

Swedish National Institute of **Public Health**

Doping in Sweden

an inventory of its spread,
 consequences and interventions

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Contents

- 5 Foreword
- 6 Summarising points
- 7 Definitions
- 9 Limitations

10 Act Prohibiting Certain Doping Substances

Establishment of the Doping Act 10 Substances covered by the law 10 All handling is a criminal offence 11 Proposals of the Narcotics Commission 11

13 Where do the doping agents come from?

Illegal imports 13 Illegal manufacture and preparation 13 Medication 14 Illegal sales 15 Prices 16

17 Groups that use doping agents

20 Extent of doping

Methodological issues 20 Adults, young adults and adolescents 21 Seizure statistics 29 Crime statistics 30 Specific groups and places 33 Geographic differences 40

41 Background factors

Gender, age and place of residence 41 Social background 41 Educational background 42 Self- confidence, self-esteem, behavioural disorders and hyperactivity 43 Athletic background 43

44 How are doping agents used

Dose size 44 Cycles, stacking and manner of intake 44 Sole use of doping agents 45 Other substances used in conjunction with doping agents 45

50 Effects of use

Hazard assessment 51 Physical effects 51 Dependence 53 Psychological effects 54 Social problems 59

61 Prevention

Price 61 Physical availability 61 Attitudes and norms 65 Social factors 66 Individual factors 74

75 Treatment

Treatment situation in Sweden 75

77 Reference list

Foreword

JUST OVER 20 YEARS AGO, it became apparent that doping agents were also being used outside sports for reasons other than improving athletic performance. These problems ended up in the lime light, a law was passed to regulate use and authorities, including the Swedish National Institute of Public Health (under a slightly different name at the time), devoted more focus to the issue for a few years. Activities conducted by society with regard to doping have since decreased.

In order to take stock of the state of knowledge regarding the spread and consequences of doping as well as of what prevention efforts are being pursued, the Swedish National Institute of Public Health conducted an inventory that resulted in the swedish version (R 2009:15) of the english translated review you have in hand.

The topics covered include an overview of the medical, social medicine, sociological and legal aspects in the area. The review begins by describing the law that regulates the handling of doping agents, as well as how users get hold of them. The discussion covers the current differences of opinion as to how widespread the use of doping agents is, and available data is presented for both the general population and individual groups. The underlying reasons for using doping agents are described, as well as the identified risk factors. In addition, available knowledge is presented with regard to patterns of use, including the mixed drug abuse that exists. The known physical, mental and social effects are presented, including the connection to aggressive behaviour and violence. The latter section of the report describes the prevention work under aimed at limiting use and concludes with a discussion of the treatment situation in Sweden.

This inventory is primarily addressed to decision-makers and professionals, who are affected by or have the opportunity of influencing doping problems in their work. The objective is mainly to raise the level of knowledge and understanding on the subject, as well as to identify the gaps that exist in terms of both knowledge and intervention.

Investigator Kajsa Mickelsson compiled facts and authored this text. Behind the inventory lies considerable involvement from several surrounding agencies, institutions and experts, who assisted by providing statistics and other fundamental documentation. A special thanks is dedicated to Professor Fred Nyberg at Uppsala University and Professor Anders Rane at Karolinska Institutet, who reviewed the contents in their entirety and provided valuable opinions.

Östersund, Sweden, December 2010

Sarah Wamala Director-General

Summarising points

- NO RELIABLE DATA is available on the number of users of doping agents in Sweden. However, at least 10,000 people are estimated to have used doping agents in the past year. The number of crimes and seizures have increased in the past decade, which may indicate a greater occurrence of doping.
- A typical user is a man between the ages of 18 and 34, who regularly exercises with weights at a gym. Use appears to be very low among women. Doping agents are mostly used in "cycles" of 6–12 weeks, interspersed with equally long doping-free periods. Mixed substance abuse involving narcotics, alcohol and/or other medications is not uncommon and can exacerbate the side-effects.
- Doping agents are used to improve athletic performance, obtain a more muscular and powerful body, become stronger and more aggressive, or achieve a feeling of invincibility. Use for intoxication purposes is less common.
- Knowledge of the health effects of doping agents is limited. However, it is clear that their use can lead to serious physical, mental and social problems such as severe symptoms of depression and aggressive tendencies.
- Methods for prevention in gym environments are being developed. However, prevention and treatment research in the doping field is otherwise undeveloped. Many questions remain unanswered as to what measures are effective in limiting and treating doping problems.
- Doping agents are easy to get hold of. The Internet plays a major role in marketing and trade as well as gathering and exchanging information. The penalties for crimes against the Doping Act are lower than for crimes against the Penal Law on Narcotics.
- Knowledge of doping is still limited. On one hand, there is a lack of research in many areas, and on the other, knowledge is limited among practitioners, officials and decision-makers.

Definitions

THE SWEDISH ACADEMY GLOSSARY of Swedish includes two terms, "doping" and "dopning". In Swedish, the linguists recommend the more colloquial "dopning". However, the terms appear to differ in content, whereby [the Swedish version of] this overview defines them as follows:

- "Doping" (athletic doping): cheating in organised sports by using illicit preparations or methods outlined in the World Anti-Doping Agency's (WADA) doping list with the aim of improving one's performance capacity¹. WADA's doping list (World Anti-Doping Agency, 2008) includes anabolic androgenic steroids (AAS), growth hormone, amphetamines, ephedrine, cocaine, hashish and marijuana.
- "Dopning" (statutory doping): the illicit handling of such substances as covered by the Act Prohibiting Certain Doping Substances (SFS 1991:1969) (also known as the Doping Act). The law covers synthetic anabolic steroids, testosterone and its derivatives, growth hormone and chemical substances that increase the production and release of either testosterone and its derivatives or growth hormone. While the Doping Act primarily concerns two types of substances (anabolic steroids and growth hormone), the athletic designation includes several types of named preparations.

[In English, these terms are difficult to differentiate, although one could say that Swedish "doping" corresponds to athletic doping in English, whereas "dopning" is defined here as the statutory doping set forth in the Doping Act. In this English translation of the overview, the term "doping" is used on its own for both meanings.]

Doping is a well-established term in sports and the term used internationally for both Swedish "doping" (athletic doping) and "dopning" (statutory doping). Increasing one's physical ability by adding performance-enhancing agents is nothing new, but was described as early as 3000 B.C. in China (Thurelius, Bäckström Rams, & Toll, 2005). The term was established at the end of the 19th century and showed up in English dictionaries.

At the end of the 1980s, it was noted that some doping agents were increasingly used outside sports as well, whereby its use began to be defined as a social problem. The Medicinal Products Ordinance (SFS 1992:1752) and the Act on Penalties for Smuggling were not considered to be enough to limit the occurrence of doping and a new law was passed. In connection with the drafting of this law, legislators decided

¹ Crimes against WADA's anti-doping code also include e.g. illegal handling and refusal to submit to control.

to use the more linguistically correct term in Swedish of "dopning" in the wording of the act. This resulted in the Act Prohibiting Certain Doping Substances (SFS 1991:1969) coming into being.

Anabolic androgenic steroids are abbreviated AAS in this report. AAS are the doping agents used most and are considered to entail the greatest physical, mental and social harm. Synthetic AAS are copies or variants of the male sex hormone testosterone and initially began to be produced in 1937. Today, there are some 40 different known AAS and all have both anabolic (tissue building) and androgenic (masculating) effects. Tissue building and wound healing characteristics are positive from a medical perspective, while the androgenic effects can cause serious side-effects. Research has made numerous attempts to develop variants of AAS with solely anabolic effects. However, no one has yet succeeded in developing an anabolic steroid that does not have androgenic effects. Consequently, anabolic androgenic steroid is a more accurate description for these preparations than the expression anabolic steroids (Marshall, 1988) and will accordingly be used in this text. It is important to note that doping has a broader definition than AAS use. Several studies only focus on AAS and the abbreviation AAS is used in this survey when referring to them.

In terms of the consumption of doping agents, it is sometimes referred to as abuse, which can have legal connotations since this consumption involves illegal preparations under the Doping Act. In this review, the neutral terms of use and consumption are generally used without any inherent judgement of these behaviours. The terms user and consumer are used synonymously.

On one hand there are users who have tested doping agents a few times in life, and on the other there are people who use or have used doping agents more frequently. There are no clear-cut definitions of current, on-going, regular or advance use. In this review, the expression of advance use is used in part and placed on a par with the intake of so-called supraphysiological doses during one or more cycles.

Limitations

THIS REVIEW INTENDS TO DESCRIBE the doping situation from a societal perspective. Sports are a part of society and the home to which both athletic and statutory doping are attributed. To obtain an illustration of how doping looks outside sports, the athletic aspect has been minimised in this review. The prevention efforts pursued in sports are only described briefly. Select elements of the research addressed to the sports world have been used when research based on the societal perspective is limited. Many of the substances discussed for sports and society are the same, and there are several points in common. These aspects are nonetheless often kept apart.

The doping agents covered by the law are not distinguished in this report, but rather treated under the general term of doping agents or the group of AAS without specifying their different aspects.

Although AAS use does occur among women, such as competitive body builders and those involved in sports requiring physical strength, the use of AAS in society is primarily a male phenomenon and this review focuses mainly on the use of doping agents among men.

The review is mainly limited to the situation in Sweden.

Act Prohibiting Certain Doping Substances

Establishment of the Doping Act

Use and illegal trade in certain doping agents were identified as a problem in Sweden at the end of the 1980s. In terms of the need for national legislation concerning doping, the Government bill on the Prohibition of Certain Doping Substances (bill 1990/91:199) notes the following:

In that doping has become more common and has come to not only be used within elite sports, the issue has gained broader significance. I can confirm that doping now not only occurs in sports competitions, but rather is also used during training periods and has reached new groups, such as those who exercise and body builders. From a public health perspective, there is consequently reason to pay attention to any instance of such types of doping where it can be feared that uncontrolled use could harm the human body.

On 1 July 1992, a law (SFS 1991:1969) entered into effect that regulates certain doping preparations in Sweden, which was the first such law in Europe. With this law, the Swedish Parliament established doping as a societal problem. The law has been refined on a few occasions. As a result of the Government appointment of the Doping Commission in 1996 (SOU 1996:126 part A), a Government bill was drafted, Action against Doping (bill 1998/99:3), which led to a further tightening of the law. In 1999, use became a criminal offence, gross doping crime was introduced and penalties were increased.

Substances covered by the law

The Act Prohibiting Certain Doping Substances (SFS 1991:1969) (also known as the Doping Act) covers:

- a) synthetic anabolic steroids,
- b) testosterone and its derivatives,
- c) growth hormone,
- d) chemical substances that increase the production and release of either testosterone and its derivatives or growth hormone.

The definition of doping preparations in the law is generic and open-ended. Through this generic definition, a whole group of products with a common basic chemical structure were categorised instead of being regulated substance by substance. This approach differs from the manner in which narcotics and health-hazardous goods are regulated in Sweden. For both narcotics and health-hazardous goods, there are lists tied to the regulations. These lists are justified politically in that they increase certainty in adjudication. This means that one cannot mistake which preparations are covered by the law. The generic definition does not offer complete predictability, since the substances covered by the law are not listed in any legally binding list. Since February 2006, as a complement to the law, there is an unofficial, guidance list (Swedish National Institute of Public Health, 2008) over substances deemed to be covered by the law. The list, administered by the Swedish National Institute of Public Health, is available at www.fhi.se, and all revisions are decided on in consultation with a group of experts².

All handling is a criminal offence

Under the current formulation of the Doping Act (SFS 1991:1969), with the exception of medical or scientific purposes, the preparations concerned may not be:

- 1. brought into the country
- 2. transferred
- 3. produced
- 4. acquired with the intent to transfer
- 5. offered for sale
- 6. held in possession
- 7. used.

Anyone intentionally in violation of points 2–7 will be convicted of doping crime and sentenced to a maximum of four years. If the crime is considered to be a misdemeanour, the person will be sentenced to fines or imprisonment of a maximum of six months. Upon a serious violation, the person will be sentenced to jail for a minimum of six months and a maximum of four years. In judging whether the crime is a minor or serious violation, the amount involved and other circumstances are weighed in.

Punishment for illegal imports are stipulated in the provisions of the Act on Penalties for Smuggling (SFS 2000:1225).

Proposals of the Narcotics Commission

In its report "Better control of substances of abuse" (SOU 2008:120), the Narcotics Commission proposes that the punishment scale for doping crimes be changed so that it coincides or approaches that for corresponding narcotics violations. For

² The expert group consists of representatives from the Centre for Andrology and Sexual Medicine and the Doping Control Laboratory/Department of Clinical Pharmacology at Karolinska University Hospital, the Swedish Medical Products Agency, the National Board of Forensic Medicine, the Swedish National Institute of Public Health, the Swedish National Laboratory of Forensic Science, the Swedish National Food Administration, the Swedish Customs laboratory and the Swedish Prosecution Service's Development Centre in Stockholm.

minor doping crimes, it is proposed that the punishment scale be kept unchanged. For doping crime of the normal degree, it is proposed that a maximum of three years' imprisonment be applied. Three years is now the maximum punishment for a narcotics violation of the normal degree. Upon serious doping violations, it is proposed that the punishment scale be adjusted to a minimum of one year and a maximum of eight years. In the assessment of a crime that is considered to be serious, how dangerous the doping agent is should also be taken into account. According to the Commission, the upper end of the punishment scale should be reserved for violations with AAS and testosterone and its derivatives, which are considered to be more dangerous than growth hormone and chemical substances that increase the production and release of either testosterone and its derivatives or growth hormone. The punishment scale for serious narcotics violations is a minimum of two years' and a maximum of ten years' imprisonment. Analogously, it is also proposed that doping agents be distinguished in the Act on Penalties for Smuggling (SFS 2000:1225) and that the maximum punishment for doping violations be increased to eight years' imprisonment.

Where do the doping agents come from?

Illegal imports

Illegal use of doping agents in Sweden is mainly supplied by preparations illegally carried in across the border. The preparations are smuggled into the country in vehicles and personal luggage or through postal dispatches after being ordered, mainly over the Internet (National Swedish Criminal Investigation Department & Swedish Customs, 2008). Seizure statistics are described in more detail in the chapter, Extent of doping. The police's intelligence information and operating cases indicate that goods are also smuggled on into Norway (C. Fant, National Swedish Criminal Investigation Department, personal communication, 15 April, 2009). The extent to which Sweden acts as a transit country has not been established, however.

Pills, capsules and injection liquids have been encountered in seizures since 1993. Powder was noted in the seizure statistics for the first time in 2006. Pure powder takes less space and is probably more difficult for customs officials to find than if the same amount of active substance were, for example, to be in the form of a finished injection liquid. A small amount of powder can be used to prepare a large number of pills, providing the producer considerable financial gains.

Illegal manufacture and preparation

There is probably no manufacturing of active doping substances in Sweden (C. Fant, National Swedish Criminal Investigation Department, personal communication, 15 April, 2009). The illegal manufacture usually takes place in China and India. The active substances are then prepared mainly into pills and injection liquids.

According to the National Swedish Criminal Investigation Department, the majority of the doping agents sold are prepared in "underground laboratories", inside and outside Sweden (Fant, unpublished). The Swedish National Laboratory of Forensic Science (SKL) confirms that up to 70 per cent of the doping preparations seized are not prepared in accordance with pharmaceutical standards (Ljung, A.-K., & Zackrisson, A., 2009).

Underground laboratories are not controlled production facilities, but rather usually unsanitary spaces located in cellar premises, storage spaces or old warehouses. Cement mixers or food processors are used to mix out the raw substance with e.g. oil if injection liquid is being prepared. Filler material and bonding agents are used if the end result will be pills. No formal chemistry knowledge is needed for this. Pills are punched and ampoules are filled to then be packaged and labelled with the company's homemade label. The label's declaration of the contents seldom matches what is actually in the pills (C. Fant, National Swedish Criminal Investigation Department, personal communication, 14 May, 2009).

Besides analyses by the Swedish National Laboratory of Forensic Science, some of the Internet pages that sell these products and the forums that permit sellers to advertise have analysed the contents of a selection of the preparations (Fant, unpublished; A.-K. Ljung, SKL, personal communication, 3 September, 2009). The outcome showed that the contents sometimes consist of the substance declared, and sometimes other individual substances or combinations of substances. There are products without any active substance and products with lower concentrations than indicated. In more than half of the cases, the concentration was significantly higher than declared. Conditions on the preparation premises (mainly those located in derelict factories) may cause pollution of the preparations with e.g. heavy metals. Several AAS sold over the Internet in Sweden contain heavy metals and there are warnings to this regard on the sales websites.

Medication

Human medicine

There are no statistics on how large the leakage is from the medical use of doping agents in Sweden. Legally manufactured medication is used illegally (National Swedish Criminal Investigation Department & Swedish Customs, 2008), but individual experts in the doping field judge this leakage to be limited (Moberg & Hermansson, 2006).

Sales statistics for the medicine prescribed by physicians in Sweden are available through Apoteket AB's statistical database, X-plain (K. Burman, Apoteket AB, personal communication, 6 April, 2009; B. Gerdén, Medical Products Agency, personal communication, 4 March, 2009). Here, it is clear that there are sales of AAS, testosterone and growth hormone (table 1 below shows an excerpt). The preparations are prescribed to young and old, men and women based on medical indications. The statistics are based on the number of line items and packages sold and it is impossible to see how many individuals are involved.

Table 1. Prescription sales of a selection of medication covered by the Doping Act (SFS 1991:1969) seen based on line items and packages, in total and divided by men in all ages and 16–35 year-olds, respectively. 2008.

	Line ite	ems (a)			Packag	es (b)		
	Total		Men		Total		Men	
	Ages 16—35	All ages	Ages 16–35	All ages	Ages 16—35	All ages	Ages 16–35	All ages
Anabolic steroids	66	922	30	302	115	1 961	66	838
Methenolone		2				12		
Prasterone	23	272		13	27	355		24
Oxandrolone	40	163	28	107	56	211	35	136
Nandrolone	3	485	2	182	32	1 383	31	678
Testosterone	4 056	35 663	3 738	34 202	5 774	56 854	5 349	55 131

(a) The number of line items is synonymous with the number of transactions where a debit or credit took place. A transaction is based on a prescription item on a prescription or a line on a prescription card or a cash line in self-care. If two packages of different sizes must be expedited to correspond to what was prescribed on a prescription item or prescribed on a line, it results in two line items.

(b) The packages may vary in size.

Source: Apoteket's sales statistics, X-plain database.

Veterinary medicine

Doping agents also occur in veterinary medicine. In a study of people who were admitted for treatment of doping, one third indicated that they had used doping agents in the form of veterinary medicine (Skårberg, Nyberg, & Engstrom, 2009). It is unclear as to whether this figure is representative of those who use doping agents.

Illegal sales

Doping agents are sold openly on Internet websites that can easily be found with common search engines. These websites are searchable and are often in both Swedish and English. A website can show up one day and disappear the next. There are many advantages of doing business over the Internet for both sellers and buyers. The seller reaches his customers easily and around the clock. No age limits are applied. The catchment area is unlimited since national frontiers and distances play no role. The Internet offers considerable anonymity and large chances of making money. Money is usually the driving force (Fant, unpublished). On the other side is the buyer, who can find current information from other buyers on discussion forums about what vendors are considered to be reliable. By easily obtaining an encrypted e-mail address that cannot be traced by the police, for instance, the buyer can make

orders and carry on e-mail correspondence with the seller. The order is paid by an account deposit or cash being sent in the post. Then the goods are sent to the recipient in a discrete package in the post or turned over in person (Fant, unpublished). However, what was ordered is not always what is delivered (see the section on illegal manufacture and preparation above).

In a U.S. web survey, four fifths of the AAS users said that they got hold of AAS on the Internet (Parkinson & Evans, 2006). The National Swedish Criminal Investigation Department believes that the Internet trade in both illegal and legal substances is growing. The range of websites that advertise the sale of narcotics, narcotics-classed medicine, unclassified drugs and AAS is believed to have never been larger (Fant, unpublished). (Read more about the Internet in the chapter on Prevention.)

Users who do not buy their own doping agents directly over the Internet buy, for example, from friends. Contacts are also made at gyms where business is initiated and sometimes carried out. These doping agents often also come from the Internet trade (C. Fant, National Swedish Criminal Investigation Department, personal communication, 15 April, 2009).

Prices

There is no authority that has annually registered the price trend for doping agents with the aim of maintaining statistics. Current prices that apply in sales over the Internet are available on each website, but knowledge of the levels that apply outside the Internet trade is limited. However, it appears as if the illegal market has been somewhat stable since the Internet trade has existed (Moberg & Hermansson, 2006).

The illegal market for doping agents is lucrative, and profitability in illicit handling is on a par with the corresponding handling of narcotics (C. Fant, National Swedish Criminal Investigation Department, personal communication, 14 May, 2009; L. Hansson & P. Johfur, Swedish Customs, personal communication, 4 April, 2009). By buying pure powder and converting it to usable preparations that are then resold, strong financial gains are made. Working as a middle-man for finished preparations also provides good profits.

Groups that use doping agents

THE REASONS THAT people begin to use doping agents vary. According to several studies, users are risk-takers and often experiment with life (Dodge & Jaccard, 2006; Eklöf, Thurelius, Garle, Rane, & Sjöqvist, 2003; Middleman, Faulkner, Woods, Emans, & DuRant, 1995). The physical, mental and social risks are considered by many to be worth exposing oneself to (if the user is aware of them) in order to approach the goal that underlies the use (Quaglio, et al., 2009). The use is not mainly motivated by euphoria, recreation or social interaction, which is common for drugs and alcohol. Rather, it involves an insecurity that the user wants to hide with the help of the effects that doping agents provide. Three main groups of users have been defined by both researchers and practitioners (Moberg & Hermansson, 2006; National Institute on Drug Abuse, 2006). No studies have been conducted that show how large these groups are relative to one another. The groups are:

- athletes
- aesthetes
- violent individuals

Athletes

Athletes are the original group that began using doping agents. The main purpose for athletes who use doping agents has always been to increase their own athletic performance through more strength, power, speed, muscle mass and aggressiveness (Graham, Davies, Grace, Kicman, & Baker, 2008).

Organised sports have long actively pursued anti-doping efforts through the Swedish Sports Confederation, which places considerable focus on doping tests. In the 1990s, the proportion of positive tests decreased to remain at a level of around 0.5 per cent during the 2000s (Swedish Sports Confederation, 2009b). The number of doping cases relative to the number of samples taken is the highest in the categories of weight and power lifting. Among elite and competition athletes, the proportion of positive tests is lower than among those who exercise.

Aesthetes

Aesthetes primarily use doping agents for cosmetic purposes to improve their appearance, become stronger and approach the ideal of beauty they strive for. For most users, the goal of achieving a more attractive and powerful body is the main reason they began using and continue to use doping agents (Graham, et al., 2008; Hildebrandt, Langenbucher, Carr, Sanjuan, & Park, 2006; Nilsson, Baigi, Marklund, & Fridlund, 2001; Parkinson & Evans, 2006). Both body builders with competitive ambitions and general exercisers are in this group. Aesthetes exercise,

often eat right and "take care of" their bodies, but hasten the build-up by using AAS. There is no equally effective way, with diet and exercise, to achieve the same muscle volume in a short period of time as with the help of AAS (Noakes, 2004; Quaglio, et al., 2009). Aesthetes strive for fast results and have narcissistic motives for their use. Moreover, there is a distinct longing to be seen and admired (Moberg & Hermansson, 2006).

The reasons for wanting to achieve a more muscular body can vary. Pope believes that this is a reaction to the Western physical ideal (H. G. Pope, Phillips, & Olivardia, 2000; Yang, Gray, & Pope, 2005), a result of the societal norm conveyed with regard to the importance of appearance and the social acceptance of getting help along the way in achieving the goal (further discussed in the chapter on Prevention under the section on attitudes and norms). Regardless of where we live, where we come from or where we grew up, we are surrounded by social, historical and traditional patterns in our surroundings. These patterns vary around the world and affect us in many aspects. Among other things, they affect our body image and our own physical goals. There are differences in the view of the male body in the East and the West (Yang, et al., 2005). In China, there has as yet been limited interest in acquiring an excessively muscular body. Chinese culture directs the ideal more towards mental strength, independent thinking and courage. A person of an advanced age is given more respect than a younger person with a well-built body. As the Far Eastern culture's antithesis, we find the "Californian lifestyle" where muscular, youthful and tanned men are valued highly (Andrén-Sandberg, 2008).

Violent individuals

Violent individuals use doping agents to achieve both a physical and a mental change in themselves (Moberg & Hermansson, 2006; National Institute on Drug Abuse, 2006). They strive for more body volume, greater strength, aggressiveness and a feeling of omnipotence in order to improve their ability to fight and instill fear. Manliness is emphasized and this group includes professional criminals, among others. A detailed discussion about this group and the connection between doping agents and violence can be found in the chapter on the Effects of use.

Additional reasons

A user rarely belongs to just one group. A user can have various reasons for his or her use, and these reasons can also change in the course of the use. In addition to the above groupings, there are also other reasons for use: using a doping agent as a drug in itself, achieving a mental change and becoming intoxicated (Graham, et al., 2008; Keane, 2005; Kindlundh, Isacson, Berglund, & Nyberg, 1998). AAS is also used as an effect amplifier for amphetamines, for example. There are clear cases of mixed drug abuse, involving doping agents among other drugs. In two thirds of the urine samples analysed in 2008 in connection with personal use³ of AAS, other substances, such as alcohol, drugs and medication, were also found (Y. Lood, National Board of Forensic Medicine, Forensic Chemicals Department, personal communication, 20 May, 2009). The use of other preparations may arise after the introduction of doping agents in order, for example, to increase the effect of AAS or to reduce the side-effects that arise during and after the steroid cycles (Sjöqvist, Garle, & Rane, 2008). AAS use may also follow other drug use. Many polydrug abusers' initial reasons for use are similar to those of the aesthetes. Some exercise in parallel with their use and others stop exercising when the perception of the drug effect is enough for them. Polydrug abusers may also be placed in the group of violent individuals since they often figure into such contexts.

Users of doping agents that end up outside or in the border zones of the grouping above are also those who take the substance to achieve a better position relative to their surroundings. This includes "regular" guys who want to become braver and get more respect, room to maneuver and acceptance without having aggressive or violent intent. They want to improve their self-confidence, increase their rank among their friends and in their surroundings, look bigger, obtain a feeling of bravery and dominance combined with a cocky, confident attitude (among others, Hildebrandt, et al., 2006; Kindlundh, et al., 1998).

Other reasons that came forth in a survey of school students are that doping agents are used because "it is fun" or "because friends do it" (Kindlundh, 2002; Kindlundh, et al., 1998). Reasons that rarely come forth are those based on the risk factors presented in the chapter on Background factors.

³ Own use in connection with narcotics crime and driving under the influence of drugs. In 2008, the Police requested 1,067 such AAS analyses, of which 353 were positive for AAS.

Extent of doping

IT IS IMPORTANT TO ESTABLISH HOW MANY people use doping agents or have problems resulting from their doping use, particularly so that society will know what resources should be allocated to the issue in terms of research, prevention, treatment, etc. It is, however, difficult to provide a complete, accurate illustration of how widespread the use of doping agents is.

In order to assess the extent of the use of doping preparations, data from several complementary sources has been used. Some data originates from studies whose primary purpose was to survey the extent of the use. Other data reflects consequences of use as well as the number of people suspected of doping crimes. Seizure statistics provide supplemental information on the occurrence of doping agents.

Methodological issues

A general difficulty in terms of estimating the number of people who use doping agents concerns the definition of a user and when use is considered to be current. There is no common view of this. In surveys of experience of doping agents, questions are often asked about the individuals' use at some time in life (lifetime prevalence), which in the adult population is of limited value for estimating the current situation. In the younger population, however, lifetime prevalence can be a measure of greater interest. Current use, i.e. that in the past year (annual prevalence), and respectively in the past month (monthly prevalence), aims to reflect more recent use, but has been asked about to a lesser degree. However, users commonly have monthlong breaks between steroid cycles (see the chapter on How doping agents are used), whereby a regular user may indicate non-use in the past month. Sometimes, the "point prevalence" is estimated instead, meaning how many people use doping agents at a certain specified point in time.

A major part of the database data presented reflects the priorities and activities of various actors. Crime statistics are affected by the efforts of the police, among others. The number of analyses of AAS ordered by workplaces depends on the employers' policies and decisions linked to the individual cases. An increase or decrease in the statistics does not always reflect actual changes in use.

In connection with surveys, a number of method problems should be particularly noted:

- The sample population can provide erroneous results in that the users are more or less frequently present in certain groups and contexts.
- Reliability of the results is affected by the drop-out rate, i.e. the proportion of people who for various reasons do not respond to the questions. The people in the

drop-out group differ from those who answered, which affects the results. The causes underlying drop-out may include an aversion to participate or respond to a given question or an inability to reach people for various reasons, such as travel, imprisonment or hospital stays. Through drop-out analyses, the study's reliability can be improved.

- If questions are not answered in the right way, it can provide distorted results. Such wrong answers may be due to peoples' social desire not to appear deviant. This may be particularly problematic with regard to questions about e.g. doping. In general, it is assumed that these measurement errors lead to an under-estimation of the drug use, but over-estimations may also occur (Andrén-Sandberg, 2008). The extent of the measurement errors for doping compared to narcotics is unknown.
- If the measurement errors are constant over time, study results can provide information on the trend. This demands that studies be repeated with the same methodology on comparable populations, which is only the case for the school surveys. However, these are carried out on a population that is younger than the age at which the debut of doping agent use generally occurs. The measurement errors may, however, vary over time as a result of attitude changes, among other causes.

Adults, young adults and adolescents

Surveys of adults and young adults

In a few studies, presented in table 2 below, doping prevalence was studied among a nationally representative selection of adults and young adults in Sweden. Four of the studies originate from the 2000s.

A substudy in the Swedish National Institute of Public Health prevalence project

In cooperation with Lund University and Statistics Sweden (SCB), the Swedish National Institute of Public Health (SNIPH) conducted a questionnaire study among 58,000 people between the ages of 15 and 64 in autumn 2008 (Swedish National Institute of Public Health, 2009b). Besides questions concerning alcohol, narcotics and tobacco habits, questions about AAS were included. Since the sample population was stratified, some groups (such as those based on age and gender) that were not included at a proportion equivalent to their proportion in the national population were weighted upwards. The weighted response frequency was 52 per cent.

The results indicate that 0.9 per cent of the men and only occasional women aged 15–54 had ever tried AAS. Nobody over the age of 54 indicated any experience of AAS. In terms of the group of 18–34 year-old men, the lifetime experience was 1.4 per cent and 0.9 per cent had used AAS in the past year. If the proportion that indicated experience of AAS in the past year is extrapolated to the population in

Sweden, these results mean that just over 9,000 men aged $18-34^4$ have tried AAS in the past year and just over 22,000 men ages $15-54^5$ have some experience of AAS (Swedish National Institute of Public Health, 2009b). An ensuing drop-out analysis of just over 1,000 people shows that the proportion was neither higher nor lower in the drop-out group.

A study of exercise and health by STAD

In 2008, Stockholm Prevents Alcohol and Drug Problems (STAD) conducted a survey of the use of doping agents (Leifman, Rehnman, Sjöblom, & Holgersson, 2009). The sample population consisted of two random selections of 5,000 people each; one with registered residents of Stockholm and the other representative for the rest of the country. In total, 10,000 people aged 18–50 received a postcard in the mail where they were asked to respond to an Internet questionnaire on exercise and health on the computer. The response frequency in total was only 31 per cent, which limits the possibilities of the drawing any definite conclusions.

In order to obtain nationally representative results, the material was weighted. Of the respondents, 0.6 per cent of the men said that they had tried AAS or growth hormone at some time in life. Broken down into the two groups, this proportion was 1.1 per cent for the men in the Stockholm sample and 0.4 per cent for the men in the rest of the country. Among the women, the lifetime prevalence was shown to be very low (0.0–0.1 per cent). The 12-month prevalence was nearly zero; only occasional women and 0.1 per cent of the men said that they had used AAS or hormonal preparations in the past year.

A drop-out analysis was conducted where the authors indicate that approximately 1.5 per cent of the men had ever used AAS (H. Leifman, STAD, personal communication, 1 September, 2009). Although the number of users in the drop-out analysis was limited, the results indicate an under-estimation of the actual prevalence in the main survey.

Population studies on behalf of the Swedish Council for Information on Alcohol and Other Drugs, Systembolaget and SNIPH

On varying assignments by the Swedish Council for Information on Alcohol and Other Drugs (CAN), Systembolaget and the Swedish National Institute of Public Health, TEMO conducted home-visit interviews on nationally representative selections of the adult population (ages 15–75) in 1993, 1994, 1996 and 2000 (TEMO, 1993, 1994a, 1996a, 2000). The studies comprised 1,000–2,000 people and questions on doping were included among other questions. In 1994, 1 per cent of the 15–49 year-old men said that they had ever tried AAS. Nobody over the age of 50 and only a few women said they had experience of AAS. During the other three

⁴ In 2008, there were 1,016,806 men in the 18–34 age group in Sweden (Statistics Sweden, 2009b).

⁵ In 2008, there were 2,475,018 men in the 15–54 age group in Sweden (Statistics Sweden, 2009b).

years, less than 0.5 per cent of both the men and the women said that they had ever used AAS. With regard to growth hormone, this experience was even lower.

For the year that the prevalence amounted to 1 per cent for the men, the estimate can be extrapolated to the population in the corresponding group. According to this, in 1994 up to 21,400⁶ men aged 15–49 had ever tried AAS.

The Doping Commission's study

Focusing on a somewhat younger population and the male part of the population, TEMO conducted a doping survey for the Doping Commission (SOU 1996:126 part A; TEMO, 1995). Telephone interviews were conducted with 10,000 men ages 18 to 30, which constituted 79 per cent of those asked. Among the respondents, 1.3 per cent had ever tried AAS or growth hormone (1.1 per cent said that they had tried AAS and 0.3 per cent that they had tested growth hormone). Of those who had tested AAS, one third had undergone at least two cycles and 0.4 per cent of the large sample population had tried AAS less than two years ago. Distributed over the population⁷ in 1995, slightly more than 10,000 18–30 year-old men had ever tested AAS or growth hormone, 3,000 men had tried AAS within the past two years and an equal number had undergone at least two AAS cycles.

Drug habit studies of adolescents and young adults on behalf of CAN and others

Young adults were also the focus of the drug habit studies conducted by TEMO, SKOP and ARS. The clients included Systembolaget, CAN, SNIPH, the Alcohol Committee and Mobilisation against Narcotics. On five occasions between 1993 and 2003, the lifetime prevalence of doping agents was surveyed among 16–25 year-olds by telephone interviews⁸ on nationally representative samples that varied from approximately 800–3,000 people. Just over zero to 2 per cent of the men indicated experience of AAS and 1 per cent or less of the women. In the years of study (1993–1998) when questions about growth hormone were included, less than 0.5 per cent indicated experience of the hormone. (Guttormsson, Andersson, & Hibell, 2004; SKOP, 1993; TEMO, 1994b, 1996b, 1998)

If the results are extrapolated to the population in the four of five years (1993°, 1994¹⁰, 1996¹¹ and 2003¹²) that lifetime prevalence amounted to 1 or 2 per cent for the men, 5,000–10,000 men aged 16–25 in Sweden are estimated to have tested AAS.

⁶ In 1994, there were 2,141,841 men in the 15–49 age group in Sweden (Statistics Sweden, 2009b).

⁷ In 1995, there were 787,170 men in the 18–30 age group in Sweden (Statistics Sweden, 2009b).

⁸ Carried out by SKOP, TEMO and ARS, respectively.

⁹ In 1993, there were 575,237 men in the 16–25 age group in Sweden (Statistics Sweden, 2009b).

¹⁰ In 1994, there were 508,712 men in the 16–24 age group in Sweden (Statistics Sweden, 2009b).

¹¹ In 1996, there were 495,142 men in the 16–24 age group in Sweden (Statistics Sweden, 2009b).

¹² In 2003, there were 487,965 men in the 16–24 age group in Sweden (Statistics Sweden, 2009b).

	oing agent										
	% Do	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS	AAS
	Women 9	0	0	0	-	Not in- cluded	0	0	0	0	0
	Men %	0	-	٢	2	-	0	-	0	0	-
. 1993–2009.	Age group	15–75	16–25	15–75	16–24	18–30	15–75	16–24	16–24	16–75	16–24
ana women, respectively	Number of respondents (rounded to even hundreds)	1 000	1 000	1 000	800	10 000 ¹³	1 500	2 000	2 000	2 000	3 000
ribution among men a	Method	Visit interview	Telephone inter- view	Visit interview	Telephone inter- view	Telephone inter- view	Visit interview	Telephone inter- view	Telephone inter- view	Visit interview	Telephone inter- view
centage distr	Research firm	TEMO	SKOP	TEMO	TEMO	TEMO	TEMO	TEMO	TEMO	TEMO	ARS
varying methods. Pei	Client	CAN	CAN and others	CAN	Systembolaget	Ministry of Health and Social Affairs	CAN	Systembolaget	Systembolaget	Systembolaget & SNIPH	***
	Year	1993	1993	1994	1994	1995	1996	1996	1998	2000	2003

Table 2: The proportion of the population that said that they had ever tried doping agents. Different clients and research

24 DOPING IN SWEDEN – AN INVENTORY OF ITS SPREAD, CONSEQUENCES AND INTERVENTIONS

13 Only men were included in the study.

Year	Client	Research firm	Method	Number of respondents (rounded to even hundreds)	Age group	Men %	Women %	Doping agent
2008	STAD	STAD	Postcards were sent by mail with a referral to the questionnaire to be completed on the Internet	10 000 (31 % response fre- quency)	1850	-	0	AAS + growth hormone
2009	SNIPH & Lund University	SCB	Questionnaire	58 000 (52 % weighted response frequency)	15–64	-	0	AAS
*** CAN, a) Referen b) Referen	Alcohol Committee, Mo ce: (TEMO, 1993) ce: (SKOP, 1903)	bilisation again	st Narcotics, SNIPH an	d Systembolaget				

u) reference: (JADUT, 1993) c) Reference: (TEMO, 1994b) d) Reference: (TEMO, 1995) f) Reference: (TEMO, 1996b) h) Reference: (TEMO, 1996b) h) Reference: (TEMO, 1998) i) Reference: (TEMO, 2000) j) Reference: (Leifman & Rehnman, 2008b) k) Reference: (Leifman & Rehnman, 2008b) l) Reference: (Swedish National Institute of Public Health, 2009b)

Estimates based on seizure statistics

A number of estimates based on seizure statistics from Swedish Customs and the Swedish Police have been done to try to find answers to how extensive the use of doping agents is. Estimates between 10,000 and 100,000 users have been presented in both scientific publications (Sjöqvist, et al., 2008) and in the Narcotics Commission's report (SOU 2008:120). However, these are of a rough estimate nature with significant uncertainty and cannot form the basis of conclusions on the extent of doping in Sweden.

Surveys of school students and military enrollees

School studies in middle school and upper-secondary school

CAN's nationally representative school surveys currently constitute the longest running time series that illustrates the prevalence of the use of doping agents. Doping most frequently occurs in the ages 18 to 34 (also see the chapter on Background factors), which is why these studies cannot, however, be used to make any statements on use in the population in general.

The doping questions were introduced in the regular surveys¹⁴ about drugs for year nine students (15–16-year-olds) in 1993 (Hvitfeldt & Nyström, 2009). Nine years later, in 2004, the drug habit surveys began to be carried out in the second year of upper-secondary school as well (17–18 year-olds). Around 5,500 middle-school students and barely 5,000 upper-secondary school students participated annually.

In year nine (table 3), approximately 1 per cent of the boys in 1993–2003 said that they had ever used AAS (Hvitfeldt & Nyström, 2009). At the same time that the formulation of the question was changed¹⁵ in 2004, the proportion of boys who had ever tried AAS increased to 2 per cent. With a few individual exceptions, this level remained stable between 2004–2008. The same increase in this figure occurred for girls. In 1993–2003, less than 0.5 per cent of the girls said that they had tried AAS; in 2004–2008, this level was 1 per cent. Up to 2003, questions about growth hormone and testosterone were also included. Experience of use was indicated to be lower for these hormones than for AAS, and less than 0.5 per cent of the boys and girls indicated experience. The exception was 1993 when 1 per cent of the boys said that they had tried growth hormone, and the years 2001–2003, when 1 per cent of the boys said that they had ever tested testosterone.

In the second year of upper-secondary school (table 3), the proportion of boys who had ever used AAS varied between 1–2 per cent over the years 2004–2008 (Hvitfeldt & Nyström, 2009). Experience among the girls remains at around barely

¹⁴ Questionnaires were distributed to nationally representative selections of classes and completed by the students under test-like conditions.

¹⁵ The formulation of the questions was adjusted for the questionnaires in 1995 and 2004, which can partially make comparability between the years difficult. CAN says that one of the reasons for the changes was the limited knowledge in the area, which makes it difficult to establish adequate question formulations in the survey (Hvitfeldt & Nyström, 2009).

1 per cent. The experience of AAS for the second year of upper-secondary school is below the levels for year nine, even though this group is two years older. One possible explanation of this may be that the populations are not entirely comparable since not all students in year nine go on to upper-secondary school. Another explanation of these lower proportions may be deviations in the measurements or an actual difference.

Table 3. The proportion of school students in year nine and the second year of upper-secondary school, respectively, that indicated that they had ever tried AAS, growth hormone or testosterone, respectively. Percentage distribution among boys and girls, respectively. 1993–2009.

	Year 9						Year 2 o upper-se school	f econdary
	ever used AA	.S (a)	ever use hormon	ed growth e (b)	ever used tes	stosterone	ever us AAS	ed
	Boys	Girls	Boys	Girls	Boys	Girls	Boys	Girls
1993	1	0	1	0	*	*	**	**
1994	1	0	0	0	*	*	**	**
1995	0	0	0	0	0	0	**	**
1996	1	0	0	0	0	0	**	**
1997	1	0	0	0	0	0	**	**
1998	1	0	0	0	0	0	**	**
1999	1	0	0	0	0	0	**	**
2000	1	0	0	0	0	0	**	**
2001	1	0	0	0	1	0	**	**
2002	1	0	0	0	1	0	**	**
2003	1	0	0	0	1	0	**	**
2004	2	1	*	*	*	*	2	0
2005	2	1	*	*	*	*	2	1
2006	1	1	*	*	*	*	1	0
2007	2	1	*	*	*	*	2	1
2008	2	1	*	*	*	*	1	0

(a) The question was changed in 2004.

(b) 1995–2003 only those who indicated injection use were presented.

* no data available, since the question was not included in the questionnaire

** no data available, since the survey was not done

Source: Swedish Council for Information on Alcohol and Other Drugs (CAN).

An international school survey – ESPAD

On four occasions (1995, 1999, 2003 and 2007), Sweden participated in an international comparison of AAS experience, among other factors (Andersson, et al., 2004; Hibell, et al., 2000; Hibell, et al., 1997; Hibell, et al., 2009). This was done under the umbrella of the European School Survey on Alcohol and Other Drugs (ESPAD), coordinated by CAN. A standardisation of both data collection methodology¹⁶ and the target group's age made it possible to compare the drug habits of 15–16 year-old adolescents in several European countries. In 2007, the study comprised 35 countries and more than 100,000 students. The average experience (lifetime prevalence) of AAS was 2 per cent for boys and 1 per cent for girls in 1999, 2003 and 2007, which also reflects the results for Sweden in the studies. Most countries with high life-time prevalence were in Eastern Europe. The highest lifetime prevalence in 2007 was reported among the boys in the Czech Republic where 7 per cent indicated use. In Cyprus and Bulgaria, the boys' experience is estimated at 5 per cent.

Survey of university students

To obtain answers concerning the drug habits of university students, the Swedish National Institute of Public Health conducted a survey in cooperation with Lund University and Statistics Sweden of 4,000 individuals between the ages of 16 and 64 in 2008. The weighted response frequency was 55 per cent. The 18–34 year age group constituted 90 per cent of the respondents and of these individuals, 1.1 per cent of the men and only a few women had ever used AAS. In the same age group, 0.3 per cent of the men said that they had tried AAS in the past year.

Military enrollee studies

The young adult group also includes enrollees for military service, mostly 18-yearold men. Being responsible for the surveys, CAN included a question about AAS beginning in 1994 and in 1995–1999 a question was included about growth hormone in the drug habit surveys¹⁷ conducted on the group since 1970 (Guttormsson, 2007). Each year, 40,000–50,000 individuals participated. The small number of women who enrol in voluntary military service were not included in the reports.¹⁸ The proportion that indicated that they had ever tried AAS gradually dropped from 1.4 per cent in 1994 to 0.6 per cent in 2006. The proportion of enrollees that indicated use of growth hormone at the end of the 1990s was less than 0.5 per cent. Around half of those who indicated some form of experience said that this was only on one occasion. For 2007, the enrolment procedure was changed to such an extent that the study ended. A long time series was broken.

¹⁶ A random selection of students completed questionnaires anonymously in the classroom with a survey leader present.

¹⁷ The surveys were conduct with anonymous questionnaires under test-like conditions.

¹⁸ Another group not included comprises the 18 year-old men who live in Sweden, but lack Swedish citizenship, as well as individuals with severe diseases and disabilities.

Conclusion: Adults, young adults and adolescents

The nationally representative studies done on various age groups in the population indicate that around 1 per cent of the men and less than 0.5 per cent of the women have tested doping agents¹⁹ at some time in life. For younger men, this proportion is somewhat higher. The statistics do not indicate any clear rising or falling trend over the 15 years that the question was included in individual questionnaires. By extrapolating the percentages of each age category and gender in the population, we obtain an impression of the number of individuals that correspond to these percentages. These estimates should be viewed with caution. This is due in part to the fact that the percentage figures often lack decimals, and in part to the age intervals varying markedly and narrow age intervals may exclude prospective users.

To find out how many users there are in Sweden today, it is most interesting to look at how many have used doping agents in the past year. Comparable data for this is limited. The latest figures originate from an as yet unpublished nationally representative study by the Swedish National Institute of Public Health. Looking at the group in which use is considered to be most prevalent, namely men aged 18–34, around 9,000 men are estimated to have used doping agents at some time in the past year. Considering the low response propensity and the aforementioned method difficulties, the results indicate that at least 10,000 people in Sweden have used doping agents in the past year.

Seizure statistics

Seizure statistics can be used to discern trends in the supply and distribution. However, the results are highly affected by the authorities' methods, where resources, priorities and methodology can have an impact without changes in the actual use. In terms of narcotics, the numerical information is generally viewed as a more reliable indicator of the supply than the amounts seized. This is because individual, large seizures have a major impact, and narcotics meant for markets other than the Swedish market can sometimes be involved. Similar reasoning most likely also applies to doping. For example, it can be mentioned that in 2003 Swedish Customs found two thirds of the year's total tablet seizures in one of the nearly 1,000 seizures made that year . Seizure statistics must consequently be interpreted with great caution.

Figure 1 below shows, however, a quadrupling of the combined number of doping seizures in the past 15 years. In 1993, Swedish Customs and the Swedish Police made a total of 370 seizures. After a decrease in the ensuing two years, the seizures generally increased, and beginning in 1999, the increase became more pronounced. In 2008, the total number of seizures increased to 1,606, which is the highest figure to-date (National Swedish Criminal Investigation Department & Swedish Customs, unpublished).

¹⁹ It is primarily the use of AAS that is measured.



Figure 1. Number of seizures and amounts seized (tablets, fluids and powders) of doping agents made by Swedish Customs and the Swedish Police. 1993–2008. Source: Swedish Customs, National Swedish Criminal Investigation Department and the Swedish Council for Information on Alcohol and Other Drugs.

The Police account for the majority of the seizures (55-85 per cent). There are fewer seizures by Swedish Customs, but they are generally larger and have grown from 75 seizures in 1993 to 222 in 2007. In 2008, a drastic increase occurred in Swedish Customs seizures by 74 per cent, to 386, compared with the year before. Swedish Customs attributes these increases to the efforts made at the postal terminals²⁰. That same year, the Police's seizures decreased by 7 per cent to 1,220.

Figure 1 also shows that the amounts seized, despite large fluctuations, have increased since the mid-1990s. Since 1993, the total number of pills that have been seized annually has swung between fewer than 100,000 in 1998 and more than one million in 2008. The extent of liquid substances founds increased from one litre in 1993 to 43 litres in 2008. The powder that was added to the seizure statistics beginning in 2006 has varied between six to eight kilograms and is enough for a significant amount of pills or injection liquid.

Crime statistics

Crime statistics present the crimes reported by the Police, Swedish Customs or public prosecutors. The statistics can describe doping-related smuggling crimes (SFS 2000:1225) and crimes under the Doping Act (SFS 1991:1969). Part of the seizure statistics presented above constitute a subset of the smuggling crimes and another part of the seizure statistics constitutes a subset of the crimes that come from pos-

²⁰ Around 250,000 packages arrive at Arlanda International Airport daily and of these, approximately 0.1 per cent are controlled by Swedish Customs (L. Hansson & P. Johfur, Swedish Customs, personal communication, 4 April, 2009).

session for personal use under the Doping Act. The focus below is on the crimes committed against the Doping Act (SFS 1991:1969). Crimes are committed daily that never come to the awareness of the judicial system.

The fact that the efforts by the Police, Customs and public prosecutors make a difference can be discerned by looking at the number of reported crimes against the Doping Act based on statistics by county (Swedish National Council for Crime Prevention, 2009a). Figure 2 presents the annual statistics on the number of reported crimes against the Doping Act per 100,000 residents for four selected counties where the number of reports stands out in some way during the 2000s. On average, Gävleborg has the largest number of reported crimes (30 per 100,000 residents compared with the national average of 10 per 10,000) during the period. An important explanatory factor is the large case (see Operation Bosco in the chapter on prevention) that was run by the Gävleborg Police Authority and resulted in several crime reports throughout the country. The reports were registered in Gävleborg County's statistics, which in 2008 resulted in a record high proportion of reports of 186 crimes per 100,000 residents. Here, it is also misleading that the proportion is calculated based on the residents of Gävleborg County, while many of the criminals live in other counties. Another clear example is Uppsala where the police pursue active efforts to combat the doping. The increased focus during the 2000s is clearly noticeable in the statistics and the average annual number of reports in the county increased from six to 45 reports per 100,000 residents during the period.



Figure 2. The number of crimes against the Doping Act per 100,000 residents for the country and four selected counties. 2000–2008. Source: Swedish National Council for Crime Prevention.

Crime statistics for crime against the Doping Act (SFS 1991:1969) have been available since 1993 when 564 crimes were reported (Swedish National Council for Crime Prevention, 2009b). Figure 3 indicates that the number of reports has more than tripled over 15 years. A gradual halving of the number of reported crimes to barely 300 began in 1998. Then the reports increased to 925 crimes in 2004. After a small decrease in 2005, a strong increase followed up to 2008 when 1,957 reports were made.



Figure 3. Number of reported crimes, suspects and prosecuted crimes against the Doping Act. 1993–2008. Source: Swedish National Council for Crime Prevention.

On average, around two crimes per person have been reported. Between the years 1993 and 1999, up to 200 people are suspected annually (figure 3) (Swedish National Council for Crime Prevention, 2009d). Since the criminalisation of use in 1999, there was an annual increase in the number of suspects to barely 900 people in 2008. Around 2 per cent of the suspects were women.

Around half of the reported crimes were prosecuted and figure 3 clearly indicates that the curve of the number of prosecuted crimes (Swedish National Council for Crime Prevention, 2009c) follows the curve of the number of suspects. Since 2004, the number of suspects has increased somewhat more than the number of prosecuted crimes. In 2008, 792 crimes against the Doping Act were prosecuted.

In around half of the prosecuted crimes in 1993, the doping violation was the main crime (Swedish National Council for Crime Prevention, 2009e), i.e. was the most serious or the only crime in the judgement. The proportion then gradually decreased and in 2008, the doping crime constituted the main crime in one third of the cases.

Figure 4 (Swedish National Council for Crime Prevention, 2009f) shows that the majority (50–70 per cent) of the crime suspects under the Doping Act since 1993 have been between the ages of 20 and 29. Significantly fewer (14–22 per cent) were between the ages of 30 and 39, closely followed by the youngest group aged 15–19 (10–23 per cent). The proportion of suspects among the youngest group decreased towards the end of the 2000s. Individuals over the age of 40 are the group least represented (3–8 per cent) in the statistics over individuals suspected for doping crimes in 1993–2008.



Figure 4. Individuals suspected for crimes against the Act Prohibiting Certain Doping Substances. Annual percentage distribution based on age group. 1993–2008. Source: Swedish National Council for Crime Prevention.

The trend of the number of reported and prosecuted crimes, suspected individuals and the number of seizures of doping agents track one another and it is clear that an increase of all four parameters took place in the 2000s. However, it is uncertain how much of the increase is due to the efforts and priorities of the authorities or an actual increase in the occurrence of doping agents in Sweden.

Specific groups and places

Doping among those who exercise at a gym

Experience of doping agents among people who exercise at a gym is more common than among those who do not exercise at a gym. It is also common for the introduction to AAS to occur at exercise facilities (Skårberg, et al., 2009). In 2007 and 2008, four local surveys were carried out at exercise facilities in Sweden.

- Within the scope of the anti-doping project "Kalmar grows without doping" a questionnaire was completed by 327 gym visitors at five different exercise facilities²¹ (Hoff & Herngren, 2008).
- The STAD section at the Dependence Centre in Stockholm collected 1,687²² questionnaires from those who exercised at 34 gyms in Stockholm (Leifman & Rehnman, 2008a).

²¹ Every gym was visited four times over a four-week period. The visits took place on different days of the week and different times of day. During the period, questionnaires were also available at the gyms' reception desks together with a sealed postbox.

^{22 68} per cent men and 32 per cent women.

- On behalf of the county administrative board, a study was conducted of 30²³ gyms in Kronoberg where 462 questionnaires were completed (Institute for Local and Regional Democracy, 2009).
- A survey²⁴ was also conducted among 786²⁵ individuals at 35 gyms in Malmö (City of Malmö Public Health Unit, 2008b).

These studies indicate a lifetime prevalence of between 2.7 and 4.8 per cent where the highest prevalence is from Malmö and the lowest from Stockholm. Divided by gender, 3.8–6.0 per cent of the men and 0–4 per cent of the women indicated ever having tried AAS/doping agents. Some studies also chose to illustrate the 12-month prevalence, which in Kalmar amounted to 1 per cent for all respondents and in Stockholm 1.2 per cent for men and nearly zero for women. The response frequency is unknown for all of these studies, which is why the results should be viewed with some caution.

As a complement to the questionnaire study, STAD completed an observation study²⁶ (Leifman, et al., 2009) in 2009, carried out at training facilities in Stockholm County. A total of 2,368²⁷ individuals were observed on 128 occasions at 64 facilities. Observation studies exhibit some uncertainty since the observer can make mistakes²⁸. The average estimated occurrence of AAS use was 5.0 per cent for men and 0.4 per cent for women. At "hard core" facilities,²⁹ 21 per cent were estimated to use AAS. Exercise facilities that focus on power and strength in their equipment³⁰ proved to have more users (11 per cent) than those that focus on health (3 per cent). An aspect that is specific to these prevalence figures is that they in all likelihood reflect current or recent use.

27 69 per cent men and 31 per cent women.

- 29 Exercise facilities that only focus on heavy strength training with free weights and machines. No other form of group training is offered, such as spinning, body pump, aerobics, etc.
- 30 The exercise facilities that are focused on power and strength in their equipment have posters of body builders, trophy collections from body building competitions and posters with invitations to the Sweden's Strongest Man competition.

^{23 13} gyms were visited on two occasions and 17 gyms on one occasion. Each visit lasted 3 hours. 462 questionnaires were completed, 55 per cent by men and 45 per cent by women.

²⁴ Each gym was visited for four consecutive hours. Everyone who entered the gym during these hours were encouraged to anonymously complete the questionnaire.

^{25 786} people constitute 69 per cent of those asked to participate in the study. Of the respondents, 70 per cent were men and 30 per cent were women.

²⁶ The observers actively participated in the exercise facilities at the same time that they secretly observed and classified people and the exercise facility according to a predetermined template.

²⁸ In order to reduce this risk, the observers had to undergo a practice observation in connection with hiring with the aim of assessing the observer's skill.

and in the past month	, respectivel	y, as well as cur	rrent experience. P	ercentage d	istribution amo	ng men and womer	1. 2008–2009.	
City	Year ^a	Study (type)	Indicator	Respond- ents (N)	Lifetime prevalence (%)	Annual preva- lence (%)	Monthly preva- lence (%)	Point preva- lence (%)
					All	AII	AII	All
					M	M	M	M
Kalmar ^b	2008	Question-	Doping	327	4	-		
		naıre			5 4			
Malmö ^c	2008	Question- naire	AAS and growth hor- mone	786	6 2			
Stockholm ^d	2008	Question-	Doping	1 678	2,7			
		naire			3,8 0,2	1,2 -	0,4 -	
Stockholm€	2009	Observation	AAS	2 368				3,5
								5,0 0,4
Kronoberg County ^f	2008	Question- naire	AAS and growth hor- mone	462	3,1			

- value unknown

a) Refers to publication year
b) Reference: (Hoff & Herngren, 2008)
c) Reference: (City of Malmö, Public Health Unit, 2008b)
d) Reference: (Leifman & Rehnman, 2008a)
e) Reference: (Leifman, et al., 2009)
f) Institute for Local and Regional Democracy, 2009)
If delimited age groups are studied, prevalence is higher. The majority of those who exercise at a gym are between the ages of 20 and 29 (Leifman, et al., 2009; Swedish Sports Confederation, 2008). According to STAD's observation study in Stockholm, the majority of those who use doping agents and exercise are between the ages of 20 and 39 (Leifman, et al., 2009). In Kalmar (Hoff & Herngren, 2008), a study indicated that 15 per cent of the 31–35 year-old men had tried AAS. In a Malmö study, 12 per cent of the men aged 30–39 who exercise at gyms said they had experience of AAS (City of Malmö Public Health Unit, 2008b).

Doping prevalence at workplaces

Some Swedish private employers have long conducted drug testing with the aim of achieving a drug-free working environment. Tests are conducted randomly at workplaces in connection with new hires or suspected use. There are two laboratories in Sweden that carry out AAS analyses on behalf of the employers: the Department of Clinical Pharmacology at Karolinska University Hospital and a private company in Eskilstuna.

The Karolinska University Laboratory has analysed AAS in workplace tests since 1994. In 2008, the lab analysed nearly 41,000 company samples, of which just over 1,300 were analysed for AAS by special order. Analysing AAS demands more resources than other, more common narcotic preparations, whereby each AAS analysis is significantly more expensive³¹. Orders for AAS analyses are probably done when there is a distinct suspicion of use in a single individual or at workplaces where it may be particularly justified. This may be one of the explanations of why positive results are more likely in an AAS analysis (1.5–2.5 per cent 2002–2008) than for the traditional drugs of cannabis, morphine, cocaine and amphetamine (which are all below 1 per cent) (O. Beck & T. Villén, Department of Clinical Pharmacology Karolinska University Laboratory, personal communication, 24 April, 2009).

Healthcare

Healthcare, particularly dependence care, occasionally takes urine samples from patients. No information is compiled on when and why this is done or when these are specially ordered for AAS analysis. The samples are analysed by the Department of Clinical Pharmacology at Karolinska University Hospital. Between 2002 and 2008, they conducted an average of 550 analyses per year. Up to April 2009, nearly 450 samples had been received. In 2008, 19 per cent of those analysed for AAS were positive (O. Beck & T. Villén, Department of Clinical Pharmacology, Karolinska University Laboratory, personal communication, 24 April, 2009).

³¹ The cost of an AAS analysis is approximately 20 times higher than a single narcotics analysis.

Forensic data

The risk of death as a result of acute poisoning from doping agents is considered to be low. However, it does happen that doping agents, primarily AAS, have contributed to deaths by e.g. cardiac death or have been found in connection with autopsies without a direct connection being able to be made (Thiblin, 2009).

In terms of narcotics, one should refer to the Cause of Death Register to obtain knowledge of the number of narcotics-related deaths. According to information from the Swedish National Board of Health and Welfare (C. Björkenstam, personal communication, 31 March, 2009), there is also an ICD code for androgenic and anabolic steroids. The code comes under "complications of medical and surgical care" and further "drugs, medicaments and biological substances causing adverse effects in therapeutic use". From 1998 up to and including 2008, eight cases were reported in the Cause of Death Register under this code, but the underlying causes of the reported cases are unclear.

Around 93,000¹² deaths (Statistics Sweden, 2009a) occur in Sweden every year, just over 5,000 of which (National Board of Forensic Medicine, 2009) are forensic cally investigated. The deaths that are autopsied are a selective sample and cannot be viewed as representative for any delimited group. According to the National Board of Forensic Medicine's Forensic Chemistry Division (Y. Lood, National Board of Forensic Medicine, Forensic Chemistry Division, personal communication, 20 May, 2009), just over 1,900 of the autopsies were analysed for narcotics in 2008. Of those, 44 with analysed for AAS, of which eight were positive. Since 1988, there have been 120 analysed deaths (Thiblin, 2009) that have shown the presence of AAS. A person is only tested for AAS when there are reasonable indications that the person used such preparations and when it is relevant to the forensic investigation. It is assumed that an important factor indicating that an autopsied body should be analysed is a large, well-built body (I. Thiblin, Uppsala University, personal communication, 27 April, 2009). Through this limitation, individuals who could have AAS in their bodies could be overlooked.

Doping among criminals

Since all handling of doping agents is illegal in Sweden by definition, it is of interest to illustrate the extent to which doping violations can be linked together with other criminal acts. Likewise, it is of interest to find out how many of the violent crimes, for example, occur under the influence of doping agents. There are no solid statistics for this, but there is information that indicates that criminal acts occur to some extent under the influence of doping agents. In addition, reports from jails and prisons indicate that there is doping and experience of doping in this group.

³² Based on the past 20 years.

Doping among criminal suspects

With the help of so-called sure signs³³, the police can order urine tests on the suspect. In connection with violent crime, samples are taken to determine if the suspect was under the influence of AAS. AAS analysis is usually ordered as a supplement to the basic package for narcotics, but AAS analyses are also done on their own. These analyses were initially done by the Doping Control Laboratory/Department of Clinical Pharmacology at Karolinska University Hospital (formerly Huddinge Hospital) and, since 2008, have been done at the Forensic Chemistry Division of the National Board of Forensic Medicine in Linköping.

The number of police cases with special orders for AAS gradually increased from some 80 cases in 1999 to 1,400 in 2008 (Y. Lood, National Board of Forensic Medicine, personal communication, 20 May, 2009). In total, in the past 10 years, just over 4,800 urine samples from the police have been analysed. The largest percentage of these analyses are ordered by the police in connection with suspected narcotics crimes or personal use (approximately 70 per cent), followed by violent crimes (20 per cent) and cases of driving under the influence of drugs (10 per cent). The proportion of positive analyses in the various groups has been relatively constant over the years. Around 30 per cent of the samples from personal use and in connection with cases of driving under the influence of drugs, and 16–18 per cent of the violent crime samples, were positive. Several samples can come from the same person, meaning that the number of samples cannot be equivocated to the number of people.

Doping at jails and prisons

There are several indications that AAS exist in correctional treatment, both at jails and prisons. At present, it is, however, difficult to obtain a clear view of how large the occurrence is and how it has changed over time.

Suspicions of AAS are investigated upon internment to the jail. In accordance with the Swedish Prison and Probation Service's suicide prevention efforts (Swedish Prison and Probation Service, 2008), two internment interviews capture the experience of AAS, in part through a health examination, in part in accordance with a suicide risk assessment (also refer to the section on the suicide prevention efforts of the Swedish Prison and Probation Service in the chapter on Prevention). The suicide assessments do not result in statistical data. In autumn 2008, a digital patient records system for the entire correctional care system was introduced. This will make it possible to monitor the health exams in the future based on an epidemiological and statistical perspective.

³³ Examples of these signs include rapid weight gain, acne across the chest and back, striations at the upper arms, swollen neck or face, information about mood swings or aggressiveness from e.g. girl friends or relatives.

During the time in prison, urine samples may be taken, mainly from a security perspective. According to the Swedish Prison and Probation Service (M. Hägerstrand, head office of the Swedish Prison and Probation Service, personal communication, 16 April, 2009), 91,130 urine samples were taken from inmates in 2008, of which 5,080 were positive. It is unknown how many were additionally analysed for AAS. Of the total number of urine samples, 1.7 per cent proved to be positive for AAS in 2008. In 2003–2004, 0.9 per cent were positive and in 2005, 1.6 per cent were positive (J. Andersson, head office of the Swedish Prison and Probation Service, personal communication, 10 June, 2009).

Based on a collective assessment, the prisons in Sweden report to the head office of the Swedish Prison and Probation Service on the occurrence of doping agents, among other substances. In 2008, there were doping agents at 13 prisons. Approaches and procedures in inspections have changed over the years, which means that the statistics are not fully comparable (Krantz & Elmby, 2007). In 2002–2008, the number of seizures varied between 26 and 100. The amount seized during the same period varied between 1.2 and 4.7 kilograms (J. Andersson, head office of the Swedish Prison and Probation Service, personal communication, 10 June, 2009).

Local experiences at jails and prisons

The occurrence of doping agents at jails and prisons is confirmed by local operations within correctional care. In the Stockholm region of the Swedish Prison and Probation Service, annual, unannounced screenings have been done since 2003 on a representative selection of 200–300 prison inmates (20–25 per cent) (Hoffman, 2007, 2008). Since the inmates sometimes refuse to provide urine samples or because the inmates provide diluted samples, it is difficult to prove the exact occurrence of the screened drugs, including AAS. However, the study indicates a decrease in the proportion that regularly uses drugs from 36 per cent in 2003 to 17 per cent in 2008. The trend for AAS looks the same and the proportion of AAS-positive cases in 2008 ended up somewhere between 2 and 11 per cent.

In Stockholm, the social medicine jail project was underway in 1987–1999 and from 2002 onwards, and in Gothenburg beginning in 2005. The project is meant to provide a survey and support HIV-prevention and is mainly directed at individuals with experience of narcotics. Around 600–700 of those who pass through the jails in Stockholm and around 300 in Gothenburg are interviewed about AAS use, among other factors.

In contrast to the view from the prisons, an increase appears to have taken place in the AAS experience of those jailed (Käll, 2004, 2005, 2006b, 2008; Wallin, 2007, 2009). In 2003, two out of ten in Stockholm said that they had tried AAS at some time. Five years later in 2008, three out of ten said that they had ever tried AAS and one out of ten had tried AAS in the past year. These levels reflect the situation since 2005. In Gothenburg, the project shows more experience. In 2005, around half of those jailed had experience of AAS or growth hormone and one out of four in 2008 indicated experience in the past year (Bendrik, 2007, 2009; Käll, 2006a, 2008).

Geographic differences

Several of the nationally representative studies described above show that experience of doping is spread throughout the country (Swedish Council for Information on Alcohol and Other Drugs, 2008). The number of people who indicated experience of consumption of doping agents is limited, which makes it difficult to show and establish regional variations for these parameters.

However, studies indicate that doping experience declines with a declining population density. It is twice as common for people to have experience of doping agents in the metropolitan areas than in the rural regions (Swedish Council for Information on Alcohol and Other Drugs, 2008; Leifman & Rehnman, 2008b).

Background factors

FOR THE PLANNING OF prevention and treatment, it is of central importance to understand the background factors (risk and protective factors) that surround doping. However, besides gender and age, knowledge is limited as to what factors underlie a use of doping agents.

Gender, age and place of residence

There has long been consensus that the majority of those who use doping agents are men (among others, Hermansson & Moberg, 2008; SOU 1996:126 part A; Thurelius, et al., 2005). Use also occurs among women, but to a significantly lesser extent.

The debut age for use is relatively high, around 18–22 years of age (Börjesson, 2008; Sjöqvist, et al., 2008; Skårberg, Nyberg, & Engstrom, 2008). A doping debut under the age of 15 or over the age of 30 is rare. By assuming that use in Sweden was under way five to ten years prior to being identified as a social problem around 20 years ago, the majority of users can be assumed to be younger than 55. Accordingly, those with doping experience in 2009 are within the age span of 15–55 years and the majority of those who use doping agents are assumed to be aged 18–34 (Börjesson, 2008; National Swedish Criminal Investigation Department & Swedish Customs, 2008; Swedish National Institute of Public Health, 2009b).

As previously mentioned, questionnaire studies show that doping experience decreases with decreasing population density. It is twice as common in the metropolitan areas for people to have experience of doping agents as in the rural regions (Swedish Council for Information on Alcohol and Other Drugs, 2008; Leifman & Rehnman, 2008b).

Social background

Research on what social background users have in doping is not sufficient to establish definite connections. Existing knowledge is largely based on studies of individuals who have sought treatment (Skårberg, 2009b). These individuals have often come far in their use and are not representative for the entire group.

During the years 2003–2008, Kurt Skårberg conducted in-depth studies of a group of AAS users that sought treatment for their AAS use in Örebro³⁴. From the

³⁴ All in the treatment group said they exercised at a gym. The group was compared with two groups of gym visitors. One control group had personal experience of AAS use (tried at some time) and the other had no personal experience of AAS use.

studies that come forth, AAS users who seek treatment have a relatively disadvantaged social background (Skårberg & Engstrom, 2007; Skårberg, et al., 2008). Most have grown up in conflict-rife families with alcohol and medication problems. However, Skårberg cannot see any definite connections with narcotics use in the family during childhood. Many have had a childhood with a general lack of social support. Nearly one out of two was abused (physically or mentally) during childhood. Subjection to violence during childhood or earlier in life is also emphasized in other studies (Meilman, Crace, Presley, & Lyerla, 1995; Petersson, Garle, Holmgren, et al., 2006). The users' relationship to their fathers is generally poor, but somewhat better to their mothers (Kanayama, Cohane, Weiss, & Pope, 2003; Kanayama, Pope, Cohane, & Hudson, 2003; Skårberg & Engstrom, 2007).

People's social situation is sometimes analysed based on the existence of deeper relationships with people in their surroundings and during childhood. In Skårberg's studies (Skårberg & Engstrom, 2007; Skårberg, et al., 2008), only just over half of the AAS users say that they currently have access to and could get help from relatives who played a major role during their childhood if it were necessary in a setback, for instance. This person is most often a maternal or paternal grandfather. None of the users that sought treatment say that they had a friend who played a major role for them as a child. A survey by Kindlundh et al. (2001) among school students shows that people with strong friendship support have experience of AAS to a lesser degree.

However, it also comes forth in studies that users of doping agents may have had a good, settled childhood, did well in school and achieved a higher level of education (Cohen, Collins, Darkes, & Gwartney, 2007; Sas-Nowosielski, 2006; Skårberg, et al., 2008). There are probably different kinds of users with more or less favourable backgrounds, but where the less favourable factors dominate.

Educational background

A few studies of students and individuals in treatment have shed light on schooling and common to these is the fact that AAS users usually have little positive experience of school. The majority with AAS experience had academic difficulties in school, usually in the form of learning and concentration difficulties. They disliked school, were bored, were tired of school and were often truant (Kindlundh, Isacson, Berglund, & Nyberg, 1999; Nilsson, Spak, Marklund, Baigi, & Allebeck, 2004; Skårberg, et al., 2008). Studies that illustrated the level of education indicate that AAS users generally have lower levels of education than those without experience of AAS (Rachon, Pokrywka, & Suchecka-Rachon, 2006; Skårberg & Engstrom, 2007).

Self- confidence, self-esteem, behavioural disorders and hyperactivity

A history of behavioural disorders in childhood is often reported by the users (Kanayama, Pope, et al., 2003) and in some cases also hyperactivity (Tirassa, et al., 1997). A number of studies emphasize that poor self-confidence may underlie AAS use (Kanayama, Cohane, et al., 2003; Kindlundh, Hagekull, Isacson, & Nyberg, 2001). Users often feel insecure and have proven to have lower self-esteem (Irving, Wall, Neumark-Sztainer, & Story, 2002; Kanayama, Pope, et al., 2003; Thiblin & Parlklo, 2002) and in some cases, an unrealistic body image is an underlying factor (also refer to the section on aesthetes under the chapter Groups that use doping agents). Studies show that a person's self-esteem is strengthened the more satisfied he or she is with his or her physical appearance (Austin, Champion, & Tzeng, 1989; McCreary & Sasse, 2000). The use of doping agents becomes a way to obtain a more muscular, stronger and more attractive body, thereby strengthening one's self-esteem and self-confidence.

Athletic background

In this review, the athletic perspective has been limited. However, it seems clear that an athletic background may in several respects underlie doping (Hoff, 2008). What this looks like is not covered here.

How are doping agents used

KNOWLEDGE OF HOW DOPING AGENTS are used is limited. Discussion forums and sales websites on the Internet describe in depth how each preparation can be used: in what doses and what combinations. This knowledge is rarely based on scientific evidence, but rather on individual experiences and rumours.

The objective of using doping agents differs in part from the objective of using drugs or alcohol, for example (also refer to the chapter Groups that use doping agents). Doping agents lack the immediate intoxicative effect provided by alcohol and narcotics, and the objective of the use is rarely the same. Consequently, knowledge of various user patterns for other psychoactive substances is of limited relevance to doping (Thiblin, 2008).

Dose size

Besides testosterone, AAS also include other bodily steroid hormones with androgenic characteristics or their synthetic chemical "relatives". The body's own production of testosterone is approximately 7 mg per day in men and 0.7 mg per day in women. In medical contexts, the hormone preparations are used, for example, for low self production of testosterone in men. In treatment, the difference between self production and the level the testosterone should be at is administered. This is an example of a therapeutic dose. For doping purposes, these levels provide no effect, whereby doping agents are overdosed in so-called supraphysiological doses. A supraphysiological dose is 5–100 times the therapeutic dose (Moberg & Hermansson, 2006). Several studies indicate that both the physical and mental effects of use depend on the dose's size. At the same time, the doses have increased in size and the cycles are considered to have become longer in the 2000s than the previous decade (Parkinson & Evans, 2006). There is considerable uncertainty as to what dose size is consumed among both users and researchers since the contents of the preparations rarely match the declared contents.

Cycles, stacking and manner of intake

Most people who use doping agents do so in "cycles", i.e. consume the doping preparations during a certain period of time followed by breaks. Continuous use without breaks also occurs (Parkinson & Evans, 2006). Normally, 2–3 cycles are undergone per year (Kindlundh, 2002). A cycle usually lasts 6–12 weeks. Then a break of 6–12 weeks follows before a new cycle is begun (Moberg & Hermansson, 2006). There are no Swedish studies that describe the distribution of the cycles,

which is why a U.S. Internet study (Parkinsson & Evans, 2006) is referred to here, in which the total use of AAS in terms of months per year is distributed as follows:

< 3 months (6 per cent 31/500),

3-6 months (49 per cent 244/500)

> 6 months (45 per cent 225/500 of which 6 per cent reported continuous use 52 weeks of the year).

Those who combine doping with exercise usually apply a more or less advanced cycle structure that includes a daily schedule. These are rarely formulated by a medically knowledgeable person. The cycles are begun with small doses that are gradually increased. Towards the end of each cycle, the doses are gradually decreased (Brower, 2002). This is called "pyramiding" (Kindlundh, 2002).

As a rule, two or more AAS preparations are combined during a cycle (Leifman & Rehnman, 2008a; Parkinson & Evans, 2006). This method is called "stacking" and the objective is to achieve an enhanced effect and minimise the risks of undesirable side-effects and the development of tolerance (Kindlundh, 2002).

Injections are the manner of intake that appears to be the most common. On the Internet, there are instructions posted by users and pictures of how the injections can be taken (also refer to the section on information on the Internet in the chapter on Prevention). The use of pills appears to be the second most common manner of intake. These two manners of intake are often combined in the belief that it decreases the risks of use (Bendrik, 2009; Brower, 2002; Moberg & Hermansson, 2006).

Sole use of doping agents

In one third of the urine samples that were analysed in 2008 in conjunction with personal use, only AAS was found, i.e. no mixed drug use (Y. Lood, National Board of Forensic Medicine, personal communication, 20 May, 2009). Whether this proportion is representative for other years and all users is unclear, but it is clear that a distinctly large group solely uses doping agents. These people usually view themselves as healthy, clean-living people and often indicate aesthetic reasons for their use.

Other substances used in conjunction with doping agents

There is a strong connection between the use of doping agents, narcotics, alcohol, dietary supplements and pharmaceuticals (among others, DuRant, Rickert, Ashworth, Newman, & Slavens, 1993; Sjöqvist, et al., 2008). Mixed drug abuse sometimes occurs among those who exercise at gyms, criminals, AAS users seeking care and recreational users. There is considerable difference of opinion regarding the nature of this connection. In Skårberg's studies (Skårberg, et al., 2009) of individuals who sought treatment for their doping agent use, more than 95 per cent (31/32) had used other substances together with AAS. Medication was indicated as the most common, followed by narcotics. In a U.S. Internet study (Parkinson & Evans, 2006), 96 per cent (481/500) of the AAS users said that they also use other substances such as stimulants, fat-burners, growth hormone and insulin with the aim of increasing the effects of the AAS use in some cases and mitigating or mastering the side-effects in other cases (Hildebrandt, et al., 2006). The objective of using several preparations may also depend on a general tendency of certain people to try various types of substance abuse. The element of polydrug abuse probably differs between the groups aesthetes, athletes and violent individuals, but knowledge on this is still limited.

Several of the negative side-effects that accompany doping, and are described in the chapter on the Effects of use, are amplified in mixed drug abuse, making it more difficult to treat individuals for a return to an abuse-free and healthier life (Skårberg, et al., 2009).

Dietary supplements

During the 2000s, the connection between dietary supplements³⁵ and doping received attention (Hoff, 2008). According to a U.S. study, it is 26 times more likely to begin using AAS if one uses dietary supplements than if not (Dodge & Jaccard, 2006). An observation study of exercise facilities in Stockholm shows that there are more who use AAS at the gyms that sell dietary supplements than at the gyms that do not sell such products (Leifman, et al., 2009). The use of dietary supplements can lead to the initial use of more powerful performance-enhancing products like AAS (Skårberg, et al., 2008). The aim of the various preparations are often the same – when the dietary supplements no longer provide the increase in effect strived for, some users go over to stronger preparations to achieve greater effect from exercise. Skårberg points out that those who exercise at a gym have received the advice from their surroundings to begin with AAS to improve the effect of the exercise (Skårberg, et al., 2008). Dietary supplements can also be used to cover the enormous dietary and caloric requirements that a person who uses AAS needs. In a study at gyms in Stockholm (Leifman & Rehnman, 2008a), 80 per cent of those who use doping agents say that they also use dietary supplements, while 42 per cent of those who do not use doping agents use dietary supplements, however.

Doping and dietary supplements may also be related to one another on another level, namely the risk of intake of AAS in contaminated preparations. An international study (Geyer, et al., 2004; Parr, Geyer, Reinhart, & Schanzer, 2004) analysed samples of slightly more than 300 suppliers of dietary supplements in 13 countries.

³⁵ The limit between dietary supplements and medication is paper thin. Medication is controlled and approved by the Medical Products Agency. Dietary supplements are covered by food legislation and neither approval or review is done by authorities of the individual products' effects and safety. (Medical Products Agency, 2008)

The companies that produce the dietary supplements were located in the U.S. and Europe. Of the samples, 15 per cent contained AAS without it being declared on the product label. Accordingly, it is possible to use AAS without being aware of it. Use may also possibly be intentional, i.e. the user chooses the preparations that are contaminated (Hoff, 2008).

Medication

AAS use is often supplemented with a number of different medications (Petersson, Garle, Holmgren, et al., 2006), which in some cases are legally prescribed by a physician and in some cases are purchased illegally (Skårberg, et al., 2009). In general, the use of medication begins after the introduction of doping agents and the aim is to increase the effect or decrease the side-effects resulting from AAS use. Depending on the purpose and the preparation, the medications are used during or between the AAS cycles, at the same time as or separately from other preparations.

Skårberg's studies of individuals who sought treatment for their doping agent use shows that just over 95 per cent of those studied by Skårberg had experience of medication abuse.

- Stimulants are the most common complementary medications where ephedrine, above all, is taken by most of those who use doping agents to reduce appetite and increase stamina (Parkinson & Evans, 2006).
- Sedatives such as benzodiazepines are commonly used to be able to sleep better, obtain better self-control and to wind down (Parkinson & Evans, 2006).
- Analgesics are taken to alleviate the pain that arises in intensive, heavy exercise (Skårberg, et al., 2009).
- Antidepressants are taken to treat depression and alleviate its symptoms (Skårberg, et al., 2009).
- Human growth hormone hGH is the most common hormone to be supplemented with AAS (Skårberg, et al., 2009) with the aim of compensating for a diminished self production of testosterone (Evans, 2004; Parkinson & Evans, 2006). Insulin is taken in the belief that it provides greater muscle mass and burns fat (Skårberg, et al., 2009).
- Additional medications are used in the belief that they prevent or impede gynecomastia, testicular atrophy, acne, oedema, inflammations, etc. (Skårberg, et al., 2009).

Narcotics

There are clear connections between doping and the use of narcotics. On one hand, consumption of doping agents may precede drug use, and on the other, drug use may begin before doping preparations are used (Kanayama, Pope, et al., 2003; Kindlundh, et al., 1999; Skårberg, 2009b).

Some researchers and clinicians believe that doping agents function as gateways³⁶ to narcotics use (Arvary & Pope, 2000; Nyberg, 2008; Wood, 2008). Animal experiments at Uppsala University indicate that the brain is sensitised to other drugs in AAS use (P. Johansson, Lindqvist, Nyberg, & Fahlke, 2000; P. Johansson, et al., 1997; Kindlundh, Lindblom, & Nyberg, 2003; Kindlundh, Rahman, Lindblom, & Nyberg, 2004). AAS users supplement their use with narcotics for several reasons, in part to increase the effect of AAS and in part to decrease the side-effects that arise during and after cycles. Others believe that narcotics users supplement their abuse with doping agents like any other drug. In a study recently conducted by the Anti-Doping Hot-line, in cooperation with the Stockholm police's youth and pub section and the Department of Clinical Pharmacology in Huddinge, that studied individuals in Stockholm suspected of crimes against the Narcotics Act, major mixed drug use was shown (Anti-Doping Hot-line, unpublished data). The narcotics use was said to have preceded the introduction of AAS among more than half of those who were found with AAS (in their urine or on their person).

- Amphetamine (Kindlundh, et al., 1999; Parkinson & Evans, 2006; Petersson, Garle, Holmgren, et al., 2006) is a central nervous system stimulant that is taken together with AAS with the aim of having the energy to exercise more. Amphetamines can increase the overdose potential for AAS (Thiblin, Lindquist, & Rajs, 2000) and AAS can increase the effect of amphetamines (Clark, Lindenfeld & Gibbons, 1996) and exacerbate amphetamine-induced aggression (Steensland, Hallberg, Kindlundh, Fahlke, & Nyberg, 2005).
- GHB (Brower, 2002; Parkinson & Evans, 2006) helps the body increase muscle volume and strength, but can also function as a soporific.
- Cocaine (Meilman, et al., 1995; Miller, et al., 2005; Simon, Striegel, Aust, Dietz, & Ulrich, 2006)
- Cannabis (DuRant, Ashworth, Newman, & Rickert, 1994; Elliot, Cheong, Moe, & Goldberg, 2007; Wichstrom & Pedersen, 2001) is the most commonly occurring narcotic substance in Sweden, which is considered to be the reason that it is also present among AAS users (Hermansson & Moberg, 2008). Animal experiments have shown that AAS provides an increased sensitivity to cannabis (Celerier, et al., 2006).
- Opiates (Kanayama, Cohane, et al., 2003; Roccella, Paterno, Bonanno, Tusa, & Testa, 2005; Wood, 2008): a U.S. study indicates that AAS can function as a gateway to heroin (Arvary & Pope, 2000) and a Swedish-Spanish research group indicates a connection between AAS and the development of opiate dependence in animal experiments (Celerier, et al., 2003).
- LSD (Nilsson, et al., 2001; Roccella, et al., 2005).

³⁶ In connection with AAS, this expression often occurs in the literature without a further discussion being held or a definition being made as to what criteria a substance should meet to be defined as a gateway.

Alcohol

Studies indicate that there is a connection between AAS and alcohol use (DuRant, et al., 1993; Klötz, Petersson, Isacson, & Thiblin, 2007; Miller, et al., 2005; Petersson, Garle, Holmgren, et al., 2006). Animal experiments show that AAS increase alcohol consumption and the behavioural tolerance to alcohol (P. Johansson, Lindqvist, et al., 2000; A.-S. Lindqvist, 2004).

Effects of use

KNOWLEDGE OF THE harmful effects of doping agents has increased in the past 20 years. Nevertheless, there is a great need for more knowledge.

Use of doping agents provides various effects, depending on what doping agent is used. This review focuses on AAS, which comprise the most studied group of preparations. There are also variations for AAS, but this is also not specified here.

The effects depend on how, by who and in what context the substance is used. The type of administration, period of use and total dose, and possibly other simultaneous substance abuse (Quaglio, et al., 2009) or medication, play in as well as individual conditions such as gender, age, possible physical or mental disease (Nyberg, 2008), previous and current social circumstances (Skårberg, 2009a; Thiblin & Petersson, 2005) and possibly ethnicity (Jakobsson, et al., 2006). The researchers also believe that they can discern an individual variability that appears crucial to the effect. As with regular medicines, genetic factors probably constitute an important cause of variation in the effects of doping agents (Sjöqvist, et al., 2008). Effects and side-effects are assumed to relate to the dose size of the doping preparation. Accordingly, it is a given that the proven wide genetic variation in the conversion of testosterone and other androgens leads to equally large variation in the exposure to these hormones with a potential significance to effects and side-effects (Jakobsson, et al., 2004; Jakobsson, et al., 2007; Schulze, Lorentzon, et al., 2008; Schulze, et al., 2009; Schulze, Lundmark, et al., 2008). What this variability fully looks like is not yet clear (Pagonis, Angelopoulos, Koukoulis, & Hadjichristodoulou, 2006; Quaglio, et al., 2009).

The negative effects emphasized for AAS at the individual level are mainly connected to advanced use, which is defined here as the intake of supraphysiological doses during one or more cycles. Conducting research on the effects of supraphysiological doses on humans is difficult for ethical reasons, and information on what doses are used by the users is rarely known. The effects of normal, physician-prescribed use and the use of supraphysiological doses differs widely and is therefore difficult to compare. As yet, research appears to be dominated by the former. In general, there is a connection between dose and effect/side-effect, but only very small doses can result in serious side-effects (Pagonis, Angelopoulos, Koukoulis, & Hadjichristodoulou, 2006; Quaglio, et al., 2009).

The physical and medical effects are more extensively surveyed than the mental and social effects. There is more knowledge about the short-term effects of AAS use than the long-term effects (Parssinen & Seppala, 2002; Sjöqvist, et al., 2008) and the effects of use over a short period are more extensively surveyed than the effects that result from prolonged use (Parssinen & Seppala, 2002). As a result of increased dose size, the side-effects are at risk of becoming worse in the future (Kanayama, Hudson, & Pope, 2008; Skårberg, 2009a).

Hazard assessment

There is no current Swedish assessment of doping agents that compares the danger of different substances. Nor is there any assessment that compares the danger of AAS or growth hormone in relation to narcotics. The Narcotics Commission (SOU 2008:120) writes in its report that it is not currently meaningful to attempt such a hazard assessment due to the limited knowledge base.

Physical effects

The intake of AAS can have effects and side-effects in several of the body's organ systems. Upon intake of AAS, special androgenic receptors are activated that are found in most tissues of the body, such as muscles, sex organs, bones, liver, kidneys, adipose tissue and the brain (Bhasin, et al., 1996; Quaglio, et al., 2009). The section below is intended to provide an overview of the physical side-effects that can arise as a result of the use of doping agents.

Acute toxicity

Most pharmaceuticals exhibit a documented acute toxicity upon overdose. This does not apply to AAS and there are no known levels the intake of which causes the risk of acute death (Quaglio, et al., 2009). If these levels exist, they are probably be very high. Autopsy data indicates that AAS may possibly be a contributing factor in acute mixed poisonings. There is insufficient scientific evidence indicating that toxicity exists for AAS (Kanayama, Brower, Wood, Hudson, & Pope, 2009) in contrast to e.g. certain narcotic preparations.

Visible changes in the body

AAS provides an increase in weight, more muscle mass and greater muscle strength beyond what can be achieved by exercise and a proper diet alone over the same period of time (Bhasin, et al., 1996; Quaglio, et al., 2009). A dose that exceeds 300 mg per week increases the muscle volume significantly (Parkinson & Evans, 2006). The AAS user also has less need for resting periods during exercise and a more rapid recovery after intensive exercise sessions (Nyberg, 2008; Tremblay, Copeland, & Van Helder, 2004), which gives the user the energy to exercise harder and more often. Accordingly, the user can exercise more than what would be the case without the influence of AAS. The muscle building effect of AAS is a common reason for use. Body mass index (BMI) increases (Klötz, Garle, Granath, & Thiblin, 2006; Petersson, Garle, Holmgren, et al., 2006) and body fat decreases (Hall, 2005; Quaglio, et al., 2009), which most often leads to an welcome change in physical appearance (Parkinson & Evans, 2006; Skårberg & Engstrom, 2007). Less welcome are the cosmetic side-effects that appear to arise, such as acne resulting from oilier skin. Stretch marks (striae) resulting from hormonal changes and rapidly stretched skin occur as well as other skin changes, such as wrinkled, thickened, hyperpigmented and unpigmented skin (Hall, 2005). Individuals with a propensity for hair loss can experience an acceleration of the process of pattern baldness. Growth of the mammary glands results in gynecomastia (Hall, 2005). Fluid retention, i.e. the collection of water in the tissues of the body resulting in swelling (especially of the face), is a well-known phenomenon (Hildebrandt, Langenbucher, Carr & Sanjuan, 2007) that is reversible, but can lead to increased blood pressure. Effects on the liver, such as cholestasis, which in severe cases can lead to visible jaundice, are common to the preparations that are taken orally. This effect also appears to be fully reversible (Thiblin, 2008). Young people who have not yet finished growing can have a permanent shortening of their final height by up to 5–7 cm as a result of AAS use (Moore, Tattoni, Ruvalcaba, Limbeck, & Kelley, 1977).

Physical complications

AAS use appears to entail a number of serious physical complications. Most connections are observed based on individual cases rather than large-scale studies, which entails difficulties in fully establishing the connections.

In the beginning of an AAS cycle, many experience a strongly increased sex drive, which soon subsides (Hildebrandt, et al., 2007; Thurelius, et al., 2005). On the long term, use can lead to testicular atrophy and diminished fertility. There is no evidence of permanent infertility, although there are also no studies that unambiguously contradict this risk.

AAS use leading to an unbeneficial lipid profile is considered to be scientifically established (Kanayama, et al., 2008; Modlinski & Fields, 2006; Thiblin & Petersson, 2005). A poor lipid profile is a risk factor for arteriosclerosis, e.g. coronary sclerosis. The direct connection between AAS-related lipid changes and coronary sclerosis has not been established, but is likely (Quaglio, et al., 2009).

Several studies show that AAS use leads to cardiac hypertrophy and, above all, the growth of the left ventricle (Hall, 2005; Kanayama, et al., 2008). Cardiac hypertrophy is assumed to be due to a physiological adaptation to the general increase in muscle mass, as well as a direct effect of AAS. Signs of morbidity of the cardiac muscles have been identified in histological studies in a manner that has not previously been placed in connection with other substances of abuse. This morbidity may be due to the intake of AAS, but also to the use of other preparations: it is not yet clear (Thiblin, 2008). Theoretical considerations and observations indicate that a prolonged use of AAS entails an elevated risk of cardiac death that is fully comparable with the use of amphetamines or cocaine (Thiblin, 2008). The degree of risk can, however, not be asserted with certainty since AAS constitute relatively new substances of abuse and it generally takes decades to develop cardiovascular diseases due to AAS use (Kanayama, et al., 2008). The individual cases rarely receive attention since there is little knowledge of the connection. When a person dies as a result

of cardiac death, an autopsy is rarely done with an analysis for AAS (I. Thiblin, Uppsala University, personal communication, 27 April, 2009).

Additional complications that have been shown in numerous case studies, but not established in epidemiological studies, include cardiac infarction, stroke, pulmonary embolism and liver cancer (Nyberg, 2008; Thiblin, 2008).

A major part of the use of doping agents takes place through intramuscular injections. Multiple complications can arise in connection with the injection due to shared or non-sterile syringes and limited knowledge (Larance, Degenhardt, Copeland, & Dillon, 2008). The knowledge of users on how this is done is commonly based on information from other users and from various "homemade" websites.

Specific physical changes for women

Women are affected by side-effects similar to those in men and the risk of exhibiting them is higher (Kindlundh, et al., 1999; Quaglio, et al., 2009). Use also often entails a masculating effect that does not automatically return to normal after discontinued use. Some of the reported side-effects are larynx growth, beard growth, substantial body hair growth and simultaneously raised hairline, menstruation disturbances, clitoris growth, and regression of the breasts (Eklöf, et al., 2003; Hermansson & Moberg, 2008).

Dependence

AAS dependence has been discussed since the 1960s (Kelly, 1964; Petersson, 2008). There are no known documented cases of dependence that arose after the use of therapeutic AAS doses although dependence is proposed to arise in the use of supraphysiological doses (Brower, 2002). Studies indicate that AAS may lead to dependence as defined by DSM IV (Diagnostic and Statistical Manual of Mental Disorders)³⁷ (Brower, Blow, Young, & Hill, 1991; Kanayama, Brower, et al., 2009; Quaglio, et al., 2009).

AAS is considered to stimulate the same type of reward mechanisms as other drugs (P. Johansson, et al., 1997; Kanayama, Hudson, & Pope, 2009; Wood, 2006, 2008), but not to the same extent and not in the same acute manner. AAS does not provide the same fast, distinct intoxication as heroin, cocaine or amphetamines (Quaglio, et al., 2009). The rewarding effect appears rather to arise slowly and be linked to mental well-being from a sense of social dominance, physical strength, invincibility and invulnerability. As intended, the body gets larger and self-confidence improves. These psychological effects can function as factors that maintain AAS use despite unbeneficial side-effects (Brower, 2002; Kashkin & Kleber, 1989). There are many indications that depression, insomnia, etc. give rise to relapses.

³⁷ According to DSM-IV (latest issue 1994), substance dependence can also be found if there are no symptoms of physiological abstinence. According to previous versions of the manual, physical abstinence symptoms were a requirement for a behaviour to be counted as dependence.

Symptoms that arise after AAS use appear to concern symptoms of depression and anxiety rather than physical abstinence from the preparation.

There are studies that indicate a specific link between opiate dependence and AAS dependence (Arvary & Pope, 2000; Celerier, et al., 2003; Kanayama, Cohane, et al., 2003; Quaglio, et al., 2009). The nature of this connection is not yet clear, however. Animal experiments show that opiates and AAS affect the brain in similar ways (P. Johansson, Hallberg, Kindlundh, & Nyberg, 2000; P. Johansson, Lindqvist, et al., 2000; Peters & Wood, 2005; Wood, 2006) and that AAS can induce other drug dependence by sensitising the brain to alcohol and certain narcotic preparations, such as amphetamines and opiates (P. Johansson, Lindqvist, et al., 2000; P. Johansson, et al., 1997; Kanayama, Cohane, et al., 2003; Kindlundh, et al., 2003; Kindlundh, et al., 2004).

Psychological effects

Use of doping agents affects the psyche on several levels. There is significantly less written about the psychological side-effects of AAS use than about the physical. This may possibly be due to the fact that most studies are observation studies, which entail difficulty in identifying what caused the problem (Talih, Fattal, & Malone, 2007). Uncertainty regarding how the psychological side-effects arise makes it difficult to determine if the use of doping agents inherently causes them or if certain psychological traits may be the reason that one begins doping. Consequently, it is difficult to know how much of a role the actual use plays in the mood and personality changes and the mental problems that arise (Kanayama, et al., 2008; Rohman, 2009). Use may possibly begin in many cases when the mental problems are already present (Talih, et al., 2007). Individual susceptibility is claimed to play an extra large role in the psychological side-effects and it is impossible to foresee who has this susceptibility (Pagonis, Angelopoulos, Koukoulis, & Hadjichristodoulou, 2006).

Larger doses (Hall & Chapman, 2005) and some kinds of doping agents (Skårberg, 2009a) lead to a higher degree of psychiatric side-effects and some psychological effects appear to remain a long time after the end of AAS use (Kanayama, et al., 2008), but this is also uncertain.

This section initially describes the phases of primarily mental perceptions that are commonly undergone in use. These phases describe both desired and undesired effects and, here, also function as a general explanation of the mental side-effects associated with AAS use. Following the description is a further discussion of certain, more distinguishing side-effects that then leads to a discussion of the connection between the use of doping agents and criminality.

Three phases users go through during use

Researchers and practitioners talk about three phases (Hermansson & Moberg, 2008; Rosén, 2009) in the use of doping agents that follow one another (also refer to the chapter on How doping agents are used). The phases are linked to the experi-

ences and, above all, the mental stages that the user goes through during use and can be described as follows.

- In the beginning, most users experience a number of positive effects from their AAS use (Hildebrandt, et al., 2006). This is the first phase. Some describe the experience as "the best in their entire life" (Skårberg, et al., 2008). The user has more energy and enthusiasm and a stronger sex drive (Bahrke, Wright, Strauss, & Catlin, 1992). They feel a sense of greater social acceptance and higher social status. The need for sleep decreases (Hall, 2005). Muscle volume usually increases and with it strength, which reinforces self-confidence, and a sense of invincibility arises. At the same time, some claim that irritability and hostility already arise here (Midgley, Heather, & Davies, 2001; Rosén), while other researchers defer these effects to phase two.
- Phase two is the phase that arises after a period of elevated dosages. The user is at risk of a diminished capacity for judgement and a loss of impulse control (Galligani et al., 1996), which can lead to unprovoked outbreaks of rage. Aggressiveness (Galligani et al., 1996) and paranoia can develop and rapid mood swings are common (Papazisis, Kouvelas, Mastrogianni, & Karastergiou, 2007; H. G. Pope, Jr. & Katz, 1994). The fixation on the body, exercise and the preparation is amplified (Moberg & Hermansson, 2006; Skårberg, et al., 2008).
- After a completed cycle, the user enters an abstinence phase, phase three. Selfconfidence wains and apathy, listlessness, mania and anxiety arise (Talih, et al., 2007). Depression, which is one of the most distinct mental side-effects, creeps up (Hall & Chapman, 2005).

The three-phase cycle begins again with recurring intake cycles. After a prolonged period of use, the negative effects tend to outweigh the positive (Skårberg, et al., 2008). There is also a small proportion of users who never experience any negative effects.

Muscle dysmorphia

Some people who use doping agents have an unrealistic body image and, with this, can become obsessed with their own conviction of not being large, strong and muscular enough, regardless of how muscular they really are. In the literature, the term of muscle dysmorphia is used and parallels are drawn to anorexia where the individuals see themselves as fat when they look in the mirror regardless of how thin they are (Goldfield, Blouin, & Woodside, 2006; Kanayama, Barry, Hudson, & Pope, 2006; C. G. Pope, et al., 2005; H. G. Pope, Jr., Gruber, Choi, Olivardia, & Phillips, 1997; Rohman, 2009). However, it is uncertain whether muscle dysmorphia is a cause or effect of the use of doping agents (Cole, Smith, Halford, & Wagstaff, 2003).

Symptoms of depression

Low doses of AAS have historically been used to treat depression and melancholy (Basaria, Wahlstrom, & Dobs, 2001). AAS affects the psyche in multiple dimen-

sions and clinical observations point to symptoms of depression as a result of AAS use. It has long been known that individuals have serious depressive symptoms after prolonged use of AAS (Brower, 1997, 2002; Hall & Chapman, 2005; Kashkin & Kleber, 1989; Malone, Dimeff, Lombardo, & Sample, 1995; Nilsson, Spak, et al., 2004; Skårberg, 2009a), but there is still uncertainty as to how much of a role the actual use of doping agents plays.

Depressions are dominated by cheerlessness (anhedonia – nothing is enjoyable) and anxiety. Depressive symptoms, with associated risk scenarios, are currently viewed as the most common, most widespread and probably the most serious side-effects after discontinued AAS intake. The symptoms escalate after an extended period of use. They primarily appear during the periods between cycles or after discontinued intake (Brower, 2002; Kashkin & Kleber, 1989). The depressive symptoms become a risk factor in themselves for both violence and suicide, and may thereby entail a direct hazard to the depressed individual and his or her surroundings (refer to the section on violence/aggressiveness and suicide, below).

Courage, omnipotence and the sense of immortality

In a number of self-reporting studies where the users of doping agents themselves describe their lives, it has come forth that people who use AAS often feel a greater sense of courage (Kindlundh, et al., 1998). This is confirmed by animal experiments (P. Johansson, Hallberg, et al., 2000; Steensland, Blakely, Nyberg, Fahlke, & Pohorecky, 2005), which also site the feeling of dominance (A. S. Lindqvist & Fahlke, 2005). In combination with a strong sense of omnipotence and immortality, case studies describe a sense of virtually unlimited strength in the form of: "when I hit the ground with my fist, I feel how the whole Earth shakes". There is no research on how this feeling expresses itself in the form of an inclination to violence or other risk behaviour.

Aggressiveness

Aggression is a commonly reported psychological effect of AAS use (among others, Chantal, Soubranne, & Brunel, 2009; Clark & Henderson, 2003; Cunningham & McGinnis, 2008; P. Johansson, Hallberg, et al., 2000; Pagonis, Angelopoulos, Koukoulis, Hadjichristodoulou, & Toli, 2006; Wichstrom & Pedersen, 2001). Animal experiments on rats at Uppsala University, among others, show that the brain is affected in areas associated with aggressive behaviour upon the intake of doping agents (Hallberg, Johansson, Kindlundh, & Nyberg, 2000; Kindlundh, et al., 2003). A general connection is made to people who have taken AAS probably becoming more aggressive. The behavioural change appears to be long term, but may be transitory (Steensland, Blakely, et al., 2005). Together with the few other studies, this indicates a certain connection where the AAS use precedes the aggressive.

Aggressiveness can express itself in several ways and connections have been shown in terms of both aggressiveness towards objects and verbal aggressiveness (Parrott, Choi, & Davies, 1994). Aggression comes to expression especially upon provocation (Bahrke, Yesalis, Kopstein, & Stephens, 2000; A. S. Lindqvist & Fahlke, 2005). Verbal aggressiveness and violence directed at the user's partner have been reported on repeated occasions (Conacher & Workman, 1989; Skårberg & Engstrom, 2007; Thiblin, et al., 2000). Aggressiveness is not always seen as a negative characteristic. Reports indicate that several users, not least women who use doping agents, perceive increased aggressiveness as a positive side-effect that can result in their continued use of the doping agents.

Aggressiveness is a male characteristic or a trait found to varying degrees in various individuals, where the level is relatively stable over time. The individuals who possess this characteristic are also assumed to have a higher risk of becoming violent by acting on their aggressiveness (N. Långström, Centre for the Prevention of Violence in Stockholm, personal communication, 21 April 2009). The connection between AAS and violence has been discussed for more than 20 years. Several spectacular, difficult to comprehend and brutal violent acts have since been linked to AAS. The media has become involved and shed light on several cases. Violence that has arisen as a result of AAS use has often been brutal and easily triggered, and the provocation has sometimes been minimal (H. G. Pope, Jr. & Katz, 1990; Thiblin & Parlklo, 2002). AAS use has proven to be able to lead to senseless and unplanned attacks and murder (Hall & Chapman, 2005). In repeated case reports, the perpetrator was unable to explain his actions afterwards and the violence was described as inexplicable in relation to the previous personality.

Connections have long been seen between the use of psychoactive substances and violent actions, including violent crime. According to a nationwide Swedish study (Grann, et al., 2005), 23 per cent of all violent crimes are committed by individuals with some type of substance abuse: users of alcohol commit 16 per cent and drug users commit 12 per cent of violent crimes. In the drug user group, the risk factor is the greatest for individuals who use multiple substances (6 per cent of all violent crimes), followed by crimes committed by amphetamine-dependent individuals (3 per cent of the crimes). Accordingly, substance use plays a role, but only constitutes a part of the explanation. A violent act depends on several co-variant explanatory factors. The same applies to most of our actions. In her dissertation (2008), Fia Klötz emphasizes that the risk factors common to criminality and abuse can also be of considerable explanatory power for AAS violence. The majority of the perpetrators have had some prior mental disorder and in committing the act have also been under the influence of some other substance, usually alcohol (Skårberg, 2009b; Skårberg, et al., 2009). However, recent research from the U.S. indicates that AAS can on its own be a causal factor in connection with violent acts (Beaver, Vaughn, Delisi, & Wright, 2008).

Far from all AAS users commit acts of violence or violent crimes. Nor do all AAS users in specific problem populations such as polydrug abusers do so, but occasional individuals do. The individual variability discussed can have an effect here (Pagonis, Angelopoulos, Koukoulis, & Hadjichristodoulou, 2006). This is also confirmed in

animal experiments where different breeds of rats respond differently to provocation after being given AAS (Steensland, Blakely, et al., 2005).

Accordingly, there is a connection between AAS, aggressiveness and violence. The extent to which the explanatory power lies in AAS or surrounding and, above all, previously existing background factors has not yet been established. According to Fia Klötz (Klötz, 2008), it is possible that AAS use is the triggering factor for individuals in the risk zone, leading to an act of violence being committed. Below, it is further discussed that it is also partially shown that violence escalates with AAS use and becomes more severe.

Criminality

The fact that all non-medical handling of doping agents is inherently illegal is discussed in the chapter Extent of doping use. The occurrence and experience of doping agents among criminals is also discussed there. Earlier sections describe how the use of AAS entails a feeling of social dominance, resolution and omnipotence. AAS can therefore be viewed as optimal to use in conjunction with criminal acts. Scientific evidence on how much of the connection that can be attributed to AAS use in itself is also not established here. As mentioned above, several factors play a role (Klötz, 2008; Skårberg, 2009b). Conducting studies of criminals is difficult since voluntary participation is often low (Isacsson, Garle, Ljung, Asgard, & Bergman, 1998; Klötz 2009). However, a number of studies indicate that a connection does exist (Beaver, et al., 2008; Klötz, et al., 2006; Klötz, et al., 2007; Skårberg, 2009b).

In the cases where a connection between AAS use and criminality is seen, the time order in which these phenomena appeared is rarely established. Some studies and experts claim that AAS are introduced after criminality has begun (Käll, 2008; Wallin, 2009). This can be with the direct purpose of better mastering one's criminality through the effect the substance has on the mind and body. Other studies indicate that AAS use leads to criminality by the user becoming more aggressive and acting out more (Skårberg, 2009b; Thiblin & Parlklo, 2002). Through their use, users come into contact with other criminals, which in itself can lead to a criminal introduction. There may be evidence of both hypotheses.

In a recent study of those seeking care for AAS at a psychiatric treatment centre in Örebro, 35 of 36 said that they had been convicted of criminal acts (Skårberg, 2009b). Of the 32 that had criminal records, two thirds had no criminal experience prior to the debut of AAS use. The study indicates an increase in criminal activity in connection with substance use and indicates that this increase is particularly distinct when AAS is the first substance introduced. Individuals that begin substance use with narcotics consequently appear to already be more inclined to commit crime before the substance use than is the case in the introduction of AAS, where AAS is attributed greater explanatory power. Like earlier scientific research, Skårberg (Skårberg, 2009b) indicates that criminality changes and becomes more severe after the introduction of AAS. Acts of violence appear to become more brutal and violent when AAS is involved (Beaver, et al., 2008). The occurrence of violent crime (Pagonis, Angelopoulos, Koukoulis, Hadjichristodoulou, et al., 2006; Thiblin & Parlklo, 2002; Tirassa, et al., 1997) and weapons crime (Klötz, et al., 2006) increases. Klötz (2008) points out that weapons crimes can be linked to serious, organised crime. This strengthens Pope's conclusion that "AAS use is a significant factor for criminal behaviour" (Pope et al., 1996). The connection becomes even stronger in combination with other substance use (Klötz, et al., 2006; Skårberg, 2009b). It also occurs that perpetrators of violence in a well planned manner take steroids a few days before committing a crime, but the extent to which this occurs is unknown (Klötz, 2008: Petersson, 2008).

Mortality

A number of Swedish studies have shown that AAS use entails an elevated risk of premature death (Petersson, Garle, Granath, & Thiblin, 2006; Thiblin & Petersson, 2005; Thiblin, Runeson, & Rajs, 1999). This may be due to physical complications such as cardiac death, suicide or death resulting from the individual exposing himself to risk-taking in connection with use (Petersson, Garle, Holmgren, et al., 2006).

In a post-mortem study by Peterson et al (Petersson, Garle, Holmgren, et al., 2006) of 52 deceased AAS users and 68 deceased, AAS-negative heroin users and amphetamine users, respectively, tissue samples and the manner of death were studied. The AAS-positive individuals had died from murder or suicide (so-called "intentional death") to a greater extent than the drug users where overdoses were dominant. The average age at death was also significantly lower (24.5 years) for the AAS-positive individuals than for those who used heroin (34 years) or amphetamines (40 years).

Suicide is the most common cause of death among men under the age of 35 (Swedish Prison and Probation Service, 2009) and also the most common cause of premature death among individuals with a mental disorder. There is no scientific evidence that supports a causal relationship between AAS use and suicide. Thoughts of suicide occur among users (Petersson, 2008), but many interacting factors play a role in carrying out the act. The symptoms of depression that can follow doping and were presented earlier in this report have been suggests as a contributing factor in some cases of suicide.

Another risk factor for premature death is being in a criminal environment, which in itself increases the risk of being involved in violence. Risk-taking, impulsive and aggressive AAS users have an even greater risk of exposing themselves to or being subjected to lethal violence (Petersson, Garle, Holmgren, et al., 2006; Thiblin, et al., 2000). For example, many of those who were shot in "criminal dealings" in the 2000s in Stockholm and Uppsala had experience of AAS (Thiblin, 2008).

Social problems

Knowledge is limited of what social problems doping entails. There is no scientific evidence that doping in itself entails an elevated risk of ending in the type of social

misery associated with intensive drug abuse. It is not uncommon that other drug use occurs. Relationship problems appear to be common (Parkinson & Evans, 2006) as are physical and mental abuse of relatives and others. Other crime that occurs is weapons crimes and theft (Skårberg & Engstrom, 2007). Moreover, use entails an elevated risk of an antisocial lifestyle (Rohman, 2009; Thiblin & Parlklo, 2002).

Case reports bear witness to individuals who have become obsessed with their exercising and doping. This fixation sometimes leads to many of life's other aspects entirely falling by the wayside. There does not appear to be any studies beyond case studies that describe this extreme fixation or how it impacts on one's personal finances, social contacts, family relationships, etc. (Thiblin, 2008).

Prevention

THROUGH PREVENTIVE intervention by society, doping problems can be forestalled or limited. This is best done by decreasing or entirely removing the causes of the problems, primarily before they arise. The fact that prevention research in the field of doping is very limited was pointed out by the Swedish Council on Technology Assessment in Health Care report on prevention and treatment in 2003 (Swedish Council on Technology Assessment in Health Care, 2003). Many questions remain unanswered with regard to the causes of problems and what measures are effective in limiting them. It is rarely possible to identify only one or a few individual causes of substance-related problems since they are often multifactorial, i.e. multiple factors jointly lead to an elevated risk.

In the same way as for alcohol, narcotics and tobacco, a number of determinants can be identified that control the extent of both the use of doping agents and the problems that they create. The determinants can be divided into five groups. These are price, physical availability, norms and attitudes, social factors and individual factors. It is these factors that must be influenced in order for the doping-related harms to decrease. Preventive efforts should therefore also be based on a multifunctional approach.

Price

No known studies describe the price sensitivity for doping agents in Sweden. However, there is no reason to believe that price would not have the same effect on doping agents as it does for alcohol, tobacco and narcotics.

Physical availability

Availability of doping agents can be related to and limited in various parts of the chain from production to use. Physical availability is a complex concept and includes several factors that influence one another. Legislation is an important tool for influencing physical availability. Restrictive legislation that is followed up by effective control measures should reduce the number of people that use doping preparations (Swedish National Institute of Public Health, 2009c).

Measures to decrease production

The manufacture of the raw substance for doping agents is complicated and takes place in factories outside the borders of Sweden, in e.g. China and India (L. Hansson & P. Johfur, Swedish Customs, personal communication, 4 April, 2009). The prepa-

ration is brought in to Sweden illegally in the form of finished tablets, ampoules and injection liquids for further distribution to the users. A few years ago, it became known that pure powder is also smuggled. The powder is then prepared into usable preparations in simple, illegal underground laboratories (often located in cellar premises), packaged and marked with labels (also refer to the chapter on where doping agents come from).

The Police and Swedish Customs have made raids on a number of underground labs in Sweden (C. Fant, National Swedish Criminal Investigation Department, personal communication, 14 May, 2009). To combat the production of the raw substance, a few international efforts have been carried out (including from the U.S., see Raw Deal below), in which Sweden has participated. Interpol recently noted the problem and formed networks to combat availability. According to the National Swedish Criminal Investigation Department, many countries still view doping as a sports problem. A few countries have recently noted the societal dimension outside sports. Sweden is a country that has made considerable progress on this front, but for a single country, there are limited chances of obstructing production. In cooperation with other countries or international actors, these possibilities improve.

Measures to reduce the occurrence of doping agents in Sweden

The physical presence of doping agents in Sweden is mainly combated by Swedish Customs, but also the Police and to a certain extent the Swedish Coast Guard. (Also refer to the section on seizure statistics.) Swedish Customs' work focuses on stopping or severely disrupting the serious organised crime and the smuggling that emanates from it. Doping preparations are not explicitly mentioned in the Swedish Customs letter of appropriations (Ministry of Finance, 2009) or action plan, but when organised crime smuggles doping agents, it is considered a prioritised area.

Swedish Customs works with various projects in addition to the continuous work at the Swedish border. One of these takes place through the Cooperation against Customs Crime (SMT) in which Swedish Customs gets help in the fight against organised cross-border customs crime through close cooperation with enterprise. In this way, these efforts have been able to be focused and effectiveness has increased in several areas, including doping agents.

The Police's work against doping agents takes place in the 21 county criminal investigation authorities and the National Swedish Criminal Investigation Department (Ministry of Justice, 2008). The focused efforts are pursued by the county criminal investigation departments and the issues fall under the narcotics divisions or special divisions, depending on how the issue is prioritised at the individual authorities. The Police's doping seizures were previously made primarily in narcotics raids. In recent years, the number of focused doping efforts has increased by following up on received tips. According to the Anti-Doping Hot-line (Börjesson, 2008), the Police is the authority that the municipalities most often cooperate with in prevention efforts. This review does not delve deeper into the efforts of individual police authorities. A large part of the Police's doping efforts are intelligence-based national efforts against criminal individuals and organisations and take place in cooperation with the National Swedish Criminal Investigation Department and the operational county police authorities. In the past two years, the Swedish Police has been involved in two major doping cases. One was initiated by the U.S. and the other was of a national nature. These projects are described below:

Police project – Raw Deal

In the summer of 2007, a cooperative effort began between the United States Drug Enforcement Agency (DEA) and the intelligence section of the National Swedish Criminal Investigation Department. The DEA had begun an operation against the illegal trade of hormone preparations in the U.S. One of the targets of their operation was to focus on the large sales of raw substance (100 per cent purity) from China – raw substance that with great likelihood was intended for self production of usable preparations and sales. The idea was to not only to disrupt the major sellers, but also the entire distribution chain. The DEA contacted China and some cooperation was built up. During the intelligence gathering for the operation, it came forth that Swedish customers were involved, together with customers from Mexico, Australia, Canada, Germany, Thailand, Belgium, Spain and Denmark. Europol was contacted and then the National Swedish Criminal Investigation Department was contacted, which identified some 20 individuals suspected of serious crime against the Doping Act. In September 2007, a coordinated action was conducted with operations around the world. In Sweden, 14 people were apprehended. The majority had not been suspected of similar crimes before. The trials are not yet finished, but judgements have been passed and resulted in prison sentences of up to two years (Fant, unpublished).

Police project – Bosco

In connection with the police apprehending a person in Malmö in 2008 for serious doping crime, large amounts of AAS were found, including a 20-kg package from China. This was the beginning of Operation Bosco (C. Fant, National Swedish Criminal Investigation Department, personal communication, 14 May, 2009). A 5-kg package had recently been sent from the person apprehended to a person in Gävle, where a raid was then conducted. At the suspect in Gävle, large amounts of AAS, pharmaceuticals and cash were found. The National Swedish Criminal Investigation Department was brought in and a large number of people who had made purchases (probably through an Internet forum from the persons in Gävle and Malmö) were traced. At a set point in time, two months after the Malmö resident was apprehended, several police authorities in Sweden conducted a coordinated raid, with search warrants and arrests. The outcome of Operation Bosco has not yet been compiled.

Prevention work against the Internet trade

The structure of the Internet with unlimited networks offer criminals many opportunities to conduct criminal activities (National Swedish Criminal Investigation Department & Swedish Customs, 2008). This has demanded changes in the approaches of the Swedish Customs and the Swedish Police. The increased trade over the Internet has meant that several preparations are smuggled in in relatively small quantities in letters and packages. Goods are sold openly and sent from suppliers abroad to Sweden, as well as within the country. Around 250,000 packages arrive at Arlanda International Airport (primarily air freight) daily and of these, approximately 0.1 per cent are searched by Swedish Customs (L. Hansson & P. Johfur, Swedish Customs, personal communication, 4 April, 2009). Approximately 70 per cent of the drugs found are ordered over the Internet. In 2004, the National Swedish Criminal Investigation Department began the project Narcotics Surveillance on the Internet (NICKS) with the main objective of identifying perpetrators who had used the Internet to sell drugs. When a later follow-up project, Narcotics/ Hormone Preparation Surveillance on the Internet (NHSPI), was begun in 2005, doping agents were also included. NHSPI was under way up to and including 2008 and resulted in several arrests and prosecutions, as well as increased knowledge about trends and the existence of drugs on the Internet (C. Fant, National Swedish Criminal Investigation Department, personal communication, 14 May, 2009). After the end of the project, a position was created at the criminal intelligence division of the National Swedish Criminal Investigation Department with a focus on the aforementioned areas. The reorganisation of the department in 2009 led to surveillance of drugs on the Internet being moved over to the IT crime section (C. Fant, National Swedish Criminal Investigation Department, personal communication, 15 April, 2009).

Application of the law and practice

In Sweden, all handling of doping agents is illegal, but the application of the law in doping crimes is regularly brought up as a recurring problem, including in the report from the Narcotics Commission (SOU 2008:120). The experience of public courts, prosecutors and police in terms of doping crime is not on a par with e.g. narcotics crime (T. Linderoth, Swedish Prosecution Service, personal communication, 8 May, 2009). Moreover, the fundamental documentation for being able to judge how dangerous the doping preparations are is limited.

In raids, doping agents are found relatively often together with narcotics. The punishment for narcotics is generally higher and the combined punishment is rarely affected by the doping crime. Because of this, preliminary investigations are often limited to solely pertain to narcotics crimes (T. Linderoth, Swedish Prosecution Service, personal communication, 8 May, 2009).

Previous uncertainty about what preparations are covered under the law was partially addressed in 2006 through an unofficial list of known preparations that are covered by the Doping Act (Swedish National Institute of Public Health, 2008).

This list was described earlier in this report under the section on substances covered by the law.

The amount of doping preparation found affects the application of the law. Converting the total amount of active substance³⁸ to 5 mg units³⁹ with the aim of estimating the amount of doping agents is a method that has been used since the end of the 1990s. Based on statistics, etc., it is difficult to say what the practice is in terms of penalties for doping crime. The reason for this is that it is rarely the handling of doping agents that constitutes the only crime the person is convicted of (Swedish Prosecution Service, 2008). According to practice, 50,000 units constitutes the limit between doping crime of the normal degree and serious doping crime in the possession of AAS preparations (Court of Appeal, 2002). The boundary between minor doping crime and normal crime is less distinct, but 200 units is the limit often applied. Objections have been brought up, mainly from SKL and the Swedish Customs laboratory, that multiple uncertainties are linked to the model whereby these authorities propose a new calculation model.

The chapter on the Act Prohibiting Certain Doping Substances mentions that the Narcotics Commission proposes a higher punishment scale for crimes against the Doping Act. To be able to make equally professional assessments in matters of doping crimes as in narcotics crimes, the Commission points out that more competence will be necessary among judges, prosecutors, police and correctional care officers in matters of doping agents and their effects (also refer to the section on informational measures and information needs).

Attitudes and norms

In order for a law to be upheld, normative support must exist in the population. In terms of narcotics, 95 per cent of the population feels that all handling of narcotics should be illegal (Swedish National Institute of Public Health, 2009c). There are no studies on corresponding support for the restrictive legislation in the doping area. The fact that the penalties for violations of the Doping Act are significantly lower than those for narcotics crimes may conceivably influence public perceptions.

The ideal of beauty has developed into external goals that are unattainable for most people (Kouri, Pope, Katz, & Oliva, 1995; Labre, 2002; H. G. Pope, et al., 2000). Society places considerable focus on the body. Feminine and masculine ideals are spread by the media, among others (Quaglio, et al., 2009). Since all handling of doping agents is illegal in Sweden, marketing and advertisement of doping agents is also illegal by extension. However, it is not illegal to show pictures of well-built, muscular bodies or market dietary supplements with the main purpose of getting individuals to use the preparations to achieve these ideals. Pope illustrates the development of the muscular ideal of beauty by looking at the toy industry's development

³⁸ As long as no other indication exists, that stated on the package is accepted.

³⁹ When the method was brought into use, 5 mg tablets were very common.

of male plastic dolls (H. G. Pope, et al., 2000). Some 30 years ago, at the end of the 1970s, the dolls had a normally built body, neither extremely thin nor extremely well-trained and today, the dolls are shaped like body builders. It is remarkable that this is an ideal directed at very socially receptive children in the form of toys (Hoff & Herngren, 2008). At an early age, we are already influenced by society's norms of a muscular appearance. The use of unnatural methods with the aim of improving one's appearance has become more common and more accepted. The fact that the social climate supports corrections of one's appearance constitutes a contributing cause to the use of AAS (T. Johansson, 2006; H. G. Pope, et al., 2000).

The author of the Swedish Sports Confederation's research compilation, David Hoff, discusses the fact that the health trend appears to underlie the beauty trend. Exercising and eating less fat are healthy habits, but Hoff believes that "there is a limit where an excessive focus on following these recommendations becomes unhealthy; when training leads to unhealthily thin bodies or to the use of harmful preparations such as AAS" (Hoff, 2008). There are many positive effects of exercise on psychological well-being, but there are also negative effects such as excessive training and eating disorders (Peluso & Guerra de Andrade, 2005). This is probably also a result of society's physical ideal (Swanberg, 2004).

The ideal of beauty and the health trend are further shaped in the scope of society's culture of performance (Quaglio, et al., 2009). Life must be pushed into a tight schedule and there must be time to do a great deal. Through consumption, we achieve status through external objects (Featherstone, 2007; T. Johansson, 2006). A beautiful body can also be bought and it is up to the individual what body and appearance he or she chooses (Lund Kirkegaard, 2007). This is where the gym comes in as a place where one can invest in a more attractive body. "At the gyms, where keeping fit and healthy has become a commercial success, there is also relatively extensive use of AAS and other doping agents – health can become unhealthy" (Hoff, 2008).

The time pressure we are under means that we do not have time to live the healthy life we want to in a natural way. If we do not have time to eat, there are always dietary supplements and vitamins to take (Waddington, 2000). Hoff links this with the medicalisation of society (Hoff, 2008) where medical preparations provide fast solutions to physical and mental problems and challenges (Harth, Seikowski, Hermes, & Gieler, 2008) and lucrative markets for health, beauty and achievement are created at the same time.

Social factors

In terms of drugs and alcohol, prevention efforts that combine supply limits and demand limits have proven to be the most effective; it is likely that this also applies to the doping field. Among these efforts are measures to influence social factors, such as school, family, working life and leisure time. The work on limiting demand largely involves reaching out to and involving people who play a major role in people's attitudes (Swedish National Institute of Public Health, 2009c). General efforts should be combined with targeted efforts. Interventions can consist of local efforts directed at young people or gyms as well as efforts to raise general awareness and knowledge of doping in society.

Information on the Internet

Users and prospective users gather a large amount of information from friends and the Internet (Larance, et al., 2008; Skårberg, et al., 2008). Internet use has increased markedly among all ages. The proportion of 16-34 year-olds who use the Internet daily increased from just over 50 per cent in 2003 to more than 80 per cent in 2008 (Statistics Sweden, 2009c). There is a large amount of uncontrolled information to be found or exchanged on the Internet through, for instance, discussion forums. At www.flashback.se (Sweden's largest multifocus discussion forum⁴⁰), IT and drugs are the topics most discussed (Fant, unpublished). Within the group "drugs", there is the category "doping and doping preparations" where the discussions mostly concern topics such as: "trace times" (how long it takes for various preparations to "leave the body" and not show positive in tests of e.g. urine samples), "gynecomastia", "what cycles can be taken without ruining the chances of having children" and "roid rage". Other forum websites, such as www.bodymass.org, are more specified and focus solely on body builders. Who is behind this information is unclear since anonymity is the rule. In connection with sales websites, besides descriptions of the site's own preparations and expected effects, there are also descriptions of how to take intramuscular injections, for example. There are references to instructional pictures via e.g. www.spotinjections.com. The degree to which the information on these discussion forums are based on science varies, and the full panorama of effects are rarely conveyed. A large part of the knowledge conveyed via the websites above is detailed and based on personal experience, assumptions and rumours, but research results are also occasionally presented. The users are overconfident in the Internet information (Larance, et al., 2008) and the forums largely work without elements of preventive intervention from society.

Informational efforts and information needs

Attitudes and norms are affected by knowledge. Knowledge of doping agents, their users and the consequences of use is limited among both the general public and specific professions in Sweden. Performance cheating, muscle growth and violent tendencies are the connections commonly made to the use of doping agents. In order to prevent its spread and be able to address the problems that arise, greater awareness is needed in the entire population in every age group: among parents and other adults, young people, and those who come into contact with doping agent users in their profession. The Anti-Doping Hot-line conducted an inventory of the need

⁴⁰ In 2008, the forum was ranked 142 in the world even though this forum in is Swedish (Fant, unpublished).

for information in Sweden's municipalities with regard to abuse of doping agents in 2008 (Börjesson, 2008). It describes a low level of interest in the doping issue in municipalities, which is assumed to be due to limited knowledge in the subject. In response to a question posed to Sweden's municipalities, 144⁴¹ expressed interest and are in need of training concerning doping. There are 20 municipalities that are not interested and 58 that cannot decide if a need exists. Personnel in the social services, police and healthcare are the group most considered to be in need of knowledge and training, followed by personnel at gyms, exercise centres and fitness facilities as well as students and school personnel. Some 40 municipalities would like lectures and information for the public. Customs officials, judges, prosecutors, correctional care staff and security guards are additional groups in society that may conceivably be in need of knowledge, but do not come forth in the survey.

On one hand, knowledge is needed in the individual professional corps and on the other, there is a need for shared knowledge, exchange and commitment among authorities and institutions in society. A regular exchange of experiences involving doping issues takes place in various contexts, but is not considered to be satisfactory by everyone. Under the direction of the Swedish National Institute of Public Health, there is a group of experts with the primary objective of identifying known preparations (Swedish National Institute of Public Health, 2008) that are covered by the Doping Act (also refer to the chapter concerning the Act Prohibiting Certain Doping Substances). At the turn of the millennium, a volunteer, independent network was formed that currently comprises researchers, public servants, social workers and care staff at various treatment centres, hospitals, agencies, training facilities and universities. The objective is to have access to each other's competence, discuss needs and exchange experiences regarding the doping issue, mainly from a societal perspective. Besides individual contacts, the network meets a few times a year. In addition to this, there is a number of groups that are affiliated with various activities and projects mainly as reference groups. The largest of these is the Central Joint Action Group for Doping Issues, which is administered by the Anti-Doping Hot-line at the Department of Clinical Pharmacology at Karolinska University Hospital. A number of authorities and organisations⁴² meet a few times a year to help make it possible for the Anti-doping Hot-line's mission to be achieved in accordance with

⁴¹ Of the 80 per cent that responded to the questionnaire.

⁴² The group includes the Doping Control Laboratory at the Department of Clinical Pharmacology, Karolinska University Hospital, the Swedish National Institute of Public Health, the Medical Products Agency, the National Food Administration, the Swedish Prosecution Service, the Swedish National Laboratory of Forensic Science, the National Board of Forensic Medicine, the National Swedish Criminal Investigation Department, Swedish Customs, the National Service Administration, the National Board of Health and Welfare, the Swedish Consumer Agency, the National Agency for Education, the Centre for Violence Prevention, the Swedish Association of Local Authorities and Regions, Apoteket AB, the Swedish Sports Confederation, the Doping Commission and the Swedish Council for Information on Alcohol and Other Drugs.

the intentions of the principals⁴³. The group distributes information and coordinates efforts brought about by current events. There is currently no national workgroup that drives the issue forward in a strategic manner.

The Narcotics Commission (SOU 2008:120) points out that it is important for a central actor to actively work to raise the level of knowledge in the legal system in order to be able to assess doping problems with the same professionalism as narcotics problems. Furthermore, it is suggested that information and knowledge distribution should be given a higher priority to reduce the harmful effects and increase awareness of the risks. To this regard, the Commission proposes that greater responsibility be placed on the Swedish National Institute of Public Health.

The Anti-Doping Hot-line⁴⁴ is one of the foremost information channels for doping towards society. Their work aims to strengthen knowledge about use and its consequences with the aim of preventing new recruitment. The Anti-Doping Hot-line has an advising, supportive and informative function and received more than 40,000⁴⁵ phone calls from the beginning in 1993 up to and including April 2009, of which around 1,600 were in 2008. If the Anti-Doping Hot-line had more capacity, more inquiries could have been answered. Its website (www.Dopingjouren.se)⁴⁶ has around 70,000 visits annually. In addition, some 40 anonymous self-reports were received from users and relatives. The website has a counselling function through which nearly 4,000 questions were answered since it was initiated in 2004. Just over half of those who find their way to the Anti-Doping Hot-line have a personal connection to the use of the preparations in some way: around 30 per cent are users, 20 per cent are relatives and a few per cent say that they are considering to begin using. The rest come from healthcare, the legal system, social services, exercise centres, correctional care, etc. The number of unique visitors who seek out the hot-line is unknown. The absolute majority of the users who contact the hot-line are men and around half of them are estimated to be in need of care, whereby they are referred to possible treatment (also refer to the chapter on Treatment). In the work to distribute knowledge for prevention purposes, the Anti-Doping Hot-line also actively participates in trade fairs and conferences, and gives lectures to several target groups in society, such as gym personnel, healthcare personnel, police, security guards, students and school staff. In 2008, an information film about AAS was launched, "Deffad, Rippad ... Rappad" (Defined, Ripped ... Lashed), with the aim of being used in schools, among other venues (Anti-Doping Hot-line, 2002, 2005, 2006, 2007, 2008, 2009).

In addition to the Anti-Doping Hot-line website, there is some information on the website of Sjukvårdsrådgivningen (Healthcare Counselling Hotline) (www.1177.se) about preparations, effects, signs of use and referrals in cases where one needs help

⁴³ Ministry of Health and Social Affairs and the Ministry of Culture

⁴⁴ Run with funding from the Ministry of Health and Social Affairs and the Ministry of Culture.

⁴⁵ The Anti-Doping Hot-line estimates that 1/3 of those who seek out the hot-line did not make contact in their first attempt.

⁴⁶ The website also has an English-language section found at www.antidopinghotline.eu.

for one's use. Similar information is available on Sjukvårdrådgivningen's website for young people (www.umo.se). Through collaboration with several organisations and authorities, there is the website www.drogportalen.se, which is administered by CAN and contains links to a selection of current doping documents such as fact sheets, research, policies and statistics. Further information about doping is presented on CAN's drug knowledge distribution website www.drugsmart.com and to some extent on the Swedish Customs website www.tullverket.se where seizure statistics are also available.

Swedish Customs is also charged to work preventively and collaborates with both local and national actors with the aim of distributing knowledge to society through lectures and discussions of doping problems. Swedish Customs believes that knowledge about doping agents should be spread to several levels in the organisation and all new employees involved in combating crime undergo training, which includes four hours on doping. In addition to this, the personnel is continuously updated on the subject. Moreover, there are some 20 trained drug information officers at Swedish Customs with overall knowledge of doping agents and their effects (L. Hansson & P. Johfur, Swedish Customs, personal communication, 4 April, 2009).

Through the police's operational work, continuous contact is made with individuals and criminal circles in society where doping occurs. In order to prevent and be able to attack the problem, thorough practical knowledge is needed in both the individual police officers and the organisation. Doping is included as a subject in the regular police training programs in Stockholm, Umeå and Växjö. According to the directors of studies (A. Orhall, Swedish National Police Academy Solna, personal communication, 21 April, 2009; I. Renström, Swedish National Police Academy Umeå, personal communication, 24 April, 2009; T. Norbe, Swedish National Police Academy Växjö, personal communication, 21 April, 2009; Moping is a subject that is discussed among the students. The National Swedish Criminal Investigation Department has contributed to the distribution of knowledge within the authority, and individual police authorities have conducted their own training and knowledge updates on doping. Doping is included as a subject in the Stockholm Police's regular narcotics course (C. Fant, National Swedish Criminal Investigation Department, personal communication, 5 May, 2009).

Local prevention and information efforts in the municipalities

In 2008, 77 municipalities said that some form of anti-doping activity was done in the municipality (Börjesson, 2008). A large part of this work is conducted by organised sports and is of a normative nature that aims to change attitudes and increase knowledge on doping. It is most common to arrange training and information for students and personnel at schools, followed closely by informing and training personnel at exercise facilities. The types of anti-doping efforts in falling order are to:

- have an action plan that includes doping in the municipality,
- inform the general public,
- train and inform the social services, police and healthcare services,

• have an anti-doping group, anti-doping coordinators and anti-doping information officers.

It is uncertain how effective the activities in the municipalities are. Only three municipalities say that the activities worked very well, 21 municipalities say they worked well, 24 municipalities deem that they worked somewhat well, eight municipalities say that they did not work at all and 21 municipalities have no opinion.

No comprehensive inventory has been done of the individual municipalities' ongoing prevention work in connection with this review. One county that actively worked with doping prevention measures is Blekinge and, for 2009, the Swedish National Institute of Public Health granted funding for this work (Blekinge Sports Association, 2008). Since 1993, the majority of efforts conducted have mainly been those that aim to take a holistic grip on the problems with the help of a broad and active network of several actors. Knowledge distribution has played a central role and several categories of people and professional practitioners have been continuously trained and informed about doping. Blekinge Sports Association, together with the police, has annually provided information about doping in the county's middle schools, upper-secondary schools, sports programmes, universities, psychiatry education programme and at the two locally based military units. They have trained security guards and doormen and informed restaurant personnel so that they can discover and understand symptoms and undertake appropriate measures. Twice a year, the local sports association, police, customs officials and county council held a major seminar with varied focus directed at gym owners, school nurses, physicians, psychiatric personnel, police, customs officials, social workers, correctional care personnel, prosecutors, politicians, etc. in order to spread new research findings concerning doping. Several of them have in turn used this knowledge in their direct professional practice and in the meeting with both users and non-users.

Another municipality that actively works and places great importance on knowledge distribution is the City of Malmö. Through an on-going project, "Malmö prevents doping (2008–2010)" (Malmö City Office Public Health Unit, 2008a), the City of Malmö holds target-group-oriented training of approximately two days each for gym employees, police, people who work with abuse issues in individual and family care in the district councils, security guards, sports leaders, school nurses and school doctors. Moreover, short informational efforts are offered for personnel in compulsory and upper-secondary school and personnel with individual and family care.

In Västra Götaland, the Swedish Narcotics Police Association (SNPF) is conducting an effort through the pilot project "Stand up - against doping and violence" with funding from the Swedish National Institute of Public Health (Swedish Narcotics Police Association, 2008). The objective is to bring about a municipal mobilisation by distributing knowledge among central professional actors. Municipal project groups have been created, including public health coordinators, representatives from the crime prevention councils, the police, the local sports associations, indi-
vidual and family care, substance abuse treatment, the leisure and recreation department, gyms, somatic healthcare, psychiatric services and volunteer organisations in order to provide updates on AAS and initiate prevention efforts.

Prevention projects to strengthen attitudes against doping

There are few effect-evaluation doping prevention projects (Swedish Council on Technology Assessment in Health Care, 2003). Most are developed outside Sweden and focused on knowledge and attitude changes among students involved in sports with well-established social networks.

One project that was developed in Sweden is one of few that did not focus on sports. Over two years, the project focused on increasing self-confidence and young people's awareness of appearance versus behaviour. Attitudes and appearance were discussed class-wise with trained moderators without explicitly mentioning AAS. An imperfect evaluation makes it difficult to draw any conclusions from the outcome (Nilsson, Allebeck, Marklund, Baigi, & Fridlund, 2004).

The Adolescents Training and Learning to Avoid Steroids (ATLAS) prevention programme is a programme based on social learning theory that was developed and implemented in the United States (Goldberg, et al., 1996; Goldberg, et al., 2000). By using already existing social units (sports teams), diet, exercise and AAS are discussed, but not by scaremongering. The participants can weigh the advantages against the disadvantages and learn alternative methods to AAS use. In role playing, the students learn to say no to drugs. Discussions are held on how the social surroundings can be handled and how one can handle ideals that are shown in the media and elsewhere. The programme runs for at least two months and, after follow-ups, has proven to provide changes in attitudes towards AAS use.

Efforts at gyms

Experience of doping agents is greater among those who exercise at gyms than among the population in general (refer to the chapter on the Extent of doping). One of the reasons for using doping agents is to build up one's body and become strong and muscular, and a natural environment to do so is at exercise facilities.

Efforts to combat the extent of the consumption of doping agents among those who exercise at gyms have been pursued on multiple levels and by several actors. In Blekinge, active cooperation between gyms, police and organised sports has been under way against doping since the mid-1990s (R. Trulsson, Blekinge Sports Association, personal communication, 10 August, 2009). In Kronoberg County, the County Administrative Board runs the project "Doping-free - Kronoberg goes to the gym without drugs" (Kronoberg County Administrative Board, 2009) and several efforts are also conducted at gyms through the project "Malmö prevents doping" (Malmö City Office Public Health Unit, 2008a). In parallel, STAD in Stockholm is working with financial support from the Swedish National Institute of Pubic Health on a model the effects of which will be evaluated (Stockholm Prevents Alcohol and Drug Problems, 2008b). The starting point for STAD's working model is to develop

coordinated, long-term prevention efforts against doping using the "community intervention" model, where research and practice belong together. The common factor for the above is that the work aims to address both supply and demand-limiting efforts. General, close cooperation with the gyms is important and some of the prevention measures being done are presented below.

Inspections have been conducted through police visits in both Blekinge and Malmö. The objective is for the visits to have a deterring effect among those who train there to want to use doping agents and thereby increase the risk of being discovered by the police. The intervention also leads to greater awareness of the problems among those who work out, the gym personnel and the individual police officers.

Doping controls may have a similar deterrent effect. Doping controls are done today solely on members of sports associations that are affiliated with the Swedish Sports Confederation. The basis of organised sports' possibilities of conducting controls and punishing violations is that the individual athlete has agreed to follow the statutes of the sports movement through membership. In AAS use, the main practice in sports of disqualification for normally two years is applied. The suspension applies to exhibitions, competitions and organised training in all sports. The matter usually stays within the sports legal system and does not go further as a crime against the Doping Act⁴⁷.

Doping controls at gyms that are not affiliated with the Swedish Sports Confederation have been discussed for many years. This is not yet possible and many questions remain concerning how this could be made possible. The uncertainties include whether demanding urine samples from individuals conflicts with human rights, who would carry out the controls, under what circumstances they would be carried out and what the resulting punishment should be (Hoff & Carlsson, 2005). Today, the possibility of offering adequate care to doping agent users is also limited.

The plans to create an independent national anti-doping organisation (NADO) were summarily reviewed by an external investigator on behalf of the Swedish Sports Confederation in 2008 (Johnson & Ericsson, 2008). At the Swedish Sports Confederation's General Assembly in May 2009, it was resolved to further investigate the matter together with the Ministry of Culture (Swedish Sports Confederation, 2009a). The investigators are further developing the reasoning that NADO could also be active against doping as a societal problem, perhaps through controls at gyms, among other efforts.

According to the Anti-Doping Hot-line's needs inventory, three fourths of the municipalities that conduct anti-doping activities directed at gyms, exercise centres and fitness facilities are in need of more information and training (Börjesson, 2008). Along these lines, STAD has been granted funding by the Swedish National Institute of Public Health for a communication effort directed at doping as a part of the development project "Gyms against doping" (Stockholm Prevents Alcohol

⁴⁷ A sports violation is not always a crime against the Doping Act.

and Drug Problems, 2008a). Other prevention activities under way in Sweden also focus on the training of owners, coaches and instructors at gyms with the aim of increasing their knowledge (also refer to the section above on local prevention and information efforts in the municipalities). This can be related to the quality assurance measures of gyms that have been tested in various projects. By formulating certain given criteria, such as having personnel trained in anti-doping efforts and having a clear policy and action plan against AAS, narcotics and alcohol, gyms are quality assured by the City of Malmö and STAD in Stockholm.

Based on the earlier discussions in the section on attitudes and norms, further efforts can influence the normative attitudes among those who exercise. This can be done by conveying an exercise culture that focuses on health rather than strength and power by, for example, not showing pictures of well-trained, muscular bodies or selling dietary supplements.

Individual factors

A presentation of the individual biological and psychological factors assumed to increase the risk of beginning to use doping agents is provided in the chapter on Background factors. This knowledge is limited which reduces the extent of targeted, individual prevention efforts. Greater knowledge among healthcare providers, among others, means better prevention and treatment of doping problems (also refer to the chapter on Treatment). Individual prevention efforts take place in correctional care.

Suicide prevention efforts in correctional care

The Swedish Prison and Probation Service has worked for many years to prevent suicide (Swedish Prison and Probation Service). In 2008, a screening tool was developed with the aim of more easily being able to identify individuals at risk and ensuring that fewer suicides occur. One risk factor is AAS use in the past year, which is why a question about this is included in the suicide assessment questionnaire that is completed in jail in connection with internment. If the person indicates AAS use, guidelines are in place that say that the inmate must be checked every 30 minutes while awaiting contact with medical care services (Swedish Prison and Probation Service, 2008). No treatment is provided, however. The primary risk of AAS is said to be the depression that arises after completion of a cycle and is linked with a high frequency of suicide among AAS users (also refer to the chapter Effects of use).

Another prevention measure carried out within the Swedish Prison and Probation Service comprises the urine samples that are taken to establish whether the inmates have taken illegal substances (M. Hägerstrand, head office of the Swedish Prison and Probation Service, persona communication, 16 April, 2009). These samples are also partially analysed for AAS. If the test indicates an illegal substance, it is noted and a penalty may follow, such as the delay of release on probation on the grounds of negligent behaviour (also refer to the chapter on extent).

Treatment

IN PARALLEL WITH THIS REPORT, an investigation is under way (special investigator: Gerhard Larsson) in order to conduct an overhaul on behalf of the Government of substance abuse and addiction treatment (dir. 2008:48). Under the directive, the investigation shall review the provisions in a number of laws and make proposals on the changes that are deemed necessary to adapt legislation to developments in the area. The goal will be knowledge-based substance abuse and addiction treatment based on the needs of the individual. The assignment, which will present a report in November 2010, includes making a statement on how the municipalities' and county councils' responsibility for substance abuse and dependence care can be clarified. The assignment also includes considering potential needs for changes in legislation and the distribution of responsibility between both of the principals to ensure that people with substance abuse or dependence receive the help they need.

Because the aforementioned investigation is under way and the treatment field is not a part of the Swedish National Institute of Public Health's direct focus, this review will only provide a very overall illustration of the area of doping treatment.

Treatment situation in Sweden

There is no national estimate of the total need for care in Sweden with regard to doping. In a U.S. Internet-based study, 7 per cent (35/500) said that they had sought medical help for problems that had arisen due to AAS use (Parkinson & Evans, 2006). These figures can be interpreted in several ways: that doping does not cause any side-effects that demand care, that the users seek care for individual symptoms in the belief that the cause is not related to the AAS use or that there is hardly any relevant care to be sought. The fact that doping leads to serious side-effects is described in the chapter on the Effects of use, whereby we can disregard the first assumption. A combination of the two latter explanations is more likely.

Users of doping agents appear to be found throughout Sweden, possibly with a greater concentration around larger towns and cities (refer to the chapter on Extent of doping). Through the nationwide Anti-Doping Hot-line, there is a possibility of anonymously getting help and answers to questions on the phone or over the Internet. When necessary, the hot-line refers to the care that is available. Two doping clinics can be visited. One of these is the Resource Centre at the Department of Endocrinology at Sahlgrenska University Hospital in Gothenburg. The other is located at the Dependence Centre under the direction of Örebro County Council. There is interest in building up a national knowledge centre in Stockholm with the

care and treatment of people who use doping agents. An application⁴⁸ (Arver, Borg, & Rane, 2007) to establish such a knowledge centre remains unanswered, which is why treatment in Stockholm takes place sporadically based on individual symptoms.

The Dependence Centre in Örebro and the Resource Centre in Gothenburg are both limited in their scope and recognise that the need for care is significantly larger than their available resources. In connection with users or relatives seeking care and when positive doping tests are found at workplaces, gyms, in sports or correctional care, there is consequently a very limited offering of care to refer to (T. Rosén, Sahlgrenska University Hospital, personal communication, 2 February, 2009; K. Skårberg & T. Strandberg, Örebro University Hospital, personal communication, 12 March, 2009).

The users seek care when problems arise, but rarely seek care for the actual use of doping agents. The complaints that underlie the visit can probably be linked to the effects described earlier. Awareness among users is limited as to understanding what effects come from use, and knowledge in healthcare is considered to be too limited for doping agent users to be able to be distinguished. Their underlying use rarely receives attention.

Research on effective treatment methods is very limited. This is also confirmed by the Swedish Council on Technology Assessment in Health Care in connection with the review it conducted together with the National Board of Health and Welfare regarding the methods that were available for the care and treatment of doping agent users in 2003 (Swedish Council on Technology Assessment in Health Care, 2003). The methods and experience that do exist are also sparsely documented. With a lack of a holistic approach, various side-effects are most often treated rather than the whole.

A common perception among those who possess practical experience (T. Moberg, personal communication, 27 January, 2009; T. Rosén, Sahlgrenska University Hospital, personal communication, 2 February, 2009; K. Skårberg & T. Strandberg, Örebro University Hospital, personal communication, 12 March, 2009) is that the treatment of individuals who use doping agents is very complex and requires considerable time and a broad spectrum of care efforts.

⁴⁸ The application was sent in April 2007 to the Stockholm County Council and the Ministry of Health and Social Affairs by the Centre for Andrology and Sexual Medicine at Karolinska University Hospital, the Stockholm Dependence Centre and the Anti-Doping Hot-line under the Department of Clinical Pharmacology at Karolinska University Hospital in Huddinge.

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Just over 20 years ago, it became apparent that doping agents were also being used outside sports for reasons other than improving athletic performance. This report focuses on doping as a problem for society and provides an illustration of the situation based on current knowledge and the efforts being pursued outside the world of sports.

The report covers legislation as well as how users get a hold of the doping agents. The discussion covers the current differences of opinion as to how widespread the use of doping agents is, and available data is presented for both the general population and individual groups. The reasons behind the use of doping agents are described, as well as the identified risk factors. In addition, known physical, mental and social effects are presented, including the connection to aggressive behaviour and violence. The latter section of the report describes the prevention work under way and concludes with a discussion of the treatment situation in Sweden.

The report is primarily addressed to decision-makers and professionals, who are affected by or have the opportunity of influencing doping problems in their work. The objective is mainly to raise the level of knowledge and understanding on the subject, as well as to identify the gaps that exist in terms of both knowledge and action.

The Swedish National Institute of Public Health develops and distributes knowledge for better health.



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