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# The Internet and lifestyle drugs: an analysis of demographic characteristics, methods, and motives of online purchasers of illicit lifestyle drugs in the Netherlands

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## ABSTRACT

**Aims:** The Internet has marked a revolution in the supply of illegal drugs, while at the same time, new types of illegal and semilegal drugs increasingly are becoming available. In order to deepen our understanding of the demand and supply of these new drugs on the Internet, this study focuses on the demographic characteristics, methods and preferences of people who purchase 'lifestyle drugs' through the surface web.

**Methods:** Data were obtained through the following two surveys: a prevalence study of 50,848 Dutch respondents and an in-depth study of 153 people who have purchased lifestyle drugs online.

**Findings:** At least 10.2% of the Dutch adult population has bought medicines online; the majority being lifestyle drugs (5.2%). In addition, an estimated 1.6% of the Dutch population has purchased medicines illicitly, with the majority of products concerning lifestyle drugs (0.9%). Illicit lifestyle drugs are primarily purchased through e-commerce sites and online pharmacies, and users report high satisfaction rates.

**Conclusion:** Purchasing lifestyle drugs is characterised by specific online dynamics, as the drugs are often openly accessible and the boundaries between legal and illegal sale blurred. As new types of drugs become available, it is important to further monitor customers' preferences and experiences.

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## KEYWORDS



Lifestyle drugs; counterfeit medicines; human enhancement drugs; online markets; surface web; dark web; online pharmacies

## Introduction

The speed with which the Internet is transforming illicit drug markets poses a major challenge to law enforcement, public health, research and monitoring agencies (EMCDDA, 2016). People are no longer restricted to local drug dealers; the Internet enables consumers easily to exchange information and purchase illegal drugs from all around the world. Customers use the dark web for purchasing traditional drugs (Van Hout & Bingham, 2013), while the surface web is preferred for lifestyle drugs (Di Nicola et al., 2015) and novel psychoactive substances (NPSs; see EMCDDA, 2016; Wadsworth, Drummond, & Deluca, 2017). The benefit of the Internet compared to traditional street-level transactions is that the identity of both buyers and sellers stays more hidden and that users have the possibility of accessing a broader range of harm reduction advice and product reviews (Aldridge & Décarry-Héty, 2016; Van Hout & Bingham, 2013). As a result, and in combination with supply side dynamics that put downward pressure on consumer prices (Koenraadt, forthcoming), the online marketing and sales of drugs has increased substantially. And, concomitant with rapid changes in the ways people obtain illegal drugs in the current decade,

a wide range of drug-related health problems have been associated with new types of illegal and semilegal drugs whose purchase is facilitated by the Internet (Khaled et al., 2016; Venhuis et al., 2011). Lifestyle drugs, novel psychoactive substances (NPSs) and precursor chemicals are central characters in this story (EMCDDA, 2016). In short, the range and nature of drug markets online are expanding.

A particular concern is the online availability of illicit lifestyle drugs that lie at the intersection of legal and illegal drug markets. In the literature, a variety of terms are often used interchangeably to describe drugs used for lifestyle and well-being purposes and/or to enhance performance and image. While some use the terms 'lifestyle drugs' or 'human enhancement drugs', others prefer 'lifestyle medicine' or 'performance and image enhancing drugs'. In this article, the term 'lifestyle drugs' is used and defined as drugs that are consumed in order to improve one's lifestyle, health or beauty, which places their use on the borderline between a health need and lifestyle wish (Gilbert, Walley, & New, 2000; Rahman, Gupta, Sukhlecha, & Khunte, 2010). Medicines like Viagra to treat erectile dysfunction are included, as is Orlistat to lose weight or cognitive enhancers such as Ritalin to boost

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concentration. While most lifestyle drugs are medicines available through official sources for particular purposes and requiring a prescription, they are also taken for non-authorised reasons to improve someone's life, physical function or appearance, as opposed to a medicine which is taken specifically to cure or manage an illness. For all of these reasons, lifestyle drugs may therefore be considered a specific subclass of medicine. In addition, some scholars also include a large variety of semilegal medicines, mainly adulterated food supplements with experimental chemical substances, in their definition of lifestyle drugs. Because the analogues are unknown, these products generally do not (yet) fall under medicine or food legislation of national countries (Venhuis et al., 2009, 2011). These products and their purchasers are excluded from the current study. In order to understand the expanding boundaries of drug markets, this article focuses on the prevalence and dynamics of purchasing medicines online and legal and illegal lifestyle drugs in particular.

Lifestyle drugs can be sold both legally and illegally online. More and more people purchase medicines online due to either the ease and convenience of this platform or because of the shame they sometimes experience during in-person transactions (Di Nicola et al., 2015; Intomart, 2009, 2012; Koenraadt & de Haan, 2016). This includes legitimate online pharmacies offer both over-the-counter and prescription-only medicines. At the same time, a growing illicit market exists in which counterfeit medicines, stolen lifestyle drugs or unlicensed generics are sold (Venhuis et al., 2011). Indeed, recent years have witnessed growing Internet sales of lifestyle drugs, and the literature points to illicit online pharmacies as an important source of distribution (Cohen, Collins, Darkes, & Gwartney, 2007; Cordaro, Lombardo, & Cosentino, 2011; De Hon & van Kleij, 2005; Gezondheidsraad, 2010; Scammell & Bo, 2016). For example, this may occur through illegal or fake pharmacies that might give the impression of propriety with a professional presentation, images of doctors in white coats and apparently genuine diagnostic tests (Di Nicola et al., 2015). Websites that hawk illicit medicines may convince consumers into believing that they can order all types of medicines, and that they are all legal medicines.

On the Internet, there are two distinct sources to purchase all sorts of drugs. One is the dark web, with cryptomarkets such as Silk Road drawing much attention, and the other being the freely accessible surface web, which can be accessed through search engines like Google or Yahoo. The substances marketed and sold on the surface web are mainly non-controlled substances or substances, including lifestyle drugs, for which legal controls differ between countries and jurisdictions (EMCDDA, 2016). Due to the blurring boundaries between the legitimate and illegitimate sale of these substances, it is particularly difficult to regulate the online lifestyle drugs market (Hall & Antonopoulos, 2016; Paoli & Donati, 2014; Van de Ven, 2015). For example, lifestyle drugs in the Netherlands are controlled as different classes and schedules of drugs, under different forms of legislation (Economic Offences Act (2001); Medicine Act (1963); Opium Law (1976)), with different responsible bodies (e.g. police and the Health Care Inspectorate). Disharmony among regulations across countries is even more problematic. As such, national regulation is often ineffective

and poorly equipped to deal with the international character of the online trade (Evans-Brown, McVeigh, Perkins, & Bellis, 2012).

The choice to purchase medicines on licit or illicit markets is often associated with the purpose of consumption. First of all, lifestyle drugs are used to treat afflictions, such as baldness, erectile dysfunction or acne and are considered to treat conditions on the boundary of a medical need and a lifestyle wish (Gilbert et al., 2000). Consumers who are eligible to make purchases in the legal market may nonetheless be deceived into purchasing illicit medicines, for example by an illegal online pharmacy. However, it is abundantly clear that a large share of consumers seek lifestyle drugs for reasons doctors do not recognise as prescription worthy, for instance, to enhance bodily, cognitive and sexual attributes and abilities (Evans-Brown et al., 2012; McVeigh, Evans-Brown, & Bellis, 2012). The illicit market, either online or offline, is the only option for these customers to obtain lifestyle drugs. This group may include bodybuilders who use steroids to increase muscle mass (Monaghan, 2001; Paoli & Donati, 2014; van de Ven, 2015), students who use cognitive enhancers such as Ritalin for better study results (Mazanov, Dunn, Connor, & Fielding, 2013) or consumers who take sexual enhancers (e.g. Viagra) during nightlife (Intomart, 2009, 2012; Koenraadt, 2015; Koenraadt & de Haan, 2016).

The ease with which illicit lifestyle drugs can be distributed and accessed online has resulted in a growing public health and criminal justice challenge (Evans-Brown et al., 2012). As such, understanding consumers' purchasing behaviour and perceptions when purchasing lifestyle drugs online is key to successfully design and implement public health interventions or law enforcement strategies. To date, studies on the role of the Internet have highlighted online sale of illegal drugs via the dark web (i.e. Barratt, Ferris, & Winstock, 2014; Buxton & Bingham, 2015; Van Hout & Bingham, 2013) or the use of cryptomarkets for trading drugs (Aldridge & Décary-Héту, 2016; Martin, 2014). Only a few studies have examined the sale of NPSs (EMCDDA, 2016; Wadsworth et al., 2017) or the availability of lifestyle drugs via the surface web (Lavorgna, 2015; Van Hout, 2014; Van Hout & Brennan, 2014). These studies show that, while some consumers are attracted to the dark web's famously anonymous environment, those who are in legal grey rather than black areas are hindered by the dark web's requirement of specific software to gain access, which increases the appeal of surface platforms. This literature generally refers to the Internet pharmacies as the main surface web source for obtaining lifestyle drugs (Di Nicola et al., 2015; Di Giorgio, 2011), although other types of websites have been identified as well (Van de Ven, 2015).

On the surface web, legitimate and illegitimate sales intermingle and it is difficult for consumers to estimate the reliability of websites that either are or pose as legitimate online pharmacies (Di Nicola et al., 2015; Lavorgna, 2015). As such, it is likely that the prevalence, demographic characteristics, motives and decision-making process of consumers on the surface web are different from those who purchase fully illegal drugs on the deep web. Because the nature and range of drugs has changed rapidly during the past decade, it is plausible to imagine that the nature and range of consumers has expanded as well. Thus, it is important to augment existing

information on drug markets with new data that incorporates both new types of drugs, such as illicit lifestyle drugs that are easily accessible on the surface web, and their consumers.

In this article, we examine the purchasers of licit and illicit medicines, and in particular, Dutch purchasers of illicit lifestyle drugs through surface websites. We specifically focus on lifestyle drugs as medicines, as opposed to (herbal) supplements (e.g. protein supplements, creatine and vitamins). These include prescription lifestyle drugs and over the counter medicines that can be purchased in pharmacies. In this study, we speak of illicit lifestyle drugs, which include all medicines that are not produced, sold and/or purchased according to Dutch or international regulations. As such, for example, we include in this article illicit weight loss drugs such as Slimex (which is banned from the market and thus all purchases are illegal) or Orlistat (when obtained outside the legal supply chain and usually without a doctor's prescription). Because of difficulties filtering out purchasers of illicit medicines only, we use data regarding purchasers of both legal and seemingly illicit medicines online.

The current study and its findings are part of a larger project on the online purchase of medicines in the Netherlands. The focus of the current paper is twofold. First, we present data on the prevalence and demographic characteristics of online buyers of medicines in general, with particular attention given to the purchasing of illicit lifestyle drugs. Second, we offer an in-depth analysis of the motives and methods for the online purchase of two types of lifestyle drugs: illicit weight-loss medicines and erectile dysfunction medicines. As our analysis will demonstrate, products from these two categories are among the most popular illicit lifestyle drugs bought online.

## Methods

As part of a larger study on the market for illicit medicines, survey data were gathered from online buyers of medicines in the Netherlands. Respondents for the survey were members of a panel recruited by the market research agency Intomart GfK in the Netherlands. Utrecht University's Faculty of Law, Economics and Government granted ethical approval for the study.

The presented data emanate from two surveys: (I) a prevalence study ( $N=50,848$ ) to estimate the occurrence of purchasing medicines online, and (II) an in-depth survey ( $N=447$ ) among respondents who indicated that they had purchased illicit medicines (including lifestyle drugs) via surface websites. The in-depth survey contains questions on motives for purchasing online, risk perception and satisfaction.

### Prevalence study

In order to estimate the proportion of Dutch citizens who purchase regular medicines online, those who purchase illicit medicines online or those considering whether to purchase these products online in the near future, a prevalence study was conducted. The prevalence study took place in August 2015 and included 50,848 respondents aged between 18 and 90 years

old in the Netherlands. The respondents are on a panel of the market research agency Intomart, from which they receive monthly requests to participate in computer-administered surveys. Respondents included both individuals who had ordered medicines online, including lifestyle drugs, and those who had not. Although the panel itself is not a fully representative reflection of the Dutch population, we were able to control for age, gender, education and region and thus generate representative estimates (see section on data analysis).

Four questions were asked of respondents: (I) what types of medicines were purchased on the Internet; (II) what types of medicines were purchased through unlicensed sources outside the Internet; (III) whether the medicines were purchased with a doctor's prescription; and (IV) whether the medicines are officially available by prescription in the Netherlands. This combination of questions enables us to make a general distinction between online purchases of illicit medicines (measured as prescription medicines purchased without a prescription and medicines not available in the Netherlands) and seemingly legitimate online purchases of medicines (obtained with a prescription, or over-the-counter medicine).

### In-depth survey

More detailed information about purchasing medicines online is based on an in-depth questionnaire among 447 respondents of which 153 respondents indicated that they had purchased weight loss drugs and sexual enhancers online. Data regarding these 153 are presented and analysed below. The 447 respondents of the in-depth survey were selected out of a first panel of 56,700 respondents<sup>1</sup>. Of these, 1800 indicated that (1) they had ever purchased medicines online, and (2) they had purchased prescription drugs without a prescription. 447 respondents were selected from the 1800 participants who fulfilled the selection criteria. In April 2015, the 447 respondents completed an extended computer-based questionnaire about their online purchase of illicit medicine.

The in-depth survey consisted of 60 questions divided into various themes, such as purchasing behaviour, satisfaction, motivations and risk perception. Questions focussed on the specific type of medicines they purchased most regularly online. The themes and the order of the questions were partly based on previous Intomart surveys on purchasing medicines online (2009, 2012). Although the primary focus was on illicit or unofficial medicines, words such as 'illicit' or 'illegal' were omitted from the survey, in order to avoid deterring participants, misreporting and social desirability bias. Open and closed, sensitive and non-sensitive, long and short questions were alternated.

### Data analysis

The panel of the prevalence study among 50,848 respondents (mean age: 53.6, std. dev. 14.6; 47% male, 53% female) did not portray a fully representative sample of the Dutch population. However, demographic information (gender, age, region, education) on all respondents was made available and compared with the general demographics of the Dutch

population. Therefore, with the use of inverse probability weights, representative estimates were made of the prevalence and profile of Dutch adult purchasers buying medicines online. As such, we were able to control for these four demographic variables using the weight variable that has been linked to the Dutch population by research agency Intomart.

In this study, we identified 'weight-loss drugs', 'sexual enhancers', 'birth control', 'quit smoking medication' and 'muscle drugs' as lifestyle drugs. We focus solely on lifestyle drugs as (prescription) medicines, and exclude lifestyle supplements. For this article's in-depth analysis, we identified 153 respondents from the in-depth survey who had purchased the two most popular illicit lifestyle drugs online: weight-loss drugs ( $N=70$ ) including Orlistat and Slimex, and sexual enhancers ( $N=88$ ) including Viagra and Kamagra. Data from both surveys have been analysed through the software programmes SPSS, version 22 (Armonk, NY) and Stata, version 14 (College Station, TX).

### Limitations

The prevalence study of online medicine purchases provides innovative information on the occurrence and demographic characteristics of purchasers of lifestyle drugs and other types of medicines. However, the use of survey questions to measure the prevalence of purchasing illicit medicines and lifestyle drugs is associated with several methodological limitations. First, it is difficult to identify and select purchasers of illicit medicines. For example, it could be that purchasers did not realise the website sold counterfeit or otherwise illegal products. It is therefore likely that the prevalence study underestimates the number of illicit lifestyle drug purchasers in the Netherlands. On the contrary, respondents might have purchased medicines that, unbeknownst to them, were perfectly legal. Many websites that offer illegal medicines offer legitimate ones as well. In relation to this, medicines that have been banned in the Netherlands may have been purchased in accordance with other countries' laws; to this extent, we may have overestimated the prevalence of illicit medicines. For these reasons, we chose to include prevalence of both legal and illegal medicines. The selection of respondents purchasing illicit medicines could be improved in further studies by

also asking prevalence study respondents about specific medicines, instead of using a 'general medicine class' they purchased (e.g. 'Viagra' as opposed to 'sexual enhancers').

Second, the respondents sorted by medicine type are not fully representative and further research is needed in order to gain more knowledge on the differentiated types of (illicit) medicines and lifestyle drugs. In the prevalence study, we defined our categories based on the drugs purchased and not on the motivations that the purchasers bought it. At the same time, in-depth study questions focussed on the types of medicines that respondents had purchased most often online. Whereas the results of the in-depth study on purchasers of sexual enhancers and weight loss drugs are thus based on a small sample, they are meant as an important indication for further research on the demand and supply of different types of illicit medicines. Third and finally, younger purchasers of illicit medicines and lifestyle drugs are excluded from the survey, as the panel consists of respondents aged 18 years and up. Young purchasers are an important target group for lifestyle and human enhancement drugs, and further research therefore must include young respondents as well.

### Results

#### Overall profile of online buyers of medicines and lifestyle drugs

Out of the 50,848 respondents, a total of 5165 respondents between the ages of 18 and 90 stated that they had ever purchased any type of medicine and/or lifestyle drug online. This includes drugs available by prescription or over the counter and includes both legal and illegal drugs. Using Intomart's inverse weighting process, we estimate that at least 10.2% of the Dutch population buys or has bought some type of medicine online. Columns 1 and 2 of Table 1 present the frequencies and percentages of online purchasers of different types of medicines and lifestyle drugs. Painkillers are the leading online purchases (31.8% of all online medical purchases), followed by weight-loss drugs (27.0%), sedatives and tranquillisers (14.2%) and sexual enhancers (14.0%). The remaining 31.2% of online purchases are of a mixture of other types of medicine. A total of 2655 respondents

**Table 1.** Types of medicine purchased online ( $N=50,848$ ).

	All medicines purchased online		Illicit medicines purchased online	
	(1) <i>n</i>	(2) Percentage of all medicines purchased online	(3) <i>n</i>	(4) Percentage of all illicit medicines purchased online
Painkillers	1640	31.8%	210	25.4%
Weight loss drugs	1397	27.0%	200	24.1%
Sedatives and tranquillisers	733	14.2%	157	18.9%
Sexual enhancers	723	14.0%	232	28.0%
Birth control	669	13.0%	87	10.5%
Quit smoking medication	387	7.5%	101	12.3%
Muscle drugs	334	6.5%	89	10.7%
Antibiotics	319	6.2%	100	12.1%
Antidepressants	274	5.3%	90	10.9%
ADHD medicines	267	5.2%	90	10.8%
Antiviral medicines	265	5.1%	90	10.9%
Other	1612	31.2%	220	26.6%

Some of these respondents reported that they purchased more than one variety of medicine. Therefore, columns (1) and (3) sum to more than the *n*-number of respondents, and columns (2) and (4) sum to more than 100%.

between the ages of 18 and 82 purchased drugs of one or more of the lifestyle types: weight loss drugs, sexual enhancers, birth control, quit smoking medication and muscle drugs. Using Intomart’s inverse weighting formula, we estimate that 5.2% of the Dutch population has ever purchased lifestyle drugs online.

The specific types and prevalence of illicit medicines that are purchased online are presented in columns 3 and 4 of Table 1. Sexual enhancers are the largest group of illicit medicines purchased online (28.0% of all illicit medicines), followed by painkillers (25.4%), weight-loss drugs (24.1%) and sedatives and tranquillisers (18.9%). Other types of illicit medicines purchased online are anti-depressants (10.9%), ADHD medication (10.8%) and muscle-enhancing drugs (10.7%). Furthermore, out of the 50,848 respondents, a total of 828 between the ages of 18 and 84 reported that they had purchased prescription medicines without the use of a prescription or had purchased medicines not available in the Netherlands. Data from the prevalence study therefore indicate that an estimated 1.6% of the Dutch population have bought illicit medicines online. Of these 828 respondents, 460 between age of 19 and 79 years old purchased some type of illicit lifestyle drug, resulting in an estimated 0.9% of the Dutch population that has purchased illicit lifestyle drugs.

With the demographic information available on all respondents of the prevalence study, it is possible to draw a profile of online purchasers of medicines in general. As presented in columns 1 and 2 of Table 2, there is no significant gender difference in purchasing medicines online in general: 50.6% of buyers are male and 49.4% are female. However, men tend to purchase a broader variety of medicines online. Further, four kinds of substances are purchased predominantly by men: two lifestyle drugs, namely sexual enhancers (85.6% male) and muscle-enhancing drugs (82.9% male); anti-depressants (77.3% male); and ADHD medication (77.2% male). Weight-loss drugs are the only substances that women buy more frequently than men (61.3% female). Interestingly, it appears that, overall, men purchase illicit medicines significantly more than women. Columns 3 and 4 of Table 2 illustrate that 64% of the purchasers of illicit medicines are men and 36% are women. With the exception of weight-loss

drugs, more men than women purchase every type of drug online. Illicit lifestyle drugs most often purchased by men are again sexual enhancers (90% male), muscle-enhancing drugs (88.6% male) and quit-smoking medication (82.4% male).

Table 3 presents the mean age of the online buyers per class of medicine. The mean age of the online purchasers is 44.7 years of age (SD = 15.4). On average, purchasers of online painkillers are among the oldest (44.3 y, SD = 15.7) and purchasers of ADHD medicines are the youngest (32.4 y, SD = 10.3). Furthermore, younger purchasers are more likely to purchase multiple types of medicines at the same time and are therefore counted multiple times for the average age of separate medicines types. This explains why the overall average age (44.7 and 44.5) is higher than the average age per medicine type. In addition, purchasers of illicit painkillers are again among the oldest (42.7 y, SD = 16.4), followed by purchasers of the lifestyle drugs sexual enhancers (42 y, SD = 15.3) and weight loss drugs (40.7 y, SD = 14.7).

Based on the first panel of 56,700 respondents, buyers were selected for the in-depth study in which the motives and methods to purchase medicines online are examined in more detail. It is important to differentiate by drugs type, as the motives for their consumption, the way to obtain them, satisfaction rates and risk assessment may vary depending on the substance being used. For the next section, we focus on the two most popular lifestyle drugs purchased through the surface web: illicit weight-loss drugs (hereafter: weight-loss drugs) and illicit sexual enhancers (hereafter: sexual enhancers). The motives, methods and satisfaction rates of these respondents will be discussed.

### Motives and risk assessment

Detailed information about the motives, methods and satisfaction when purchasing lifestyle drugs online was provided by the in-depth questionnaire (N = 447). Of these 447 respondents, 153 are relevant to the current article because they reported having purchased weight-loss drugs (N = 70), primarily including Slimex and Orlistat without a prescription and/or sexual enhancers (N = 88), primarily including Viagra and Kamagra without a prescription online. There are various motivations that drive buyers to purchase these lifestyle

Table 2. Medicines by the gender of buyers (n = 5165).

	Gender online buyers all medicines		Gender online buyers illicit medicines	
	(1) Male	(2) Female	(3) Male	(4) Female
Sexual enhancers	85.6%	14.4%*	90%	10%*
Antiviral medicines	84.2%	15.8%*	92.2%	7.8%*
Muscle drugs	82.9%	17.1%*	88.6%	11.4%*
Antidepressants	77.3%	22.7%*	88.9%	11.1%*
ADHD medicines	77.2%	22.8%*	92.2%	7.8%*
Antibiotics	76.8%	23.2%*	83%	17%*
Quit smoking medication	69.3%	30.7%*	82.4%	17.6%*
Painkillers	56.2%	43.8%	71.4%	28.6%*
Sedatives and tranquillisers	55.5%	44.5%	69.2%	30.8%*
Birth control	49%	51%	78.2%	21.8%*
Weight loss drugs	38.7%	61.3%*	51.5%	48.5%*
Rest group	52%	48%	65.5%	34.5%*
Total	50.6%	49.4%	64.1%	35.9%*

\*Significant differences between male and female purchasers.

Table 3. Mean age of online buyers per medicine type (n = 5165).

	Age online buyers all medicines		Age online buyers illicit medicines	
	Mean age	Standard deviation	Mean age	Standard deviation
Painkillers	44.3	15.7	42.4	16.4
Sedatives and tranquillisers	40.4	15.7	39	15
Weight loss drugs	39.1	13.5	40.7	14.7
Antiviral medicines	36.3	12.5	31.7	12
Sexual enhancers	35.7	13.3	42	15.3
Antibiotics	35.3	13.6	34.2	13.6
Antidepressants	34.7	12.7	30.9	10.0
Quit smoking medication	34.6	11.1	36.6	13.8
Muscle drugs	34.0	11.8	31.5	11.5
Birth control	33.7	10.2	32.3	10.8
ADHD medicines	32.4	10.3	28.8	7.7
Rest group	42.8	15.8	44.3	16.7
Total	44.7	15.4	44.5	15.5

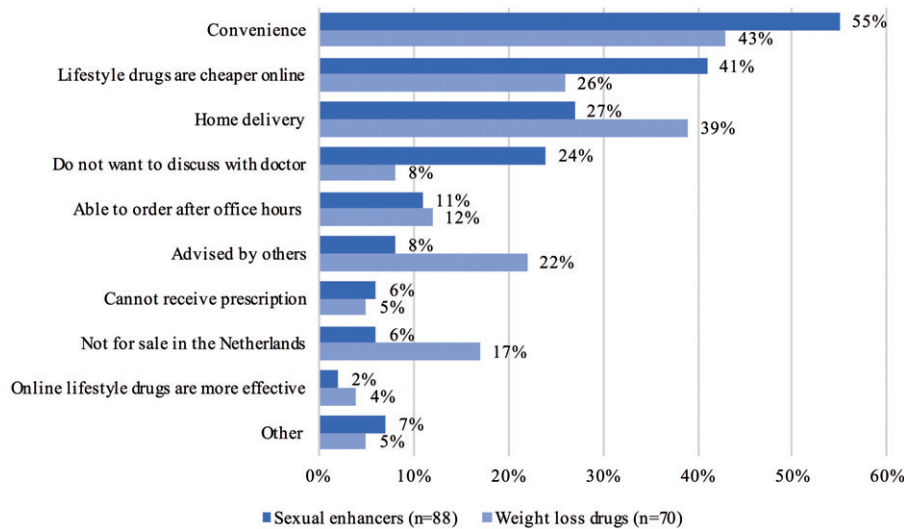


Figure 1. Motivations for purchasing sexual enhancers ( $n = 88$ ) and weight loss drugs ( $n = 70$ ).

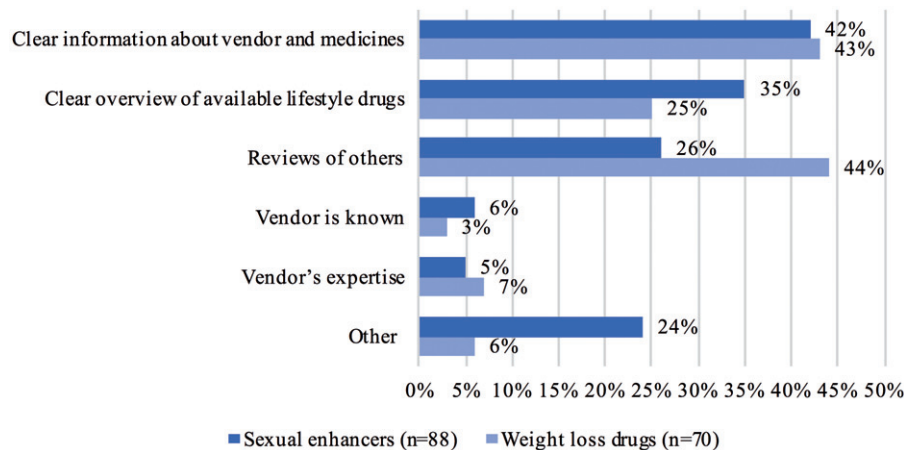


Figure 2. Reasons why buyers trust a website when purchasing sexual enhancers ( $n = 88$ ) and weight loss drugs ( $n = 70$ ).

drugs online. As presented in Figure 1, financial motives, convenience and home delivery are the most important factors for the purchasers of both illicit weight-loss drugs and sexual enhancers. Looking at the situation in more detail, a particular reason for purchasing sexual enhancers online is that 24% of the buyers do not want to discuss this with their physician. The main motivations for purchasing weight-loss drugs online are convenience (43%) and home delivery (39%).

Generally, buyers rely on various characteristics by which they determine the trustworthiness of the website they use. The features are presented in Figure 2. After a respondent had chosen to explore the Internet options for lifestyle drug purchases, their choice of website was most strongly affected by clear information about the vendor and lifestyle drugs (43% and 42%), a clear overview of available lifestyle drugs (35% and 25%), and reviews of others (26% and 44%).

### Websites for purchasing online lifestyle drugs

Sexual enhancers and weight-loss drugs, as expected, are being sold through so-called online pharmacies, in, respectively, 22% and 17% of cases (Figure 3). However, the data show that other vending websites appear to be used even

more frequently, including second-hand vending sites and 'specialist websites' that focus on the sale of particular lifestyle drugs (47% and 38%, respectively). Respondents do not list social media as an important online source (2% and 4%).

It is generally acknowledged that customers may face various difficulties in their effort to determine the risks and quality of lifestyle drugs offered online. Nevertheless, findings from this study indicate that respondents seem to be loyal customers who often return to the same website. In particular, purchasers of sexual enhancers are most consistent in returning to the same website, as 44% of the respondents stated they always use the same website to purchase lifestyle drugs (Figure 4). Purchasers of weight-loss drugs more often differ in the website they choose (34%).

### Satisfaction

In line with the finding that purchasers tend to return to the same website for subsequent lifestyle drug purchases (Figure 4), we find that buyers are generally satisfied with their online purchase and the quality of these lifestyle drugs. Figure 5 provides an overview of customers' levels of satisfaction with the information on and quality of lifestyle drugs.

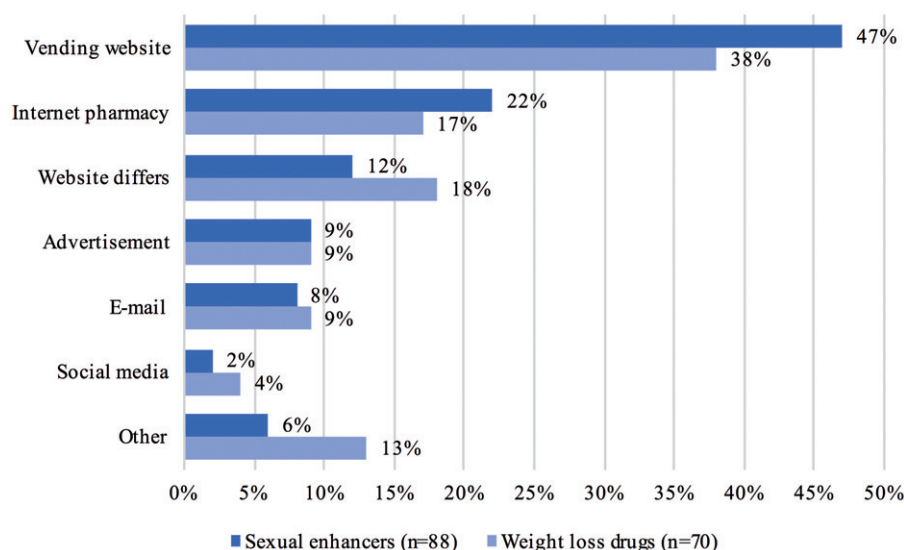


Figure 3. Type of website used for purchasing sexual enhancers ( $n = 88$ ) and weight loss drugs ( $n = 70$ ).

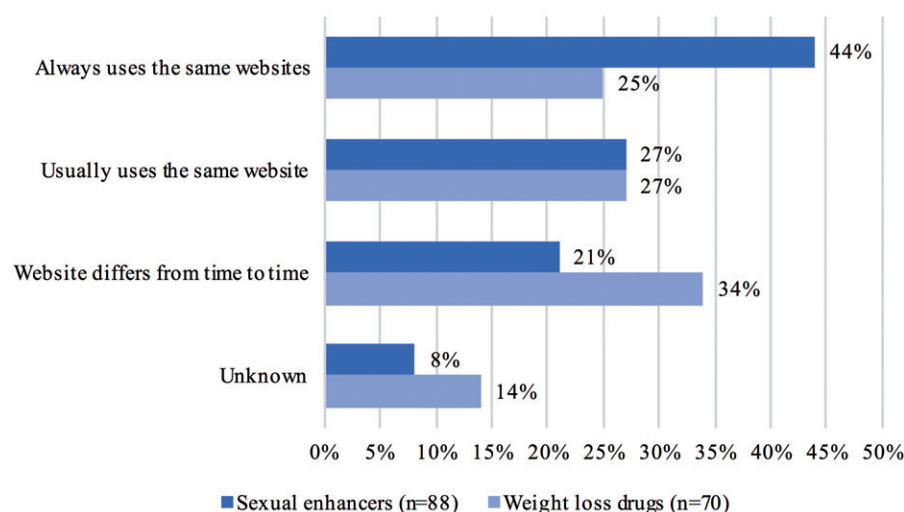


Figure 4. Variety in the websites used for purchasing sexual enhancers ( $n = 88$ ) and weight loss drugs ( $n = 70$ ).

Overall, purchasers report to be satisfied or very satisfied with information and drug quality.

Finally, we found that more than one-third of buyers would recommend others to purchase lifestyle drugs online. In total, 36% of purchasers of weight-loss drugs and 47% of sexual enhancers would recommend purchasing (illicit) lifestyle drugs online to others.

## Discussion and conclusion

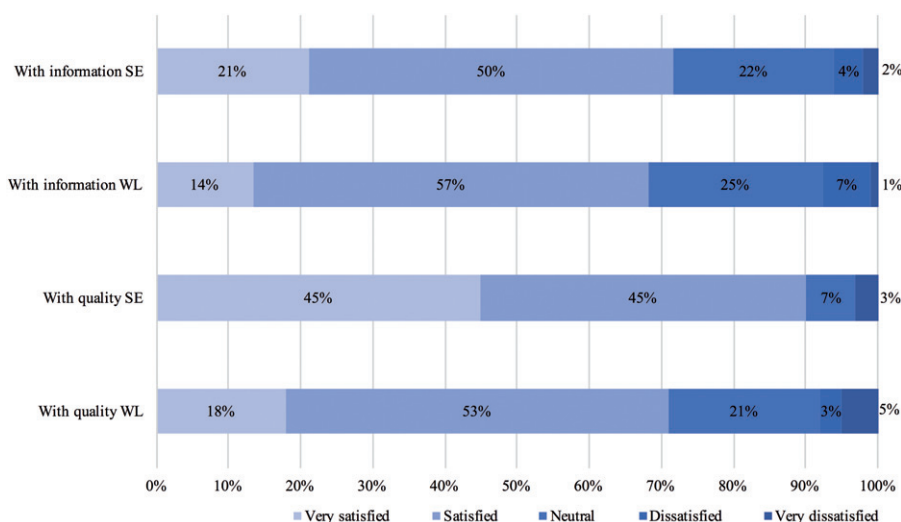
This article provides insights into the role of the Internet in illicit lifestyle drug markets from a buyers' perspective. Although a growing body of research on online drug markets is available, recent studies focus on purchasing drugs through the dark web (Buxton & Bingham, 2015; Martin, 2014; Van Hout & Bingham, 2013), or the supply of NPS via the surface web (EMCDDA, 2016; Wadsworth et al., 2017). What makes the market for lifestyle drugs unique is their open accessibility through the surface web, where all kinds of legitimate, semilegitimate and illegitimate products intermingle

(EMCDDA, 2016; Walsh, 2011). In addition, few studies focus on buyers, whose demographic characteristics, motives, ideas and preferences have been unknown. The results of this study provide a basis for further research on how the Internet mediates the supply and demand of new illegal and semi-legal drugs, more specifically lifestyle drugs.

### General profile of online purchasers of medicines and lifestyle drug users

Data from our prevalence study illustrate that an estimated 10.2% of the Dutch population between 18–90 years old purchases or has ever purchased medicines online. This is a slightly lower percentage than previous prevalence estimates. For example, based on a web survey conducted in seven European countries, Di Nicola et al. (2015) measured that 16% of the 874 online recruited respondents had at one time purchased medicines online during their lives. A Sanofi study among 5010 European citizens concluded a prevalence of 18% of respondents had at one time purchased medicines





**Figure 5.** Low to high satisfaction of consumers concerning the quality of and information on online purchased sexual enhancers ( $n = 88$ ) and weight loss drugs ( $n = 70$ ).

online (Di Nicola et al., 2015). In the Netherlands, two studies conducted by Intomart (2009, 2012) suggest that the proportion of the Dutch population that has purchased medicines online grew from 3% in 2009 to 13% in 2012. The current study included only adult respondents, which may result in lower estimates. Yet, our estimates rely on a large representative panel and use inverse probability weights and are therefore a robust indication of the proportion of the adult population that purchases medicines via the Internet in the Netherlands. The most online-purchased medicines are painkillers, sedatives, weight-loss drugs and sexual enhancers. These medicines are high on the list of illicit medicines that are most frequently purchased online: lifestyle drugs, and opioid analgesics and psychotropic substances (Lavorgna, 2015). An estimated 5.2% of the Dutch population between 18 and 82 years old has purchased lifestyle drugs through the surface web.

In addition, contrary to the previous studies, this research has made a first attempt to estimate the prevalence of the population that purchases illicit medicines. As such, the prevalence study indicates that an estimated 1.6% of the population between 18–84 years old had at one time purchased illicit medicines. Yet, as outlined, purchasers do not always know they dealt with a legal or illegal supplier, if they bought legally produced or counterfeit medicines, or if the medicines they bought required a prescription (Jackson, Arver, Banks, & Stecher, 2010; Siva, 2010; Venhuis et al., 2011). Therefore, the estimated proportion of purchasers who purchase illicit medicines online should be regarded as a first indication. An estimated 0.9% of the Dutch population between ages 19–79 has ever purchased illicit lifestyle drugs through the surface web. Hereby, sexual enhancers and weight-loss drugs are the most popular (illicit) lifestyle drugs purchased online.

Drawing a general profile, purchasers buying (illicit) lifestyle drugs and other medicines online are most likely individuals between the ages of 20 and 40. While there is no significant gender difference in purchasing medicines online (men: 50.6%; women: 49.4%), a significant difference can be

found in the types of substances purchased. Men are more likely to buy painkillers, muscle-enhancing drugs, antiviral medicines, ADHD medicines, antibiotics, sexual enhancers, sedatives and tranquillisers, quit-smoking medication and antidepressants. The only substances that women buy significantly more frequently online are weight-loss drugs. The most popular (illicit) lifestyle drugs purchased by male respondents are: sexual enhancers and muscle drugs, while the most popular lifestyle drug purchased online by women are weight-loss drugs. Indeed, in line with the work of Hall and Antonopoulos (2016), our data illustrate that the overall demand for online lifestyle drugs is not gender specific but that the 'groups at risk depend more on the specific drug and the intended purpose' (p. 77). Importantly, although further research should analyse the underlying differences between men and women in medicines consumption and online risk taking (Calzo, Sonnevile, Scherer, Jackson, & Austin, 2016), it is important to take gender differences into account when designing prevention or harm reduction interventions.

### **Purchasing lifestyle drugs online**

Sexual enhancers and weight-loss drugs are the most popular (illicit) lifestyle drugs purchased online. Although the results of the in-depth study are not representative, they provide an important indication for further research on the demand and supply of different types of illicit medicines. A key attribute for respondents to purchase these lifestyle drugs online – besides financial motivations – is ease or convenience. Similar results have been found in other prescription/lifestyle drugs studies (Orsolini, Francesconi, Papanti, Giorgetti, & Schifano, 2015) and some motives, such as convenience, have likewise been found in other online drugs markets (Barratt et al., 2014). However, our study also illustrates that it is important to identify specific motives for online purchasers of different types of drugs. For example, an important motive for purchasing sexual enhancers online is that buyers do not want to discuss their use with their doctor (24%) while for

purchasing weight-loss drugs, the fact that some of these illicit lifestyle drugs are not available in the Netherlands plays a role (17%). It is important to take these differences into consideration when designing and implementing non-judgmental prevention campaigns and harm reduction initiatives. For instance, messages that focus only on the dangers of purchasing poor quality – which currently seems to be the base of most health messages in relation to the sale of medicine online – might dissuade some buyers from entering the online marketplace. However, some buyers want to have the ability to evaluate quality for themselves and, by and large, report to be satisfied. Further, since avoidance of embarrassment plays a key role, it could be that this group is currently willing to take quality risks if this means that they do not have to disclose their need to a doctor. Future research should thus differentiate between various types of user groups and the different reasons for purchasing drugs online in order to better understand online drug markets.

Although online pharmacies are generally believed to be the main online source for lifestyle drugs (Di Nicola et al., 2015; Di Giorgio, 2011; Lavorgna, 2015), we find that other vending websites, such as second-hand vending sites and specialist websites attract more than twice as many lifestyle medicine customers. Moreover, while there are growing concerns that social media may play an active role in the development of drug markets, this research indicates that social media sites and apps are rarely used for buying and selling lifestyle drugs. Instead, it seems that social media generally plays a rather indirect role, such as advertising and information exchange on consuming lifestyle drugs (Lavorgna, 2015).

In addition, the widespread availability of all sorts of information and distribution channels may provide difficulties for purchasers when determining the legitimacy of online pharmacies (Di Nicola et al., 2015; Lavorgna, 2015). Unlike the dark web, purchasers on the surface web cannot make use of escrow systems that protects them from scamming (Van Hout & Bingham, 2013). Based on our data, purchasers of lifestyle drugs on the surface web primarily rely on reviews of others, as well as on clear information on the medicines and vendor. However, it should be acknowledged that information on the medicines and vendors, and reviews on the surface web, do not guarantee reliable information and quality of substances (Di Nicola et al., 2015). Nonetheless, most people in this study who purchase lifestyle drugs online report that they trust the website they employ. Trust in this context refers to the confidence customers have in these websites and does not necessarily reflect the quality of the purchased illicit drugs. In online markets, this ‘quality check’ is usually based on having a reliable friend who has ordered via the same website, ‘trial and error’ practices, a review by others, and discussing these online sources on forums and social media platforms (Kimergård, McVeigh, Knutsson, Breindahl, & Stensballe, 2014; Van Hout, 2014; Van de Ven, 2015). However, most of these self-implemented harm-reduction strategies currently used by users are not evidence based and may not be effective or even cause greater harm such as testing the product oneself (the ‘trial and error’ approach) (Kimergård et al., 2014). In order to reach this group, it is therefore important to implement harm-reduction strategies, such as testing services and

medical supervision, to promote and protect the health of lifestyle drug users.

Furthermore, our data show that purchasers are not always aware of the requirements for purchasing medicines online. For example, purchasers do not always know whether or not a prescription is needed and what kinds of websites are legitimate. Lifestyle drugs can be sold both legally and illegally on the surface web, which positions it at the intersection of the legal and illegal online market. It is therefore important to make (online) customers aware of the potential risks involved (e.g., contaminated supplements, online scamming), to offer alternatives (e.g. diet and training advice, reliable websites) and to protect them against these grey market issues (e.g. quality labels). However, while informing customers about counterfeit and poor quality medicines remains important, it should be acknowledged that many buyers are actually aware of the risks but still, knowingly, purchase these substances on the illegal market (Koenraadt, 2012; Van de Ven & Mulrooney, 2016). Importantly, our data show that the majority of online purchasers mention that they are very satisfied with the quality of their illicitly purchased lifestyle drugs and, if they seek more, would return to the same online supplier. Chaudry and Zimmerman (2009) also note that there is a common belief that fakes can offer the same quality of the trademarked product and highlight a lack of consumer concern for intellectual property rights (IPR). ‘Consumer complicity’ (Hall & Antonopoulos, 2016) seems to be an important driver for the illicit online market for lifestyle drugs.

With lifestyle drugs becoming increasingly available online combined with the high satisfaction rates amongst customers, it is likely that the online market for lifestyle drugs and medicines in general will continue to grow. Future research should monitor the demand and sale of lifestyle drugs as well as further differentiating between the motives and methods for purchasing various substances. With more knowledge about both users and suppliers, as well as about surface web market dynamics, differentiated prevention, educational campaigns and harm-reduction initiatives can be implemented to inform online purchasers of lifestyle drugs in a clear and helpful manner to reduce and prevent (potential) health harms.

## Conclusions

This article has emphasised the role of the Internet in drug markets and the increased online availability of a broad range of drugs. There is much intersectionality between different types of online drug markets, not just in the way drugs are marketed and sold but also in regard to issues such as quality and regulatory challenges. Research on online drug markets often focuses on the distribution of traditional drugs via the dark web or the selling and buying of NPSs via the surface web. However, these findings are not necessarily applicable to online markets for lifestyle drugs. For example, the legal status of lifestyle drugs differs from that of traditional drugs, and lifestyle drugs buyers choose the Internet for different reasons than NPS buyers. In order to deepen our understanding of the demand and supply of a range of new drugs on

the Internet, while increasingly new types of drugs are becoming available online, it is important to further monitor customer preferences and experiences.

## Notes

1. The first panel of 56,700 participants was adequate for selecting 447 in-depth study respondents, but, in order to make reliable estimates on the Dutch population, we rephrased two questions on off- and online purchasing in a second prevalence study. The second prevalence study is based on 50,848 respondents, as outlined in the previous section.

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