gear to people they didn’t like, and they just filled the containers up with oil… people they see in the gym every day.

Counterfeit and substandard substances were prevalent, leading to scepticism about the transparency and integrity of suppliers. The illegal nature of the market limited consumers’ recourse in addressing these issues, as there was no official avenue to report or address counterfeit products. Participants expressed frustration over the lack of accountability, recognising the inherent challenges of illicit trade. As one participant noted, attempts to manipulate labelling systems and distribute inferior products not only undermined the branding efforts of legitimate suppliers but also left consumers powerless to seek recourse.

The absence of regulatory oversight and the illegal nature of the trade contributed to a sense of helplessness and the inability to voice concerns or seek redress.

Albert [37, Male]: Someone tried to knock off their [brand name] labelling system and there was a heap around of it [product]… stuff that was sort of bunk shit which sort of wrecked their branding and
there’s nothing that you can do about it because it’s illegal. Who are we going to fucking tell?

Winslow [40, Male]: There’s no receipt. So, you’d legitimise the trade process if people were able to test it.

The comparison between pharmaceutical-grade AAS and those produced in underground operations also emerged as a noteworthy distinction. Participants recognised that obtaining AAS directly from testosterone-replacement therapy clinics offered a higher level of confidence in terms of product quality and legitimacy. Pharmaceutical-grade AAS were often considered more potent and reliable, leading to a perception of increased control and effectiveness. However, the illicit nature of the AAS market and the associated risks of legal repercussions made accessing pharmaceutical-grade products difficult for many consumers.

Victor [39, Male]: I know a lot of guys who have gone from underground to pharma [pharmaceutical testosterone] and then go wow. They feel the difference in a smaller dose of pharma because it’s stronger and it’s more legit and controlled. To know what you’re getting, it’s a roll of the dice, because who knows how those guys are making it, right.

To mitigate the risks associated with product legitimacy, participants had various strategies for checking the quality and authenticity of the AAS they obtained. These strategies ranged from visual inspections to more advanced techniques, such as testing. Participants emphasised the importance of testing the substances they purchase to verify their potency and purity.

Paris [43, Female]: So there has been two different brands that I’ve used and stuck with. I tested and they both came back as great quality. So I was like okay, done. I’m onto a good thing, not gonna change it.

Forums also played a significant role in disseminating information and experiences related to product legitimacy and brand reputation. These sites were used so that consumers could share their testing results and discuss trusted and untrusted brands. These forums provided consumers an opportunity to navigate the complex landscape of the AAS market and make informed decisions about their purchases.

Alexis [32, Female]: I know there’s a private group there where you can pay per month and then you get access to those results. But getting access to those results, you’d at least know which branch you should definitely stick away from.

Despite the awareness of the prevalence of counterfeit and sub-standard AAS and the inherent risks associated with them, consumers continued to rely on these products to discern authenticity. These processes underscore an urgency for enhanced measures, such as drug checking services, to address the persistent issues precluding consumers from ensuring reliable AAS for informed decision-making among consumers.

Theme 4: emphasis on testing, transparency, and support: “there’s a level of trust that needs to be built”

There was strong inclination to possess comprehensive knowledge about the composition, potency, and absence of contaminants in AAS. The significance of ensuring accurate labelling of AAS was emphasised, indicating the commitment of consumers to procure and use AAS that are not only effective but also considered ‘safe’. This finding underscores the importance placed by consumers on obtaining reliable and trustworthy AAS products.

Bryce [33, Male]: We’re gonna want to know the label’s right. The compound. The purity. If there’s anything that shouldn’t be in there.

The idea of drug checking was met with acceptance by participants. They saw no issues with sending their samples to a testing facility and receiving results through an email or an online portal. The convenience and anonymity offered by this approach aligned with the participants’ desire for harm reduction in a public space. They emphasised that AAS use is a niche community with unique complexities, and the availability of reliable drug checking services would contribute to harm reduction efforts.

Victor [39, Male]: It is a little bit more serious for us [AAS consumers]. You’re making sure something that you’re putting intra-muscularly into your system is what it is. You see some horror stories where guys put in random stuff and get an infection and have to get it cut out.

Consumers discussed the potential benefits of real-time monitoring and anonymous dissemination of testing results. They envisioned that their individual test results could contribute to a larger database of brand-specific testing outcomes. This approach would allow consumers to track the quality and consistency of different brands over time, leading to informed decisions about their purchases.

Alexis [32, Female]: Then you can database it. If you’ve got an account you can log into, you can see what things were and what they are.

The participants recognised the potential benefits of a service that provided information and support for harm reduction in the context of AAS use. They believed that if such a service existed, individuals would be less likely to use variable dosed or contaminated substances.

Phoebe [21, Female]: I think with regards to harm reduction, say they had that service accessible where they could test their gear. I think if they found out what they were taking currently or had plans to take was fake or underdosed, overdosed, or contaminated etc. they may be less inclined to take that. They may just do something else like I think it would be so helpful just if it was accessible.

Trust and rapport emerged as significant factors in the participants’ discussions about accessing support services. These views were closely linked to participants’ experiences of persistent stigma associated with AAS use, describing it as a “hush, hush” and taboo subject. Engaging in discussions about AAS use was perceived as socially unacceptable, leading to secrecy and silence among consumers. The prevailing stigma created an environment of fear and apprehension, contributing to a culture of secrecy surrounding AAS consumption.

Bryce [33, Male]: Yeah, it’s still like very, you know, hush, hush. I know a lot of people that use or have used, but it’s still a very taboo subject.

As a result, participants stressed the importance of building trust with the service providers which already had strong rapport in the community – needle service providers (NSPs). The close and trusted association with NSPs and AAS consumers has been demonstrated to facilitate access to essential resources, support, and information related to safe injection practices, harm reduction, and other health-related services.

Henry [35, Male]: I walk in the front door [of the NSP] and walk out. You take those brown bags out; everyone knows what it is and I don’t care. I think that it [the NSP] helps in a big way. Down on the [place name] there’s one needle exchange and that’s the one I used to go to. They’re good.

Phoebe [21, Female]: So, I guess if the service was attached to like a needle exchange that would be helpful.

Building on this, participants recognised that trust is vital to establishing a safe and supportive environment where individuals can seek advice and share their experiences openly. The presence of qualified experts or individuals with firsthand experience was highly valued, as they could offer reliable and informed guidance.

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There was importance placed on confidentiality and trust as key elements in facilitating effective interventions. While these findings align with the existing literature on the broader group of illicit substance consumers who welcome drug checking services (Kennedy et al., 2018; Krieger et al., 2018; Palamar et al., 2019; Sherman et al., 2019; Valente et al., 2019), it is important to acknowledge that this study contributes to the establishment of specific support needs and insights within the AAS community. This aspect positions these findings as a potential reference point for policy makers, demonstrating the unique requirements and advocating for the implementation of targeted interventions and support services for AAS consumers.

**Shaping the steroid market: enabling contexts to reduce harm**

Drug harms are shaped by social situations and environments, expanding the responsibility for harm reduction beyond individuals to include social and political institutions (Rhodes, 2009). Contemporary discourse in the field of public health, drawing upon diverse research traditions, underscores the significance of social determinants in shaping health disparities and asserts that effective mitigation of these disparities necessitates the implementation of population-level interventions (Gehring et al., 2022). However, scholars have asserted that relying solely on ‘persuasion’ and ‘command and control’ strategies for intervention is insufficient (Bacon & Seddon, 2020; Ritter, 2010). Notably, market-driven regulation has been suggested to have the potential to mitigate the harms associated with drug use for some time (Ritter, 2010), further evidenced by proactive support from consumer groups (Measham & Turnbull, 2021). Implementation of market strategies such as drug checking can effectively alter consumer preferences and incentivise changes in the behaviour of sellers operating within the drug market (Ritter, 2010; Seddon, 2020). For AAS, the surging unregulated supply from online sources is accompanied by misleading information regarding the benefits and risks associated with their use (Gibbs, 2023; Turnock & Gibbs, 2023), posing significant concerns. The present study builds on previous work, outlining AAS consumers overreliance on information from suppliers (Hanley Santos & Coomber, 2017). Therefore, public drug checking services, with provision for AAS, could have potential to shape the market for AAS consumers, representing an enabling place and resource (Duff, 2010, 2011). Due to the reported structure of AAS markets (Coomber et al., 2015) this ‘shaping’ may have large-scale impact.

Social environments significantly influence AAS consumers’ decisions and experiences (Hanley Santos & Coomber, 2017; Kimergard & McVeigh, 2014). AAS consumers trusted their long-term drug dealers due to established relationships, consistent supply, and effective communication, which shares parallels with other illicit substance consuming cohorts (Bardwell et al., 2019). Participants in this study relied on word-of-mouth information and trusted suppliers who had established relationships. Further, fitting with previous work, coaches (Gibbs et al., 2022; Gibbs & Piatkowski, 2023; Piatkowski et al., 2023b, 2023c) and peers (Piatkowski, Hides et al., 2022) influenced consumers’ choices by endorsing specific suppliers, reflecting their important structural position within AAS communities. Trust in personal connections may create a perception of reliability and reduce perceived risks associated with AAS procurement and use. However, it is important to recognise that this trust may be misplaced, as the trusted individuals may not have direct control over the quality of the substances they sell, and their own suppliers may play a significant role in determining product quality. Perhaps, as a result, participants did discuss concerns about counterfeit and substandard products in the AAS market, indicative of current trends (Frude et al., 2020; van de Ven et al., 2020). Underground operations were recognised as variable in product quality, while pharmaceutical-grade AAS were seen as more potent and reliable, albeit difficult to access, reflective of existing work (Bunn et al., 2021; Underwood et al., 2021). Online forums have been proposed to provide a platform for sharing harm reduction information (Tighe et al., 2017), which the current findings build on, demonstrating a component of reducing harm is employed through consumer-driven measures to improve product quality. Accessible harm reduction support was desired by this group, both at a point-of-care fixed site and via digital platforms. There was importance placed on confidentiality and trust as key elements in facilitating effective interventions. While these findings align
increase brand transparency. Strategies for checking quality and authenticity ranged from visual inspections to advanced techniques like QR codes and private testing services. Although consumers indicated some utility of private testing services, they specified public drug checking services would be welcomed and preferable. Ultimately, the discussion on drug checking services which catered to AAS consumers underscored the significance of providing this group with feedback on testing results, enabling them to modify their usage practices, thus, empowering them to make informed decisions and incentivise suppliers to improve the quality and legitimacy of their products. The practice of making informed choices on substance consumption has demonstrated its beneficial impact on consumers’ health, particularly in the context of engaging with other illicit substances (Bardwell et al., 2019; Barratt et al., 2018).

Conclusions

The present study investigated the specific needs of a sample of AAS consumers from Queensland, Australia regarding drug checking services and their perceptions of the most effective strategies for meeting those needs. Although the study sample was modest, this work represents the world’s first research to explore AAS consumers drug checking needs. These findings contribute to establishing specific support and needs within the AAS community, serving as a potential reference point for policy makers to advocate for targeted interventions for AAS consumers. The study underscores the importance of tailored education and drug checking services to address the diverse needs of AAS consumers. Further research may assess the utility of building strategies for producing and disseminating education to AAS consumers alongside drug checking services. These measures could further mitigate the risks associated with AAS use and enhance harm reduction efforts.

CRediT authorship contribution statement

Timothy Piatkowski: Writing – review & editing, Writing – original draft, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. Cheneal Puljевич: Writing – review & editing, Formal analysis. Cameron Francis: Writing – review & editing, Formal analysis, Conceptualization. Jason Ferris: Writing – review & editing, Formal analysis. Matthew Dunn: .

Declaration of Competing Interest

Dr’s Piatkowski, Dunn, Puljевич, and Prof Ferris, are volunteer members of The Loop Australia, which is a national organisation for drug checking and drug checking research. Cameron Francis is the CEO of The Loop Australia.

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Ethics

The Authors declare all procedures were performed in compliance with relevant institutional guidelines and that the appropriate institutional committee(s) have approved them. We also include a statement in the manuscript regarding appropriate ethical safeguards and ethical approvals which were obtained.

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