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Rapid assessment of performance and image enhancing drugs (PIEDs) in New South Wales: Feasibility study 2005

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RAPID ASSESSMENT OF PERFORMANCE AND IMAGE ENHANCING DRUGS (PIEDs) IN NEW SOUTH WALES: FEASIBILITY STUDY

2005

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- Australian Crime Commission (formerly the Australian Bureau of Criminal Intelligence);
- Australian Institute of Health and Welfare (AIHW);
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- Australian Pesticides and Veterinary Medicines Authority (APVMA);
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ABBREVIATIONS

AAS	Anabolic-androgenic steroids
ABCI	Australian Bureau of Criminal Intelligence
ABS	Australian Bureau of Statistics
ACON	AIDS Council of NSW
ACC	Australian Crime Commission
ACS	Australian Customs Service
ADIS	Alcohol and Drug Information Service
AFP	Australian Federal Police
AODTS-NMDS	Alcohol and Other Drug Treatment Services National Minimum Data Set
ASSADS	Australian Secondary Schools Alcohol and Other Drugs Survey
A&TSI	Aboriginal and/or Torres Strait Islander
APVMA	Australian Pesticides and Veterinary Medicines Authority
BBV	Blood-borne virus
COPS	Computerised Operational Policing System
ECA	Ephedrine, Caffeine and Aspirin (combined)
EPO	Erythropoietin
DAL	Division of Analytical Laboratories
DASSA	Drug and Alcohol Services South Australia
DHEA	Dehydroepiandrosterone
HBV	Hepatitis B virus
HCG	Human Chorionic Gonadotrophin
HCV	Hepatitis C virus
HGH	Human Growth Hormone
HIC	Health Insurance Commission
HIV	Human Immunodeficiency Virus
ICD	International Classification of Diseases
IGF-1	Insulin-like Growth Factor-1
IDRS	Illicit Drug Reporting System
KE(s)	Key Expert(s)
NCIS	National Coronial Information System
NDARC	National Drug and Alcohol Research Centre
NDSHS	National Drug Strategy Household Survey
NHMD	National Hospital Morbidity Database
NSP(s)	Needle and Syringe Program(s)
NSW	New South Wales
PBS	Pharmaceutical Benefits Scheme
PIEDs	Performance and Image Enhancing Drugs
PSB	Pharmaceutical Services Branch (NSW Health)

EXECUTIVE SUMMARY

This report presents findings from a rapid assessment of performance and image enhancing drugs (PIEDs) trends in NSW. In 1997, Peters, Copeland, Dillon & Beel documented the range of substances used, cycle length and frequency, and users' experiences of a range of physical and psychological harms. Since 1997, there has been no new Australian research in this area.

The methodology of the present study was based on an existing program of research, the Illicit Drug Reporting System (IDRS). There were three main sources of information used to document PIEDs trends in NSW:

1. Face-to-face interviews with 60 male PIEDs users recruited in Sydney;

2. Telephone interviews with 24 key experts who, through the nature of their work, had regular contact with PIEDs users or knowledge of PIEDs markets in NSW; and

3. Indicator data sources such as domestic and border seizures of AAS, calls to drug information lines, and health data.

These three data sources were triangulated to provide an indication of emerging trends in PIEDs use and markets. The 2005 findings were compared to the 1997 findings to give a broad indication of whether trends in the PIEDs market over time. The present study also examined the feasibility of using this methodology across all jurisdictions as an ongoing monitoring system for PIEDs (such as the IDRS model).

PIEDs use in the general Australian population

The 2004 National Drug Strategy Household Survey estimated that only 0.3% of Australians aged 12 years and older had 'ever used' AAS for non-medical reasons, and that a negligible number had used recently (Australian Institute of Health and Welfare, 2005). These figures are likely to under-estimate the number of PIEDs users, and other studies have found different rates of prevalence among different groups (e.g. regular gym goers, gay men, and young men).

Characteristics of PIEDs users interviewed

PIEDs users were not a homogenous group of men. One-third (33%) of the 2005 sample were aged between 17 and 25 years of age. Just under one-third (30%) of the sample were gay/bisexual men. Two-thirds (63%) of the sample had completed school to HSC level, and two-thirds (65%) had completed post-school qualifications (either a university degree or trade). Small proportions of the 2005 PIEDs user sample reported risk behaviours such as injecting other illicit drugs (25%), involvement in violent incidents in the six months prior to interview (23%) and involvement in criminal activity in the month prior to interview (35%). Overall, the demographic characteristics of the 1997 and 2005 samples were very similar, with three exceptions: the mean age of the 2005 sample was slightly higher (27 in 1997 and 32 in 2005); the 2005 sample had slightly higher rates of

unemployment (5% in 1997, 15% in 2005) and the 2005 sample had higher rates of alcohol and other drug use.

The 1997 and 2005 sample characteristics, and the comments from KEs, indicate that PIEDs users maintain high levels of social and occupational functioning.

Patterns of use

The mean age of first use of PIEDs was 25.7 (SD 7.9), ranging from 15 to 58. The main substances used included AAS, prohormones (e.g. DHEA and androstenedione), HCG, HGH, insulin, anti-oestrogens, clenbuterol, stimulants (e.g. ephedrine, methamphetamine), diuretics and a range of over-the-counter dietary and sports supplements such as creatine monohydrate. Injectable human and veterinarian AAS remain the most popular and widely used PIEDs.

The 2005 sample used a mean of 2 AAS (ranging from 0 to 6 AAS) in their most recent cycle. Typical cycles were a median of 10 weeks, followed by a rest period of equivalent length. Cycle lengths ranged from 3 weeks to 52 weeks, indicating that small numbers of the group were using PIEDs weekly without a break. The median number of cycles per year was 2, ranging from 1 to 4. KEs reported that PIEDs use is generally seasonal, increasing over spring and summer months.

There appeared to be no major changes in the patterns of PIEDs use from 1997 to 2005. The two samples reported similar cycle lengths, frequencies and types of PIEDs being used. Since 1997 there has been a slight shift away from veterinarian AAS products, towards more human AAS products and other 'prohormones' such as DHEA and androstenedione. The 2005 sample also reported increased diversification in the range of other PIEDs used alongside AAS.

Motivations for use

The 2005 study reinforced the importance of body image as a motivation for PIEDs use, particularly the desirable effects on physique. The reported benefits of PIEDs use included: improved muscle definition, increased size, increased weight, increased strength, being able to train harder for longer, improved self-esteem, increased confidence, and positive feedback from others.

There was some evidence of occupational use of PIEDs among the 2005 sample. When asked to identify a category that best described their use of PIEDs, only 9% of the sample identified 'occupational user'. While not identified as a primary motivation for their PIEDs use, 53% of the 2005 PIEDs user sample reported having worked in a profession where muscular strength and physical appearance were important (including jobs such as trades/labouring, fitness industry, security/armed services, adult entertainment industry and sales).

Harms

The 1997 and 2005 samples reported very similar experiences of harms relating to PIEDs use. The majority (97%) of PIEDs users had experienced at least one minor physical side effect, most commonly increased appetite, water retention, reduced teste size, acne, increased sex drive and sleeplessness. No PIEDs-related deaths were identified in databases that record drug-related deaths in Australia.

Most of the sample had injected PIEDs (93%) and the mean age of first injection was 25.5 (SD 6.4). In general, there were low rates of needle sharing among the group, but other risky injection practices included: re-using needles, being injected by another person, injecting small muscle groups, injecting from a shared container, injecting other illicit drugs and injecting insulin. Three percent of the sample reported being HBV positive, 5% reported being HCV positive and 12% reported being HIV positive.

The majority of participants (87%) had experienced some changes in their mood or behaviour when using PIEDs. The positive effects included increased motivation, increased confidence, feeling more satisfied with body image and having an increased sex drive. The negative effects included irritability and aggression. Twenty-three percent of participants reported having been involved in an incident involving aggression or violence in the 6 months prior to interview. Just over one-third (37%) of participants reported having ever experienced 'roid rage'.

A quarter (27%) of the sample reported experiencing mental health concerns in the six months prior to interview. Depression and anxiety were the problems mentioned most frequently. The 2005 sample reported symptoms of dependence, most frequently withdrawal symptoms. The most common withdrawal symptoms included desire for more steroids, dissatisfaction with body image, general lack of interest, depression and fatigue after stopping a cycle.

In general, there were low rates of involvement in crime. One-third of participants (35%) reported involvement in crime in the last month, most commonly dealing (23%). No distinction was made in the data regarding the type of drugs involved, or whether 'dealing' was supplying to friends or large-scale supply. Nationally, the numbers of AAS-related arrests were low (AAS-related arrests account for 0.1% to 0.2% of all Australian arrests) and most AAS-related arrests involved consumers (and amounts consistent with personal use).

PIEDs users view their behaviour as 'healthy' and are wary of research and the 'medical profession'. Subsequently, they may have a tendency to disregard the long-term negative effects. The vast majority (90%) of the sample believed that the benefits of PIEDs use outweighed the risks.

PIEDs markets

General comments from the 2005 sample indicated that, prior to 2000, AAS were more widely available, cheaper, and believed to be more frequently 'genuine' human or veterinarian products. PIEDs users reported that, in the years following 2000, there has been an increase in the number of fakes/counterfeits and new products such as 'Dianabol

paper products' and 'homebake'. Thirty-five percent of the sample reported having ever being sold counterfeit AAS.

The price of veterinary injectable AAS products ranged from $2 to $15 per ml. The price of human injectable AAS products ranged from $20 to $40 per ml. Oral AAS products were generally cheaper with prices ranging from $0.80 to $3.50 per tablet. Participants most often reported that prices of AAS had remained 'stable' over the last six months (40%). The most commonly reported price range for HGH was between $450 and $500 per week for a 4 to 6 week cycle. Clenbuterol was believed to cost between $150 and $200 per tub (of gel or powder), and between $2 and $7 per tablet. Anti-oestrogens ranged from between $2.50 to $10 per tablet. The price reports for other PIEDs were generally more variable and less reliable.

Information and help-seeking

PIEDs users seek information frequently from the internet, friends, doctors and gym contacts. Most health services do not give this group a high profile, and there are rarely posters, images, signs, and harm reduction materials that depict PIEDs users. Although 71% of participants reported accessing NSPs for clean injecting equipment, only 7% reported seeking information from an NSP. PIEDs users do not generally seek advice or support from AOD-specific services (such as NSPs, ADIS and treatment agencies) and do not identify with messages or services targeting 'illicit drug use'. Small numbers of PIEDs users reported accessing mental health support from a 'psychiatrist' or a 'counsellor'. KEs suggested that the 'hidden' nature of this group leaves them vulnerable to an over-reliance on 'folk pharmacology'.

Key recommendations:

Harm reduction and intervention

- Harm-reduction strategies should consider peer-education models and access to a non-judgemental doctor/health service for regular health checks (including regular blood tests and monitoring of the risk factors for endocrine, heart, liver and kidney disease).

- Improved training on PIEDs for NSP workers, GPs and other professionals working in primary healthcare

- Development of a brief intervention (suitable for NSPs, health workers in primary care settings and personal trainers), with information on safe injecting, sex risk, insulin, etc.

- Development of a range of user-friendly, PIEDs-specific resources that reflect current research (harm reduction leaflets, BBVI awareness, safer injecting techniques, etc). These need to cater for different audiences (e.g. young men, professional and enthusiast bodybuilders, gay/bisexual men).

- Health services should clarify and promote their services to this group, and increase the profile of this group at their services by displaying PIEDs-specific resources and images that depict PIEDs users.

- Health services need to engage the private fitness industry (gyms, personal trainers, etc) in health promotion and developing resources targeting this group.

Future research

- Further investigations could focus on other risk behaviours of this group (e.g. driving, sex risk, alcohol and other drug use, involvement in accidents, physical injuries, victim/perpetrator of violence).

- Longitudinal/cohort studies are needed for a better understanding of the long-term effects of real-life, non-medical patterns of use and the effects of 'cycling'.

Future monitoring

- The 2005 study found very similar group characteristics, patterns of use, and experiences of harms to the 1997 study. Given the challenges in accessing a regular sample of PIEDs users within short timeframes across all jurisdictions, it may not be practical or necessary to conduct annual face-to-face interviews with a sentinel group of users. To continue monitoring trends, a realistic timeframe for PIEDs users surveys is every 3-5 years, rather than annually.

- Data from key expert interviews and routine indicator data sources should be collated across all jurisdictions, in a shorter timeframe (annually). Regular collation of these data sources will provide a sufficient overview of the market and emerging trends, supplemented by less frequent PIEDs user surveys.

1. INTRODUCTION

1.1. What are 'performance and image enhancing drugs'?

Performance and image enhancing drugs (PIEDS) refer to substances that are typically used to enhance muscle growth ('anabolic' effects) or to reduce body fat ('catabolic effects'). The expected benefits of using these substances range from increasing the size and definition of muscles, reducing water retention and body fat, to increasing physical strength and endurance (Bahrke & Yesalis, 2002; Bahrke & Yesalis, 2004; Yesalis & Bahrke, 2000).

The widespread use of the term 'performance and image enhancing drugs' (PIEDs) has evolved over the last 5 years in Australia. Originally, 'performance-enhancing drugs' (PEDs) was the term used to describe the range of substances that may have performance benefits for athletes. 'PEDs' is a term that is still widely applied in the US, even where there is no direct link to competitive sports. Several Australian reports have identified that the use of anabolic-androgenic steroids (AAS) and related substances affect not only the sporting sector, but also a wider cross-section of the Australian community (Australian Olympic Committee, 2000; Henry-Edwards, 2004; Henry-Edwards, Ali, Bisshop, Gordon, & Hall, 1999; Larance, Degenhardt, Dillon, & Copeland, 2005; Peters, Copeland, Dillon, & Beel, 1997). For many, PIEDs are used solely for their effects on physical appearance. Accordingly, the use of the term 'PIEDs' has become the preferred term in Australia.

The major substances of concern are human and veterinary AAS, growth hormones, anti-oestrogens, diuretics, stimulants, beta-2 agonists (i.e. clenbuterol), creatine monohydrate and hormones such as insulin and thyroxine (Henry-Edwards, 2004). A brief description of each of these substances is presented in Appendix One. A detailed description of PIEDs has been given in a separate review of the literature (Larance, Degenhardt, Dillon & Copeland, 2005).

In Australia, the range of PIEDs that are available tend to include over-the-counter food supplements, medicines that are commercially produced for human use, medicines that are commercially produced for veterinary use, and substances that are illicitly produced (Australian Crime Commission, 2003). Many PIEDs are prescription-only medications that have been diverted to the blackmarket. Use of PIEDs often occurs without medical supervision, and in amounts that greatly exceed recommended therapeutic doses. Assessing the health risks can be difficult as users may take complex combinations of drugs. Table 1 (below) gives an indication of the wide range of substances that could potentially be used to enhance performance and image.

The most widely used PIEDs are AAS. Of all PIEDs, AAS are the most frequently investigated and there is a growing body of evidence regarding patterns of use and effects. AAS also remain the primary way that people change their appearance if they choose to use drugs to do so (Evans, 2004). There is very little (if any) scientific literature on the non-medical use, effects and harms of other PIEDs.

Table 1: Drugs and substances used to enhance performance and appearance	
Amino acids/protein powders	Ginseng
Amphetamines/stimulants	Gonadotrophin-releasing hormone (GNRH)
Anabolic-androgenic steroids (AAS)	Human Chorionic Gonadotrophin (HCG)
Androstenedione	Human Growth Hormone (HGH)
Anti-inflammatories	Insulin-like Growth Factor (IGF-1)
Boron	Marijuana
Chromium picolinate	Methcathinone
Clenbuterol	Minerals
Creatine	Oil of Evening Primrose
Cyproterone acetate	Perfluorocarbon
Dehydroepiandrosterone (DHEA)	Smilax
Diuretics	Tamoxifen
Drug testing/masking agents	Thyroid hormone
Ephedrine	Tribestan
Erythropoietin (EPO)	Vanadyl Sulfate
Gamma Hydroxybuterate (GHB)	Vitamin B
Glandular extracts	

Source: Yesalis and Bahrke (2000: p. 26)

Note: This list is not exhaustive. Some of these substances, such as tamoxifen and HCG, are used to treat the adverse effects of AAS use. In addition, not all substances listed have been demonstrated to enhance performance or appearance.

1.2. Groups of PIEDs users

Although there are individuals who are legitimately prescribed substances such as AAS for medical reasons, the present study examines the use of PIEDS for non-medical purposes. The motivations for the non-medical use of substances like AAS are inherently personal to the individual (Peters et al, 1999). The literature frequently identifies four general categories of non-medical PIEDs users (Australian Olympic Committee, 2000; Bolding, Sherr, & Elford, 2002; Peters, Copeland, & Dillon, 1999; Peters et al., 1997; Shapiro, 1994), listed below:

- Elite athletes
- Body image users
- Occupational users
- Adolescents

In their 2000 submission, *Substance Abuse in Australian Communities*, the Australian Olympic Committee highlighted that the use of performance and image enhancing drugs (PIEDs) in Australia is not just within the sporting community, but extends to the non-sporting sectors of Australian life. While the issue of 'drugs in sports' is an interesting one, it is also an area that is well researched and resourced. The present study did not focus on the use of drugs in sport. Its primary aim was to describe the characteristics of other (non-sporting) PIEDs users, such as those who use for appearance, their occupation and adolescent users.

The literature profiling PIEDs users is controversial, and PIEDs use has been associated with a range of different demographic and behavioural variables for each of the above groups. Non-sporting users of PIEDs are predominantly male, although there are small

(and possibly increasing) numbers of women who also use PIEDs (Yesalis & Bahrke, 2000).

1.2.1. Body image users

There has been an increased focus on the issue of body image among men in the scientific literature over the last 10 years. Once we understand the body image concerns of men in terms of the 'drive for muscularity', rather than the 'drive for thinness', body image concerns among men of all ages appears widespread. Body image concerns (such as muscle dissatisfaction) have been demonstrated in men of different cultural backgrounds (Pope et al., 2000); bodybuilders and weight trainers (Davis & Scott-Robinson, 2000; Peters & Phelps, 2001; Schwerin et al., 1996); gay men (Beren, Hayden, Wifley, & Grilo, 1996; Bolding et al., 2002; Bolding, Sherr, Maguire, & Elford, 1999; Conner, Johnson, & Grogan, 2004; Dillon, Copeland, & Peter, 1999; Drummond, 2005; Yelland & Tiggemann, 2003) and young men (Grogan & Richards, 2002; Humphreys & Paxton, 2004; McCabe & Ricciardelli, 2004; Nilsson, Spak, Marklund, Biagi, & Allebeck, 2004; Wroblewska, 1997).

Chronic body image distortions among men were first described in the literature as 'reverse anorexia'. This term was later changed to 'muscle dysmorphia' (Olivardia, Pope, & Hudson, 2000; Pope, 2001; Pope et al., 2000). There are critiques of these theories, including debate regarding what constitutes 'normal' body image concerns and 'normal' competitive sporting behaviour, as opposed to a psychological disorder (Chung, 2001; Keane, 2005).

The masculine physique of broad shoulders, muscular arms, v-shaped torso with a "6-pack" abdomen has become a familiar ideal in the media. There is an increasing body of literature examining the relationships between media representations and mens' body image concerns (Drummond, 1994; Drummond, 2005; Humphreys & Paxton, 2004; Leit, Gray, Harrison, & Pope, 2002; Leit, Harrison, Pope, & Gray, 2001). Many studies have concluded that men may pursue unhealthy activities in order to achieve an unrealistic ideal: that is, the media may influence body dissatisfaction, anxiety, eating disorders, muscle dysmorphia, and use of PIEDs and untested dietary supplements (Cafri & Thompson, 2004; Drummond, 2005; Harvey & Robinson, 2003; Leit et al., 2002; Olivardia, Pope, Borowiecki III, & Cohane, 2004; Olivardia et al., 2000; Peixoto Labre, 2002; Pope et al., 2000; Schwerin et al., 1996; Wroblewska, 1997).

A good physique and physical appearance bring social acceptance, admiration and opportunity (Schwerin et al., 1996). PIEDs such as AAS are used for their specific effects on muscularity. The physical changes and the accompanying psychological effects of increased confidence, self-esteem, social benefits and elevation in mood may be the key factors in supporting and continuing AAS use (Peixoto Labre 2002).

1.2.2. Occupational users

Occupational users are a group that have been frequently discussed in the literature (Australian Olympic Committee, 2000; Maycock, 1999; Maycock & Beel, 1997; Monaghan, 2002a; Mugford, 1995). It is believed that for some, use of AAS serves a direct purpose, usually in the carrying out of employment duties (Shapiro, 1994). The user may believe that their 'survival' depends on their physical ability. The example provided by Dart 1991 (cited by Peters et al., 1997) is a policeman who, as their concern for their ability to protect

themselves increases, their use of AAS might increase, giving them the 'physical edge they fear they lack'. Police, door staff, security personnel, bodyguards, fire fighters, members of the armed forces and members of street gangs have been some of the professions identified in the literature as possibly associated with PIEDs use (Australian Olympic Committee, 2000; Maycock, 1999; Monaghan, 2002a, 2002b; Mugford, 1995; Peters et al., 1997).

The ways in which AAS might give a 'physical edge' are two-fold. The first is through achieving an enhanced physique. The second is through enhanced aggression levels. Thiblin (1999) observed that certain criminals might use AAS prior to planned violent activity, in order to benefit from the heightened arousal to anger and aggression, and central stimulatory effects. It follows, that the functional use of 'increased arousal' may be attractive to professions where there is a need to react quickly and confidently (Thiblin, 1999).

Other researchers have discussed the concept of 'bodily capital', where the body is viewed as an economic asset (Monaghan, 2002a, 2003). This perspective has primarily been applied to those working in the security industry. However, other industries where an attractive physique may be a financial asset could include the fitness industry (e.g. personal trainers), entertainment industry (e.g. actors) and fashion industry (e.g. models).

1.2.3. Adolescents

The group that are most often identified in the literature as being at risk of body image concerns are adolescents. Adolescence is the age for the development and maintenance of physical health care behaviours, self-esteem, self-identity and psychological wellbeing (Wroblewska, 1997). Adolescent identity is closely linked to the image that is portrayed, and the lure of 'looking good' is powerful at any age. Young men may be more susceptible to the social pressure to achieve the same physique as adult men portrayed in the popular media (Australian Olympic Committee, 2000; Drummond, 2005; McCabe & Ricciardelli, 2004; Peters et al., 1999; Thomson, 1999). Adolescent PIEDs use has also been found to relate to body image concerns (eg: Irving, Wall, Neumark-Sztainer, & Story, 2002; Labre, 2002; Olivardia et al., 2004; Peters & Phelps, 2001; Wichstrom & Pedersen, 2001; Wroblewska, 1997).

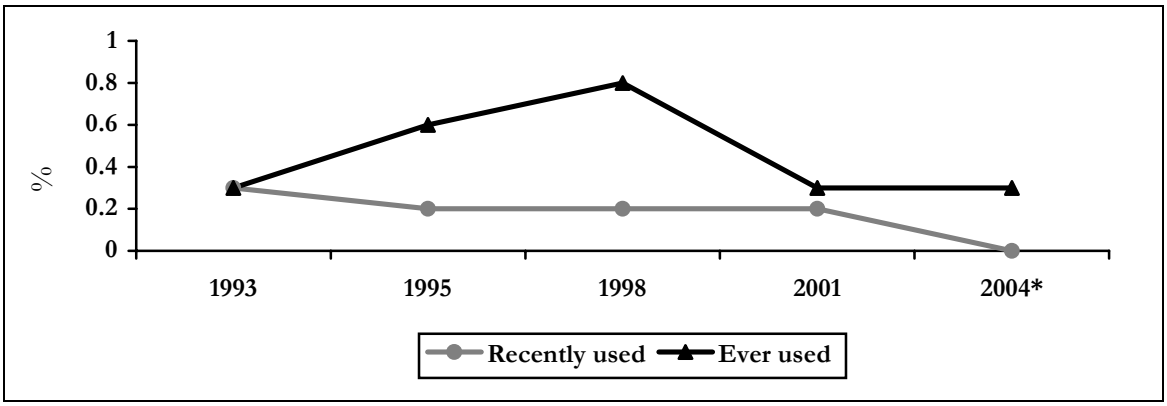
However, there are other studies suggesting that AAS use among young men may be part of a wider problem behaviour syndrome related to use of alcohol and other drugs, truancy, risk-taking and aggression (eg: Handelsman & Gupta, 1997; Kindlundh, Hagekull, & Isacson, 2001; Miller, Barnes, Sabo, Melnick, & Farrell, 2002; Nilsson et al., 2004; Pedersen, Wichstrom, & Blekesaune, 2001).

1.3. Prevalence in Australia

The National Drug Strategy Household Survey (NDSHS) is a survey of Australians (aged 14 years and over) regarding their use of alcohol and other drugs. Households are selected through a multi-stage, stratified areas sample design. The survey is conducted approximately every three years (see Figure 1 below).

In general, the prevalence of AAS use among the NDSHS sample has been low for both recent and lifetime use (consistently less than 1%). The 2004 National Drug Strategy Household Survey surveyed Australians aged 12 years and over. In 2004, the number of Australians who have 'ever tried' AAS has stayed stable since 2001, the number of Australians who have 'recently used' AAS has decreased significantly from 2001 (2-tailed α=0.05: AIHW, 2005: p. 3-4).

Figure 1: Proportion (%) of Australians aged 14 years and over who have 'recently used' steroids (in the last 12 months) and 'ever used/ever tried' steroids for non-medical purposes, 1993-2004

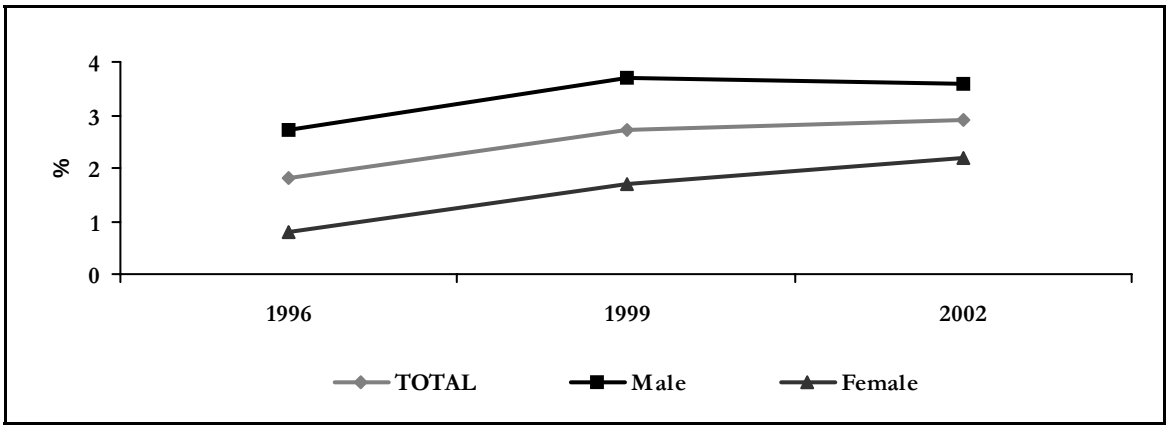


SOURCE: Australian Institute of Health and Welfare (2005)
** Note: The 2004 data was collected from Australians aged 12 years and over*

While the prevalence rates among the general population appear to be low, studies looking at particular subgroups have found higher prevalence rates of AAS use.

The Australian Secondary Students Alcohol and Drug Survey (ASSADS) is a survey conducted every three years at 143 randomly selected government and independent schools in NSW. The target age group is 12 to 17 year olds. The most recent national survey in 2002 (n=23,417) found that 3.6% of males and 2.2% of females had ever used AAS 'without a doctor's prescription in an attempt to improve sporting ability, increase muscle size or improve appearance' (see Figure 2 below) (White & Hayman, 2004).

Figure 2: Proportion of Australian secondary students' (aged 12-17 years) who had 'ever used' steroids without a doctor's prescription in an attempt to improve sporting ability, increase muscle size or improve appearance, 1996-2004



Source: (Letcher & White, 1999; White, 2001; White & Hayman, 2004)

Among those males who had used AAS recently, 36% had used these substances only once or twice, with a further 12% using them 3–5 times. Among females, 50% had only used them once or twice, with a further 22% using them 3–5 times. While the prevalence estimates were still low, the results did suggest that use was more common among school students than the general population (White & Hayman, 2004).

The prevalence of AAS use among Australian adolescents is higher than that found among the general population in the NDSHS. The rates of school-aged AAS use in Australia are similar to countries such as Norway, Sweden and England, ranging from 1% to 4% in school-aged males and 0.2% to 2% in females (Handelsman & Gupta, 1997; Kindlundh et al., 2001; Miller et al., 2002; Wichstrom & Pedersen, 2001). These rates are also slightly lower than those found in multiple US local, state and national surveys, where school-aged AAS use ranges from 4% to 6% of high school males (Bahrke & Yesalis, 2002; Bahrke & Yesalis, 2004).

Surveys conducted by the National Centre for HIV Social Research (NCHSR) of gay and homosexually active men in Sydney also report slightly higher rates of prevalence than those found in the NDSHS. From 1999 to 2002, the Gay Community Periodic Survey reported that rates of AAS use among gay men in the previous six months ranged between 1% and 4% (Hull et al., 2003). The Health In Men surveys conducted in 2001 and 2002 found that the proportion of men who had injected AAS in the previous six months was approximately 1% (Prestage et al., 2003). This survey did not ask about other forms of AAS (e.g. oral tablets).

Higher rates of AAS use have been identified within specific subgroups of the community. For example, international surveys have demonstrated much higher rates of prevalence among weight trainers in Australia (Chee, Kuan, Rynn, & Teoh, 1994), a wider cross-section of gym goers in the UK (Korkia, 1994) and gay men involved in weight-training in London (Bolding et al., 2002). In these groups, the proportions indicating they had ever used AAS ranged from between 8% and 16%.

1.4. Background to the present study

In 1997, Peters, Copeland, Dillon and Beel conducted a study of patterns and correlates of PIEDs use. They interviewed a sample of 100 AAS users in NSW and the ACT, and reported the substances used, cycle length and frequency, and users' experiences of a range of physical and psychological harms. While PIEDs use in Australia has continued to be discussed in the literature (e.g. Aitken & Delalande, 1999; Aitken, Delalande, & Stanton, 2002; Copeland, Peter, & Dillon, 1998; Copeland, Peters, & Dillon, 2000; Corrigan, 1999; Handelsman, 2004; Handelsman & Gupta, 1997; Keane, 2005; Kennedy, 2000; Kennedy & Kennedy, 1999; Maycock, 1999; Maycock & Beel, 1997; Peters et al., 1999), no new research into the patterns of non-sporting use has been conducted since 1997. In a report to the Ministerial Council on Drug Strategy (MCDS) in 2004, the Working Party on Performance and Image Enhancing Drugs recommended that ongoing surveillance of non-sporting use of PIEDs was needed to provide the evidence-base for targeted demand and harm reduction programs (Henry-Edwards, 2004).

Following the MCDS recommendations, the Australian Government Department of Health and Ageing (AGDH&A) funded a study to assess the feasibility of a rapid assessment of PIEDs trends in one jurisdiction (New South Wales), with a view to extending data collection to other jurisdictions.

The present study was based on an existing methodology developed for the Illicit Drug Reporting System (IDRS). The IDRS is a national programme of research that monitors drug trends (such as price, purity and availability) for the main illicit drug types in Australia (namely heroin, amphetamine, cocaine and cannabis). The IDRS has collected annual, comparable data in NSW since 1996, and has collected this data across all Australian jurisdictions since 2000. The project is an early warning system for emerging drug trends of local and national significance in various illicit drug markets (Hando, O'Brien, Darke, Maher, & Hall, 1997; Stafford et al., 2004; Topp, Breen, Kaye, & Darke, 2004). The findings of the IDRS have had important implications for audiences from a variety of sectors, including health personnel, law enforcement personnel, and policy makers.

The IDRS triangulates data from three sources:

1. Interviews with injecting drug users (IDU);
2. Interviews with key experts (KEs) who, through the nature of their work, have regular contact with illicit drug users; and
3. Analyses of existing indicator data sources related to illicit drug use such as national surveys, health and law enforcement data.

Each of these data sources has inherent biases and limitations. However, when taken together, they provide a valid picture of emerging trends.

Since its development, the IDRS methodology has been applied in other illicit drug markets. The Party Drugs Initiative (PDI) first trialled the methodology to monitor trends in ecstasy and related drugs markets in NSW in 2002 and has been conducted across all jurisdictions since 2003 (Breen et al., 2003; Topp, Barker, & Degenhardt, 2004; Topp, Breen et al., 2004).

The present study uses the IDRS methodology to conduct a rapid assessment of trends in the use and availability of PIEDs in New South Wales (NSW). Where possible, characteristics of the 2005 PIEDs user sample have been compared to those found in the 1997 sample (Peters et al., 1997). These comparisons are intended to give a broad indication of whether trends in the PIEDs market have changed since 1997. The present study also examines the feasibility of an ongoing monitoring system for PIEDs (such as the IDRS model) being extended to all jurisdictions.

1.5. Aims of the present study

1. To describe the demographic characteristics of a sample of current PIEDs users interviewed in Sydney, NSW, in 2004/2005;

2. To examine the patterns of AAS and other PIEDs use by this sample, including lifetime and recent use, cycles, and routes of administration;

3. To investigate the benefit and risk perception of participants regarding their use of AAS and other PIEDs;

4. To document the current price, purity and availability of AAS and other PIEDs in Sydney, NSW;

5. To examine participants' perceptions of the prevalence and nature of AAS- and other PIEDs-related harms, including acute harms (physical and psychological);

6. To identify emerging trends in the PIEDs market that may require further investigation; and

7. To evaluate the feasibility of this methodology as a national monitoring system (across all states and territories).

2. METHODS

The study used three main sources of information to document PIEDs trends in NSW:

1. Face-to-face interviews with current (or recent) AAS and other PIEDs users recruited in Sydney;

2. Telephone interviews with key experts who, through the nature of their work, have regular contact with PIEDs users or knowledge of PIEDs markets in NSW; and

3. Indicator data sources such as domestic and border seizures of AAS, calls to drug information lines, and health data.

These three data sources were triangulated to provide an indication of emerging trends in PIEDs use and markets.

2.1. Survey of PIEDs users

The sentinel population chosen to monitor trends in PIEDs markets consisted of people who had engaged in the recent (or current) use of anabolic substances. Recent use was defined as having used PIEDs in the six months prior to interview. AAS remain the primary way in which people change their appearance. In the present study, participants were also eligible if they had used HGH and/or IGF-1 recently (or currently).

2.1.1. Recruitment

Participants were recruited through a purposive sampling strategy (Kerlinger, 1986), which included advertisements in entertainment street press, gay and lesbian newspapers, gyms, supplement stores, Needle and Syringe Programs (NSPs), internet forums, interviewer contacts, and 'snowball' procedures (Biernacki & Waldorf, 1981). 'Snowballing' is a means of sampling 'hidden' populations that relies on peer referral, and has been used previously to access PIEDs users (Peters et al. 1997). Recruitment methods were targeted to ensure representation of young men, gay men and regular gym goers.

A total of 60 males who had used AAS or other anabolic agents recently (in the six months prior to interview) were interviewed face-to-face. All participants resided in the Sydney metropolitan region. On completion of the interview, participants were requested to mention the study to friends who might be willing and able to participate.

This sentinel sample may not be representative of all PIEDs users. However, purposive sampling involved recruitment from a wide cross section of users, which in other studies has been shown to give rise to a sufficiently representative sample to draw some inferences about patterns of use and characteristics of the wider population (Topp, Barker et al., 2004).

2.1.2. Procedure

Participants contacted the researchers by telephone and were screened for eligibility. To meet entry criteria, they had to be at least 17 years of age (due to ethical constraints), have used anabolic substances (AAS, HGH or IGF-1) for non-medical purposes in the preceding 6 months, and have been a resident of the Sydney metropolitan region for the past 12 months. Recruitment was confined to Sydney.

Participants were advised that all information provided was strictly confidential, and that the study would involve a face-to-face interview that would take approximately 1 hour. All participants were volunteers who were reimbursed $50 for their time and travel expenses. Interviews took place in a location negotiated with participants, predominantly in coffee shops or at NDARC, and were conducted by the first author. The nature and purpose of the study was explained to participants before informed consent was obtained.

2.1.3. Measures

Participants were administered a structured interview schedule that was based on previous NDARC studies: a study of AAS users conducted in 1997 (Peters et al., 1997) and the 2004 IDRS interview schedule (Stafford et al., 2004). The interview schedule focused primarily on the preceding six months, and assessed demographic characteristics; patterns of PIEDs use, including length of use, dose and routes of administration; the price, purity and availability of a range of related substances; perceived benefits of PIEDs use; perceived physical and psychological harms; self-reported criminal activity; and the main sources of information used to learn about PIEDs.

2.1.4. Data analysis

The majority of analyses in this report are descriptive in nature. Percentages are reported for categorical variables. For continuous, normally distributed variables, means are reported. Where continuous variables were skewed, medians are reported. All analyses were conducted using SPSS for Windows, Version 13.0 (SPSS inc, 2001).

Where possible, the measures from the 2005 PIEDs user sample are reported alongside similar measures obtained in the 1997 study of AAS users (Peters et al., 1997). These findings are provided for general comparison only. Due to differences in sampling techniques and study design, differences have not been tested for statistical significance.

2.2. Survey of key experts (KEs)

2.2.1. Recruitment

The eligibility criterion for key expert (KE) participation was regular contact with PIEDs users in the preceding six months, and/or expert knowledge of current PIEDs markets. Regular contact was defined as average weekly contact and/or contact with six or more PIEDs users during the preceding six months.

Interviews were conducted with 24 KEs from various metropolitan areas of Sydney. Sixteen KEs provided information that mainly pertained to the PIEDs users with whom they had regular contact. Eight KEs (who worked in monitoring/law enforcement) provided information that mainly pertained to PIEDs-related markets. Eighteen interviews were conducted over the phone and two were conducted face-to-face. Four members of the NSW Police (Drugs Squad) self-completed an interview format, with their responses combined as a team.

The KE interviews were conducted using a semi-structured interview schedule. This schedule was adapted for self-completion by the NSW Police team. Most questions were open-ended and focused primarily on the preceding six months. KEs were asked to comment on the groups' characteristics; their motivations for PIEDs use; patterns of use; price, purity and availability of PIEDs; any changes in PIEDs-related markets and any observed physical and/or psychological harms among users.

Thirteen of the KEs interviewed individually were male and eleven were female. They represented a range of occupations including the fitness industry (n=2), health service providers (such as NSP workers, doctors and pharmacists) (n=14), and law enforcement personnel (n=8). Most of the law enforcement personnel did not have direct contact with PIEDs users, but were able to share knowledge of PIEDs markets obtained through their work in intelligence analysis or investigations.

The number of individual PIEDs users KEs had contact with in the last six months ranged from 3 to 72. NSP workers (including a pharmacist who also provided needles and syringes) saw the largest number of individual PIEDs users in a six month period. On average, this group saw between one and three PIEDs users a week. One NSP worker reported seeing up to 20 PIEDs users a week at their NSP. The number of occasions KEs reported seeing an individual over the preceding six months ranged from one to two times per month in NSPs, to five to six times per month among those working in the fitness industry.

All KEs reported knowing about PIEDs through the course of their work. Only two of the KEs reported additional knowledge of PIEDs from personal experience or social life. The majority of the KEs (n=18) were either moderately or very certain of their knowledge. Only three KEs were less certain, and this was usually in regards to describing the specific practices of PIEDs users.

2.3. Other indicators

To complement and validate data collected from the PIEDs user survey and KE interviews, a range of secondary data sources were examined. These included health, survey, and law enforcement data.

Data sources that were considered in this project included:

- AIHW: National Drug Strategy Household Survey
- AGDH&A: Australian Secondary Schools Alcohol and other Drugs Survey (ASSADS)
- Australian Crime Commission: AAS consumer/provider arrests
- Australian Customs Service: seizures by drug type and weight
- Australian Federal Police: seizures by drug type
- NSW Police: AAS consumer and provider arrests/ COPS database searches
- AIHW: inpatient hospital treatment episodes
- ADIS: helpline calls relating to PIEDs
- Family Drug Support: helpline calls relating to PIEDs
- NSW Health: Minimum Data Set – Alcohol and Other Drugs (AOD)
- NSW Health: Department of Analytical Laboratories (DAL) - drug-related deaths
- NSW Health: Pharmaceutical Services Branch – details of investigations
- National Coronial Information System (NCIS): PIEDs-related deaths
- NCHECR: NSP Survey (IDRS Drug Trends Bulletin – Oct 2004)
- NCHSR: Gay Community Periodic Survey
- NCHSR: Health In Men Survey
- Australian Pesticides and Veterinary Medicines Authority (APVMA): national sales of veterinary AAS
- AGDH&A: Office of Chemical Safety -number of approved imports for medical purposes

The indicator data sources considered for this study are presented in detail in Appendix Three.

3. CHARACTERISTICS OF PIEDs USERS

3.1. Demographics

The characteristics of the 2005 PIEDs user sample and the descriptions from KEs indicate that PIEDs users are not a homogenous group. One KE, who had detailed knowledge of PIEDs users through their work and also through their social life, gave this description:

> *'There are three main groups of men. The first is young men. Younger men aged 17 to 28 tend to use whatever they can find. They are more risk-taking, use higher doses, are buying more fake and vet steroids, and usually buy off the blackmarket or in gyms. They also use other drugs like party drugs, not drugs that are injected. The second group is middle-aged users who are aged 30+ and who tend to be professional people. They normally use human steroids, they are more likely to source genuine products, know the source and where they come from and usually have friends who are vets, doctors, or horse trainers. Gay men make up about 20% of this group. The third group are the bodybuilders. Competitive bodybuilders use mainly human AAS, large doses, take AAS constantly (instead of cycling), and stack different types, etc. There are women, but the women who use tend to be in physique competitions and tend to use stanazol and vitamin B'.*

3.1.1. Age and gender

Sixty male PIEDs users were interviewed from December 2004 to August 2005. The mean age was 32.0 (SD 9.7, Range: 17-59). Young men aged 25 or less made up 33% of the sample. The 2005 PIEDs user sample was slightly older than the 1997 sample (mean age was 27).

These characteristics were confirmed by KE descriptions. KEs estimated that PIEDs users were between 85% and 100% male. KEs reported that the largest groups of PIEDs users were aged between 18 and 35 (18 KEs).

3.1.2. Ethnicity

Among the 2005 PIEDs user sample, the majority spoke English as their main language (95%). Among those participants who reported speaking a language other than English at home, two spoke Arabic and one spoke German. Twenty seven percent of the sample were born in countries other than Australia, most frequently New Zealand (10%), United Kingdom (5%) and the Middle East (5%).

The KE reports regarding the cultural and linguistic diversity of PIEDs users were more mixed. Eleven KEs reported that Middle Eastern or Arabic-speaking communities were over-represented among the PIEDs users they had contact with. However, four KEs reported the cultural and linguistic diversity among the PIEDs users they had contact with was proportional to the diversity of the wider community they served. There were another four KEs who reported having contact with predominantly Australian-born Caucasian males.

3.1.3. Area of residence

The PIEDs user sample resided in a wide range of metropolitan regions of Sydney, including the eastern suburbs (27%), inner city (18%), western suburbs (15%), inner west (12%), south west (10%), south (10%), northern suburbs (7%) and south eastern suburbs (1%). The majority lived in rental accommodation (64%), a parent's home (23%) or their own flat/house (13%).

The KEs reported very similar geographical areas (although this was largely determined by their place of work). One law enforcement KE (with a statewide overview) reported intelligence that suggested the top NSW addresses for postal deliveries of PIEDs included the inner, south western and northern areas of Sydney. Eight NSP workers reported PIEDs users accessed their NSP from regional areas such as Blue Mountains, Southern Highlands and Central Coast of NSW.

3.1.4. Education

Sixty three percent of the PIEDs user sample had completed school to Year 12. Thirty two percent had completed trade or technical certificates and a further 33% had completed a tertiary (university/college) qualification.

Most KEs were unable to comment on the education levels of PIEDs users. Four KEs reported that, among the PIEDs users they had contact with, most had completed year 10 or higher, but the group were not likely to have completed tertiary qualifications. One KE reported that some PIEDs users known to them were still currently school aged.

Table 2: Demographic characteristics of PIEDs user samples in 1997 and 2005

Variable	1997 sample (N=100)	2005 sample (N=60)
Median age in years (range)	27 (18-50)	**31 (17-59)**
Male (%)	94	**100**
English as main language spoken at home (%)	92	**95**
A&TSI (%)	1	**3**
Heterosexual (%)	70	**70**
Completed HSC (Year 12) (%)	-	**63**
Tertiary and/or vocational qualifications (%)	68	**65**
Employed full-time (%)	73	**57**
Full-time students (%)	6	**7**
Unemployed (%)	5	**15**
Lifetime involvement in security industry (%)	-	**23**
Ever worked in a profession where muscular strength or physical appearance was important (%)	42	**53**
Ever been in prison (%)	-	**9**

Source: PIEDs user interviews (2005); Peters et al (1997)

3.1.5. Employment

The majority of participants were either in full-time (57%) or part-time/casual employment (22%). Seven percent of participants were full-time students and 16% were unemployed. Among those who were currently employed at the time of interview, the types of work and income are summarised in Table 3 (below). Most PIEDs users earned between $30,001 and $60,000 per annum (43%), but a substantial proportion (27%) earned $60,001 or more.

Table 3: Employment and income among the 2005 PIEDs user sample

Type of employment (n=51)	**Proportion (%)**
Tradesperson/labourer	27
Customer service/sales	23
Administration/management	15
Fitness industry	13
Professional	10
Hospitality/entertainment	4
Armed services/security	4
Personal services	4
Income (n=60)	**Proportion (%)**
$30,000 or less	30
$30,001 – 60,000	43
$60,001 or more	27

Source: PIEDs user interviews (2005)

KEs identified a varied range of occupations similar to those reported in Table 3 (above). Most commonly, traditional blue-collar employment such as trades and labouring were identified (8 KEs), as well as a range of other service-related jobs such as office, sales and customer service positions (6 KEs). Four KEs mentioned involvement in security and armed services. Three KEs reported that a small number of PIEDs users were professionals (such as solicitors). Another group identified by two KEs included professional sportsmen or bodybuilders. One KE described age differences in employment: younger men were more likely to be in the less skilled jobs (e.g. labouring) and middle-aged men were more likely to be in para-professional, well-paid jobs.

3.1.6. Relationship status

Forty two percent of participants were in a relationship at the time of the interview. Among those in a relationship, 84% reported that their partner knew about their use of PIEDs, and 20% reported their partner also used PIEDs. Thirty percent of participants were gay/bisexual men.

3.2. Alcohol and other drug use

3.2.1. Alcohol

Twenty-two percent of the 2005 PIEDs user sample rarely or never drank alcohol. Thirteen percent of the sample drank alcohol monthly, 55% drank weekly or a couple of times a week and 10% of the sample drank daily. Among those who did drink, the median number of standard drinks consumed in a typical drinking session was 4 (range 0 - 50). In comparison with the 1997 sample (28%), a larger proportion of the 2005 PIEDs user sample were drinking weekly or daily.

3.2.2. Tobacco

Sixty-two percent of participants were non-smokers (68% in 1997). Among those who did smoke, the mean number of cigarettes smoked per day was 15 (SD=9.18; Range: 1 – 30).

3.2.3. Other illicit drugs

The illicit drug use among the 2005 PIEDs user sample was high (see Table 4 below). Larger proportions of the 2005 PIEDs user sample indicated having 'ever used' and 'ever injected' illicit drugs than the 1997 sample. Rates of lifetime injection were high. Lifetime injection of stimulant drugs (such as speed, crystal methamphetamine, cocaine and ecstasy) was identified more frequently than lifetime injection of opiates (such as heroin, methadone or other opiates).

Seventy-seven percent of the sample had used an illicit drug recently (in the six months prior to interview). The median number of drugs used in the six months prior to interview was 2, ranging from 0 to 10. Stimulant drugs were most commonly used in the six months prior to interview. Approximately half the sample had recently used ecstasy (56%) and cannabis (50%), followed by cocaine (40%), speed (31%) and crystal methamphetamine (28%). Ten percent of the sample had used heroin, 8% had used benzodiazepines, 8% had used methadone, and 2% had used other opiates in the six months prior to interview.

The KE reports regarding illicit drug use among PIEDs users were mixed. There were four KEs who reported that PIEDs users were unlikely to use other illicit drugs due to their interest in health and fitness. Another five KEs thought that it would only be the professional bodybuilders or 'extreme fitness' users among the group who would not use other illicit drugs. Over half the KEs (n=12) reported that PIEDs users may use 'party drugs' (such as cannabis, alcohol, ecstasy and speed) recreationally, especially among the younger group (aged 17 to 30). Apart from a small minority of users, drug use among this group was described as unlikely to be problematic, with lower rates of injection than other injecting drug users.

It is possible that the different methods of recruitment employed by the 2005 study may account for illicit drug use being over-represented in the sample. There was an increased reliance on advertising within NSPs, and additional advertising on harm reduction/ user-group websites (e.g. www.pillreports.com).

Table 4: Lifetime and recent use of illicit drugs among PIEDs users					
	1997 sample N=100	2005 sample N=60			
	Ever used (%)	Ever used (%)	Median age of first use (range)	Ever injected (%)	Used in last 6 mths (%)
Methamphetamine powder (speed)	51*	78	19 (12-38)	20	31
Crystal methamphetamine		53	26 (17-47)	17	28
Cocaine	43	75	22 (15-40)	13	40
Ecstasy	49	77	22 (14-46)	8	56
Cannabis	70	80	16 (11-31)	0	50
Ketamine	-	12	21 (17-30)	0	3
GHB	-	5	20 (18-31)	0	2
Hallucinogens (LSD, mushrooms)	36	45	18 (13-34)	5	3
Inhalants	20	45	20 (12-38)	0	15
Heroin	9	17	19 (14-30)	12	10
Methadone	2	8	23 (16-32)	5	8
Other opiates	-	3	20 (20-20)	0	2
Benzodiazepines	-	8	25 (17-26)	2	8
Median no. of different drug types ever used		5 (SD=2.96; Range: 0-12)			
Median no. of different drug types used in the last 6 months		2 (SD= 2.32; Range: 0-10)			

Source: PIEDs user interviews (2005); Peters et al., (1997)

** The 1997 study did not distinguish between powder and crystal forms of methamphetamine*

3.3. Summary of PIEDs user characteristics

- The majority of PIEDs users are male, although the number of Australian adolescent women (aged 12 to 17 years) reporting lifetime use of AAS has more than doubled since 1996.

- PIEDs users are not a homogenous group of men. They range in age (from mid-teens to late-fifties) and come from diverse cultural and linguistic backgrounds (although some KEs report over-representation of men from Middle-Eastern backgrounds). One-third (33%) of the sample were aged between 17 and 25 years of age. Just under one-third (30%) of the 2005 PIEDS user sample were gay/bisexual men.

- Two-thirds (63%) of the 2005 PIEDs user sample had completed school to HSC level, and two-thirds (65%) had completed post-school qualifications (either a university degree or trade).

- The majority of the 2005 PIEDS user sample was employed (79%) in occupations ranging from trades/labour, customer service/sales to traditional professional occupations (e.g. solicitor). Thirteen percent of the sample was currently working in the fitness industry. Twenty-three percent of the sample reported having ever worked in the security industry. Only one-third of the sample earned less than $30,000 per annum. One-third of the sample earned in excess of $60,000 per annum.

- The 2005 PIEDs user sample had higher rates of alcohol and other drug use than the 1997 sample (Peters et al., 1997). Two-thirds (65%) of the 2005 sample drank alcohol weekly or daily. Seventy-seven percent of the 2005 sample had used an illicit drug in the six months prior to interview, most commonly stimulant drugs (such as ecstasy, cocaine, speed and crystal methamphetamine) and cannabis. The majority (62%) of the 2005 PIEDS user sample were non-smokers.

4. PATTERNS OF PIEDs USE

4.1. First use of PIEDs

Among the 2005 PIEDs user sample, the mean age for first use of any PIEDs was 25.7 (SD 7.9, Range: 15-58). These findings were similar findings to the 1997 sample where the average age of first use was 25 (SD 6.3), ranging from 14 to 46 years (Peters et al., 1997).

When asked which PIEDs they had first used, 97% of the 2005 PIEDs user sample reported AAS. The remaining 3% used HGH, medications purported to release growth hormone, and 'blood doping' (blood transfusions). Among those who used an AAS the first time they used any PIEDs, 34% used nandrolone (e.g. Deca®, Deca Durabolin ®), 23% used Sustanon® (a mix of testosterone esters), 11% used stanazolol, 9% used methandrostenolone (e.g. Dianabol®) and 6% used testosterone esters (e.g. propionate, enanthate and cypionate). A further 21% used other AAS products.

Eighteen percent of the sample used two or more AAS in their first cycle. Other substances used with AAS included clenbuterol, creatine and DHEA.

4.2. Lifetime use of PIEDs

Participants were asked to list all the PIEDs they had ever used in their lifetime. The results of their responses are presented in Table 5 (below). All (100%) PIEDs users interviewed had used some kind of AAS product in their lifetime. The median number of different AAS used in their lifetime was 3 (ranging from 1 to 13). The median number of other PIEDs used was 2 (ranging from 0 to 10). Comparisons of the 1997 and 2005 samples indicate a possible shift away from veterinarian AAS products to other types of PIEDs (such as prohormones and human AAS products). There also appears to be increased diversification in the types of PIEDs used.

Table 5: Lifetime use of AAS and other PIEDs			
	1997 sample N=100	2005 sample N=60	
	Ever used (%)	Ever used (%)	Median age of first use (range)
Veterinarian AAS products	90	**68**	22 (17-44)
Human AAS products	82	**88**	24 (15-58)
Other prohormones	-	**20**	26 (16-58)
Human Chorionic Gonadotrophins (HCG)	11	**15**	22 (17-43)
Human Growth Hormone (HGH)	9	**15**	22 (20-29)
Insulin-like Growth Factors (IGF-1,2)	1	**2**	26 (26-26)
Insulin	4	**12**	24 (20-38)
Anti-oestrogenic agents	19	**37**	23 (18-37)
Beta agonists (clenbuterol)	14	**35**	23 (18-42)
Stimulants (ephedrine, etc)	17	**27**	21 (17-52)
ECA stacks	-	**8**	19 (17-32)
Thyroxine	8	**8**	23 (20-24)
Diuretics	12	**10**	27 (19-38)
Erythropoietin (EPO)	-	0	
Creatine Monohydrate	-	65	22 (16-48)
Other dietary supplements	-	50	20 (16-48)

Source: PIEDs user interviews (2005); Peters et al (1997)

Almost half of the 2005 PIEDs user sample (48%) had used PIEDs regularly every year since starting use. A summary of cycle frequency and duration is presented in Table 6 (below). Past cycles were a median of 10 weeks in length, with a period of 11 weeks between cycles. The median number of PIEDs cycles in a year was two. These patterns of use were very similar to those identified in the 1997 sample.

Half the 2005 PIEDs user sample (53%) described their typical cycling method as taking constant doses of AAS during the cycle. 'Pyramid cycles' (where doses are increased each week until mid-cycle, then decreased again) were reported by 20%; phasing (where different AAS are phased in and out throughout the cycle) was reported by 12%; and long increasing cycles were reported by 7%. The remaining 8% reported irregular cycles or other cycling methods.

Table 6: Cycle frequency and duration				
	1997 sample (N=100)		2005 sample (N=60)	
	Median	Range	Median	Range
No. of cycles in the last 12 months	2	-	**2**	1-4
Usual cycle duration (weeks)	10	3-52	**10**	2-52
Longest cycle duration (weeks)	-	-	**12**	4-72
Shortest cycle duration (weeks)	-	-	**6**	1-52
Usual rest period between cycles (weeks)	12	1-52	**11**	0-52

Source: PIEDs user interviews (2005); Peters et al. (1997)

4.3. Description of most recent cycle

Participants were asked to list the substances they had used in their most recent (or current) cycle. These are summarised in Table 7 and Table 8 (below). Ninety-seven percent of all PIEDs users interviewed had recently used an AAS product, the majority having injected. There were only two cases where the cycle was based on injected IGF-1, and the other was a combination of DHEA and Arimidex.

The three most commonly used AAS were those containing nandrolone and its esters (such as Deca 50®, Deca Durabolin®, nandrolone phenylpropionate, etc); Sustanon® (a human AAS preparation containing a mix of testosterone esters); and stanazolol (a veterinary AAS preparation). The majority of the sample used injectable AAS. The oral AAS used among this group included methandrostenolone (most commonly Dianabol®), methenolone (Primobolan®) and stanazolol.

These patterns of use were very similar to the 1997 sample. In 1997, the most commonly used injectable AAS were Deca Durabolin®, Deca 50®, Sustanon 250® and stanazolol. The most commonly used oral AAS were Anapolan® and Primobolan® tablets.

KE comments also confirmed that nandrolone esters (such as Deca50®, Deca Durabolin®, and Dynabol, mentioned by 7 KEs), Sustanon® (6 KEs), and stanazolol (5KEs) are the most popular and widely used AAS. Drive® and Dianabol® tablets were mentioned by 3 KEs each. Other AAS preparations that were mentioned by individual KEs included Andriol®, Primoteston®, and testosterone enanthate. Nine KEs felt that the majority of AAS (between 50% and 95%) were veterinarian products. Four KEs indicated that injecting is the most common route of administration for AAS. Two KEs highlighted an increase in oral Dianabol® tablets.

Table 7: Recent use of AAS		
N=60	**Used recently (%)**	**Injected (%)**
Boldenone (and esters)	3	100
Drive®	8	100
Methandrostenelone	12	0
Methenolone	5	67
Nandrolone (and esters)	38	100
Oxymetholone	5	0
Sustanon®	38	100
Stanazolol	22	77
Testosterone Cypionate	5	100
Testosterone Enanthate	13	100
Testosterone Propionate	12	100

Source: PIEDs user interviews (2005)

Note: Descriptions of the above AAS classifications are given in Appendix Two. Other AAS used by individuals among the 2005 sample included Spectriol®; 1-test, 4-AD; Lonavar®; methylated testosterone tablets; and testosterone lozenges.

The range of PIEDs (other than AAS) used by the 2005 PIEDs user sample in their most recent cycles are summarised below in Table 8. In general, the 2005 PIEDs user sample only used AAS in their cycles. Among those who also used other PIEDs, anti-oestrogens were used most often (13%), followed by clenbuterol (5%).

There were a range of other PIEDS identified by KEs: HGH (7 KEs); insulin (7 KEs); DHEA (3 KEs); androstenedione (2 KEs); creatine (3 KEs); clenbuterol (2 KEs); tribolan (a supplement containing extract of the plant Tribulus Terrestris, 1KE); HCG (1 KE); anti-oestrogens (3 KEs); antibiotics such as Lincocin (1 KE); anti-inflammatory cortico-steroids such as Depo-Modral (1 KE); and other vitamin supplements (e.g. Vit B12 injections).

KEs generally agreed that there had been little or no change in the PIEDs being used, or the way in which they were being used, over the last six months (12 KEs). Two KEs highlighted an increased interest in HGH and insulin among the PIEDs users they had contact with. One pharmacist highlighted the concurrent use of anti-oestrogens with AAS.

Table 8: Recent use of other PIEDs		
N=60	**Used recently (%)**	**Injected (%)**
Other prohormones (e.g. DHEA, androstenedione)	3	0
Human Chorionic Gonadotrophin (HCG)	2	100
Human Growth Hormone (HGH)	3*	50
Insulin-like Growth Factor (IGF-1,2)	2	100
Insulin	0	
Anti-oestrogenic agents (Nolvadex®, Arimidex®, Clomid®)	13	25
Beta agonists (clenbuterol)	5	0
Stimulants (e.g. ephedrine, caffeine, amphetamine, cocaine, etc)	3	0
ECA stack (ephedrine, caffeine and aspirin combined)	2	0
Thyroxine	2	0
Diuretics	0	
Erythropoietin (EPO)	0	

Source: PIEDS user interviews (2005)

* One participant injected somatotropin (HGH), and one participant took oral homeopathic tablets of HGH.
Note: Other PIEDs used by individuals in this sample included supplements such as Tribulus Terrestris (a plant extract that purportedly stimulates the release of luteinising hormones); Ma Huang, Thermanol® and Hydroxycut® (used to facilitate 'fat burning'); and the dietary supplement HMB (beta-hydroxy beta-methylbutyrate).

A typical recent cycle was described as between 3 and 52 weeks in length, with a median length of 9 weeks. A median number of two different AAS products were used (ranging from 0 to 6). The majority of the sample injected AAS.

These patterns of use were confirmed by KE reports. Ten KEs described cycles ranging from 4 to 16 weeks in length, with rest periods of equal length between cycles. The number of different AAS used in a cycle was reported to be from 1 to 3, with KEs reporting that the practice of 'stacking' (using more than one AAS at a time) was common.

Table 9: Description of most recent cycle		
N=60	**Median**	**Range**
Length of most recent cycle (weeks)	9	3 - 52
No. of different AAS used	2	0 - 6
No. of 'other PIEDS' used (excluding AAS)	0	0 - 3
No. of PIEDS used (including AAS)	2	1 - 7

Source: PIEDs user interviews (2005)

Other KE observations regarding cycles included reports that patterns of use change with the seasons, with more PIEDs users accessing NSPs during spring and summer, and less over winter months (4 KEs). Four KEs also reported that young men may take more risks, use higher doses, buy more fakes, and have poorer knowledge regarding diet and training.

4.4. Summary of patterns of PIEDs use

- The mean age for first use of PIEDs was 25.7 (SD 7.9, ranging from 15 to 58). Most commonly, PIEDs users reported lifetime use of veterinary and human AAS (97%). Approximately one-third of the 2005 PIEDs user sample reported lifetime use of anti-oestrogens, clenbuterol and stimulants (such as ephedrine and methamphetamine) as part of their training.

- Half (48%) the 2005 PIEDs sample had used yearly since their first PIEDs cycle. Past cycles were a median of 10 weeks in length, with a median of 11 weeks rest period between cycles. The median number of PIEDs cycles in a year was two.

- AAS remain the most popular PIEDs. The vast majority (97%) of the 2005 PIEDs user sample had used an AAS product in their most recent cycle. The most commonly reported AAS were nandrolone and its esters (Deca 50®, Deca Durabolin®, etc), Sustanon 250® and stanazolol. In general, the 2005 PIEDS user sample did not use many other PIEDs in their most recent cycle. Anti-oestrogens were used most often (13%), followed by clenbuterol (5%). The median length of the most recent cycle was 9 weeks, during which a median of two different AAS products were used.

- KE reports indicate the PIEDs use is seasonal, increasing in spring and summer months.

5. MOTIVATIONS AND BENEFITS

5.1. Motivations for PIEDs use

5.1.1. PIEDs users' description

Participants were asked to nominate a category that best described their use of PIEDs from an interviewer list (Table 10 below). Almost two-thirds of the sample (62%) described themselves as 'body image users' and 25% described themselves as 'bodybuilders'. This proportion was higher than that in the 1997 sample, where more participants described themselves as 'bodybuilders'. The proportions of participants in the 2005 sample describing themselves as 'competitive athletes' and 'occupational users' were low (8% and 9% respectively).

Only a minority of participants reported current involvement in sport (23%, n=14). Among those involved in sports, 64% had used PIEDs for competitive advantage. The sports in which PIEDs were used for competitive advantage were bodybuilding (n=5), football (n=3), athletics (n=2), boxing (n=2) and break dancing (now known as body popping) (n=1).

KE reports confirmed that only a small proportion of PIEDs users are motivated by competitive advantage in sport (mostly those involved in bodybuilding and rugby). Three KEs reported health or fitness reasons as the main motivations for PIEDs use.

Table 10: Participants' self-description

	1997 sample N=100 (%)*	2005 sample N=60 (%)*
Weight training user	12	14
Bodybuilder	52	25
Competitive athlete	12	8
Occupational user	6	9
Body image user	45	62

Source: PIEDs user interviews (2005); Peters et al (1997)

**Note: These percentages do not add up to a total of 100%. Cumulative percentages are reported where participants endorsed more than one category.*

5.1.2. Occupational use of PIEDs

Fifty-three percent of the 2005 PIEDs user sample reported having ever worked in a profession where muscular strength and physical appearance were important. The types of occupations reported included trades/labouring (n=10), fitness industry (n=8), security/armed services (n=8), adult entertainment industry (n=6), sales (n=3) and professional athlete (n=2). While not necessarily identified as an occupation in which

muscular strength and physical appearance were important, 23% reported having ever worked in the security industry.

Three KEs reported occupational use as a motivation. The occupations most frequently mentioned included work in the security and construction industries, and occupations where physical strength are implicitly valued.

5.1.3. Balance between work, training and life

The mean number of years participants had been training regularly for was 9 (SD=7.10, Range: 1 to 27). When asked about the balance between training and life, the majority either organised their training around the rest of their life (37%) or felt that they had a balance between the two (34%). The remaining 29% of participants felt that they organised their life around their training. Table 11 (below) summarises the average week of the 2005 PIEDs user sample.

Fifty-five percent (n=33) of the sample set specific goals in their training. The most commonly reported goals related to: increasing body weight (51%); increasing strength (30%); increasing size (or getting 'bigger') (18%); achieving a defined/muscular appearance (18%); and decreasing body fat (6%). Where goals related to increasing weight, participants specified wanting to gain between 5 and 15 kgs.

Among those who set themselves goals, the most commonly identified methods of judging success included: body weight (45%); the way they looked in a mirror (24%); and the size of weights lifted (18%). Other methods mentioned included measuring percentage body fat and taking measurements (arm size, chest size, back size, etc).

Table 11: Description of participants' average week

N=60	Mean hours per week	SD (Range)
Time spent in employment	34	16.7 (0 - 75)
Time spent training with weights	7	3.6 (0 - 10)
Time spent in other physical exercise	4	4.1 (0 - 20)
Time spent in leisure	25	13.9 (0 -56)
Time spent sleeping	50	9.89 (21 - 77)

Source: PIEDs user interviews (2005)

5.1.4. Introduction to PIEDs use

Participants were asked 'who first introduced you to PIEDs?'. The majority (57%) identified 'a friend', followed by doctor (15%), coach/trainer (10%), gym and other training contacts (5%), relative (5%) and other (2%).

When asked 'how did you find out about PIEDs?' (i.e. how to plan their first cycle), participants most commonly identified their friends (58%), followed by the internet (17%),

gym and other training contacts (8%), and magazines (7%). The remaining 10% sought information from a range of other sources.

5.1.5. Motivations for use

Participants were asked open-ended questions about what motivated them to use PIEDs the first time they used. Their responses are summarised in Table 12 (below). Most commonly, participants identified the perceived desirable effects on physique as being important motivations for first use. Participants specifically mentioned the increase in size weight and muscularity. A range of social benefits were also reported. These included reports such as 'my friends were using', being involved in the gym culture, to be more attractive to partners, and occupational benefits. A substantial proportion (23%) reported positive effects on appearance and/or body image. Other motivations included enhancing feelings of confidence, training benefits, medical or health reasons, and competitive advantage.

Table 12: Summary of motivations for first using PIEDs	
Desirable effects on physique (%)	
▪ Increased size	33
▪ Increased weight	22
▪ Increased muscularity	15
▪ Faster 'gains'	7
Social benefits (%)	
▪ My friends were using PIEDs	12
▪ Being involved in the 'gym culture'	10
▪ To be more attractive to partners	5
▪ My job required a good physique (occupational benefits)	8
▪ To feel more intimidating	7
Enhanced feelings of confidence (%)	
▪ Positive effects on appearance/body image	23
▪ To increase confidence or self-esteem	8
Training benefits (%)	
▪ Increased strength	20
▪ Break through a 'plateau' in their training	10
Medical or health reasons (%)	
▪ To aid recover from an injury	8
▪ To increase libido	7
▪ Other medical condition (e.g. low testosterone, depression)	13
Competitive advantage (%)	
▪ Bodybuilding	7
▪ Other sports/athletics	7

Source: PIEDs user interviews (2005)

The following are some examples of the reasons given by participants for their first using PIEDs:

> *'The physical effect. It's purely aesthetic. I had plateaued in size. I had strength, but wanted size… As a gay man, it's purely about body image. It's to do with self-esteem. The gay community can be very body conscious. I had achieved what I could [naturally] and wanted to be bigger.' (32 year old male)*

> *'I always wanted to be bigger and look better. I went to a specialist about a knee injury, and recommended steroids to them to build muscle. It was the perfect excuse. The doctor was concerned about my depression, but I was more concerned about maximum benefit from my fitness training, following a period of illness.' (59 year old male)*

> *'I was working in the gym industry. I felt pressure to look the part. I was trying to put on size.' (22 year old male)*

> *'I was training for a while and I wasn't getting any results. I saw a few of the other boys on it and a friend suggested I give it a go.' (27 year old male)*

> *'More self-confidence, better self-esteem. I wanted to feel more intimidating. I wanted to feel more attractive to the opposite sex.' (24 year old male)*

Motivations can change over time, so participants were also asked about their motivations for their current (or most recent) PIEDs use. Eighteen percent of participants reported continuing to use PIEDs for the same reasons they first used them. Among those whose motivations had changed, the desirable effects on physique remained the most commonly identified (e.g. increased size, leanness and muscle tone). Subjective descriptions of 'feeling good' were also frequently reported. These included responses like being more motivated to train, having more confidence and feeling 'healthy'. Those who stated it made them 'feel healthy' were not being prescribed for medical reasons. Other motivations given were to 'look good', for training benefits and for competitive advantage (e.g. bodybuilding and other sports).

KE reports were very similar to those reported by the PIEDs users. The main motivations for PIEDs use identified by KEs included 'body image' (mentioned by 12 KEs) and the effects on physique (mentioned by 7 KEs) including 'increased muscularity', 'size', or 'bulk'. While 'body image' was commonly suggested as a motivation, only two KEs noted serious concerns. One KE suggested that PIEDs users have a lower threshold for body image concerns than other men, making them more intolerant of what they perceive as 'problem areas'. Another KE expressed concern regarding serious body image problems among young men. In general, however, KEs equated 'body image concerns' with the desire to 'look good' or 'look attractive'.

KEs also identified a range of other social benefits (such as belonging to a 'tribe' or social network), self-enhancement, feelings of confidence and increased motivation. These may be inter-related. For example, one KE suggested that 'a muscular appearance could bring a sense of power and wellbeing, and be seen as a life-enhancing action, giving some kind of positive consequences'.

The following quotes are some examples of how PIEDs users described their recent motivations for PIEDs use:

> *'Initially it was because I was skinny and sick of being small. Now it's about symmetry. I want to be 110kgs and I can't do this naturally.' (26 year old male)*

> *'For recovery and increased power, as opposed to strength. It's more about being able to do explosive movements and generating force. More sports-specific now.' (28 year old male)*

> *'I wanted to get bigger to keep my girlfriend happy. It gives me more confidence, I'm happy when I look in the mirror. I get a general feeling of wellbeing.' (27 year old male)*

> *'Force of habit. Its been a part of my regime, and now its easier to have it than to go without it.' (52 year old male)*

5.2. Perceived benefits of PIEDs use

A list of possible benefits was compiled from a review of the literature. Participants were asked to endorse which benefits they had experienced, and how frequently, from the list in Table 13 (below). The benefits most frequently endorsed (i.e. endorsed by over 50% of the sample as a benefit they 'always' experienced on a cycle) related to the desirable effects on physique (i.e. improved muscle definition, increased size, and increased weight), benefits for training (i.e. increased strength, being able to train harder for longer) and 'feeling good' (i.e. improved self-esteem, increased confidence and positive feedback from others). The only benefit from the list that was consistently endorsed as 'rarely' or 'never' experienced was 'decreased weight'.

Table 13: Benefits experienced by the PIEDs user sample

N=60	Always %	Often %	Sometimes %	Rarely %	Never %
Improved muscle definition	61	19	13	5	2
Increased size	70	15	10	3	2
Increased weight	54	14	25	5	2
Decreased weight	3	3	27	9	58
Increased strength	68	21	9	0	2
Decreased body fat	24	22	27	15	11
Improved sporting performance	39	12	24	14	11
Improved self-esteem	56	15	15	3	10
Increased confidence	54	26	12	3	5
Positive feedback from others	55	23	19	3	0
Increased sex drive	36	22	18	12	12
Able to train harder for longer	68	22	5	0	5
Prevention of injuries	24	8	32	14	22
More attractive to partners	32	23	18	14	13

Source: PIEDs user interviews (2005)

In addition to the forced-choice response list (Table 13 above), the 2005 PIEDs user sample was also asked open-ended questions about the benefits of PIEDs use. Positive effects on physique were mentioned most commonly. These included increased muscularity (23%), increased 'size' (21%), increased weight (18%) and decreased body fat (10%).

The next most frequently mentioned benefits related to subjective descriptions of 'feeling good'. These included feelings of increased confidence or self-esteem (37%), positive mood (15%) and 'feeling healthy' (13%). A further 12% identified being more motivated and having more focus. Thirteen percent of PIEDs users identified a positive body image as a significant benefit. Assertiveness and aggression were seen as positive behavioural changes by 10% of the sample. PIEDs were seen as being socially beneficial by 6% of the sample and a further 8% had received positive feedback (regarding their body) from others.

A range of benefits relating to weight training and gym activities was also identified. These included an increase in strength (28%), better endurance/faster recovery (22%), and quicker 'gains' (6%).

The health benefits mentioned included increased libido (12%), increased energy (17%) and general health improvements (5%). Three participants described the main benefits of PIEDs as being 'life enhancing'.

The following quotes are some examples of how PIEDs users described the benefits of PIEDs use:

> *'Improved health, improved self-esteem, better sex life. I get comments and feedback regarding the improvement to my body. I get support from staff and management at the gym.' (45 year old male)*
>
> *'[You get a] more athletic look. It's about bringing out a better body in a shorter amount of time. Quick results. More satisfied with appearance. Being able to train harder for longer. I have a stronger goal to work to…' (25 year old male)*
>
> *'I felt invincible, I felt so good. I could lift heavier weights.' (18 year old male)*
>
> *'I can train harder for longer and recover quicker. You can work for longer hours and sleep less and still function. Your food is not so critical. I don't have to be so cautious about what I eat as your metabolism is faster' (41 year old male)*
>
> *'[It gives] a severe confidence boost. I'm heaps more confident and a bit arrogant towards things. I feel like I have more of an edge, less laid back, more confident.' (32 year old male)*

KE responses mirrored those of the PIEDs users. Most KEs (n=12) identified the effects of PIEDs on physique as being the main perceived benefit. Six of the KEs mentioned a positive impact on the way users 'feel'. Most commonly KEs described these benefits as 'feeling better, feeling more confident'. These included increased confidence, feeling attractive and having a higher self-esteem. Three KEs mentioned strength as a benefit. One KE explained the benefits as:

> *'To look bigger. To look better. And to feel more confident. They say they feel healthier, and that they get feedback about how healthy they look'. (NSP worker)*

5.3. Social networks

Participants were asked to estimate the numbers of people personally known to them who used PIEDs. The mean number of 'close friends' was 5.2 (SD 4.8, ranging from 0 to 20); the mean number of 'workmates' was 1.5 (SD 3.5, ranging from 0 to 17); and the mean number of 'relatives' was 0.4 (SD 0.8, ranging from 0 to 3).

When asked whether their close friends and relatives knew about their use of PIEDs, over a quarter (28%) of the sample responded 'no'. When asked why they had not told family or friends, 33% identified 'stigma' and 'judgemental attitudes' as the main reason. Other reasons included 'wanting to keep it personal/secret' (22%) and 'I didn't want them to worry' (3%).

5.4. PIEDs users' assessment of risks versus benefits

The vast majority of the PIEDs user sample (90%) felt that the benefits of PIEDs use outweighed the risks. Sixty-seven percent of participants indicated that they would continue to use for the foreseeable future. When asked how many years they think they will use for, most participants could not specify a timeframe. Those that could put a timeframe on their continuing use specified between 6 months and 5 years. Four participants intended to continue using AAS constantly and had no plans to stop.

Seventeen percent of participants indicated that they were currently considering stopping their use. Most commonly, their reasons for stopping use related to changes in their life goals/priorities or concerns with health. Other reasons included age (growing older), experiences of aggression and financial costs. The following are some examples of the reasons given for ceasing PIEDs use:

> *'Because of the health risks and the costs. Science hasn't got it right just yet.'*
>
> *'My mind has changed. My girlfriend got me off them. She opened my mind to a lot of things. I have different goals now.'*
>
> *'I'm happy with what I have and I just want to maintain it now.'*
>
> *'It was a pointless thing I was trying to do. I don't care that much about my image. My friend continues to use though.'*

Others were more ambivalent about their plans for the future:

'I'll get to a size I am happy with and then I will [get into] a more healthy regime to maintain it.'

'I might stop when I want to have kids, once I am married.'

'As I get older, I will re-evaluate.'

5.5. Summary of motivations and perceived benefits

- Almost two-thirds (62%) of the sample described themselves as 'body image users'.
- The 2005 PIEDs user sample engaged in regular physical activity, including a mean of 7 hours per week training with weights and a mean of 4 hours per week in other physical exercise.
- Over half (57%) of the 2005 PIEDs user sample reported being introduced to PIEDs by a 'friend'.
- The most commonly reported motivation for first using PIEDs was for the desirable effects on physique (such as increased size, increased weight, increased muscularity and faster 'gains'). Other motivations included social benefits, enhanced feelings of confidence, training benefits, medical or health reasons and competitive advantage.
- The desirable effects on physique remained the most commonly reported reasons for maintaining PIEDs use. PIEDs users also continue to use to 'feel good' (e.g. feel motivated, feel 'healthy', enhanced feelings of self-esteem), and to 'look good' (such as to enhance appearance, fight ageing or for body image reasons), as well as for training benefits, competitive advantage and social benefits.
- The benefits of PIEDs most frequently identified by the 2005 PIEDs user sample included: improved muscle definition, increased size, increased weight, increased strength, being able to train harder for longer, improved self-esteem, increased confidence, and positive feedback from others.
- The vast majority (90%) of the 2005 PIEDs user sample felt that the benefits of PIEDs use outweighed the risks. Seventy-six percent of PIEDs reported that they would continue to use for the foreseeable future.

6. PIEDs MARKETS

6.1. Price

This is the first time that street prices for PIEDs have been gathered in Australia. Comparisons cannot be easily drawn across different PIEDs due to differences in reporting units (e.g. tablets vs. injectable preparations), quantities (e.g. iu, mgs, mcgs or mls) and strength (e.g. mg/ml). The participants' own knowledge was limited regarding the units and strength of the products they were purchasing. The following price information is intended as a guide only, and is limited in its application.

6.1.1. Price of AAS

The 2005 PIEDs user sample were asked whether the general prices of AAS had changed over the last six months. Their responses are summarised in Table 14 (below). Most participants reported that the prices of AAS had remained stable (40%). A substantial proportion reported that AAS had increased in price (19%), although three participants reported that prices often increase in summer. Almost a third of the sample indicated that they 'didn't know' whether prices had changed (28%).

Five KEs commented on recent trends in price and their reports were extremely varied. Two KEs reported that the price of AAS had increased over the last 6 months, however one KE also suggested this might be due to a price increase in summer months. Individual KEs reported that prices of AAS had remained stable, fluctuated and decreased over the last 6 months respectively.

Table 14: Price range and variation of AAS over the last 6 mths

N=60	Proportion (%)
Increasing	19
Stable	40
Decreasing	3
Fluctuating	10
Don't know	28

Source: PIEDs user interviews (2005)

Participants were also asked to give the street prices they had paid for the AAS used in their current (or most recent) cycle. Not all participants could give street prices for the AAS they had used recently as a friend had purchased them, they were prescribed or they were given to them at no cost.

In general, the street prices of AAS given by participants were largely corroborated by KE reports. The view among KEs was that veterinarian AAS preparations were generally cheaper than human AAS preparations. One KE reported that a 10 ml vial of veterinarian

AAS would cost $15-16 wholesale, but on the blackmarket a 10 ml vial would sell for between $80 and $120.

Boldenone (and esters) - $2 to $2.20 per ml

Only two participants could give prices for the their most recent purchase of boldenone (unknown strength). The responses were consistent with each other – $2 and $2.20 per ml (i.e. $200 and $220 respectively for a 10 ml vial).

Methandrostenolone (e.g. Dianabol®) - $1.10 to $1.50 per tab

Five participants were able to give recent street prices for methandrostenolone. For methandrostenolone tablets, the prices ranged from $0.80 per tablet to $3.20 per tablet (of unknown strength). Most commonly, Dianabol® tablets were purchased for between $1.10 and $1.50 per tablet (n=3).

One participant reported that paper methandrostenolone products are being sold on the blackmarket. 'Dianabol paper products' are methandrostenolone powder sprinkled evenly between sheets of paper, pressed and perforated into square tabs (like LSD) for ingestion. The dosage is not reliable. Homemade paper products were reported to cost approximately $1 per tablet.

Methenolone (e.g. Primobolan®) - $0.80 per tab

Only one participant reported recently purchasing Primobolan®, paying $0.80 per tablet ($25 for 30 tabs).

Nandrolone (and esters) - $8 to $11 per ml Deca50®; $15 per ml for Deca100®; $22 to $40 per ml for Deca200®; $20 to $30 per ml Deca Durabolin®

The following discussion has made assumptions regarding the relative strengths of some of the nandrolone esters. Products sold on the blackmarket as Deca50®, Deca100® and Deca200® are assumed to be 50mg/ml, 100mg/ml and 200mg/ml respectively. However, the relative strengths of the products sold as 'Deca Durabolin®' and 'nandrolone phenyl propionate' were generally not known.

Ten participants were able to provide recent street prices for Deca50® (generally a veterinarian AAS), most commonly purchased as 10 ml vials. Street prices ranged from $4 per ml to $30 per ml. The majority of participants paid between $8 and $11 per ml for Deca 50® (n=6). Three participants bought Deca50® for between $4 and $6 per ml (i.e. $40 to $60 for a 10 ml vial). These lower prices were described by participants as unusually 'cheap'. Three other participants bought 10 ml vials of Deca50® for $160, $280 and $300 respectively.

One participant paid $15 per ml for Deca100® ($150 for a 10 ml vial). Two participants gave recent street prices for 'Deca200'. One paid $22 per ml and the other paid $40 per ml.

Six participants were able to provide recent street prices for Deca Durabolin® (unknown strength). Prices ranged from $10 per ml to $33 per ml. Most commonly, participants were buying Deca Durabolin in 10 ml amounts. Three participants paid between $20 and $30 per ml. The remaining three participants paid between $10 and $12 per ml.

The prices of injectable 'Deca' (unknown strength) reported by KEs varied from $9 to $35 per ml (3 KEs). This was consistent with participants' reports.

Two participants gave recent street prices for nandrolone phenylpropionate. One participant bought 10 mls for $120. The other paid $25US for 10 grams of powder over the internet.

Oxymetholone (e.g. Anapolan®) - $1.50 to $3.10 per tab

Two participants gave recent street prices for oxymetholone (Anapolan®). One participant paid $1.50 per tablet (50 mg tabs). The other paid $250 for a box of 80 tablets (unknown strength), i.e. $3.10 per tablet.

Stanozolol - $0.80 to $3.50 per tab; $7 to $15 per ml

Eleven participants gave street prices for stanozolol products. The majority (n=9) purchased injectable stanozolol and two purchased stanozolol tablets.

For injectable stanozolol products, prices were generally consistent. The most common amounts purchased were 10 ml and 20 ml vials. The prices given by participants were extremely variable, ranging from $2 per ml to $38 per ml. Most commonly, stanozolol was purchased for between $7 and $12.50 per ml (n=5). At the lower end, one participant paid $2 per ml. At the higher end, a further two participants paid $25 and $38 per ml respectively.

Four KEs reported injectable stanozolol (unknown strength) to cost between $7 and $12 per ml, which was consistent with the reports from participants. One KE, however, reported stanozolol to cost as much as $30 per ml.

Among the two participants who had bought oral stanozolol, only one had bought tablets in Australia. They paid $3.50 per 50 mg tablet.

Sustanon® - $25 to $35 per ml

Most participants believed that the products sold to them as 'Sustanon' on the blackmarket were 250mg/ml in strength.

Seventeen participants were able to give recent street prices for Sustanon®. Prices ranged from $14 per ml to $50 per ml. The most common price range was $25 to $35 per ml (n=11) with five participants paying $25 per ml. At the lower end, three participants paid between $14 and $20 per ml. At the higher end, three participants paid between $40 and $50 per ml.

The only inconsistencies between KE and participants' reports were for the street prices of Sustanon®. The prices reported by KEs were higher than those reported from participants. Sustanon® was most often reported to cost between $40 and $50 per ml (3 KEs) up to $125 per ml (1 KE).

Testosterone (cypionate, enanthate and propionate) - $5 to $10 per ml

Only one participant could recent give street prices of testosterone cypionate, paying $13 per ml ($130 for a 10 ml vial).

Six participants could give recent street prices of testosterone enanthate. Prices ranged from $4 per ml to $50 per ml. Most commonly, participants paid between $6 and $10 per ml (n=4).

Five participants could give recent street prices for testosterone propionate. Prices ranged from $4 per ml to $12 per ml. Most commonly, participants paid between $5 and $10 per ml (n=3).

One participant reported importing 'raw powders' from China (costing about $10) to make large quantities of their own injectable testosterone enanthate and propionate.

6.1.2. Price of other PIEDs

The 2005 PIEDs user sample were asked whether the general prices of other PIEDs had changed over the last six months. Their responses are summarised in Table 15 (below). The majority of participants were not able to comment on recent changes in the price of other PIEDs (as indicated by the large proportions of 'don't know/missing' data). Among those who did comment, prices for clenbuterol and HGH were mostly reported as remaining 'stable'.

KEs were not able to comment on recent price changes for other PIEDs.

Table 15: Price range and variation of other PIEDs (excluding AAS) over the last six months

N=60	Clenbuterol	HGH	HCG	IGF-1	Insulin	EPO
Increasing (%)	2	12	0	0	0	0
Stable (%)	23	22	10	0	5	0
Decreasing (%)	3	3	0	0	0	0
Fluctuating (%)	2	0	0	0	0	2
Don't know (%)	70	63	90	100	95	98

Source: PIEDs user interviews (2005)

Participants and KEs were also asked to give the current street prices of other PIEDs. Where possible, the street prices reported by participants who had recently purchased other PIEDs are reported. In some instances, the discussion also includes estimations of street prices by participants who had not bought them. The estimations of street price should be interpreted with caution, as they are less reliable.

PIEDs users were most often able to comment on the prices of AAS, clenbuterol and anti-oestrogens. HGH prices and knowledge varied widely, with only one participant being able to talk from recent experience. There was little or no knowledge of HCG, IGF-1 or EPO, reflecting the low levels of use of these substances among the sample.

Clenbuterol

Clenbuterol was purchased as tubs of powder or gel, or as tablets. Most participants did not know the quantity or relative strength of clenbuterol in the tubs they were purchasing. Three participants were able to provide recent street prices for clenbuterol. One participant paid $190 for a tub of powder (believed to be a 500 mg tub). Two participants bought tablets, paying $2 and $6.70 per tablet respectively.

Fourteen participants (who had not purchased recently) provided estimations for the street prices of clenbuterol. Among this group, the most commonly reported price range was between $150 and $200 for a tub of clenbuterol powder or gel (unknown quantity and unknown strength). There was little or no difference in the prices of gel and powder. Five participants reported prices less than $150 a tub (ranging from $80 to $130).

Two participants estimated the price of clenbuterol tablets as ranging from $1.20 to $3.50 per tablet.

The street prices of clenbuterol reported by KEs were less than those reported by participants. KEs reported clenbuterol to cost between $50 and $100 per tub (3 KEs).

HGH

Only one participant had recently purchased HGH, but not from the blackmarket. They were prescribed HGH for the purposes of image enhancement from an anti-ageing clinic, at a cost of $330 for 12 international units (iu), injected fortnightly ($2000 for a 12 week cycle). All participants agreed that HGH was the most expensive of these other PIEDs.

Twenty participants offered estimations of street prices of HGH. Their reports of price per unit (either mgs or iu) were highly inconsistent. For this reason, only the street price per 'cycle' is reported here. HGH prices varied widely, ranging from $150 per week to $3500 per week for a 4 to 10 week cycle. The most common price range reported was $450-500 per week, for a 4 to 6 week 'cycle' (n=7).

The street prices of HGH reported by KEs were more consistent with the street prices reported by participants (between $250 and $580 per week for a 4 to 10 week cycle, 3 KEs).

HCG

No participants could give recent street prices of HCG. However, four participants offered estimations. Estimated prices were extremely variable, ranging from $5 per 'shot' (bought over the counter in another country) to $500 per 'shot'. KEs could not provide price estimations.

IGF-1

Neither the participants nor the KEs could provide information on street prices of IGF-1.

Insulin

Only one participant reported recent street prices of insulin - $100 per 'box' of Actrapid®. Another participant commented that insulin is 'very cheap' and that 'you only need to find someone who is diabetic and they will usually give it to you'. KEs could not comment.

EPO

Neither the participants nor the KEs could provide information on street prices of EPO.

Anti-oestrogens

Two participants could provide recent street prices for Nolvadex® and Clomid®. They paid $2.50 per tablet and $10 per tablet respectively. One participant had also recently purchased Clomid®, paying $5 per tablet. KEs could not comment.

6.2. Purity

As most PIEDs are usually diverted pharmaceuticals, discussions of purity are less relevant than for illicitly manufactured drugs. In addition, purity data (such as that collected from other illicit drug seizures) is not routinely collected by forensic agencies for PIEDs. There is currently no objective measure of the purity of street-level PIEDs available in Australia, although it is widely accepted that street PIEDs may be affected by contaminants or be counterfeit (and contain no active ingredients). Counterfeit PIEDs are likely to be unsterile, increasing the potential for infection or poisoning (particularly where injected).

In view of this, participants were asked whether they thought they had been sold fake or counterfeit PIEDs. Their responses are summarised in Table 16 (below). AAS were reported as being the most commonly faked PIEDs (35%), followed by HGH (20%) and clenbuterol (15%). Over one-third of the sample reported having been sold fake or counterfeit AAS. KE reports confirmed that counterfeit AAS were abundant. Five KEs specifically reported that the amount of fake AAS may have increased over the last 6 months. Two KEs suggested there have always been fakes and that the situation was as stable as it always had been.

Seventeen participants explained how they knew they had been sold fake or counterfeit AAS. Half (n=8) could tell from the poor quality of packaging or labelling. Examples included the print on the label smudging; crooked labelling; homemade-looking labels; and comparisons with 'real' products that didn't match up. Six participants identified fake AAS because 'they had no effect'. Three reported that the seal on the top of the vial had been broken or tampered with (such as pinpricks in the rubber stop). Two participants fell ill or experienced ill health after using 'fake' AAS. KEs reported similar ways of identifying fake AAS, including poor quality packaging and noticing that there was 'no effect'. One law enforcement KE reported receiving complaints from purchasers that products being sold via the internet were not real.

Six participants gave descriptions of fake or contaminated HGH they had been sold. Two reported poor quality packaging or labelling. Two participants reported 'unrefridgerated' or 'dead' HGH (making it inactive). One participant had heard of people changing the packaging of HCG and selling it as HGH. One participant used a veterinarian HGH ('Supergrowth') which caused severe flu-like symptoms.

With regards to clenbuterol, two participants commented that it was not often faked (as it was widely available and cheap). However, a further three participants described having been sold fake clenbuterol. Two participants believed that their clenbuterol was 'less active' and that it had been cut with another substance. One participant described poor quality packaging.

Table 16: Proportion of the sample who thought they had been sold counterfeit (fake) PIEDs	
N=60	**Proportion (%)**
AAS	35
Clenbuterol	15
HGH	20
HCG	12
IGF-1	0
Insulin	0
EPO	0

Source: PIEDs user interviews (2005)

6.3. Availability

6.3.1. Recent trends in availability

In order to gauge recent trends in availability, all participants were asked to rate changes in the availability of AAS, clenbuterol, HGH, HCG, IGF-1, Insulin and EPO over the last 6 months (see Table 17 below).

Most PIEDs users rated the recent availability of AAS (73%), but their responses were varied. Ten percent of the sample felt that, over the last six months, AAS availability 'fluctuated', 20% felt that AAS were 'more difficult to obtain', 29% felt that availability had remained 'stable' and 13% felt that AAS were 'more easy to obtain'. These responses probably reflected the reliability of their personal networks, rather than general availability of AAS.

Only 37% percent of the sample rated the availability of HGH and 32% rated the availability of clenbuterol. The availability of HGH was most commonly rated as 'stable' or 'more difficult to obtain'. The availability of clenbuterol was most commonly rated as 'stable' or 'more easy to obtain'.

The vast majority of PIEDs users interviewed did not feel able to comment on the availability of HGH, HCG, IGF-1, insulin or EPO over the last six months. This reflects the relatively low levels of use and knowledge of these markets among the 2005 sample.

Table 17: Variation in availability in the last 6 months							
Variable	**AAS**	**Clen**	**HGH**	**HCG**	**IGF-1**	**Insulin**	**EPO**
More easy to obtain (%)	13	8	7	0	0	0	0
Stable (%)	30	15	12	7	2	5	0
More difficult to obtain (%)	20	6	18	8	0	0	0
Fluctuates (%)	10	3	0	0	0	0	2
Don't know/missing (%)	27	68	63	85	98	95	98

Source: PIEDs user interviews (2005)

In addition to the forced-choice responses given above, the 2005 PIEDs user sample and KEs were also asked open-ended questions about the recent availability of PIEDs. Some common themes emerged.

Eight participants believed that AAS have become harder to obtain over the last few years, especially some of the veterinary products such as Stanazol®. A further two participants noted that, prior to 2000, AAS were more widely available and cheaper. Six participants reported that it was becoming increasingly harder to obtain 'real' AAS and there has been a dramatic increase in the number of fakes on the market. Two participants mentioned the recent increase in 'homebrew' or homemade AAS, possibly in response to the legislative changes and perceived 'crackdown', restricting the supply of veterinarian and other pharmaceuticals being diverted to the blackmarket.

KE perceptions were generally that AAS are widely available on the blackmarket. Seven KEs reported AAS as being 'easy' or 'very easy' to obtain at present. Only one KE reported it being more 'difficult'. When asked whether there had been any changes in availability of PIEDs in the last 6 months, seven KEs reported AAS as being 'more easy to obtain' than previously. One KE from the fitness industry suggested that the ease with which an individual obtains AAS depends on their personal networks. For example, if the person is already using AAS and has contacts then it is easy for them to obtain. If they are using for the first time, then it is more difficult as dealers are reluctant to sell to people not known to them. Another KE indicated that PIEDs users will often 'stockpile' AAS, in case the availability changes or the price rises.

Concurrent use of HGH among the 2005 PIEDs user sample was low, and its availability was also generally thought to be low. However, three participants commented that HGH was becoming easier to obtain through doctors, particularly in anti-ageing clinics. As another put it, 'media attention has given this a high profile'. HGH was also reported by KEs as being 'difficult' to obtain (3 KEs). However, one law enforcement KE reported recently seizing large quantities of HGH through the post. Most commonly, oral HGH tablets were being seized, although some vials were also seized.

General comments about the availability of HCG indicated that HCG has always been 'hard' to obtain. The awareness of IGF-1 was extremely low among this group, with only three participants able to provide comments on its availability. Their comments indicated

that IGF-1 is not popular in Australia, although there has been an increasing awareness in the last year or so. These participants believed that IGF-1 was primarily used by professional bodybuilders and was obtained from overseas (one participant mentioned higher availability in New Zealand). The general comments on clenbuterol trends were mixed. Two participants reported that its availability had increased and two reported that it had decreased. One participant indicated that more women were using clenbuterol as an alternative to AAS.

6.3.2. Availability of the PIEDs used recently

Participants were asked how easy or difficult it was to obtain the PIEDs they used in their current (or most recent) cycle. The results are presented in Table 18 (below).

The majority of participants (ranging from 67% to 100%) who had recently used AAS rated Drive®, methandrostenolone, methenolone, nandrolone (and esters), stanozolol, Sustanon® and testosterone (and esters) as either 'very easy' or 'easy' to obtain. Most notably, out of those participants who had recently used testosterone (cypionate, enanthate or propionate), all of them rated it as being 'very easy' to obtain.

Only individual participants commented on how easy it was to obtain the other PIEDs they had used recently. Those participants who had used clenbuterol, HGH and DHEA reported them as being 'very easy' to obtain. The participant who had used IGF-1 reported it as being 'very difficult' to obtain. None of the participants could comment on the availability of HCG, insulin, EPO or anti-oestrogens.

Table 18: How easy was it to obtain the AAS used in your last cycle?

Type of AAS	n	Very Easy (%)	Easy (%)	Difficult (%)	Very difficult (%)
Boldenone (and esters)	No data				
Drive®	5	80	0	20	0
Methandrostenolone	7	72	14	14	0
Methenolone	3	0	67	33	0
Nandrolone (and esters)	22	64	23	13	0
Oxymetholone	No data				
Stanozolol	13	77	15	8	0
Sustanon®	23	44	43	13	0
Testosterone (and esters)	12	100	0	0	0

Source: PIEDs user interviews 2005

Note: The number of respondents (n) may be less than the total number of participants who had used the above PIEDs in their last cycle. Not all participants commented on how easy the PIEDs they had recently used were to obtain (for example, they were given PIEDs by another person, or had stockpiled from previous purchases).

6.3.3. Main source of PIEDs

Participants were asked to indicate the source of each of the PIEDs used in their current (or most recent) cycle. Among the 23 participants who reported the source of nandrolone (and esters), 48% reported 'friend', 22% 'dealer' and 13% 'doctor' (all of whom were HIV positive patients). Among the 13 participants who reported the source of stanazolol, 46% reported 'friend', 23% 'dealer' and 15% 'coach/trainer'. Among the 23 participants who reported the sources of Sustanon®, 44% reported 'friend', 27% 'doctor' (7% of whom were HIV positive patients) and 22% 'dealer'. For all other AAS, 'friend' was the most commonly mentioned source (ranging from 33% to 67% of reports), followed by 'dealer' (ranging from 14% to 60% of reports).

Clenbuterol was only used by a small number of participants in their most recent cycle (n=3). Two participants reported 'friend' as the source of clenbuterol and one participant reported 'dealer'. Only very small numbers of participants reported the source of the other PIEDs used in their most recent cycle such as HGH (n=1), HCG (n=1), IGF-1 (n=1), DHEA (n=2) and anti-oestrogens (n=2). The most common source of these substances was reported to be 'doctor'.

Just over half the participants (55%) indicated that their supplier was someone they knew either 'quite well/a friend' or 'extremely well/a close friend' (see Table 18 below). Forty-two percent indicated they didn't know their supplier on a personal level. Eighty-three percent of participants indicated that there was a high degree of trust between themselves and their supplier. When participants were asked whether their supplier's stocks dictated what they used, 63% responded 'yes'. Taken together, these findings indicate that the majority of the sample relied heavily on personal networks of trusted suppliers.

KE reports confirmed the importance of personal networks for PIEDs users. The most commonly reported source of PIEDs was through friends and the gym (11 KEs). One KE described the market as involving large numbers of individuals who supply PIEDs on a small scale. The other sources of PIEDS were reported to be diversion of AAS from medical settings (2 KEs); prescription by a doctor for non-medical purposes (5 KEs); diversion of veterinarian AAS (5 KEs); internet sources (4 KEs) and importing PIEDs from overseas (4 KEs).

6.3.4. Characteristics of suppliers

One-third of the 2005 PIEDs user sample (32%) indicated having ever sold PIEDs (see Table 19 below). Among this group, the majority (94%) sold to either 'acquaintances' or 'friends', further highlighting the importance of personal networks for this group.

KE descriptions of the characteristics of people selling PIEDs were varied. The most common descriptions of PIEDs dealers were that they were older, used PIEDs themselves, and only sold within their own personal networks (4 KEs). One KE suggested that young PIEDs users were less likely to know their dealer personally.

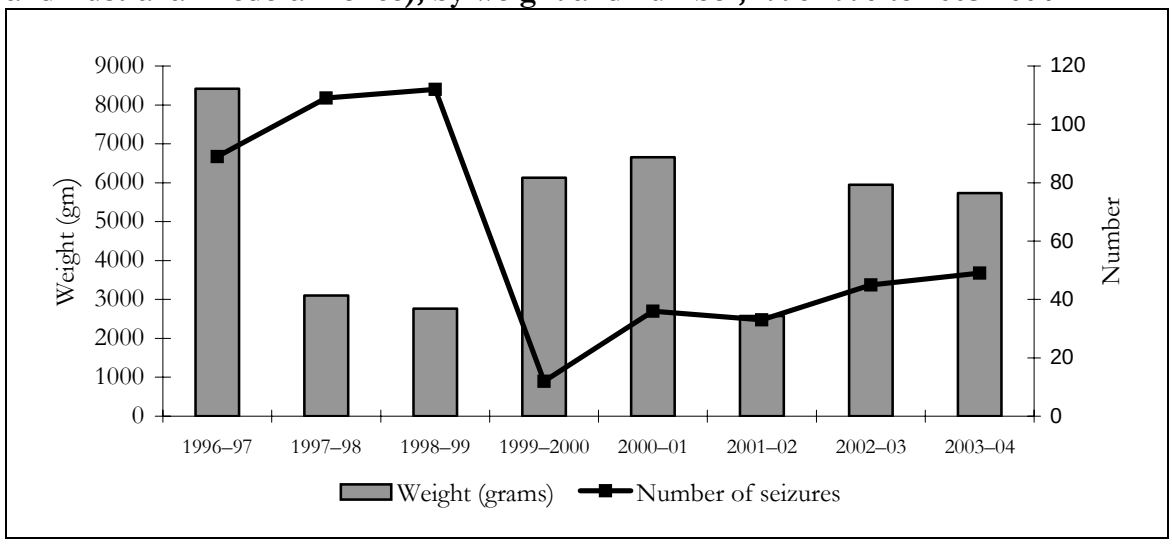
Table 19: Supplier characteristics	
N=60	**Proportion (%)**
Relationship with supplier	
I don't know them on a personal level (%)	42
I know them quite well/a friend (%)	23
I know them extremely well/a close friend (%)	32
Is there a degree of trust between yourself and your supplier?	
Yes (%)	83
Ever sold PIEDs?	
Yes (%)	32
If Yes, who to:	
Friends (%)	73
Acquaintances (%)	21
People I don't know (%)	5

Source: PIEDS user interviews 2005

6.3.5. Domestic seizures of PIEDs

Figure 3 (below) gives a national overview of domestic AAS seizures from 1996-1997 to 2003-2004. Only those seizures for which a drug weight was recorded have been included. Therefore, Figure 3 is likely to underestimate the number and weight of domestic seizures nationally. The numbers of domestic seizures have decreased from 112 seizures in 1998-99 to 49 seizures in 2003-04. The total weights of seizures have fluctuated widely over this time, ranging from approximately 2500 grams to 8000 grams.

Figure 3: Domestic steroid seizures in Australia (made by State/Territory Police and Australian Federal Police), by weight and number, 1996-1997 to 2003-2004

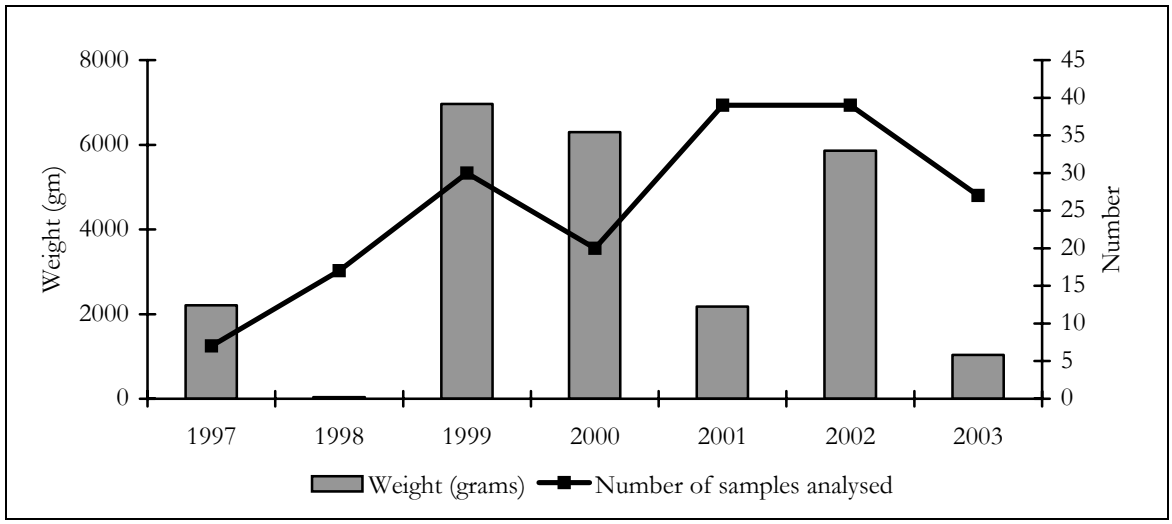


Source: Australian Crime Commission (2005)

Note: The above graph only includes those seizures for which a drug weight was recorded. There may be double counting of some seizures resulting from joint operations between the AFP and state and territory police services. Totals may vary from those reported in jurisdictional annual reports due to differences in counting rules applied.

Figure 4 (below) presents the number of samples analysed by Australian Federal Police (AFP). These figures include only those samples confirmed to contain 'anabolic steroids' or 'steroids'. The AFP seizures have been counted in the totals presented in Figure 3 (above). Figure 4 shows that although the numbers are still small, the number of confirmed AAS samples seized by the AFP have increased from 7 in 1997 to 27 in 2003. The weights of confirmed samples was variable.

Figure 4: Australian Federal Police seizures of steroids, by weight and number of samples analysed, 1997 to 2003.

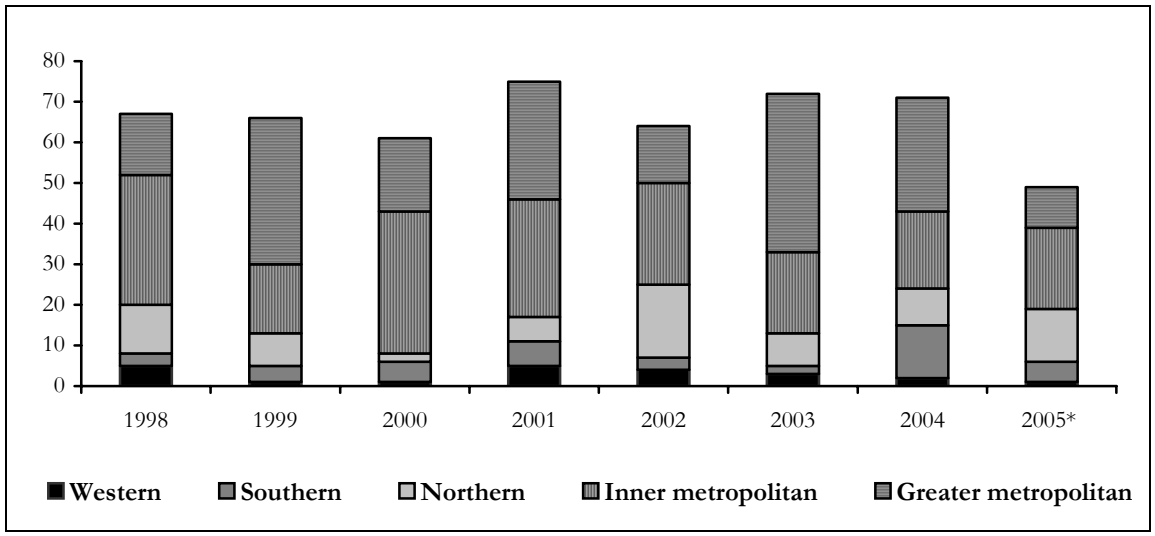


Source: Australian Federal Police

Note: The number of samples analysed is not necessarily equal to the number of seizures (reported in Figure 3 above). Multiple samples may be analysed from a single seizure.

The total number of AAS detections made by NSW Police remained relatively constant across 1998 to 2004, and varied from between 60 and 80 recorded detection incidents per year. The majority of detections occurred in inner and greater metropolitan areas of New South Wales (see Figure 5 below). KE reports indicated that most police detections of AAS were through other illicit drugs investigations or general incidents, rather than PIEDs-specific investigations.

Figure 5: Number of steroid detections by NSW Police by region of New South Wales, 1998 to 2005



Source: NSW Police (2005)

** Note: 2005 data is to 30 June 2005 only*

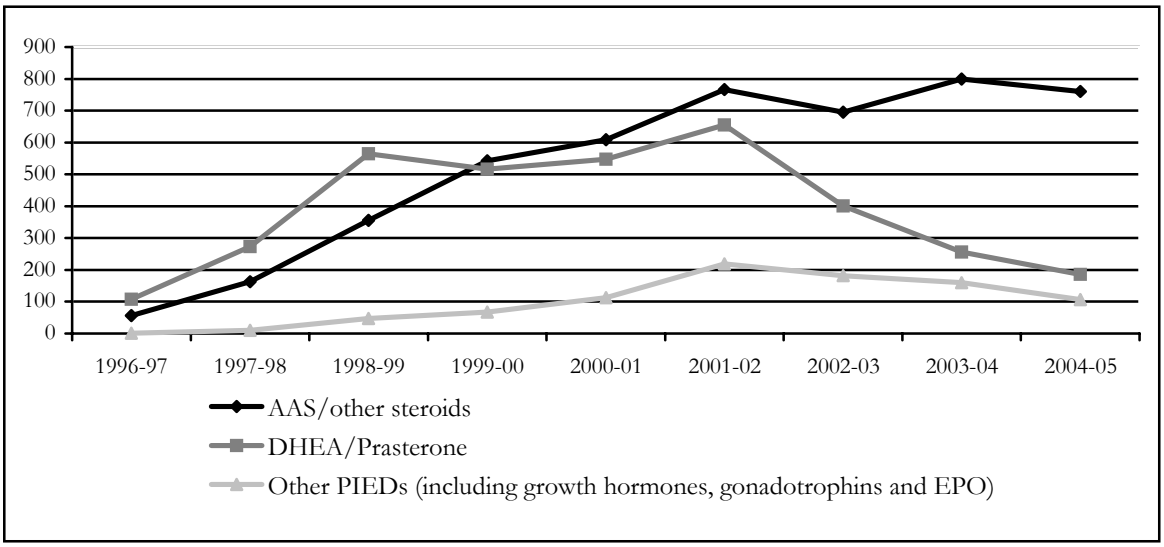
6.3.6. PIEDs seizures at the border

The majority of PIEDs seizures in Australia occur at the Australian border. Figure 6 (below) summarise seizures of anabolic and androgenic substances, DHEA and other PIEDs made by the Australian Customs Service (Customs).

Figure 6 shows that the number of seizures of AAS made by Customs increased steadily from 1996-97 through to 1999-00. Since 1999-00, variations in the numbers of seizures have been less pronounced. The steady increase in AAS seizures in the years leading up to the Sydney Olympics may reflect a number of factors including a growth in internet trade in substances legally available in other countries, and enhanced capacity of law enforcement. The structure of the higher-level Customs data limits the extent to which analysis on sub-categories of AAS seized can be undertaken. However, it can be confidently stated that seizures of testosterone precursors (such as DHEA and androstenedione) have made up a significant percentage of total AAS seizures over the period reported on. A large percentage of seizures of these substances involved importations from the United States, where testosterone precursors were legally available over-the-counter until October 2004.

Seizures of DHEA have followed similar patterns to those of AAS, as is illustrated in Figure 6 (below), until 2001-02 where the number of DHEA seizures has tapered off. The fall in DHEA seizures from the peak in 2001-02 may be due to a decrease in inadvertent illegal imports as law enforcement education initiatives have increased awareness of its illegal status in the community.

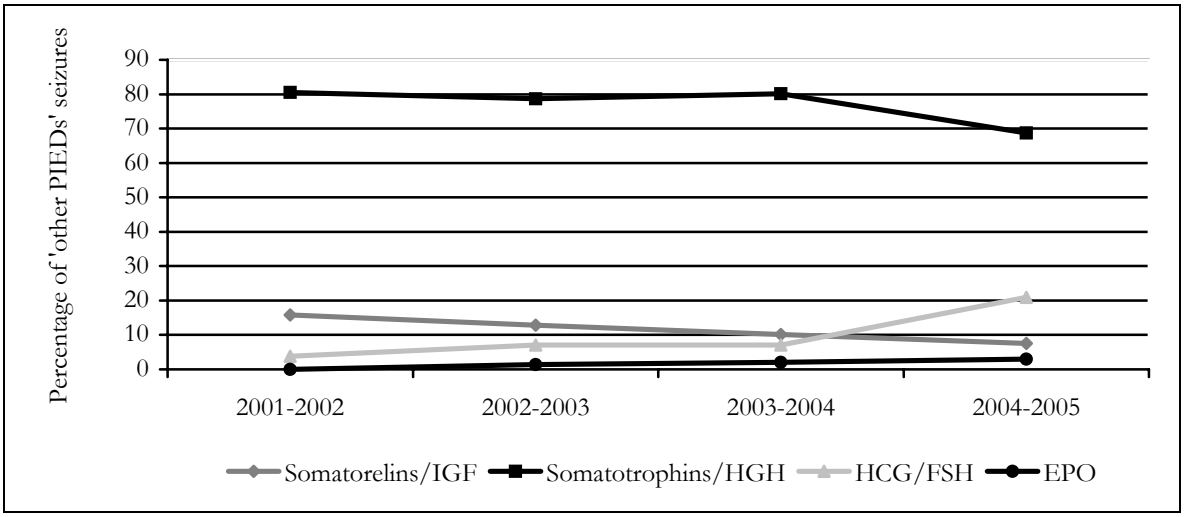
Figure 6: Number of seizures of anabolic and androgenic substances by Australian Customs Service, 1996-97 to 2004-05



Source: Australian Customs Service Annual Reports

Seizures of 'other PIEDs' also increased in the years leading up to and immediately following the Sydney Olympics as highlighted in Figure 6 (above). This was driven by seizures of HGH/somatotrophins increasing and remaining at higher levels than previously. HGH/somatotrophins seizures have made up over two-thirds of other PIEDs seizures every year since 2001-02, as also illustrated in Figure 7 (below).

Figure 7: Breakdown of seizures of 'other PIEDs' by category, 2001-02 to 2004-05



Source: Australian Customs Service

Note: These percentages are based on analysis of those seizures of 'other PIEDs' in the sample period for which breakdown by category was possible using Customs higher-level data.

Law enforcement KEs detailed three main ways in which PIEDs are imported into Australia: through the post, cargo and by air passengers. One KE estimated that a large majority of imports come through the postal stream, while small percentages are also imported by passengers and through cargo. One KE reported that the number of large-scale imports over the last 5 to 10 years has been small, and that, on the whole, imports are generally opportunistic and one-off attempts. The example given was that most commonly seized PIEDs are AAS tablets, in amounts consistent with personal use. A range of source countries was identified by KEs. It was indicated that the vast majority of AAS and other PIEDs that are illegally imported are sourced from the United States. Other key source countries include Thailand, China and Western, and (to a lesser extent) Eastern Europe.

6.3.7. Rates of testosterone prescribing

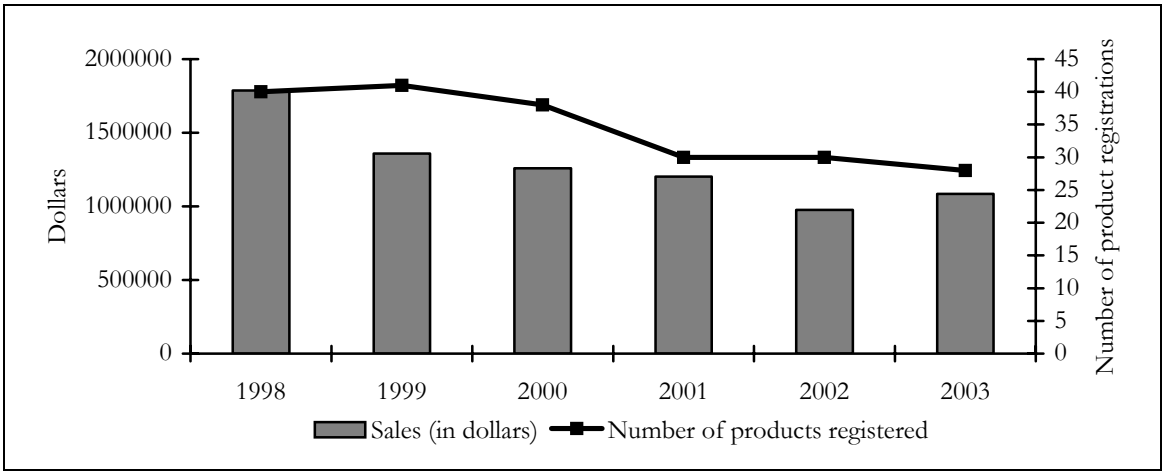
An Australian study by Handelsman (2004) examined the patterns of Australian Pharmaceutical Benefits Scheme (PBS) expenditure on injectable, oral and implantable testosterone products from 1991 to 2001. There were two periods (1993-1994 and 1998-1999) of dramatic increases followed by decline in national total prescribing of testosterone. The two periods of decline coincided with the introduction of increased regulations in 1994 and 2000. In 1994, an authority requirement was introduced for androgen prescribing. After another gradual rise in the late-1990s, the PBS introduced restrictions on prescribing for older men without overt androgen deficiency in 2000 (Handelsman, 2004).

Nationally, these changes were more prominent for oral than injectable testosterone products, and patterns were similar in all jurisdictions, (including New South Wales) apart from a disproportionately higher peak in Western Australia in 1998. On a per-capita basis, Western Australian continued to show a dramatic increase in the prescribing of oral and implantable, but not injectable, testosterone from 1997 onwards. This increase coincided with the opening of a franchised men's sexual health clinic in Perth (Handelsman, 2004).

6.3.8. Veterinary AAS sales data

National data from the Australian Pesticides and Veterinary Medicines Authority shows that the number of products registered and the overall sales of veterinary AAS products have decreased gradually from 1998 to 2002 (see Figure 8 below). In 2003, the total sum of national sales of veterinary AAS products was $1,084,572.

Figure 8: National sales figures of veterinary AAS and total number of veterinary AAS products registered, 1998 to 2002.



Source: Australian Pesticides and Veterinary Medicines Authority (2004)

6.4. Perceptions of changes in PIEDs markets

In agreement with the PIEDs users' reports, most KEs believed that legislative changes over the past 5 years have brought about changes in the PIEDs market in Australia. Since legislation was introduced in 2000 increasing the penalties for the importation of PIEDs, there has been a steady increase in the number of PIEDs seizures (reported by 2 law enforcement KEs). In addition, there have been increased controls on the domestic manufacture and supply of PIEDs (such as amendments to the *NSW Stock Medicines Act, 1989*). However, there may be attempts to circumvent these controls, particularly with respect to exports. For example, one law enforcement KE reported an increase in the wholesale of veterinarian products to countries such as Holland and Fiji (countries that are not known for horse-racing or demand for veterinarian products) and it seems likely that some of these exports are being diverted to the blackmarket. At present, there are less controls on the export of veterinary AAS products from Australia than there are for human AAS products.

Two KEs (one from an NSP and one from the fitness industry) highlighted an increase in the amount of 'homemade' or 'homebrew' on the market in NSW. Another KE expressed concern about the marketing of more convenient forms of androgens such as gels and creams which could be easily over-used. Aggressive marketing of these products has occurred in the US, but not in Australia to date.

Half the KEs felt that there was little change in the numbers of people using PIEDs over the last 6 months (11 KEs) and four KEs reported that numbers of people using usually increase over the spring and summer months. Six KEs (all NSP workers) reported seeing a general increase in the numbers of PIEDs users accessing their services, particularly an increase in young men (aged under 25). One fitness industry KE noted a possible increase in the numbers of women using PIEDs.

6.5. Summary of PIEDs markets

- The vast majority of PIEDs users and KEs were unable to comment on the street price, purity and availability of HCG, IGF-1, insulin or EPO over the last six months. PIEDs users and KEs were more confident in their knowledge of AAS, HGH and clenbuterol.

Price

- The price of veterinary injectable AAS products (such as Boldenone®, Deca50®, Stanazol®, testosterone esters, etc) ranged from $2 to $15 per ml. The price of human injectable AAS products (such as Deca Durabolin®, Sustanon250®, etc) was higher, ranging from $20 to $40 per ml. Oral AAS products were generally cheaper with prices ranging from $0.80 to $3.50 per tablet. Most (40%) of the PIEDs users interviewed reported that prices of AAS had remained 'stable' over the last six months.

- Knowledge of the street price of other PIEDs was less consistent. In general, it was agreed that HGH was the most expensive, but the prices quoted by participants were widely variable. The most commonly reported price range for HGH was between $450 and $500 per week for a 4 to 6 week cycle. Clenbuterol was believed to cost between $150 and $200 per tub (of gel or powder), and between $2 and $7 per tablet. Anti-oestrogens ranged from between $2.50 to $10 per tablet. Most PIEDs users were unable to comment on whether the prices of other PIEDs had changed over the last six months.

Purity

- The most commonly faked PIEDs were reported to be AAS (35%), followed by HGH (20%) and clenbuterol (5%). PIEDs users' reports were also confirmed by KE reports.

Availability

- PIEDs users most often reported the availability of AAS as being 'stable' or 'more difficult to obtain'. The availability of HGH was most often rated as 'stable' or 'more difficult to obtain'. The availability of clenbuterol was most often rated as 'stable' or 'more easy to obtain'.

- The majority of PIEDs seizures occur at the Australian border. From 1996-1997 to 1999-2000, the number of seizures of AAS made by the Australian Customs Service increased steadily. Since 2000, the variations in the number of seizures have been less pronounced.

- General comments indicated that, prior to 2000, AAS were more widely available and cheaper. AAS products were believed to be 'genuine' human or veterinarian products, and that since this time the number of fakes/counterfeits has increased. The restrictions in supply of veterinarian and human pharmaceuticals may have given rise to new products such as 'Dianabol paper products' and 'homebake'.

7. CRIMINAL ACTIVITY

7.1. PIEDs users' and KEs' reports of criminal activity

The majority of the 2005 PIEDs user sample reported no recent involvement in criminal activity (65%). A minority of participants (35%) reported involvement in crime at least once during the last month, most commonly 'dealing' (23%), 'crime involving violence' (12%) and 'fraud' (7%) (see Table 20 below).

Among those participants who reported involvement in selling drugs or controlled substances for profit (i.e. dealing), six reported dealing 'daily' or 'more than once a week'. One participant reported dealing 'once a week', and two reported dealing 'less than once a week'. There are no distinctions made in this data between sourcing for friends and large-scale supply, nor was data collected on the different drug-types being sold.

Among the 7 participants who reported 'crimes involving violence', one participant reported committing violence 'once a week' and six participants reported committing violence 'less than once a week' during the last month. Among the four participants who reported involvement in fraud in the last month, all reported committing a fraud 'less than once a week'.

Twelve percent of participants reported having been arrested in the 12 months prior to interview and 8% reported having ever been to prison.

These levels of involvement in crime were confirmed by KE reports. Half the KEs reported that among the PIEDs users they had contact with, the majority had no legal issues (11 KEs). A small minority of PIEDs users were thought to have some criminal involvement or be involved in the supply of PIEDs or other drugs (this group were mentioned by 6 KEs). Those PIEDs users who were involved in crime were described as being very different from the majority of PIEDs users. Criminal involvement was more likely to be related to other illicit drug use (e.g. heroin use) rather than PIEDs use per se. Three KEs mentioned that driving offences may be an issue for the group, such as driving at high speeds and 'road rage'. One NSP worker reported that three PIEDs users in contact with his service had recently lost their driving licenses through incidents of 'road rage' and speeding.

Table 20: Self-reports of criminal activity

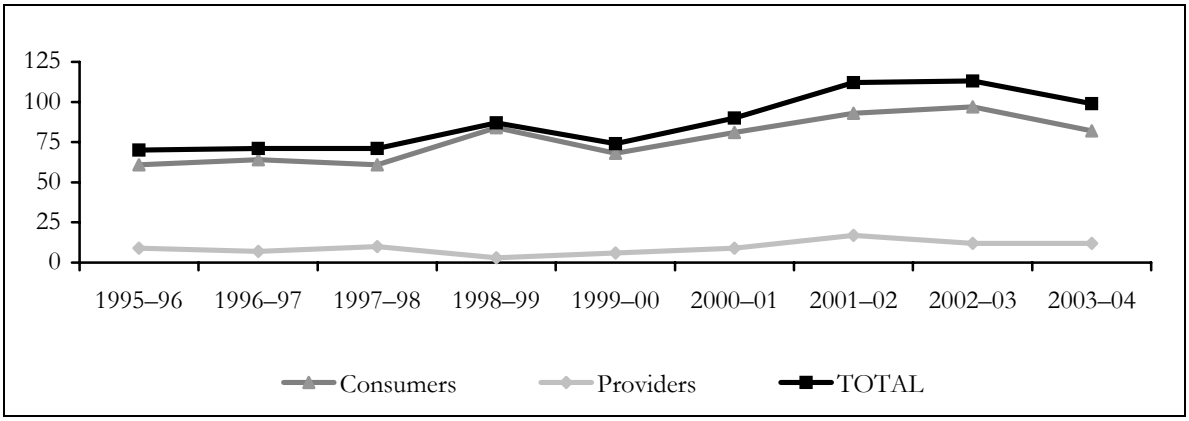
Involvement in criminal activity in the last month:	**n**	**%**
Property crime	5	8
Dealing	14	23
Fraud	4	7
Crime involving violence	7	12
Arrested in the last 12 months	7	12
Ever been to prison	5	10

Source: PIEDs user interviews 2005

7.2. AAS-related arrests

AAS-related arrests account for 0.1% to 0.2% of all Australian arrests (Australian Bureau of Criminal Intelligence, 2001; Australian Crime Commission, 2003, 2005). Nationally, there were 99 steroid-related arrests in 2003-04. Figure 9 (below) presents the number of arrests nationally broken down by consumers (PIEDs users) and providers (PIEDs suppliers). The number of provider arrests has remained constant from 1995-96 to 2003-04. There has been a slight increase in the number of consumer arrests over the same period.

Figure 9: Number of steroid-related arrests of consumers and providers in Australia, 1995-1996 to 2003-2004

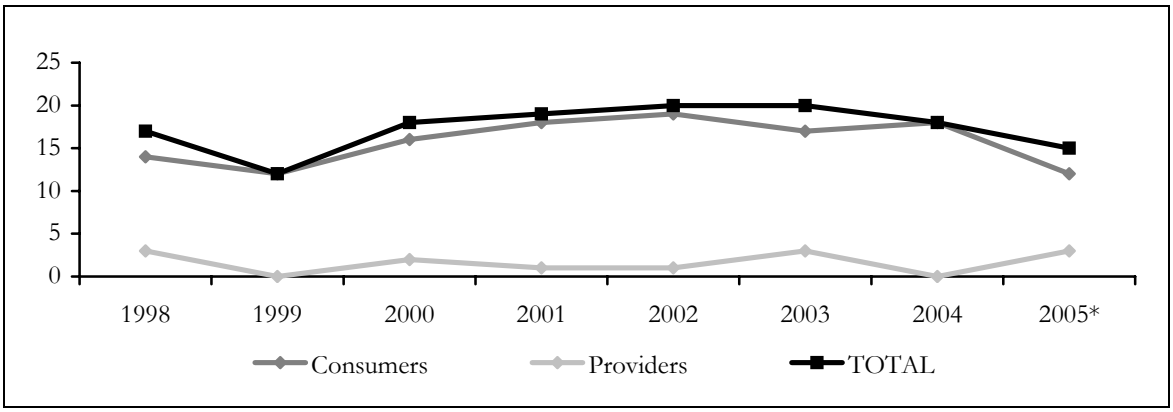


Source: Australian Bureau of Criminal Intelligence (2001); Australian Crime Commission (2003); Australian Crime Commission (2005)

Note: The above graph is based on data that has been revised since it was published in that year's Australian Illicit Drug Report (AIDR or IDDR). This applies to the years 1998-99, 2000-01 and 2001-02. In addition, the total number of steroid arrests includes offenders for whom consumer/provider status was not stated. The total may therefore exceed the sum of consumers and providers.

NSW AAS-related arrests accounted for approximately 20% of all AAS-related arrests recorded nationally (see Figure 10 below). The total number of consumer and provider arrests in New South Wales remained constant from 1998 to 2004. The data suggests that police interception is consumer-based. Since 1998, very few AAS provider arrests were recorded in NSW, and the majority of arrests made involved consumers.

Figure 10: Number of steroid-related arrests of consumers and providers made by New South Wales Police, 1998-2005



Source: NSW Police (2005)
*Note: * The 2005 data is to 30 June 2005 only.*

7.3. PIEDs users' views on the legal status of use, possession and supply

PIEDs users were asked whether they thought the use, possession and supply of PIEDs (for non-medical uses) should be decriminalised. Approximately half the sample (53%) agreed, 27% disagreed and 20% were undecided or didn't comment.

Among those who thought that the use, possession and supply of PIEDs (for non-medical purposes) should be decriminalised, 29 participants gave further comments. Two-thirds of this group wanted to retain some controls. For example, thirteen participants thought AAS should only be available on prescription, under supervision of a doctor. Five participants thought there should be age restrictions to protect young people. This group suggested restricting the supply to those over the age of twenty-one (possibly as high as twenty-five). A further two participants also wanted to retain some controls, but were undecided as to what those controls should be. Among those who wanted to remove all controls, nine participants believed that decriminalisation would reduce the harms associated with covert use and fakes. Six participants believed that PIEDs were not harmful substances.

Among those who disagreed with decriminalisation, 14 gave further comments. Five participants expressed concern regarding the harms to young people. Four participants expressed concerns for psychological health (giving the examples of PIEDs-related aggression, mental health problems and dependence). Another four participants expressed concerns about harms in general (this group did not give specific examples). Only one participant expressed concerns regarding potential harms to physical health.

PIEDs users were asked how they would respond if PIEDs were (hypothetically) available on prescription from a doctor (for non-medical purposes). When asked whether they would increase the amount taken, the group were split evenly between those who would be likely to (39% either 'definitely' or 'more likely to') and those who would be less likely to (39% either 'definitely not' or be 'unlikely to'). A further 22% were either unsure or did not answer. When asked whether they would always use medically prescribed AAS, the

majority (76%) indicated that they were likely to. Only 10% indicated that they 'would be unlikely to' (and 14% were unsure or didn't answer). When asked whether they would be more open about their use, the group were evenly spilt. Thirty-five percent indicated that they would be more likely to and 35% indicated that they would be less likely to (29% were unsure or didn't answer).

7.4. Summary of criminal activity and law enforcement

- The majority of the 2005 PIEDs user sample reported no recent involvement in criminal activity. A minority of participants (35%) reported involvement in crime in the last month, most commonly dealing (23%). Twelve percent of the sample reported having been arrested in the 12 months prior to interview, and 8% reported having ever been to prison. KE reports indicated that a minority of PIEDs users may be involved in crime.

- AAS-related arrests account for only 0.1% to 0.2% of all Australian arrests. The NSW AAS-related arrests account for approximately 20% of national AAS-related arrests. The number of AAS-related provider arrests made nationally was small, and by far the majority of arrests involved consumers (and amounts consistent with personal use).

- While 23% of the sample reported involvement in dealing in the last month, no indication was given regarding the amounts involved, and no distinctions were made in this data between sourcing for friends and large-scale supply.

- Over half the 2005 PIEDs user sample indicated that they would like the non-medical (i.e. body image) use of PIEDs to be decriminalised. Among this group, the majority wanted to retain some controls including medical supervision and age restrictions. However, a substantial proportion (27%) indicated that they did not want the non-medical use of PIEDs to be decriminalised, identifying a range of potential physical and psychological harms.

8. PIEDs-RELATED HARMS

8.1. PIEDs users' perceptions of harms

Only 2% of participants reported having no concerns regarding their PIEDs use. The majority of participants (82%) identified a range of physical health issues as the problems that most concern them. Twelve percent of participants identified a range of psychosocial issues and 4% identified both physical and psychosocial issues. PIEDs users' comments indicate that they are aware of a range of potential harms, without necessarily having experienced them. In general, the group emphasised physical harms over psychosocial harms. Summaries of their comments are presented in Table 21 (below).

Forty-two percent of the sample reported general physical health concerns. Among those who reported specific concerns with physical health, liver disease was reported most frequently (20% of participants). The other physical concerns included gynaecomastia, heart/vascular disease and hair loss. Among the psychosocial concerns, aggression was mentioned most frequently (10% of participants).

Table 21: Main problems of concern

Physical	(%)	Psychological/Social	(%)
General physical health concerns	42	Aggression	10
Liver disease	20	General psychological health concerns	5
Gynaecomastia	12	Relationship problems	5
Heart/vascular disease	12	Body image concerns	5
Hair loss	12	Depression (post-cycle)	3
Acne	8	Dependence	1
Cancer	8		
Fertility problems	8		
Loss of teste size	7		
Sexual dysfunction	5		
Headaches	3		
Prostate problems	2		
Diabetes	2		
Teeth/gum disease	2		

Source: PIEDs user interviews (2005)

The following are some examples of PIEDs users' views on the harms:

> *'The psychological effects are similar to social drugs [in that] they become part of your routine and habit of life. Sometimes you rely on them to go to the gym. This creates a sort of dependency. This is more scary because gyms can dominate your life. It affects what you eat, when you sleep, going out … you can get quite neurotic about it. [PIEDs use] might encourage over-training and unrealistic expectations. There is always someone bigger than you.'*

'I worry about heart attack and the severe physical health risks. But these are only for those who stack and abuse them. Under supervision and where you don't abuse them, it's safer.'

'I worry about the problems that I might face in the future, like my health.'

'I worry about health concerns, particularly cancer. But I wouldn't take something if I thought it was doing me harm.'

'Anger. If it came up, this would concern me. I'm already an angry person.'

8.2. Physical health

8.2.1. Physical problems related to PIEDs use

Participants were asked to indicate whether they had experienced any of the physical side effects from the list in Table 22 (below). The vast majority (97%) reported at least one minor physical side effect (18% of sample reported experiencing more than three physical side effects). The most commonly reported physical side effects (reported by at least 50% of the sample) included increased appetite, water retention, reduced teste size, acne, increased sex drive, and sleeplessness. It is important to note that some of these effects were not necessarily viewed as negative effects (e.g. having an increased appetite and increased sex drive). A large proportion of the sample also reported experiencing sore or swollen injecting sites (45%) and increased body hair (42%). Thirty percent of the sample reported having experienced gynaecomastia. Equally high proportions of the 1997 PIEDs user sample also reported these physical side effects.

There were a couple of differences between the 1997 and 2005 PIEDs user samples in the reporting of physical side effects. The 2005 PIEDs user sample reported having experienced impotence and swollen glands more frequently than the 1997 sample. In addition, the 2005 sample were asked about having experienced hypoglycaemia (from insulin use). It is concerning that 5% of the 2005 PIEDs user sample had experienced insulin-induced hypoglycaemia, which is a potentially life-threatening condition.

In addition to the list provided, individual participants also reported having experienced other physical problems from their use of PIEDs, including injecting problems (n=1); diarrhoea from creatine monohydrate (n=1); nausea (n=1); underarm sweat (n=1); stretch marks (n=2); gum disease (n=1); more frequent urination (n=1); and seizures (n=1).

Twenty-seven percent of participants had experienced permanent side effects of PIEDs use, including gynaecomastia (n=3); voice changes (n=2); acne scarring (n=2); hair loss (n=2); body hair growth (n=2); headaches (n=2); smaller testes (n=1); tendon injuries (n=1); and damage to the pituitary gland and hormonal function (n=1). Among the permanent physical effects experienced, two participants also reported positive changes to their physique. Only 15% had experienced side effects that were bad enough to stop a cycle.

Table 22: PIEDs users' (lifetime) experiences of physical side effects		
	1997 sample (N=100) %	**2005 sample (N=60) %**
Increased sex drive	84	79
Increased appetite	85	72
Water retention	64	62
Acne	54	50
Sleeplessness	43	50
Sore/swollen injection sites	57	45
Increased growth of body hair	48	42
Ligament or tendon injuries	16	28
More frequent colds	17	27
Decreased appetite	17	25
Voice deepening	16	25
Headaches	28	25
High blood pressure	18	23
Lymph node swelling	3	23
Nosebleeds	14	22
Hair loss/baldness	10	18
Kidney problems	3	13
Buttock abscesses	13	13
Liver problems	10	10
Heart problems	2	8
Hypoglycaemia/diabetic coma	-	5*
Male-specific side effects		
Shrinking testicles	55	55
Development of breast (gynaecomastia)	34	30
Impotence	4	25
Prolonged, painful erections	15	12
Problems with reproductive function	4	10
Prostate problems	3	8
Mean number of physical side effects identified among men		**8** (SD=4.2, Range= 2-20)

Source: PIEDs user interviews 2005; (Peters et al., 1997)

** Note: This question was not asked in 1997. In all reported cases, hypoglycaemia was attributed to insulin use.*

In general, KEs reported that the PIEDs they had contact with reported very few side effects. The physical side effects most commonly mentioned to KEs included acne (6 KEs), gynaecomastia (6 KEs), changes in liver enzymes or liver pain (4 KEs), changes in sex drive and impotence (4 KEs), fluid retention (3 KEs), abscesses and infections (2 KEs), headaches (2 KEs) and endocrine or reproductive problems (1 KE). Three KEs expressed concerns regarding the increased medicalisation of body image. Their concerns related to a possible under-appreciation of the potency of AAS products, and a failure to recognise that the individuals using them were 'healthy, normal-sized men'. Four KEs (health service providers) reported that PIEDs users did not present with any physical problems.

The following are some examples of KEs' views on the physical problems associated with PIEDs use:

> *'If they are experiencing any problems, they are not reporting them to this NSP. They may use other networks of support, such as steroid-friendly doctors. I'm not clear as to whether this group are experiencing any physical side effects.' (NSP worker)*
>
> *'The problems are overstated. In my 15-20 years of working with this group, I've never seen a severe case or problem of concern.' (Doctor)*
>
> *'The problems are not life-threatening, but more commonly just distressing, such as gynaecomastia.' (NSP worker)*
>
> *'They tend to be young. There is not a long history of use, so we are not seeing any problems.' (NSP worker)*
>
> *'They only ever present at a doctor when they have got into difficulties. Usually they recover when they stop everything. Sometimes they have been suppressed for so long it takes months to recover and they really don't feel well during this time. There is a strong temptation to use again.' (Doctor)*

KEs were also asked to comment on any groups they thought were particularly vulnerable to the harms associated with PIEDs use. Twelve KEs highlighted young men as a vulnerable group. This group were seen to be at greater risk of physical health problems due to poor injecting techniques and general risk taking (such as polypharmacy, relying on word-of-mouth reports and mega-dose cycles). Concern was also expressed regarding the deleterious effects on natural growth and development.

Two KEs expressed concerns regarding older men aged 40+ who were likely to have had longer histories of PIEDs use, and were more likely to be vulnerable to the negative long-term physical effects of use.

8.2.2. Morbidity

Using the National Hospital Morbidity Database[1] (NHMD, Australian Institute of Health and Welfare), searches were conducted of the following ICD-10 codes as the primary and additional diagnoses:

- T38.7 - Poisoning by drugs, medicaments and biological substances – androgens and anabolic congeners.
- T44.5 - Poisoning by drugs primarily affecting the autonomic nervous system – predominantly beta-adrenoreceptor agonists, not classified elsewhere (e.g. clenbuterol), excludes salbutamol.

There were no cases reported in the 2002/03 NSW data where 'poisoning by androgens and anabolic congeners' was listed as primary diagnosis and 8 cases where this code was listed as an additional diagnoses. There was one case where 'poisoning by beta-adrenoreceptor agonists' (e.g. clenbuterol) was listed as the primary diagnosis, and 4 cases where this code was listed as additional diagnoses. It is not clear whether these cases were accidental poisoning through the use of these medications to enhance performance or image. Given the relatively small number of cases, no further analyses were conducted.

In addition to the above ICD-10 codes, the present study also examined the number of cases of known side effects of PIEDs use. For example, gynaecomastia (hypertrophy of the breast tissue in men) was considered as a possible indicator of AAS use. The results of gynaecomastia searches of the National Hospital Morbidity Database (NHMD) are presented in Appendix Five. Given the complex and multiple causes of gynaecomastia, the present study concluded that rates of gynaecomastia (as with other possible side effects) could not be taken to indicate trends in PIEDs-related harms.

8.2.3. Mortality

In order to ascertain the number of PIEDs-related deaths, the present study examined data from two sources:

- Suspected drug-related deaths in which PIEDs were detected post mortem, March 1996 to June 2004 (Forensic Toxicology Laboratory database, Division of Analytical Laboratories (DAL) [2]); and
- Suspected drug-related deaths relating to PIEDs as mentioned in police reports and coronial findings (National Coronial Information System (NCIS)[3]).

There were no cases where PIEDS were listed as 'primary' or 'other drugs' detected post-mortem in DAL toxicology data. However, this data only pertained to cases where death was suspected to be drug-related.

---

[1] The NHMD collects confidential summary records for admitted patients from almost all public and private hospitals in Australia.

[2] The Division of Analytical Laboratories (DAL) Forensic Toxicology database monitors the drug and alcohol constituents found in persons who died or were driving a motor vehicle while using illicit and other drugs (Barker et al., 2004).

[3] The National Coronial Information System (NCIS) is a regularly updated electronic database allowing access to all coronial cases in Australia (Barker et al., 2004).

To establish the number of deaths relating to PIEDs in other cases, keyword searches were conducted of the NCIS. Searches of the keywords 'clenbuterol', 'growth hormone', 'EPO', 'steroid' and 'anabolic' revealed no recorded deaths relating to the use of these medications as PIEDs.

Despite no PIEDs-related deaths being identified in routine data sources, there was one anecdotal report from a KE regarding a death attributed to use of HGH (this could not be corroborated by extant data sources). One Swedish retrospective autopsy protocol study compared 52 deceased AAS users to 68 deceased users of amphetamine and/or heroin who were AAS negative (Petersson et al., 2005). AAS users died at a significantly younger age than users of heroin and/or amphetamine, and they died significantly more often from homicide or suicide than users of other drugs. The authors concluded that AAS users might be more likely to become involved in incidents leading to violent death (Petersson et al., 2005).

8.2.4. Monitoring of PIEDs use

Participants were asked who monitors their PIEDs use. More than half the sample (57%) reported that they monitored themselves. The other half of the sample reported being monitored by a doctor (25%), a friend (15%) or a trainer/coach (3%).

Seventy-seven percent of the sample reported having regular medical check-ups. Seventeen percent of participants had medical check-ups once or twice a year. Fifteen percent reported having medical check-ups every 1-2 months. Two participants reported going for weekly check-ups. Four participants had not seen a doctor in the last 12 months. Sixty-five percent of participants had told their doctor about their use of PIEDs.

8.3. Injecting risk behaviour

Ninety-three percent of the sample had injected PIEDs at some time. The mean age of first injecting PIEDs was 25.5 (SD6.4, Range: 17-43).

When asked who first showed them how to inject PIEDs, participants most commonly reported 'a friend' (39%), followed by 'self-taught' (29%), 'doctor' (20%), 'coach/trainer' (5%), 'NSP worker' (2%) and 'other' (5%). The first time they injected, thirty-eight percent of the sample reported being injected by a friend, and 34% injected themselves. The remainder of the sample reported being injected by 'doctor' (21%), 'coach/trainer' (4%) and 'other' (4%).

When asked 'who injects you now?' 73% of participants reported injecting themselves, 14% reported being injected by a friend and 13% reported being injected by a doctor. Sixty-eight percent of participants reported injecting recently (i.e. within the last month).

There were low rates of needle sharing among both the 1997 and 2005 samples (see Table 23 below). In the 2005 sample, three participants reported having ever shared needles. One participant reported having shared needles in the past month for injection of other illicit drugs, sharing on more than 10 occasions.

A larger proportion of the 2005 sample reported having ever reused needles (compared to the 1997 sample). Among the 12% (n=7) who had ever reused needles, 4 participants had reused a needle in the last 6 months. Three participants cleaned their needles before re-using: one participant reported using water only, and two participants used water and bleach.

Although there were low levels of needle sharing among the 2005 sample, there was a range of other injecting risk behaviours reported by the group. Twenty-seven percent of the sample reported having injected from a shared container. PIEDs users who reported injecting from a shared container also reported various methods of attempting to reduce the risks of cross-contamination. Most commonly, PIEDs users would use one (clean) needle to draw up from a container and another to inject with (their friend doing the same). By using in this way, they believed they were protecting themselves from the risk of Hepatitis C or HIV infection. There were low levels of concern regarding the sterility of the substances they were injecting. Twenty-five percent of the sample had ever injected other illicit drugs. Of concern is that a further 12% had ever injected insulin (known to carry a risk of possible hypoglycaemic coma and, if untreated, death).

Similar rates of injecting risk behaviours among AAS injectors were also found by Delalande, Aitken, Mercuri & Stanton (1998). Delalande and colleagues found that among 134 AAS injectors surveyed in Victoria in 1997, 6% had ever shared needles, 14% had reused needles, 15% had injected from a shared container, 8% had ever injected insulin and 14% had injected drugs other than AAS (Delande, Aitken, Mercuri, & Stanton, 1998).

Table 23: Summary of self-reported injecting risk

	1997 sample (N=100)	2005 sample (N=60)	
	%	n	%
Currently injected by another person	35	16	27
Ever shared needles	5	3*	5*
Shared needles in last month	0	1	2
Ever reused needles	4	7	12
Ever injected from a shared container	-	16	27
Ever injected drugs other than AAS	-	15	25
Ever injected insulin	-	7	12

Source: PIEDs user interviews (2005); Peters et al, (1997)

*Note: * All 3 participants who reported ever sharing needles injected other illicit drugs*

Intramuscular injections were reported by 100% of the 2005 sample (see Table 24 below). While substantial proportions of the sample had experimented with subcutaneous and intravenous injection of PIEDs in the past (18% and 7% respectively), only a small proportion (4%) reported currently injecting subcutaneously. This was in the administration of HGH. No one reported current intravenous injection of PIEDs.

Most commonly, the PIEDs user sample reported injecting larger muscle groups such as the buttocks, thighs/quadriceps and shoulders/deltoids. However, 7% of the 2005 sample were engaging in the riskier injection practice of targeting smaller muscle groups (e.g. injecting into calves, latissimus and triceps and other small muscle groups). This group were frequently targeting more than one small muscle group in the belief that localised injection will lead to localised growth of 'problem' areas. Injecting small muscle groups also carries the additional risk of injecting into a nerve or vein.

The majority of participants who injected (98%) reported having no problems obtaining clean injecting equipment. Only one participant reported difficulties in obtaining clean needles and syringes. Most commonly, participants obtained needles and syringes from NSPs (71%), followed by chemist/pharmacy (14%), doctor (11%), friend (2%) and others (2%).

Two KEs (both NSP workers) observed that PIEDs injectors often pick up clean needles and syringes for their friends. Both KEs expressed concerns that this group are often taking bulk equipment supplies, refusing sharps bins and not returning frequently (at least not over the counter).

> *'The injecting problems have been getting worse. But this might also be because they are using the service differently and asking for this kind of advice. I have seen abscesses and scar tissue; boils; inappropriate injecting sites like the back of the calves … infections and problems with acne.' (NSP worker)*

Table 24: Summary of PIEDs injection sites and methods

Current injection site (N=56)	**n**	**%**
Buttocks	44	79
Thigh/quadriceps	24	43
Calves	1	2
Latissimus	1	2
Shoulder/deltoids	21	38
Triceps	2	4
Lifetime injection in small muscle groups	4	7
Past and current methods of injection (N=56)	**Past (%)**	**Current (%)**
Intramuscular	100	100
Subcutaneous	18	4
Intravenous	7	0

Source: PIEDs user interviews 2005

8.3.1. Self-reports of BBVI status

Participants were asked whether they had had been tested for blood-borne virus infection (BBVI), and if so, their current status (see Table 25 below). A substantial proportion of the sample reported being HIV positive (12%). Smaller proportions reported being HCV and HBV positive (5% and 3% respectively). The 1997 study (Peters et al., 1997) did not collect data on self-reported prevalence of BBVI, so comparisons cannot be made.

In the 2005 PIEDs user sample, all HIV positive men identified as gay or bisexual. While a substantial proportion of HIV positive men were being prescribed PIEDs for therapeutic reasons (5 out of 7 men), the group were also using PIEDs that were not prescribed to them. International studies have also identified HIV positive gay men as a significant group of PIEDs users. A survey of 772 gay men engaged in weight training in London gyms found that among those who reported using AAS in the last 12 months, 32% reported being HIV positive (Bolding et al., 2002). The authors concluded that HIV positive gay men were more likely to use than other gay men, some of who were using for therapeutic reasons.

In a Victorian study of serum prevalence among AAS-injectors, Aitken and colleagues (2002) found higher rates of HCV exposure (9.5%), than the self-reported rates in the present study (5%). Among Aitken and colleagues' sample, HCV exposure was associated with prior heroin injection, imprisonment, sharing needles to inject other drugs, number of tattoos, and hepatitis B exposure. These were all factors other than AAS injecting per se. While the self-reported rates of hepatitis C infection among the 2005 PIEDs user sample are lower than those among other injecting drug users, a number of injecting risk behaviours were reported that could spread the virus.

Table 25: Self-reports of BBVI status

BBVI status	Proportion of sample %
hepatitis B (HBV) positive	3
hepatitis C (HCV) positive	5
HIV positive	12

Source: PIEDs user interviews 2005

8.4. Psychological health

8.4.1. Changes in mood and behaviour related to PIEDs use

Eighty-seven percent of participants indicated that they had experienced changes in their mood or behaviour when using PIEDs. When participants were asked to describe changes in their mood or behaviour, the most commonly identified change was an increase in aggression (mentioned by 45% of participants). Participants described aggression as feeling more 'angry' or 'assertive'. The types of aggressive behaviours described included being 'snappy', 'stubborn', 'tense at work', 'challenging' and having 'more drive'. Only three participants described an increase in physically aggressive behaviour including: 'fighting when drinking'; being 'aggressive towards other males' and 'road rage'. A further 37% of participants (n=22) described feelings of irritability, intolerance or impatience.

A proportion of participants mentioned changes in mood when using PIEDs. Most often, positive effects on mood or feelings of wellbeing were mentioned (15%, n=9). Fifteen percent (n=9) described feelings of increased confidence, possibly from the physical changes (i.e. having a larger physique). Participants also mentioned an increase in energy (8%, n=5) and an increase in sex drive (5%, n=3). The negative effects on mood included mood swings or 'feeling more moody' (13%, n=8), and feelings of anxiety or depression (8%, n=5).

In addition to the responses given to the open-ended question above, participants were also asked to confirm whether they experienced any of the changes in mood or behaviour from an interviewer list. Their responses are summarised in Table 26 (below). The similarities between the 2005 and 1997 samples in the reporting of items from the interviewer list offers support for some consistent changes in mood and behaviour relating to PIEDs use. For example, the majority of PIEDS users report increased motivation, increased confidence, feeling more satisfied with their body image and having an increased sex drive. Only small proportions of PIEDs users report feeling suspicious/paranoid or depressed.

Participants most commonly described negative effects (such as aggression) in response to the open-ended questions about changes to mood or behaviour. This differs from the responses in Table 26 (below), where a large majority (78-92%) of participants reported experiencing more socially reinforcing effects (such as increased motivation, more satisfaction with body image, increased confidence and increased sex drive).

Forty-seven percent of the 2005 PIEDs user sample stated that their personal relationships with family and friends had (ever) been affected by their PIEDs use. Of these, 15% said their relationships had improved, 74% said their relationships had worsened and 11% said their relationships had both improved and worsened. Among those who indicated their relationships had improved, the reasons given included feeling more confident from their use of PIEDs (n=3) and an increased sex drive (n=2). Among those who indicated that their relationships had been made worse, the most commonly reported reason was the increased irritability from PIEDs use escalating arguments with friends/partners (n=12). Other reasons included family/friends/partners disapproving of PIEDs use (n=7), relationships breaking down due to spending too much time at the gym (n=3), relationship

breaking down due to reproductive problems (n=1) and increased sex drive causing problems in relationships (n=1).

Table 26: PIEDs users' experiences of changes in mood and behaviour

	1997 sample (N=100) %	2005 sample (N=60) %
Increased motivation	82	92
More satisfaction with body image	76	92
Increased confidence	82	90
Increased sex drive	80	78
More irritable	54	65
Increased aggressiveness	-	63
More moody	54	55
More impulsive	28	45
Euphoria	24	42
More relaxed	29	38
More tired/fatigued	29	38
Anxiety	-	33
Decreased sex drive	25	28
More suspicious/paranoid	12	17
Depression	21	12

Source: PIEDs user interviews 2005; (Peters et al., 1997)

8.4.2. Aggression related to PIEDs use

Participants were asked about whether their behaviour was more or less aggressive when taking PIEDs, compared to when they were not taking PIEDs. Forty-four percent stated their behaviour was more aggressive, 7% stated their behaviour was less aggressive and 49% reported no change in their behaviour. Those who stated a change in aggressive behaviour were then asked how they thought PIEDs affected aggression. Eighteen percent described feeling like they had a 'shorter fuse' or feeling 'more irritable'. Four participants reported behaving more confidently and three participants reported being quicker to react physically. One participant thought that aggression was dose-related. Three participants reported feeling happier or euphoric, and therefore less aggressive when they were using PIEDs.

Nearly two-thirds (62%) of the sample reported having ever been involved in an incident involving aggression or violence (Table 27 below). However, only 23% reported being involved in an aggressive incident in the last six months, and 12% reported being involved in an aggressive incident more than once in the last six months.

Table 27: PIEDs users' self-reports of incidents of aggression or violence	
Variable	**Proportion (%)**
Ever been in an incident involving aggression or violence (%)	62
Involved in an incident of aggression or violence in last 6 mths (%)	23
Involved in more than one incident of aggression or violence in last 6 mths (%)	12

Source: PIEDs user interviews 2005

Participants were asked whether they had ever experienced 'roid rage' (see Table 28 below). 'Roid rage' is a common street term for anger relating to AAS use. Although not clinically recognised, it is a term that is popularised by the media. 'Roid rage' has been defined as when 'aggressive feelings increase to the extent that violent, hostile, anti-social behaviour develops' (Corrigan, 1996: p.6). Just over a third of participants (37%) indicated they had experienced 'roid rage'. Thirty-five percent of this group had experienced 'roid rage' in the last six months. 33% had experienced 'roid rage' once, 5% had experienced 'roid rage' twice, 5% had experienced 'roid rage' three times and 9% had experienced 'roid rage' on four or more occasions in the last six months.

Participants were asked to describe their experiences of 'roid rage'. Their comments are summarised in Table 28 (below). In general, those who reported experiencing 'roid rage' (n=19, 86%) described a specific trigger, possible escalation to physical aggression (towards an object or person), and the experience lasting a short duration. There was a small group of participants (n=3) who believed the phenomenon of 'roid rage' was unrelated to AAS use, and was the result of inherent characteristics of the individual (for example, their 'personality' or 'lack of self-control').

Not all KEs had observed aggressive behaviour among PIEDs users. Ten KEs from a range of occupations reported having observed irritability, verbal aggression and physical aggression among the PIEDs users they had contact with. Police KEs reported some specific incidents of aggressive behaviour among PIEDs users such as threats to family members and damage to property. However, six KEs reported seeing no psychological or behavioural effects among the PIEDS users with whom they had contact.

Table 28: PIEDs users' self-reports of key features of 'roid rage' (n=22)	
Environment in which the event occurred	**n**
▪ Domestic environment (own or friends' home)	11
▪ Driving a car	6
▪ Pub/bar	3
▪ Work environment	2
Precursors/ triggers to the event	**n**
▪ Argument/disagreement with friend, family or partner	10
▪ Incident while driving	4
▪ Fatigue	2
▪ Innocent remark or action by another person	2
▪ Hunger	1
Response during the event	**n**
▪ Escalation to physical aggression towards an object	11
▪ Escalation to physical aggression towards a person	6
▪ Escalation to verbal aggression	3
▪ Intense arousal or feelings of anger, but able to control	2
Characteristics of 'roid rage'	**n**
▪ Sudden rush of anger/arousal	17
▪ Over-reaction or magnified response to a specific trigger	10
▪ Uncharacteristic response	9
▪ Able to control or prevent escalation to physical aggression	8
▪ Unable to control or prevent escalation to physical aggression	6

Source: PIEDs user interviews 2005

8.4.3. Symptoms of PIEDs use disorders

An indication of symptoms of PIEDs abuse/dependence was obtained using criteria from the fourth edition of *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV: American Psychiatric Association, 1994). The results are presented in Table 29 (below). Data was not collected regarding the specific PIEDs participants were referring to when answering questions, so these symptoms cannot be attributed to any one substance. Therefore only general comparisons with the 1997 PIEDs use sample can be made (as this sample included only primary AAS users). Similarly, data on temporal relationships between use and experience of symptoms was not collected. As a result, these findings can be taken as a general indication of experience of symptoms only.

The vast majority (95%) of the 2005 PIEDs user sample endorsed at least one symptom of abuse or dependence on PIEDs. The most commonly endorsed symptoms of dependence

by both 1997 and 2005 samples were 'withdrawal' (83% in 2005), followed by 'continued use despite negative consequences' (45% in 2005).

Table 29: Prevalence of substance use disorders

Dependence Criteria		**1997 sample (N=100)**	**2005 sample (N=60)**
1	Tolerance	12	18
2a	Withdrawal	64	83
2b	Withdrawal relief	7	13
3	Use more than intended	12	23
4	Efforts to cut down	17	8
5	Great deal of time spent using	9	28*
6	Forgo important events	29	**
7	Continued use despite negative consequences	35	45
Abuse Criteria		**1997 sample (N=100)**	**2005 sample (N=60)**
1	Failure to meet role obligations	4	17
2	Use in hazardous situations (n/a)***	-	-
3	Recurrent legal problems	5	8
4	Continued use despite psychosocial problems	35	45

Source: 2005 PIEDs user interviews; (Copeland et al., 2000)

* *The question asked was 'Do you spend a great deal of time getting and using PIEDs?'. Responses may be confounded by low availability of PIEDs.*

** *A question assessing this criterion was not asked in 2005.*

*** *This question was omitted in 1997 and 2005, as not relevant to this drug class.*

The 2005 PIEDs user sample most commonly reported experiencing 'desire for more steroids' (71%), 'dissatisfaction with body image' (47%), 'general lack of interest' (50%), 'depression' (47%) and 'fatigue' (42%) after stopping a cycle (Table 30 below). The median number of withdrawal symptoms endorsed was 4 (SD 2.6; Range: 0-10).

Only two KEs reported observing possible dependence among PIEDs users. One NSP worker noted that PIEDs users might develop a dependence on the 'look' they are achieving. The other KE (a doctor) had observed withdrawal symptoms among patients who had been 'mega-dosing'. This KE reported that where AAS are prescribed for medical reasons in order to keep testosterone within a normal physiological range, there are very little, if any, negative physical or psychological side effects. However, when larger, non-medical doses are taken, the endogenous hormones are suppressed, sometimes for long periods of time. When the cycle ends, users do experience withdrawal-like symptoms (tiredness, feeling unwell, etc). For these patients, it may take between 3 and 12 months to recover normal hormonal function. In time, most patients do recover fully. This KE expressed concerns that most clinical trials of AAS run for 8-10 weeks, and may have under-estimated the longer-term effects of mega-dosing. It is possible, for example, that trials might have found different degrees of harm if they had continued beyond 12 weeks.

Table 30: PIEDs users' withdrawal symptoms after stopping a cycle	
Variable	**Proportion (%)**
Desire for more steroids	71
Dissatisfaction with body image	57
General lack of interest	50
Depression	47
Fatigue	42
Loss of appetite	33
Restlessness	30
Anxiety	28
Headaches	15
Chills	13
Nausea	7
Suicidal thoughts	3
Median number of withdrawal symptoms endorsed	**4 (SD=2.6, Range=0-10)**

Source: PIEDs user interviews 2005

8.4.4. Mental health

The incidence of mental health concerns in the last six months among the PIEDs user sample was generally quite low (see Table 31 below). Twenty-seven percent (n=16) of the sample reported experiencing a problem with mental health in the last 6 months, most commonly depression (20%) and anxiety (10%).

In general, KEs described the group as functional, with low levels of pathology (particularly in comparison with other illicit drug users). Despite the PIEDs users' strong motivations regarding body image, only one KE reported an 'extreme altered sense of what they look like'. Notably, the health service providers did not report significant body image distortions. The other possible mental health concerns mentioned included 'extreme narcissism' (2 KEs), depression when coming off a cycle (1 KE), and mania during a cycle (1 KE). One fitness industry KE reported that they had 'known PIEDS users give up because of the psychological effects, but where they are cycling 2-3 times per year, they don't seem to experience too many effects'.

> *'No serious problems. Pretty well never. They seem to be quite healthy and well. They are more likely to have struggles … psychological difficulties, struggles with relationships … but less than the IDU population.' (NSP worker)*

Table 31: Self-reported mental health concerns experienced in the last 6 months	
Variable (N=60)	**Proportion (%)**
Depression	20
Mania	0
Manic-depression	2
Anxiety	10
Phobias	3
Panic	2
Obsessive-compulsive disorder	0
Paranoia	0
Anti-social personality disorder	0
Other personality disorder	0
Schizophrenia	0
Post-traumatic stress disorder	2
Drug-induced psychosis	2
Other psychosis	2

Source: PIEDs user interviews 2005

8.5. Summary of PIEDs-related harms

- The 2005 PIEDS user sample mainly worried about physical problems such as liver disease, gynaecomastia, heart disease and hair loss.

- The majority (97%) of PIEDs users had experienced at least one physical side effect through their use of PIEDs. Most commonly, the 2005 PIEDs user sample experienced increased appetite, water retention, reduced teste size, acne, increased sex drive and sleeplessness. A large proportion of the sample also reported experiencing sore or swollen injection sites and increased body hair. One-third of the sample reported having experienced gynaecomastia and a quarter reported experiencing high blood pressure. Very few participants reported more serious problems such as heart or liver problems.

- KE reports indicated that PIEDs users rarely report physical side effects. There were individual reports from KEs regarding injecting injuries (such as infections).

- The majority of the sample had injected PIEDs at some time (93%). The median age of first injecting PIEDs was 24. Most PIEDs users were shown how to inject by a friend or they were self-taught. While there were low rates of needle sharing among the group, other risky injection practices included: reusing needles, being injected by another person, injecting from a shared container, injecting other illicit drugs and injecting insulin.

- Twelve percent of the sample were HIV positive (all gay/bisexual men). There were small proportions of the sample that reported being HCV or HBV positive.

- The majority of participants (87%) experienced some changes in their mood or behaviour, both positive and negative. The positive effects included increased motivation, increased confidence, feeling more satisfied with body image and having an increased sex drive. The negative effects on mood and behaviour included feeling more irritable and aggression. In some cases, changes in mood and behaviour impacted negatively on social relationships.

- While almost two-thirds of the PIEDs user sample reported feeling more aggressive, 44% reported that they behaved more aggressively. Twenty-three percent of participants reported having been involved in an incident involving aggression or violence in the 6 months prior to interview.

- Just over one-third of participants reported having ever experienced 'roid rage'. 'Roid rage' descriptions generally involved a specific trigger, a sudden rush of anger or arousal, and possible escalation to verbal or physical aggression (either towards an object or a person). For the majority of participants, the experience lasted for a short duration. The most common environments in which 'roid rage' occurred were the domestic environment (own or friends' home) and driving a car.

- The 2005 PIEDs user sample endorsed symptoms of dependence, most frequently withdrawal symptoms. The most common types of withdrawal symptoms experienced by the sample included desire for more steroids, dissatisfaction with body image, general lack of interest, depression and fatigue after stopping a cycle.

- The most commonly reported mental health concerns were depression and anxiety. Just over a quarter of the sample reported experiencing mental health concerns in the previous six months. KEs generally described the group as 'functional' with low levels of pathology.

9. HELP-SEEKING

KEs were asked to comment on whether they had observed any changes in help-seeking among PIEDs users. Among those KEs in regular contact with PIEDs users, most reported either no changes in the severity of problems during the last six months (9 KEs) or that PIEDS users were not presenting with any problems at all (6 KEs). The remaining KEs identified a range of problems perceived as increasing in severity, including poor injecting techniques (2 KEs), lack of knowledge regarding BBVI (3 KEs) suppression of natural hormones (1 KE) and changes in libido (1 KE).

9.1. Sources of information about PIEDs

There are few services specifically targeted at PIEDs users. While alcohol and other drug services (such as NSPs and treatment agencies) provide some services to the group, it is widely acknowledged that PIEDs users do not identify with messages and services targeting recreational (or other illicit) drug users.

However, PIEDs users do frequently seek information about PIEDs. Seventeen percent of participants sought information daily, 27% sought information weekly or more, 26% sought information fortnightly or monthly and 23% sought information twice a year. Only 7% of the sample sought information yearly or less often. However, with the exception of doctors, PIEDs users did not commonly seek information or advice from services, preferring to rely on more anonymous methods or personal networks. The most common sources of information reported by PIEDs users were internet sites, friends, doctor and contacts at the gym (see Table 32 below).

KEs' reports of information-seeking were similar to those of PIEDs users. KEs believed that PIEDs users were most likely to rely on friends (11 KEs), gym contacts (9 KEs), word-of-mouth/mentoring (7 KEs) and the internet (5 KEs) for advice on PIEDs. Two KEs reported that PIEDs users were unlikely to go to a doctor for advice. The only difference between the reports of KEs and those of PIEDs users was that six KEs reported NSPs being approached for information or advice (whereas only 7% of PIEDs users rated NSPs as a usual source of information). Four KEs noted an increase in the numbers seeking injecting advice.

Table 32: Usual sources of information on PIEDs	
N=60	**Proportion (%)**
Internet sites	62
Friends	55
Doctor	22
Gym contacts	18
Books on AAS	10
Magazines	8
Pamphlets/leaflets on AAS	8
Medical literature	8
Dealer	7
Trainer/coach	7
Needle and Syringe Program	7
Pharmacy	2
Posters	0
Helplines/phone counselling	0

Source: PIEDs user interview 2005

9.2. Utilisation of Needle and Syringe Programs (NSPs)

Although doctors working in general practice may have contact with individual PIEDs users, the services that are likely to have regular contact with larger numbers of PIEDs users are NSPs. However, PIEDs users rarely seek information regarding PIEDs from these services (only 7% of participants reported seeking information from an NSP, despite 71% of participants accessing NSPs for injecting equipment).

Separate data from the annual Australian Needle and Syringe Project Survey indicate that in 1999, 2000, 2002 and 2003, 2% of all cases reported AAS as the 'last drug injected' (1% of cases reported AAS as the 'last drug injected' in 2001) (Thein, Maher, & Dore, 2004). While AAS may be reported far less frequently compared to other illicit drugs such as heroin, recent reports of AAS as the 'last drug injected' are greater than those for cocaine (cocaine accounted for 1% of cases in 2002 and 1% in 2003) (Thein et al., 2004). Some PIEDs users are accessing NSPs for clean needles and syringes.

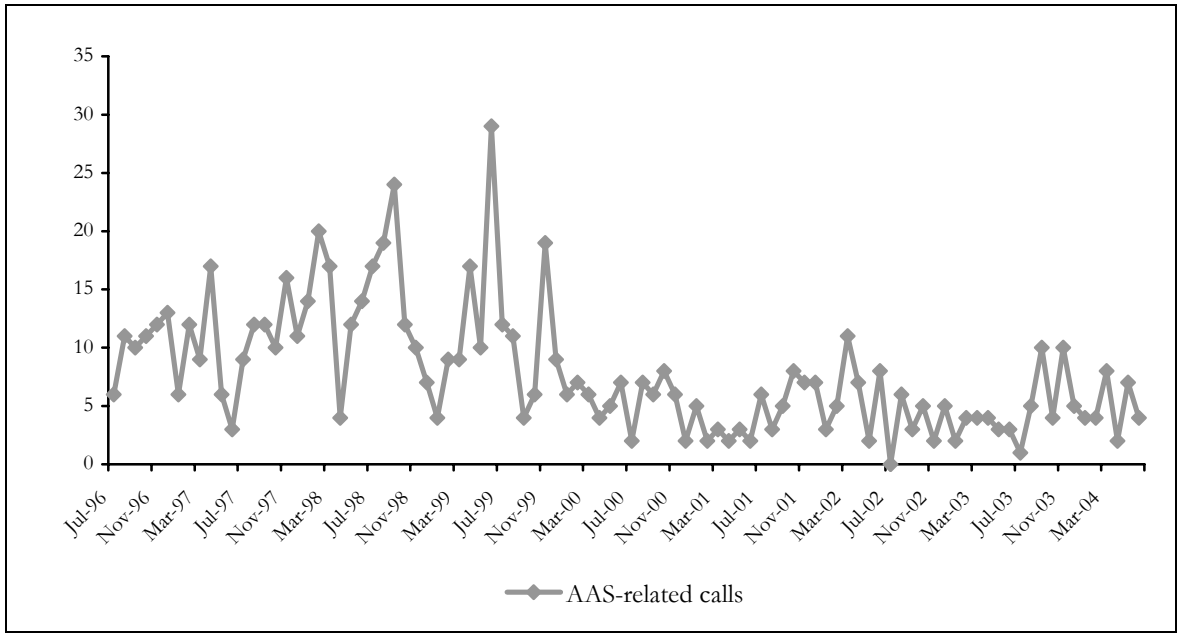
9.3. Utilisation of telephone helplines

PIEDs users were asked whether they had contacted either the Alcohol and Drug Information Service (ADIS) or the Australian Sports Drug Agency (ASDA). Only one participant had contacted ASDA regarding detection periods, and none of the participants interviewed reported contacting ADIS. Separate records of the number of enquiries to

ADIS regarding AAS indicate fairly low numbers of calls (less than 30 calls a month, and usually between 2 and 15 calls a month – see Figure 11 below).

Two KEs reported that PIEDs users in Sydney sometimes call a Steroid Peer Education Project in Victoria for advice.

Figure 11: Number of enquiries to ADIS regarding anabolic-androgenic steroids, 1996-2004



Source: New South Wales Alcohol and Drug Information Service

9.4. Utilisation of alcohol and other drug (AOD) treatment agencies

In order to assess whether PIEDs users sought help from AOD services, the present study examined data from the National Minimum Data Set - Alcohol and Other Drug Treatment (NMDS-AODT). The NMDS-AODT is a standardized record of clients accessing alcohol and other drug treatment, service utilization and treatment programs. The number of treatment episodes relating to 'clenbuterol', 'steroid' and 'anabolic' in NSW in 2002/03 and 2003/04 were examined. There were no episodes where any of these were listed as the primary drug of concern. In 2002/03, AAS (unspecified) were mentioned as an additional drug of concern in four cases only. In 2003/04, AAS (unspecified) were mentioned as an additional drug of concern in seven cases, two cases mentioned 'testosterone' and one mentioned 'stanazolol'. Given the relatively low number of cases, and the fact that these were not treatment episodes where AAS use was the primary drug of concern, no further analyses were conducted.

It is important to note that these numbers do not necessarily reflect treatment demand. As PIEDs users do not identify as 'illicit drug users', it is unlikely they will seek treatment or support from AOD services.

9.5. Utilisation of mental health services

PIEDs users were asked whether they had accessed mental health services in the last six months. Their responses are summarised in Table 33 (below). The rate of mental health service utilisation among this group was low. Ten percent of the 2005 PIEDs user sample reported accessing the support of a psychiatrist in the last six months. Most often, however, PIEDs users reported accessing mental health support from a 'counsellor' (12%).

Two KEs reported having referred PIEDs users onwards for psychological support: one for bereavement, and the other for AOD treatment.

Table 33: Mental health support accessed in the last 6 months

N=60	Proportion (%)
Counsellor	12
Psychiatrist	10
Psychologist	5
GP	4
Community Health Nurse	2
Mental Health Nurse	2
Hospital Emergency Department	0
Psychiatric ward	0
Social Worker	0

Source: PIEDs user interviews 2005

9.6. Summary of help-seeking

- The 2005 PIEDs user sample reported regularly accessing information regarding PIEDs from the internet, friends, a doctor and gym contacts.

- PIEDs users do not generally seek advice or support from AOD-specific services (such as NSPs, ADIS and treatment agencies). Small numbers of PIEDs users reported accessing mental health support from a 'psychiatrist' or a 'counsellor'.

10. GENERAL DISCUSSION

Comparisons of the 1997 and 2005 studies indicate that the PIEDs market is relatively stable. Demographics, patterns of use and experience of harms were very similar across the two samples. The 2005 study identified similar substances to the 1997 study, with the addition of 'prohormones' such as DHEA and androstenedione being used by the 2005 sample.

The majority of PIEDs users are male, although the number of Australian adolescent women (aged 12 to 17 years) reporting lifetime use of AAS has more than doubled since 1996 (Australian Institute of Health and Welfare, 2005). While the 2005 study only recruited men, the study confirmed that PIEDs users are not a homogenous group. The sample was made up of young men (aged under 25 years), older men (over the age of 45) and gay/bisexual men (including HIV positive gay men). They represented a wide cross-section of the Sydney community with regards to age, area of residence, education and occupation. A common characteristic shared by the sample was regular gym attendance.

The importance of body image (particularly with respect to muscularity) was confirmed by the present study as an important motivation for the use of PIEDs. The most commonly perceived benefits of PIEDs use related to the desirable effects on physique (i.e. the ability of PIEDs to increase size, increase weight and enhance muscularity). A muscular physique was seen to have individual, social, and in some cases, occupational/economic benefits.

PIEDs users are a group who are cautious about disclosing their use. For example, one-quarter (28%) of the 2005 sample had not told family or friends about their use of PIEDs. Accordingly, it is difficult in this study to quantify the numbers of people using PIEDs for non-medical purposes in Australia. Although the 2004 National Drug Strategy Household Survey estimated only 0.3% of Australians aged 12 years and older had 'ever used' AAS for non-medical reasons, and that a negligible number had used recently (Australian Institute of Health and Welfare, 2005), this is an extremely hidden group who may not be reporting their use. Regular gym-goers and bodybuilding enthusiasts do not identify their use of PIEDs as 'recreational' or 'illicit' drug use, and are not likely to report in this context. The present study experienced a reluctance among PIEDs users to participate in what the group perceived to be an 'illicit drug survey', and had difficulty in recruiting (despite the 2005 sample reporting a mean of 5 close friends who also used PIEDs). Population surveys (such as the NDSHS) also assume that the prevalence of PIEDs use is spread evenly across geographical locations. However, there may be some suburbs or communities in which there are higher rates of PIEDs use. For example, other prevalence studies have found higher rates of use among young men (e.g. Handelsman & Gupta, 1997; White & Hayman, 2004; Yesalis & Bahrke, 2000), gay men (e.g. Bolding et al., 2002; Bolding et al., 1999; Dillon et al., 1999) and regular gym-goers (e.g. Chee et al., 1994; Korkia & Stimson, 1993).

10.1. PIEDs users

The 2005 PIEDs user sample were male, and the majority were Australian-born. One-third (33%) of the sample were aged between 17 and 25 years of age. Just under one-third (30%) of the 2005 PIEDS user sample were gay/bisexual men. Two-thirds (63%) of the 2005 PIEDs user sample had completed school to HSC level, and two-thirds (65%) had completed post-school qualifications (either a university degree or trade). Seventy-nine percent of the sample were employed in occupations ranging from trades/labour, customer service/sales to traditional professional occupations (e.g. solicitor). Thirteen percent of the sample was currently working in the fitness industry and 23% reported having ever worked in the security industry. Only one-third of the sample earned less than $30,000 per annum. One-third of the sample earned in excess of $60,000 per annum.

Overall, the demographic characteristics of the 1997 and 2005 samples were strikingly similar, with three exceptions: the mean age of the 2005 sample was slightly higher (27 in 1997 and 32 in 2005); the 2005 sample had slightly higher rates of unemployment (5% in 1997, 15% in 2005) and the 2005 sample had higher rates of alcohol and other drug use. However, the 2005 sample interviewed a larger proportion of young men aged 17 to 25, and HIV positive men (all gay/bisexual men) made up 12% of the sample.

The reasons for the higher rates of alcohol and other drug use in 2005 compared to 1997 were not clear. Two-thirds (65%) of the 2005 sample drank alcohol weekly or daily. Seventy-seven percent of the 2005 sample had used an illicit drug in the six months prior to interview, most commonly psychostimulants (such as ecstasy, cocaine, speed and crystal methamphetamine) and cannabis. The majority (62%) of the 2005 PIEDs user sample were non-smokers. Other studies have examined whether PIEDs users show a propensity for general drug use, or whether they specifically use substances that impact on their image and performance. Among young men in particular, PIEDs use has been found to be associated with the use of alcohol, illicit drugs and tobacco (Kindlundh et al., 2001; Miller et al., 2002; Nilsson et al., 2004; Wichstrom & Pedersen, 2001). On the other hand, a large survey of a wide cross-section of fitness centre members of all ages found that PIEDs users were a specific physical-achievement-oriented group adapted to society's stereotypes of body image, whose use of PIEDs was associated with a decreased use of alcohol compared to the general population (Striegel et al., 2005).

Small proportions of the 2005 PIEDs user sample reported risk behaviours such as injecting other illicit drugs (25%), involvement in violent incidents in the six months prior to interview (23%) and involvement in criminal activity in the month prior to interview (35%). KE reports were consistent with the view that a small proportion of PIEDs users may be 'risk-takers' across a range of settings. Future studies should examine driving risks, involvement in accidents, rates of physical injuries, sex risk behaviours, and the rates of involvement as victims/perpetrators of violence.

Overall, both the 1997 and 2005 sample characteristics confirmed that PIEDs users maintain high levels of social and occupational functioning. For example, almost half the sample (42%) were in a stable relationship at the time of interview, the sample engaged in regular physical activity (the 2005 sample engaged in a mean of 7 hours per week weight training, and 4 hours per week in other physical exercise) and the vast majority of the sample were employed.

10.2. Patterns of use

The mean age first use of PIEDs was 25.7 (SD 7.9), ranging from 15 to 58. The patterns of lifetime and recent use indicate a diversity of substances being used. The main substances used by the 2005 sample included AAS, prohormones, HCG, HGH, insulin, anti-oestrogens, clenbuterol, stimulants (e.g. ephedrine, methamphetamine), diuretics and a range of over-the-counter dietary and sports supplements such as creatine monohydrate. Injectable human and veterinarian AAS remain the most popular and widely used PIEDs. The 2005 sample used a mean of 2 AAS (ranging from 0 to 6 AAS) in their most recent cycle. Typical cycles were a median of 10 weeks in length, with a median of 11 weeks rest period between cycles. Cycle lengths ranged 3 weeks to 52 weeks (i.e. a small proportion of PIEDs were on constant doses of AAS, including HIV positive participants). Most had used PIEDs annually since first using, and the median number of cycles per year was 2, ranging from 1 to 4. KEs reported that PIEDs use is generally seasonal, increasing over spring and summer months.

There appeared to be no major changes in the patterns of PIEDs use from 1997 to 2005. The two samples reported similar cycle lengths, frequencies and types of PIEDs being used. Since 1997 there has been a slight shift away from veterinarian AAS products, towards more human AAS products and other 'prohormones' such as DHEA and androstenedione. The 2005 sample also reported increased diversification in the range of other PIEDs used alongside AAS. For example, there were higher rates of lifetime use of insulin, clenbuterol, HCG and anti-oestrogen by the 2005 sample.

10.3. Motivations for use

The 2005 study reinforced the importance of body image as a motivation for PIEDs use. The most commonly reported motivation for first using PIEDs was for the desirable effect on physique (such as increased size, increased weight, increased muscularity and faster 'gains'). Other motivations included social benefits, enhanced feelings of confidence, training benefits, medical or health reasons and competitive advantage. The desirable effects on physique remained the most commonly reported reasons for maintaining PIEDs use. PIEDs users reported continuing to use to 'feel good' (e.g. feel motivated, feel 'healthy', enhanced feelings of self-esteem), and to 'look good' (such as to enhance appearance, fight ageing or for body image reasons).

The 2005 sample's comments on the benefits of PIEDs use highlighted the importance of muscularity for self-esteem and confidence. The benefits most frequently identified included: improved muscle definition, increased size, increased weight, increased strength, being able to train harder for longer, improved self-esteem, increased confidence, and positive feedback from others.

Occupational use of PIEDs has been frequently discussed in the literature (e.g. Australian Olympic Committee, 2000; Maycock, 1999; Maycock & Beel, 1997; Monaghan, 2002a; Mugford, 1995). Police, door staff, security personnel, bodyguards, fire fighters, members of the armed forces and members of street gangs have been some of the professions and groups identified previously (Australian Olympic Committee, 2000; Maycock, 1999; Monaghan, 2002a, 2002b; Mugford, 1995; Peters et al., 1997). However, the present study found that when asked to identify a category that best described their use of PIEDs, only 9% of the sample identified 'occupational user'. While not identified as a primary

explanation for their PIEDs use, 53% of the 2005 PIEDs user sample reported having ever worked in a profession where muscular strength and physical appearance were important. The types of occupations reported included trades/labouring, fitness industry, security/armed services, adult entertainment industry, sales and professional athlete. While not necessarily identified as an occupation in which muscular strength and physical appearance were important, 23% reported having ever worked in the security industry.

10.4. Harms

The majority (97%) of PIEDs users had experienced at least one minor physical side effect (28% had experienced more than three). Most commonly, the 2005 PIEDs user sample experienced increased appetite, water retention, reduced teste size, acne, increased sex drive and sleeplessness. A large proportion also reported experiencing sore or swollen injection sites and increased body hair. One-third of participants reported having experienced gynaecomastia and a quarter reported experiencing high blood pressure. Very few participants reported more serious side effects such as heart or liver problems. No PIEDs-related deaths were identified in the routine data sources.

Most of the sample had injected PIEDs (93%) and the mean age of first injection was 25.5 (SD 6.4). Most PIEDs users reported having been shown how to inject by a friend or were self-taught. In general, there were low rates of needle sharing among the group, but other risky injection practices included: reusing needles, being injected by another person, injecting small muscle groups, injecting from a shared container, injecting other illicit drugs and injecting insulin. Self-reports of BBVI were 12% HIV positive, 3% HBV positive and 5% HCV positive. All HIV positive participants identified as gay/bisexual men.

The majority of participants (87%) had experienced some changes in their mood or behaviour when using PIEDs. The positive effects included increased motivation, increased confidence, feeling more satisfied with body image and having an increased sex drive. The negative effects included feeling more irritable and aggression. Twenty-three percent of participants reported having been involved in an incident involving aggression or violence in the 6 months prior to interview. Just over one-third (37%) of participants reported having ever experienced 'roid rage'. 'Roid rage' occurred most often in domestic environments or driving a car, and was described as requiring a specific trigger, a sudden rush of anger or arousal, and possible escalation to verbal or physical aggression (either towards an object or a person). For the majority of participants, the experience lasted for a short duration.

Just over a quarter (27%) of the sample reported experiencing mental health concerns in the previous six months. The most commonly self-reported mental health concerns were depression and anxiety. The 2005 sample endorsed symptoms of dependence, most frequently withdrawal symptoms. The most common withdrawal symptoms included desire for more steroids, dissatisfaction with body image, general lack of interest, depression and fatigue after stopping a cycle.

In general, there were low rates of involvement in crime. One-third of participants (35%) reported involvement in crime in the last month, most commonly dealing (23%). No distinction was made in the data between sourcing for friends and large-scale supply. Twelve percent of the sample (n=7) reported having been arrested in the 12 months prior to interview, and 8% (n=5) reported having ever been to prison. National AAS-related

arrest data shows that the numbers of AAS-related arrests account for only 0.1% to 0.2% of all Australian arrests, and in the majority of cases these arrests involved consumers (and amounts consistent with personal use).

The links between PIEDs use and potential harms are less clear than with other illicit drugs. With drugs such as heroin, the harms to the individual, their families and the wider community tend to be more apparent through higher rates of unemployment, acquisitive crimes, poorer physical health, and a potentially greater demand on the healthcare system. These issues, while still relevant, do not apply so directly to PIEDs users. Compared to other injecting drug users, PIEDs users have lower rates of unemployment, lower rates of acquisitive crime and, on the whole, seem to be maintaining high levels of social and occupational functioning. They view their own behaviour as 'healthy' and eat well, sleep well and engage in rigorous physical activity. The belief that 'strong bodies' are 'healthy' is reinforced by society, and the image of the highly muscular male body is prevalent in the popular media (Leit et al., 2002; Leit et al., 2001; Pope, 2001).

PIEDs users are wary of the 'medical profession' and are critical of past research having overstated the harms, and may have a tendency to disregard the long-term negative effects (e.g. Monaghan, 1999; Pope, Kanayama, Ionescu-Pioggia, & Hudson, 2004). However, the PIEDs users in the present study reported experiencing some physical and psychological problems, but were making costs-benefits analyses of their behaviour. The vast majority (90%) of the sample believed that the benefits of PIEDs use outweighed the risks. Seventy-six percent of the sample reported that they would continue to use for the foreseeable future.

10.5. PIEDs markets

This is the first detailed study of the PIEDs market in Australia, particularly with respect to street prices. The knowledge of PIEDs markets among both KEs and PIEDs users was generally quite low, particularly in reporting on recent street price, proportion of counterfeits and street-level availability of the less frequently used PIEDs such as HCG, insulin, IGF or EPO. PIEDs users and KEs were more confident in their knowledge of AAS, HGH and clenbuterol markets.

10.5.1. Price

The price of veterinary injectable AAS products (such as Boldenone®, Deca50®, Stanazol®, testosterone esters, etc) ranged from $2 to $15 per ml. The price of human injectable AAS products (such as Deca Durabolin®, Sustanon250®, etc) was higher, ranging from $20 to $40 per ml. Oral AAS products were generally cheaper with prices ranging from $0.80 to $3.50 per tablet. Participants most often reported that prices of AAS had remained 'stable' over the last six months (40%).

Knowledge of the street price of other PIEDs (other than AAS) was less consistent, and fewer participants could comment. In general, it was agreed that HGH was the most expensive, but the prices quoted by participants were widely variable. The most commonly reported price range for HGH was between $450 and $500 per week for a 4 to 6 week cycle. Clenbuterol was believed to cost between $150 and $200 per tub (of gel or

powder), and between $2 and $7 per tablet. Anti-oestrogens ranged from between $2.50 to $10 per tablet. Most PIEDs users were unable to comment on whether the prices of these other PIEDs had changed over the last six months.

10.5.2. Counterfeits

The most commonly faked PIEDs were reported to be AAS (35%), followed by HGH (20%) and clenbuterol (5%).

10.5.3. Availability

General comments from PIEDs users indicated that, prior to 2000, AAS were more widely available, cheaper, and believed to be 'genuine' human or veterinarian products. Since the introduction of restrictions on supply, some PIEDs users reported an increase in the number of fakes/counterfeits and the rise of new products such as 'Dianabol paper products' and 'homebake'.

The majority of PIEDs seizures occur at the Australian border. The number of seizures of AAS made by Customs increased steadily from 1996-1997 through to 1999-2000. Since 1999-2000, variations in the numbers of seizures have been less pronounced. The steady increase in AAS seizures in the years leading up to the Sydney Olympics may reflect a number of factors including growth in internet trade in substances legally available in other countries and the enhanced capacity of law enforcement. Customs data also indicate that androstenedione-type substances (i.e. prohormones) made up a significant proportion of seizures over the same period.

The participants' reports of recent availability (i.e. in the last six months) were highly variable. AAS were most often reported as being 'stable' or 'more difficult to obtain', HGH as 'stable' or 'more difficult to obtain', and clenbuterol as 'stable' or 'more easy to obtain'.

10.6. Information and help-seeking

In general, PIEDs users expressed a strong desire for information and knowledge regarding risks and how to reduce them. They seek information frequently from the internet, friends, doctors and gym contacts. Most health services do not give this group a profile, and there are rarely posters, images, signs, and harm reduction materials that depict PIEDs users. The services that are most likely to have regular contact with large numbers of PIEDs users are NSPs. However, PIEDs users rarely seek information regarding PIEDs from these services (only 7% of participants reported seeking information from an NSP, despite 71% of participants accessing NSPs for injecting equipment). There is a perception that NSPs are targeted at other injecting drug users and not appropriate to PIEDs users as a source of harm reduction information.

The low numbers of PIEDS users accessing AOD treatment services is not accurately reflecting the demand for support, but rather the limited treatment options that are available. PIEDs users do not generally seek advice or support from AOD-specific services (such as NSPs, ADIS and treatment agencies) and do not identify with messages

or services targeting 'illicit drug use'. Small numbers of PIEDs reported accessing mental health support, most commonly from a 'psychiatrist' or a 'counsellor'.

Comments from PIEDs users and KEs emphasised the importance of personal networks of information and support for this group. This is reflected in the emergence of internet forums where PIEDs users can exchange cycle information and harm reduction advice. Substantial proportions of the sample reported relying on friends to learn how to inject and plan cycles. KEs suggested that the 'hidden' nature of this group leaves them vulnerable to an over-reliance on 'folk pharmacology'. An example of 'folk pharmacology' is the widespread belief among PIEDs users that cycling (using for a defined period, followed by a rest period of equal or longer length) protects against the harms associated with long-term use. This concept remains untested in the scientific literature, but remains a strongly held belief and a central strategy for harm reduction.

PIEDs users themselves suggested suitable harm reduction strategies could include peer-education models and access to a non-judgemental doctor for regular health checks (including regular blood tests and monitoring of the risk factors for endocrine, heart, liver and kidney disease). The group also expressed concern about fake products.

10.7. Limitations of the present study

Despite the 2005 study having a smaller sample size, the similarities in the groups' characteristics, patterns of use and experience of harms indicate that the 1997 and 2005 studies accessed similar sentinel groups. Accordingly some inferences have been cautiously drawn about characteristics of the wider population of PIEDs users. There are, however, limitations of the present study.

The 2005 sample is not representative of all PIEDs users in Australia. The sample was only recruited from metropolitan areas of Sydney (NSW) and did not include women. Recruiting through NSPs may have resulted in an over-representation of PIEDs users who used alcohol and other drugs. Participation in the study was voluntary, and the sample was self-selecting. A further limitation of the study is the reliance on self-reports of participants.

KEs interviewed for the study could only talk about those PIEDs users they were in regular contact with. KE descriptions of PIEDs users may not be representative of the wider population. For example, doctors may only see problematic PIEDs users who are experiencing harms.

Indicator data can only provide a general picture of trends in the PIEDs market. Indicator data often made no distinctions between different types of PIEDs, or reported only AAS trends. The present study was unable to identify objective health indicators.

Differences between the 1997 sample and 2005 sample were not tested for statistical significance due to the smaller 2005 sample size, differences in study design and sampling methods. The size of the 2005 sample (n=60) also limits the extent to which inferences can be drawn regarding the general population of PIEDs users.

10.8. Recommendations for intervention and harm reduction

- At present, there is an over-reliance on personal networks of friends and user-group internet forums for advice and information. Services should consider supporting alternatives for accessing objective, non-judgemental medical advice and health monitoring. PIEDs users would like access to regular health assessments and blood tests, including monitoring of risk factors relating to endrocrine, heart, liver and kidney disease.

- NSP workers need ongoing training on PIEDs, particularly with respect to providing injecting and harm reduction advice to this group. Some NSPs indicated a lack of clarity regarding their services to this group (i.e. is their service the appropriate service for this group?).

- The development of health promotion/harm reduction strategies (suitable for NSPs, health workers in primary care settings and personal trainers) would be useful for this group, with information on safe injecting, sex risk, insulin, etc.

- KEs highlighted the need for a range of AAS-specific resources (harm reduction leaflets, safer injecting techniques, etc), catering for different audiences. Many services in Sydney were providing photocopies of *The Big Book: An Overview of Anabolic-Androgenic Steroids* produced more than 7 years ago by The Exchange, Manly. This resource needs to be updated to reflect current research, and needs to be adapted to suit different groups such as young men, gay men and professional/enthusiast bodybuilders.

- Health services need to increase the profile of this group at services by displaying PIEDs-specific resources and appropriate images at NSPs, etc. At present, PIEDs users do not perceive NSPs as being appropriate services for them.

- Services should consider implementing the model of the Steroid Peer Education Project in Victoria.

- Health services should engage the private fitness industry (gyms, personal trainers, etc) in health promotion and developing resources targeting this group.

10.9. Recommendations for future research

- More research is needed to understand other risk behaviours of this group (e.g. driving, sex risk, alcohol and other drug use, victim/perpetrator of violence).

- Longitudinal/cohort studies are needed to understand the long-term effects of real-life, non-medical patterns of use and the efficacy of 'cycling'.

11. FEASIBILITY OF THE METHODOLOGY

The present study adapted the established IDRS methodology and assessed the feasibility of using this method annually, and possibly nationally, to monitor PIEDs markets over time. There has been very little research into the non-medical use of PIEDs in Australia, and a regular program of data collection would allow for a clearer understanding of the issues. Such data would be helpful in monitoring patterns of use, harms, service utilization and changes in the market (price, purity and availability).

In evaluating the feasibility of regularly monitoring the PIEDs market, consideration has been given to:

- The match between the project's outcomes and initial specifications.
- The quality of the data obtained using this methodology.
- Consultation with IDRS researchers in other jurisdictions.

11.1. PIEDs users

11.1.1. Sample size

The study conducted by Peters and colleagues (1997) recruited 100 AAS users over a 9 month period from September to May 1997. The present study fell short of its recruitment target (N=100), completing 60 PIEDs user interviews over an 8 month period from January to August. This was despite extensive work using varied recruitment strategies and consistent follow-up by the interviewer. Despite the smaller sample size, the 1997 and 2005 samples had many characteristics in common, confirming that the 2005 sample had accessed a similar sentinel group.

Feedback from researchers in other jurisdictions was generally that obtaining a 'snapshot' (within a short timeframe) from a sample of 60-100 PIEDs users on an annual basis in each jurisdiction was not achievable. Researchers in Victoria reported accessing the group in their jurisdiction might be easier due to established researcher networks, and the profile of the Steroid Peer Education Project. Overall, researchers in other jurisdictions suggested smaller sample sizes (between 10 and 30 PIEDs users) may be achievable, but would not be easily obtained within a one-month timeframe as in the IDRS and PDI data collection.

11.1.2. Interview format

The face-to-face interview with PIEDs users took a minimum of one hour to complete (the longest interview took 1.5 hours). Many PIEDs users were employed, and the length of the interview may have been a disincentive. Future surveys could be briefer, and presented in a user-friendly format for self-administration. Face-to-face interviews could be supplemented with self-complete surveys, telephone interviews and possibly internet-based surveys. While internet surveys may be limited by a possible bias towards a higher socio-economic demographic, as implied by the necessity of having access to a computer and being internet-aware, other studies have not found significantly distorted information

that would suggest artificial responses (e.g. Perry, Lund, Deninger, Kutscher, & Schneider, 2005).

11.1.3. Recruitment

PIEDs users were extremely challenging to access, and the present study employed a range of purposive recruitment strategies. Table 34 (below) presents the response rates for each recruitment strategy.

Anonymity and confidentiality were particularly important for PIEDs users. The group were also very cautious about research in general (see Appendix Five). Their concerns mainly related to their behaviour being further stigmatised. Two potential participants clearly expressed an unwillingness to contribute to studies that may directly, or indirectly, inform law enforcement. Other participants described previous research findings as overstating the harms and presenting an exaggerated view of the risks. Accordingly, the group may have been self-selecting to represent only those who were willing to participate and to give information on their use of PIEDs.

Recruitment was time-consuming and required persistent networking on the part of the researchers. The sample was recruited through advertising in street press, on radio, on internet forums, through NSPs, gyms, GPs, and through advertising targeting the security industry. Due to ethical constraints, the researchers were not able to directly solicit potential participants at gyms. Instead the project relied on gym managers and staff to advertise and promote the study. This approach was problematic: often gym managers/trainers were willing to give their personal view, but did not feel able to promote the study to their customers for fear of presenting as a 'steroid-friendly' gym.

Almost one-third of the sample was recruited through NSPs. NSPs are the health services most regularly in contact with the target group. However, their profile mainly targets other injecting drug users, and both KEs and researchers in other jurisdictions reported that PIEDs users do not engage readily with NSPs for services other than needle/syringe collection. This may have led to a sampling bias, and over-representation of PIEDs users who also used other illicit drugs.

Feedback from researchers in other jurisdictions was that they would need sufficient lead-in time to develop networks with the fitness and bodybuilding communities. Very little research has been conducted in other jurisdictions in the area of PIEDs (with the exception of Victoria), and researchers would be developing these relationships for the first time.

Table 34: Summary of responses to recruitment strategies

Recruitment strategy:	Total number of enquiries	Number of interviews conducted
Street press (Sydney Star Observer, 3D World, SX Magazine)	26	13
Radio (Triple J's Hack program)	10	3
Needle Syringe Programs (Kings Cross, Cantebury, Penrith, Bankstown, Redfern, Manly, Liverpool, Parramatta, St George, Blacktown, Sutherland, ACON, pharmacies)	27	18
Snowballing (Peer referral)	12	12
Gyms/fitness industry (Mailout to gyms, mailout to supplement stores, posters, fliers)	9	5
Bodybuilding magazine (Ironman)	1	0
Website advertising (www.pillreports.com, www.anabolex.com)	15	9
Security industry (ASIAL newsletter)	0	0
GPs (South Western Sydney GP Liaison Newsletter)	0	0
TOTAL	**100**	**60**

Note: A number of the enquiries came from interstate and overseas, and as such were not eligible to participate in the study. Others failed to meet eligibility criteria for the study (i.e. they were not resident of Sydney, were not aged 17+, and had not used anabolic substances in last 6 months).

11.2. Key experts

The present study exceeded its target of 10 KE interviews. Twenty-four KEs were interviewed, including fitness industry professionals, NSPs, doctors (who had an interest in the area), pharmacists (who either provided needles and syringes to the group, or worked in the investigations unit of the NSW Health Pharmaceutical Services Branch), and law enforcement personnel (NSW Police, Australian Federal Police and Australian Customs Service). The KEs were able to talk about PIEDs mainly through the course of their work; however, some were also able to talk from personal experience or social networks.

Based on the NSW experience, KEs were easier to identify than PIEDs users. KEs were able to give insight into the group's characteristics, as well as information about PIEDs markets. Future data collection could aim for higher numbers of KE interviews in each jurisdiction (e.g. 15 to 20 KE interviews).

11.3. Indicator data

The present study identified and evaluated a range of indicator data sources, presented in Appendix Three. Most indicator data sources have been established to monitor trends in other illicit drugs, rather than specifically to monitor the range of PIEDs. So the available data was patchy, and largely incomplete.

Identifying objective indicators regarding the physical harms associated with PIEDs use was problematic. Unlike the harms associated with other illicit drugs, PIEDs do not have clearly identifiable ICD-9 or ICD-10 codes for monitoring PIEDs-related hospital admissions. The codes that may have given the best indication of harms were the poisoning codes (ICD-10: T38.7 and T44.5). However, only small numbers of cases were identified. Reporting of admission data relies on identification of PIEDs as the underlying cause for the presentation. Many PIEDs users may be reluctant to disclose their use of these substances. Similarly, while the present study considered gynaecomastia as a potential indicator for PIEDs use, many of the known effects of PIEDs (such as gynaecomastia) have multiple causes, making it difficult to draw conclusions regarding causality and the relative proportion of PIEDs-related cases. The results of the gynaecomastia investigation are presented in Appendix Four.

NSPs do not collect standardised data across all Area Health Services in NSW regarding 'last drug injected' or 'drug injected most often in the last month'. Accordingly, the present study was unable to estimate the proportions of NSP clients who were primary PIEDs users in NSW. Data from the annual NSP survey conducted by the National Centre for HIV Epidemiology and Clinical Research, University of New South Wales, gives the best indication of NSP utilisation by PIEDs users.

Other useful indicators of PIEDs that were not examined by the present study include regular reviews of prescription data (public and private), data on sales and supply of veterinarian AAS and data from NSW Pharmaceutical Services Branch investigations as well as pharmaceutical manufacturing. Feedback from other jurisdictions confirmed that the indicator data accessible to most jurisdictions included helpline data, hospital admissions and police/customs seizures.

11.4. General issues

11.4.1. PIEDs user involvement

Both KEs and PIEDs users highlighted the importance of the culture of mentoring and word-of-mouth information among PIEDs users. This is reflected in the groups' use of internet-based bodybuilding forums and reliance on personal networks. Appendix Five gives examples of PIEDs-related internet chat rooms/forums and discussion themes. Future research could consider using peer interviewing models, or having peer representation on steering groups for the research.

11.4.2. Resource demands

Particularly for face-to-face interviews, researchers will need to factor in additional costs of traveling to participants (as many are employed). Other resource considerations include the development of a web-based survey, database development and the costs of participant reimbursement for travel costs and time.

Feedback from researchers in other jurisdictions was that implementing an annual rapid assessment of PIEDs in their areas would require additional resources and dedicated researchers. Assessment of PIEDs does not dovetail neatly with existing drug monitoring systems, and researchers would have to develop new relationships and networks in order to access the group.

11.4.3. Timeframes

The present study found that face-to-face recruitment was time-consuming and the 60 PIEDs user interviews took 8 months to complete. Recruitment of the 2005 PIEDs user sample may have also been more difficult due to the time of year. The present study recruited mainly through late summer, autumn and winter. KE comments highlighted that PIEDs use is often seasonal, peaking in spring and summer months. These were the months during which the 1997 study were recruiting. Future studies may need to take this into account.

Focusing on the most successful recruitment strategies could also shorten the timeframes (e.g. NSPs, street press, the internet, key fitness industry contacts and snowballing). Face-to-face interviews (which are time-consuming and may be less attractive to a group who are worried about anonymity and are often employed fulltime) could be supplemented with phone interviews, web-based or self-complete surveys.

In order to collect annual, comparable data as part of an early warning monitoring system, recruitment of PIEDs users would need to occur over a shorter timeframe (e.g. over 1 to 2 months) at the same time each year (e.g. ideally between the months of October and March). This may be impractical given the 'hidden' nature of this group.

11.4.4. The importance of monitoring PIEDs

The non-medical use of PIEDs is an under-researched area in Australia, and PIEDs users are often described as a 'hidden' group. We know from medical applications of PIEDs (and clinical trials) that there are unwanted side effects and potential harms. Transferring the use of these substances to non-medical, naturalistic (i.e. real life) settings is likely to see these risks increase.

Given that most PIEDs are diverted pharmaceuticals, it is necessary to monitor trends and patterns of use. Indicators of diversion could include seizures of attempted imports, exports of human and veterinarian AAS, sales of human and veterinarian AAS, details of investigations and PBS data. The media profile of elite sports users and the wider debate regarding drugs in sport also contributes to the need for ongoing monitoring.

The present study found high levels of alcohol and illicit drug use (in particular psychostimulant and cannabis use) among PIEDs users. In addition, KEs reported risky behaviours relating to sex and driving. Given that one-third of the sample (33%) were young men aged 25 years or younger, harm reduction messages may need to be specifically tailored for this group.

The patterns of PIEDs use documented by the present study had not changed significantly since the 1997 study. The exceptions were a possible shift away from veterinarian AAS towards human AAS and other 'prohormones', and increased diversification in the use of other PIEDs alongside AAS. There is a good body of evidence regarding the main PIEDs used, cycle length and frequency, and experience of physical and psychological side effects.

Although the 2005 PIEDs user sample reported negative physical and psychological effects, the harms experienced were less acute than those observed in other groups of injecting drugs users. The present study did not identify any deaths attributed to the use of PIEDs in the routine data sources. The self-reports of PIEDs users were also backed up by the comments from KEs, who indicated that PIEDs users rarely present at services seeking help. The majority of PIEDs users believed the benefits of use outweighed the possible risks. These findings were very similar to those found in the 1997 study. However, it is possible that, as new substances appear on the market or larger numbers of PIEDs users utilise a wider range of pharmaceuticals in their cycles, new harms may emerge.

Researchers from some jurisdictions expressed concerns that there may not be a big enough population of PIEDs users in all states and territories, and that the 'hidden' nature of the group may impede the success of the group being captured by a rapid annual assessment. Using PIEDs remains a highly stigmatised activity and users often choose not to disclose their use of PIEDs to family or friends. The 'secret' nature of use may prove a further barrier to being able to access this target group in regular programs of research.

11.5. Recommendations regarding feasibility

- The 2005 study found very similar group characteristics, patterns of use, and experiences of harms to the 1997 study. Given the challenges in accessing a regular sample of PIEDs users within short timeframes across all jurisdictions, it may not be practical or necessary to conduct annual face-to-face interviews with a sentinel group of users. To continue monitoring trends, a realistic timeframe for PIEDs users surveys is every 3-5 years, rather than annually.

- In terms of future monitoring, surveys of PIEDs users should focus on new products being used, patterns and correlates of use and experience of harms. There is now a good body of evidence regarding the motivations of this group.

- PIEDS user surveys could make use of multiple formats to ensure flexibility for a group who are often employed, concerned about anonymity, and engaging in highly stigmatised activities. Internet surveys and phone surveys would be a useful adjunct to face-to-face interviews.

- Key expert interviews could be conducted annually across all jurisdictions, in a shorter timeframe. The present study found that key experts had detailed knowledge of the groups' characteristics and the PIEDs market.

- Key indicators could be collated annually, including: helpline calls (e.g. ADIS, Steroid Peer Education Project in Victoria); NSP surveys ('last drug injected'); coronial and toxicology data (e.g. NCIS, DAL); population surveys (e.g. NDSHS, ASSADs); gay community surveys (e.g. Health in Men, Gay Community Periodic Survey); seizures of attempted imports (e.g. Customs); domestic seizures (e.g. AFP and State/Territory Police); sales of human and veterinarian AAS (e.g. APVMA figures); AAS-related arrests (e.g. AFP and State/Territory Police); prescription data (e.g. PBS aggregated expenditure from HIC); and pharmaceutical investigations (e.g. NSW Health – Pharmaceutical Services Branch).

- Where possible, indicator data sources could collect breakdowns of different PIEDs (e.g. anabolic-androgenic steroids, androstenedione, DHEA, somatotrophins, gonadotrophins, somatorelins; anti-oestrogens, etc), rather than reporting global categories such as 'steroids' or 'hormones'.

APPENDIX ONE: The main PIEDs of concern

This list is not exhaustive, and there are a range of other medicines and dietary supplements that are used to enhance performance or image. This list summarises the main substances referred to in the body of the report. These have been described in more detail elsewhere (Larance et al, 2005). The majority of these substances are banned under the Olympic Movement's *World Anti-Doping Code Prohibited Classes of Substances and Prohibited Methods (2005),* with the exception of creatine monohydrate.

Anabolic-androgenic steroids (AAS)

Androgens are the male sex hormones responsible for the primary and secondary sex characteristics of adults, such as body hair, deepening of the voice, development of the male sex organs and sex drive. AAS are synthetic derivatives of testosterone originally developed for human and veterinary medicine. AAS act on the musculoskeletal system, influencing lean body mass, muscle size, erythropoiesis, strength, protein metabolism, bone metabolism, and collagen synthesis. AAS are prescription-only medications. Athletes and others are using AAS to enhance muscle growth. See Appendix Two for a summary of the main AAS names used in this report.

Anti-oestrogenic agents

Anti-oestrogenic agents are prescription-only medications that either block the actions of oestrogen by occupying the oestrogen receptors on cells (e.g. tamoxifen), or reducing the amount of circulating oestrogen (e.g. 'aromatase inhibitors'). Aromatase inhibitors work by keeping androgens from being converted to oestrogen. The main substances of concern include tamoxifen (Nolvodex®), clomiphene (Clomid®) and aromatase inhibitors such as anastrazol (Arimidex®), exemestane (Aromasin®), and letrozole (Femara®). Men are using anti-oestrogenic agents to counteract the undesirable side effects of AAS use. Most commonly, these substances are used to prevent the unwanted side effects of AAS use such as gynaecomastia (development of the breast tissue).

Clenbuterol

Clenbuterol is classed as a 'beta-2 agonist' and its short-term effects are similar to stimulant drugs like amphetamine or ephedrine (i.e. increased heart rate, temperature, perspiration and blood pressure). The main therapeutic use of clenbuterol is in the treatment of asthma to relax the smooth muscle in the airways. Clenbuterol is not approved for human use in Australia, but is used as a bronchodilator in veterinary medicine. Some animal studies have shown that clenbuterol has the 'anabolic effect' of increasing muscle mass and body weight by enhancing muscle protein synthesis in rodents. However, no human studies are available on whether clenbuterol has a direct anabolic effect in humans. Most often, clenbuterol is used as a 'fat burner' to 'define' muscles (i.e. for its 'catabolic' or 'repartitioning' effect).

Creatine Monohydrate

Creatine is a naturally occurring compound synthesised from amino acids by the kidneys and liver. Creatine is also contained in foods such as meat, fish and poultry. Creatine monohydrate is the most commonly used salt form of synthetic creatine and is sold over the counter as a sports supplement. Using creatine monohydrate may replenish and increase the energy stores to delay fatigue during intense, brief exercise, as well as reduce recovery time between bouts of exercise. Research in this area seems to support the theory that creatine may benefit certain athletes in certain situations. It is not a banned substance.

DHEA and Androstenedione

DHEA is a weak androgen that is secreted by the adrenal gland. It is one of the main precursors in the production of male and female sex hormones. Androstenedione is an AAS produced either by the gonads and adrenal glands, or from DHEA by peripheral transformation. DHEA and androstenedione are often described as 'prohormones' or 'hormone precursors'. Both are believed to have anabolic effects by increasing serum testosterone levels. However, studies on their effectiveness are limited. Synthetic DHEA and androstenedione do not have medical applications, although DHEA is marketed as having anti-ageing properties. These substances are classed as 'AAS' in Australia..

Erythropoietin (EPO)

EPO is a naturally occurring hormone produced by cells in the kidneys that regulate the production of red blood cells in bone marrow. EPO stimulates the bone marrow to produce more red blood cells (to increase the oxygen carrying capacity of the blood). Artificial EPO is a prescription-only medication primarily used in the treatment of severe anaemia caused by kidney disease or other medical conditions. The use of EPO is believed to increase oxygen absorption, reduce fatigue and improve endurance by increasing the rate of red cell production. Unlike other PIEDs, EPO has limited or no application to enhancing body image. EPO is being used to enhance performance in elite endurance sports.

Human Chorionic Gonadotrophin (HCG)

Human Chorionic Gonadotrophin (HCG) is a naturally occurring hormone produced in the placenta of women during pregnancy. It is important in triggering hormonal changes in women during pregnancy and embryo development. HCG is a prescription-only medication that has been used in the treatment of delayed puberty in boys (where boys do not develop secondary sexual characteristics at the normal age of 12 - 14 years old), female infertility (HCG stimulates ovulation), low sperm count (oligospermia) and undescended testes. The most common brand name of HCG used in Australia is Pregnyl®. During long duration AAS cycles, the natural testosterone levels stay suppressed for a considerable time causing atrophy of the testes. By administering HCG, AAS users believe they can bring back the size of the testes and kickstart natural testosterone production.

Human Growth Hormone (HGH)

HGH is a naturally occurring hormone produced by the pituitary gland and is one of the most important hormones influencing growth and development in humans. HGH plays a major role in normal growth from birth to adulthood. It stimulates the liver and other tissues to secrete insulin-like growth factor (IGF-1). IGF-1 stimulates production of cartilage cells, resulting in bone growth and also plays a role in muscle growth. Low HGH levels in children and teenagers can result in dwarfism. Excessive HGH secretion in children (which is extremely rare and usually resulting from a tumour of the pituitary gland) can result in giantism. Excessive endogenous or exogenous HGH in adults can lead to a condition known as acromegaly (abnormal growth of bones of the hands, feet and face). HGH is a prescription-only medication. HGH is being used to promote muscle growth by bodybuilders and possibly athletes (despite limited research in this area), and is also marketed on the internet as having anti-ageing properties.

Insulin-like Growth Factor-1 (IGF-1)

IGF-1 is a naturally occurring growth factor or hormone that stimulates many processes in the body. It is the hormone through which human growth hormone (HGH) exerts most of its growth promoting effects. IGF-1's chemical structure is similar to that of insulin, so in very high quantities it can produce the same effects as insulin (such as low blood sugar, or 'hypoglycaemia'). Artificial IGF-1 was produced for clinical use in the 1990s and, during this time, its effects on growth-promotion and insulin effects were closely studied. However, many trials stopped following apparent links between high levels of IGF-1 and malignancy in the cohort studies. Since then, the situation has been reviewed and some clinical trials have resumed. IGF-1 may have beneficial applications in the treatment of some growth disorders (e.g. Laron syndrome), diabetes mellitus and insulin resistance. It is assumed that IGF-1 is used by athletes and others to promote muscle growth.

Insulin

Insulin is a naturally occurring hormone that is secreted by the cells of the pancreas in response to high blood sugar levels. When blood sugar is high, insulin is released to reduce glucose levels in the blood and prevent the liver from releasing additional glucose. Insulin plays a role in the metabolism of carbohydrates, fats and proteins. Insulin is a prescription-only medication for the treatment of diabetes. Bodybuilders use insulin to enhance muscle growth. The evidence appears to indicate that insulin does not play a role in protein synthesis directly. However, insulin may affect body composition by increasing muscle glycogen stores and by inhibiting muscle protein breakdown.

APPENDIX TWO: Common anabolic-androgenic steroids (AAS)

Boldenone (and esters)
Common brand street name(s): Boldebal-h ®; Boldec®; Boldenone; Boldenone 50®; Depobol®.

Drive®
Contains: boldenone undecylenate/methandriol dipropionate.

Methandrostenelone
Common brand/street name(s): Dianabol®.

Methenolone
Common brand/street name(s): Primobolan®; Primobolan Depot®.

Nandrolone (and esters)
Common brand/street name(s): Deca 50, 100; Deca-durabolin®; Durabolin®; Laurabolin®.

Oxymetholone
Common brand/street name(s): Adroyd®; Anadrol®; Anapolan 50®.

Sustanon®
Contains: testosterone propionate/testosterone phenylpropionate/testosterone isocaproate/testosterone decanoate.

Stanazolol
Common brand street name(s):Stanazol®; Stanosus 50®; Winstrol®.

Testosterone Cypionate
Common brand/street name(s): testosterone cypionate; Testo la®; Coopers Banrot®.

Testosterone Enanthate
Common brand/street name(s):testosterone enanthate; Primoteston depot®.

Testosterone Propionate
Common brand/street name(s): testosterone propionate; Tepro-sterile injection®.

Note: This list is intended as a guide only – it is not exhaustive of all AAS and related compounds.

APPENDIX THREE: Evaluation of indicator data sets

Health Indicators		
Data custodian:	**Description of data:**	**Outcome:**
NSW Health	Minimum Data Set – Alcohol and Other Drugs (MDS-AOD) – treatment episodes	Reported
NSW Health	Alcohol and Drug Information Service (ADIS) – helpline calls	Reported
Family Drug Support (FDS)	FDS – helpline calls	No PIEDs-related data
NSW Health	Department of Analytical Laboratories (DAL) – toxicology data from drug-related deaths (mortality data)	No PIEDs-related data
Australian Institute for Health and Welfare (AIHW)	Inpatient Statistics Collection (ISC) – hospital admissions (morbidity data)	Reported – limited PIEDs-related data
AIHW	Emergency Department Collection (EDC) – emergency admissions (morbidity data)	No PIEDs-related data
National Coronial Information System (NCIS)	Deaths related to use of PIEDs	Reported
National Centre for HIV Epidemiology and Clinical Research (NCHECR)	Annual NSP survey data – last drug injected statistics	Reported
Prevalence Indicators		
Data custodian:	**Description of data:**	**Outcome:**
AIHW	National Drugs Strategy (NDS) Household Survey	Reported
National Centre for HIV Social Research (NCHSR)	Gay Community Periodic Survey – prevalence of AAS use among gay men surveyed in Sydney, NSW	Reported
NCHSR	Health in Men Survey – prevalence of AAS injecting among gay men surveyed in Sydney, NSW	Reported
Australian Government Department of Health and Ageing (AGDH&A)	Australian secondary students' use of illicit drugs and alcohol	Reported

Market indicators		
Australian Pesticides and Veterinary Medicines Authority	National sales of veterinary AAS	Reported
Australian Government Department of Health and Ageing (AGDH&A) Office of chemical Safety	Number of approved imports of PIEDs	Not reported here
Health Insurance Commission (HIC)	Australian Pharmaceutical Benefits Scheme (PBS) aggregated records of PBS expenditure on AAS products	Reported from Handelsman (2004) study
Law Enforcement Indicators		
Data custodian:	**Description of data:**	**Outcome:**
Australian Customs Service	Seizures of PIEDs at the border	Reported
Australian Federal Police	Domestic seizures of PIEDs	Reported
New South Wales Police	COPs data – consumer and provider arrests for PIEDs and details on PIEDs-related incidents	Reported
Australian Crime Commission	Illicit Drug Data Report – consumer and provider arrests for PIEDs	Reported
NSW Health Pharmaceutical Services Branch	No. of investigations regarding PIEDs	Requires a manual audit – unable to report here

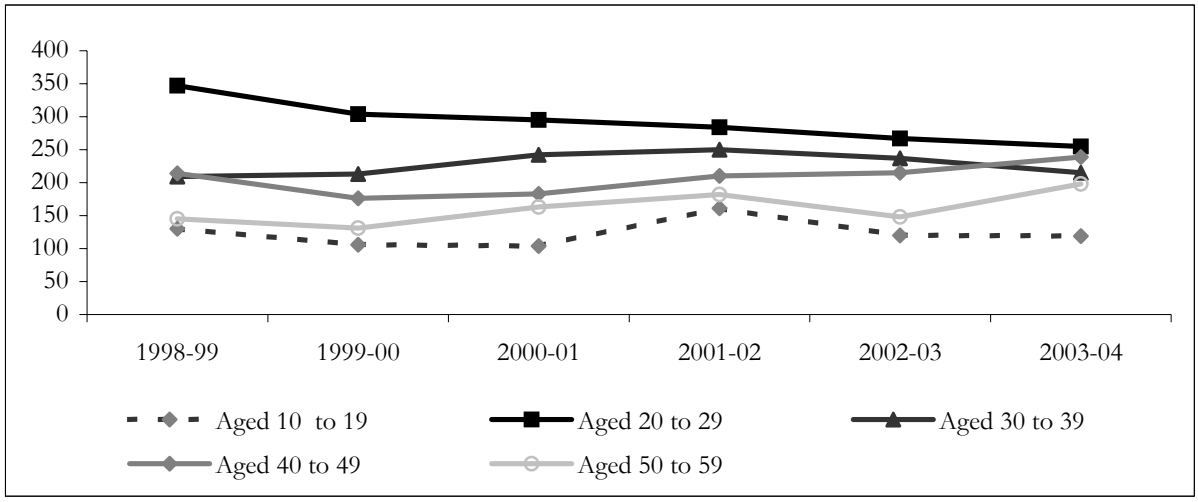
APPENDIX FOUR: Gynaecomastia

Gynaecomastia is a relatively common condition in men. Primary (physiological) gynaecomastia usually affects the extremes of age, whereas secondary gynaecomastia occurs when there is a pathological stimulus. Most cases of gynaecomastia reflect an increased ratio of oestrogens to androgens as a result of age, disease, drugs or idiopathic factors. The majority of men whose oestrogen to androgen ratios have been disrupted are asymptomatic and clinical presentation is infrequent (Daniels & Layer, 2001; Hanavadi, Banerjee, Monypenny, & Mansel, 2005).

Given that primary gynaecomastia usually affects adolescents and older men (aged 50+), the present study made the assumption that these groups would have higher diagnosis rates than younger adult men, and that overall, the diagnosis rates for gynaecomastia would remain constant over time. Figures 12 and 13 (below) show the number of gynaecomastia diagnoses (primary diagnoses and any diagnoses) in NSW from 1998-99 to 2003-04. While the overall rates of gynaecomastia have remained fairly constant over time, the group that had the highest rates of diagnosis from 1998-99 to 2000-01 were 20 to 29 year olds. This group is usually identified as being at lower risk of primary gynaecomastia. The somewhat higher rates among the 20 to 29 year old age group may indicate that this group is at greater risk of secondary gynaecomastia. Secondary gynaecomastia can be caused by lifestyle factors such as alcohol and cannabis use as well as the use of PIEDs.

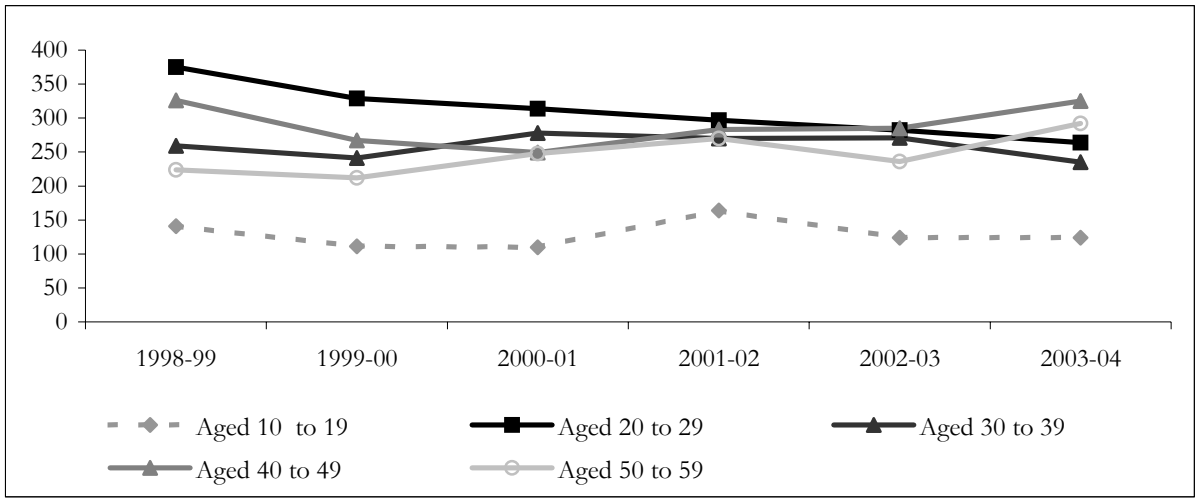
However, given the multiple causes of gynaecomastia, this data cannot be taken as a definitive health indicator of PIEDs use. It is included as an appendice to demonstrate the challenges in identifying physical harms of PIEDs use using hospital morbidity data.

Figure 12: Number of NSW cases where gynaecomastia was listed as primary diagnosis, by age, 1998-99 to 2003-04



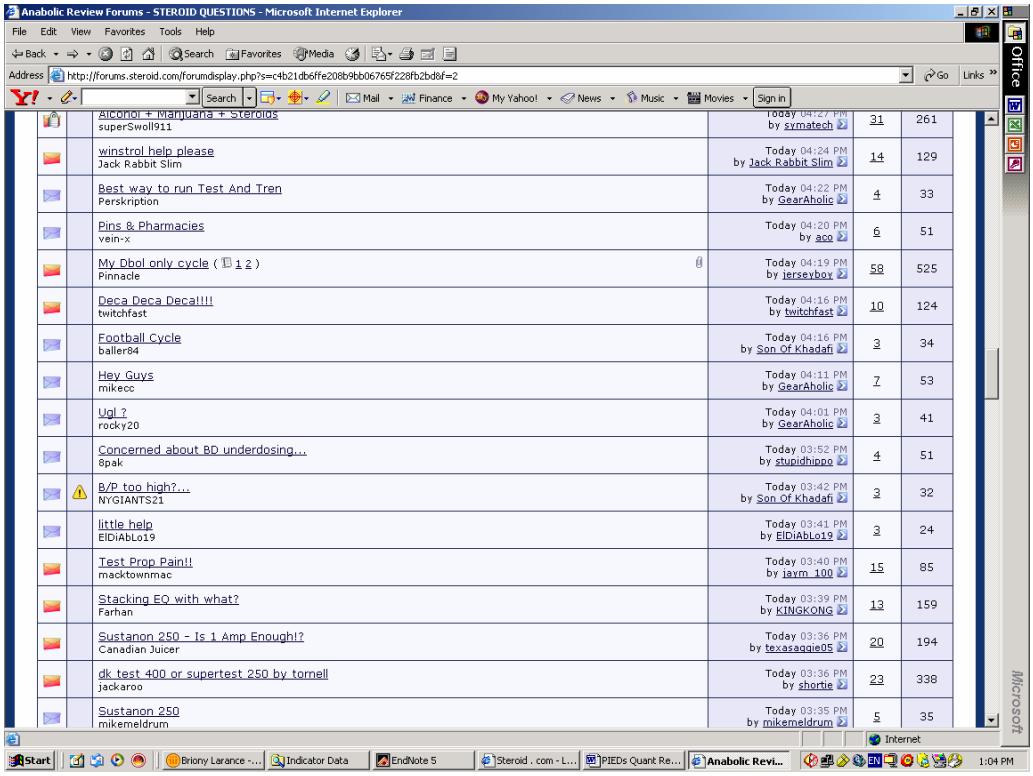
Source: AIHW (NHMD)

Figure 13: Number of NSW cases where gynaecomastia was listed as any diagnosis, by age, 1998-99 to 2003-04



Source: AIHW (NHMD)

APPENDIX FIVE: Examples of PIEDs users' internet forums and chat rooms



Source: www.forums.steroid.com, accessed 22.11.05

The following excerpts are from an Australian internet forum on a bodybuilding website. The internet discussion took place following the advertisement of the present study on the site. Not all posts are listed below, and some posts have been edited. However, the following examples illustrate the general concerns expressed by members of the forum regarding PIEDs research:

A: *'It would be good to see who the "experts" are, hell most in the medical world are of the belief that AAS are more toxic than arsenic!! I went to a GP once for a knee problem & he asked if I was taking steroids, so I started by saying, "deca" so he proceeded to get out a medical book & read through it … I got up & left ...'*

B: *'Information that can be handed to [A Current Affair] to "reveal the alarming trend in the use of harmful and potentially deadly substances amongst our young Australians" … What angle would you be taking? "Side effects"? Social effects? Abuse, over use, lack of education....? Pray do tell. Would the study begin with "an investigation into the improved quality of life of educated individuals between the age of 21-61 who engage in responsible use of AAS?" Unlikely. Think about it guys and don't give this shallow attempt to recruit ammunition the time it deserves … PS - that suggestion for a study into improved quality of life and wellbeing is a serious statement. Feel free to contact us again if you are going to undertake anything positive …'*

C: *'I would still advise against participating in that … Its mock concern of the "we are so concerned that you take such nasty and dangerous drugs, lets help them stop by showing them the error of their*

ways" type concerns. Typical wowser bullshit. This type of study does nothing to help the BB community. It may help the individual participant as they get paid for their time, but thats all …'

D: *'But this has to be one good way of obtaining some truth from real world experiences other than isolated 'news worthy' incidences that only serve to perpetuate the bullshit that is publicised, surely.'*

C: *'Well, if they used the data for that purpose, that would be great. However, they have a strong tendency to find the worst in the data, and, their data will be used to design better interventions designed to prevent use. This includes policing and customs strategies/policies … The data from studies like this … are widely used when the various law enforcement agencies have their collaborative meetings to plan drug strategy.'*

A: '*From what I know of these types of research, particularly from the medicos, that's on the money. The research is in no way going to be put to a public education campaign, public good, harm minimisation (still a dirty word) nor for educating officials… I am certainly no advocate of rec[reational] drugs in the slightest, but the fact that a whole heap of Sydney surveys have returned repeated results that a high proportion of high-income earning, responsible adults are using rec drugs "safely" on weekends has resulted in sniffer dogs running amok through the streets, nightclubs being emptied randomly and people being humiliated and booked for tiny amounts. I don't think gear will be looked at any differently, but I hope I am proven wrong…'*

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