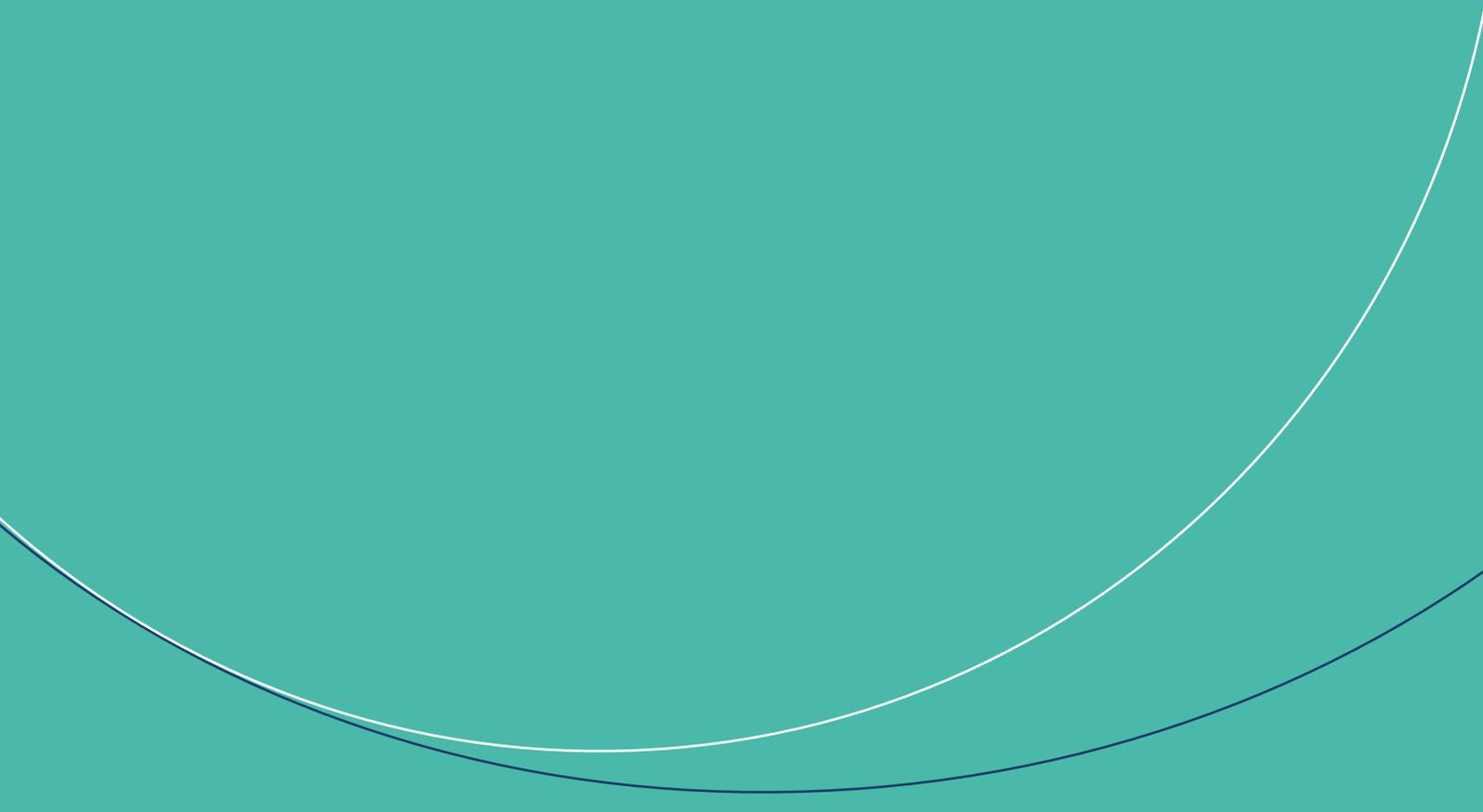




EPS NPS PROJECT

THE ILLEGAL SALE OF MEDICINES ON THE DARK NET

THE CASE OF BENZODIAZEPINES
AND PRESCRIPTION DRUGS ON ALPHABAY





EPS NPS PROJECT

The Project EPS/NPS - Enhancing Police Skills on Novel Psychoactive Substances is coordinated by RiSSC and developed in cooperation with the University of Hertfordshire Higher Education Institution (UH) (UK), University of Szczecinski (US) (PL), Eotvos University (ELTE) (HU) and INTERPOL (associate partner), with the financial support of the EU Commission - Targeted call on cross border law enforcement cooperation in the field of drug trafficking - DG Justice/DG Migrations and Home Affairs (JUST/2013/ISEC/DRUGS/AG/6429). The Advisory Board is composed of experts from the Arma dei Carabinieri, EUROPOL, INTERPOL, Swiss Federal Police, UNODC and US Drug Enforcement Administration. The overall objective of the Project is to contribute to enhancing a knowledge-based and joint EU approach to effectively addressing the rapid spread of NPS, by promoting in particular the generation of data/knowledge, information-sharing, and cooperation.

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The RiSSC is an independent non-profit Italian research centre dealing with security and crime. The Centre promotes social and cultural development on crime prevention by means of research activities, education/training initiatives and technical assistance projects on the most relevant criminal phenomena and their trends, on the causes and factors that facilitate crime and anti-social behaviour, and on the countermeasures to prevent and reduce both crimes and their impact. The RiSSC implements projects for prevention and risk reduction in favour of public and private bodies, involving a network of experts and researchers who contribute to a multi-disciplinary approach.

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THE ILLEGAL SALE OF MEDICINES ON THE DARK NET

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METHODOLOGY

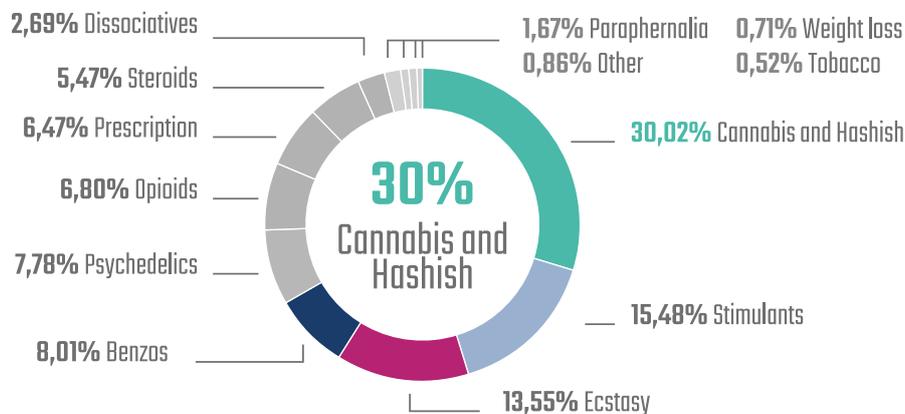
This analysis of the Dark Web drug market has used the cryptomarket Alphabay as a sample and has taken into account all the drugs offered for sale. A total of 17,163 items were logged during four 'crawling' sessions with a time delay of twenty days between each session starting on December 15th, 2015 and with the last session on February 15th, 2016. Specific attention has been given to the benzos section ("benzos" - 1,372 items offered for sale) and the prescription drugs section ("prescription" - 1,110 items on sale). This Report was executed using quantitative and qualitative analysis of the site content and of the items on sale.

The drugs section of AlphaBay is organised into 13 categories. The items for sale in the benzos category represent 8.01% of the total, while prescription drugs take up 6.47%.

The analysis has above all considered the type of substances and products available, the possible combinations in which they are known to be consumed and bought, and their country of origin (identified according to which country the goods are shipped from) and their prices.

EPS/NPS PROJECT- ALPHABAY DRUG SECTION CATEGORIES.

Data processed by the RiSSC



BENZODIAZEPINES AND “RECREATIONAL” USE

Amongst the legal and illegal substances sold via the cryptomarkets active across the Dark Web, drugs represent a substantial part. The goods offered are various and particularly concentrated around products for which it is usually necessary to obtain a medical prescription. The obligation to present a prescription in order to obtain the restricted drugs is conveniently avoided by the fact that the items can be bought online with no need for verification or checks of any kind.

In particular, amongst the most important types of drugs found on the online sale and demand networks, are the benzodiazepines (BDZ), which have been found to be the most prescribed (Olfson, King, Schoenbaum, 2015), and whose pharmacological powers are often underestimated.

BDZs are commonly described as sedatives, hypnotics, antiepileptic drugs and anaesthesia adjuvants. Because of their sedative qualities, they are often used in combination with new psychoactive substances, with the aim of mitigating, or in some cases, in heightening their effects. However, these medicines are not without their dangerous side effects. For instance, they can act on a cardiovascular level, reducing blood pressure and leading to ‘reflex tachycardia’. There can also be a risk of ischemia. Other effects have been noted on the lungs. These drugs have inhibitory effects which induce depression of the respiratory centre. One of the gravest effects of these sedative/hypnotic substances are their ability to cause the user’s progressive tolerance to, and then addiction to the drugs. These two conditions take effect in response to a continued administration of benzodiazepines, causing the need to increase dosage to maintain the suppression of anxiety or for the promotion of sleep. In other words benzodiazepines can induce a physical tolerance in the subject which forces their compulsive use.

Discontinuation can cause withdrawal symptoms, which manifest as opposite effects compared to those induced by the drug. This means that, if the user seeks to give up taking this class of drug, he or she must reduce their dose slowly, ensuring a gradual readjustment of their body’s receptor systems.

BOX 1

FROM THE PHARMACOLOGICAL PERSPECTIVE, BENZODIAZEPINES CAN BE SUBDIVIDED AND CLASSIFIED INTO THE FOLLOWING GROUPS:

Medium to long half-life:

Both Nitrobenzodiazepine (24-48 h) which includes Nitrodiazepam, and Pronordiazepam-like substances (48-100h) such as Diazepam (Valium), and Flurazepam, belong to this class. Particularly in the event of prolonged use, the compound can accumulate in the user’s body, and therefore increases the possibility of interaction with other drugs (cimetidine, propranolol, SSRI).

Short/ultrashort half-life:

In this case we refer to two groups of molecules:

1) Oxazepam-like: Lorazepam, Oxazepam, Temazepam.

These drugs, directly combined with glucuronic acid, do not undergo the first metabolism phase and therefore do not form active metabolites. They have half-lives of less than 24 hours, making them easier for the body to handle compared to Benzodiazepines which have a medium-long half-life.

2) Alprazolam (Xanax), Bromazepam, Brotizolam, Estazolam, Etizolam and Triazolam.

Unlike the drugs above, these substances undergo the hydroxylation process before being combined with glucuronic acid which means that they form active metabolites with a half-life of less than or equal to the parent compound. This means that like the benzodiazepines with a medium/long half-life, they risk interactions with other drugs (Cimetidine, Propranolol or SSRI). They have half-lives of less than 24 hours. For Triazolam and Brotizolam however, it is even less - about 6 hours.

As well as their purely therapeutic purposes, benzodiazepines are increasingly being acquired for misuse, including for so-called "recreational" use. Unfortunately, this can lead to serious intoxication and even fatality. Risk of poisoning is increased due to the behavioural disinhibition or aggressive, hostile attitudes which are provoked in the user. This happens especially with an alcohol and/or opiates combination - a poly-use that is considered in this analysis as one of the main causes of drug related deaths.

Recent studies on night club goers between the age of 18 – 44, show that consumers of opiates use benzodiazepines mostly in order to intensify and prolong the effect of other drugs. In fact, if taken intravenously, benzodiazepines enhance the effects of opioids on the central nervous system and therefore heighten feelings of euphoria. For the most part, the users questioned said they had started consuming these combinations out of curiosity, to relax, to relieve tension or anxiety, or to get "high" (Chen, Berger, Forde, D'Adamo, Weintraub, Gandhi, 2011).

Other users of benzodiazepines are patients undergoing substitution treatment for opiate addiction. It seems that an under-dosage of methadone, or the fear of the possible onset of withdrawal symptoms, are among the factors that lead patients to make use of mostly fast acting BDZs in these situations. When taken in combination with methadone, the percentage of deaths in France, the US and Australia was 40-80% (Vogel, 2013).

According to European studies, BDZs, aside from Cannabis and Alcohol, are the substances which have contributed most to the increase of road accident death rates - being taken alone or in combination with other depressants. It has been shown that these drugs impair the ability to drive, and when used in combination with alcohol, the risk of drivers being involved in, or responsible for, a road accident is notable (EMCDDA). Benzodiazepines are, in fact, responsible for reduced braking capacity, states of drowsiness and difficulty in movement coordination. Statistics compiled in Denmark in 2010 show that the benzodiazepines most frequently traced in samples collected in people driving, are Clonazepam (17% -25%) and Diazepam (9% -17%).

A study carried out in the UK (Oliver et al., 2006), on biological samples of drivers suspected to be under the influence of narcotics, have shown that benzodiazepines are the most common drug found after opiates. In fact benzodiazepines were found in 41% of the positive samples (Wolff, Brimblecombe, Forfar, Forrest, Gilvarry, Johnston, Morgan, Osselton, Read, Taylor, 2013).

Benzodiazepines, like other narcotics, can be bought online and sent directly to the buyers address in total anonymity. In addition to the easy availability of these substances, another point of interest is the increasing diversification of substances available online. In fact, records show that the spread of psychoactive substances in the benzodiazepine family are becoming ever more present on the web. These new types of substances have much more powerful and long lasting depressive-hypnotic effects than the "old generation" drugs. Above all, these effects are also more difficult to predict, given the lack of clinical and pharmacological studies available. Among the new BDZs available on the Internet are Clonazepam, Nifoxipam, Pyrazolam and Flubromazolam.

The pharmacological properties of benzodiazepines, together with their potential for abuse or otherwise improper use as psychoactive substances, could become a serious public health problem.

THE SELECTION OF BENZODIAZEPINES ON ALPHABAY

The market for benzodiazepines in the online cryptomarket AlphaBay was outlined starting from the offers contained in the drugs section of AlphaBay and classified by the vendors themselves as “benzos”. 1,375 offers were evaluated, of which 1,046 (76%) concerned benzodiazepines, while the remaining 329 (24%) concerned the offering of active substances with similar chemical and pharmacological properties to benzos, but which are, in effect, completely different substances.

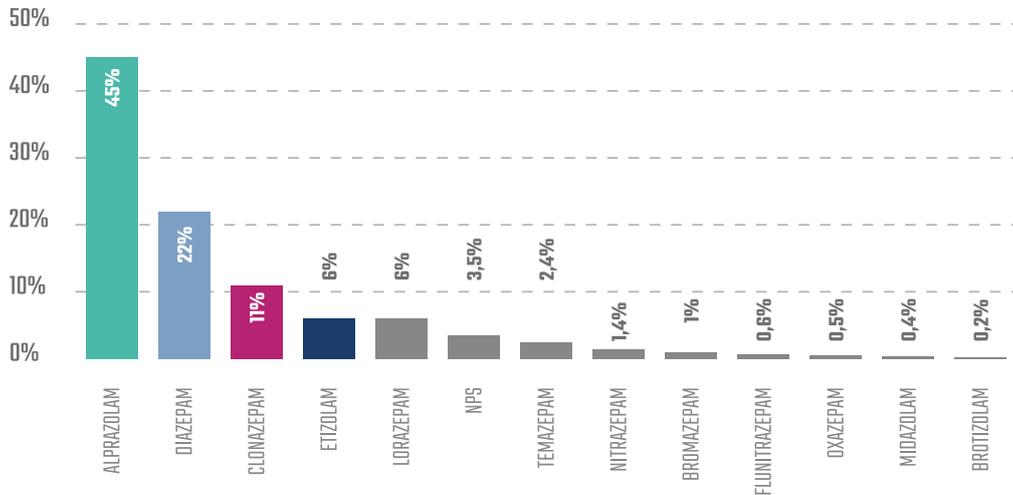
The following thirteen BDZs were found to be present on AlphaBay (listed in the decreasing order of the number of offers available):

1. ALPRAZOLAM
2. DIAZEPAM
3. CLONAZEPAM
4. ETIZOLAM
5. LORAZEPAM
6. NPS
7. TEMAZEPAM
8. NITRAZEPAM
9. BROMAZEPAM
10. FLUNITRAZEPAM
11. OXAZEPAM
12. MIDAZOLAM
13. BROTIZOLAM

TOI. RISSC – ALPHABAY – THE PERCENTAGES OF THE THIRTEEN IDENTIFIED BDZS AVAILABLE FOR SALE ON ALPHABAYRIES.

BDZ	%
ALPRAZOLAM	45%
DIAZEPAM	22%
CLONAZEPAM	11%
ETIZOLAM	6%
LORAZEPAM	6%
NPS	3,5%
TEMAZEPAM	2,4%
NITRAZEPAM	1,4%
BROMAZEPAM	1%
FLUNITRAZEPAM	0,6%
OXAZEPAM	0,5%
MIDAZOLAM	0,4%
BROTIZOLAM	0,2%

01. RISSC – THE PERCENTAGES OF THE THIRTEEN IDENTIFIED BDZS AVAILABLE FOR SALE ON ALPHABAY



Alprazolam e Diazepam respectively make up 45% and 22% of the items on sale, therefore they represent the majority of the market.

The NPS category, which takes up about 3.5% of the market, includes: Deschloroetilazolam, Diclazepam, Flubromazepam and Pyrazolam. These are substances not found in Pharmacopeia (pharmaceutical codes). From a chemical-toxicological point of view they can be classified as sedative-hypnotic drugs belonging to the benzodiazepines class. Diclazepam, Flubromazepam and Pyrazolam have already been listed in manuals by both the Department of the Italian Anti-Drug Organisation and by Cayman Chemicals (these catalogues not only allow early detection of the appearance of new drugs and new methods of consumption on their respective territories, but also advise on appropriate response measures in states of emergency).

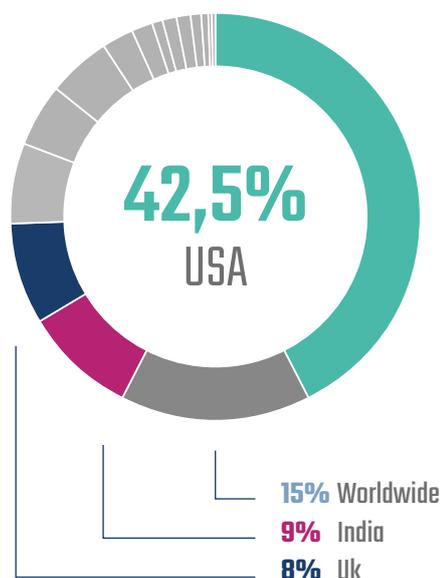
For each of the different categories of benzodiazepines available in AlphaBay the main country of export changes. This allows us to map the routes taken by each type of substance. In some cases, we can see that specific countries have a monopoly over the sale of particular substances.

1. ALPRAZOLAM

Alprazolam is the most sold BDZ (45% of all the offers in the Benzo category), but other medicinal products available are Xanax (Pfizer), Ksalol (Galenika), ONAX and Tranax (Cipla). The largest number of offers for these products seems to come from the United States (42.5%). In 15% of cases, the vendors also use the generic label "Worldwide". ONAX, the product produced by Ocean Pharmaceutical (a pharmaceutical company based in Pakistan), is offered exclusively by Indian vendors.

02. RISSC – ALPHABAY ALPRAZOLAM - COUNTRY OF DISPATCH

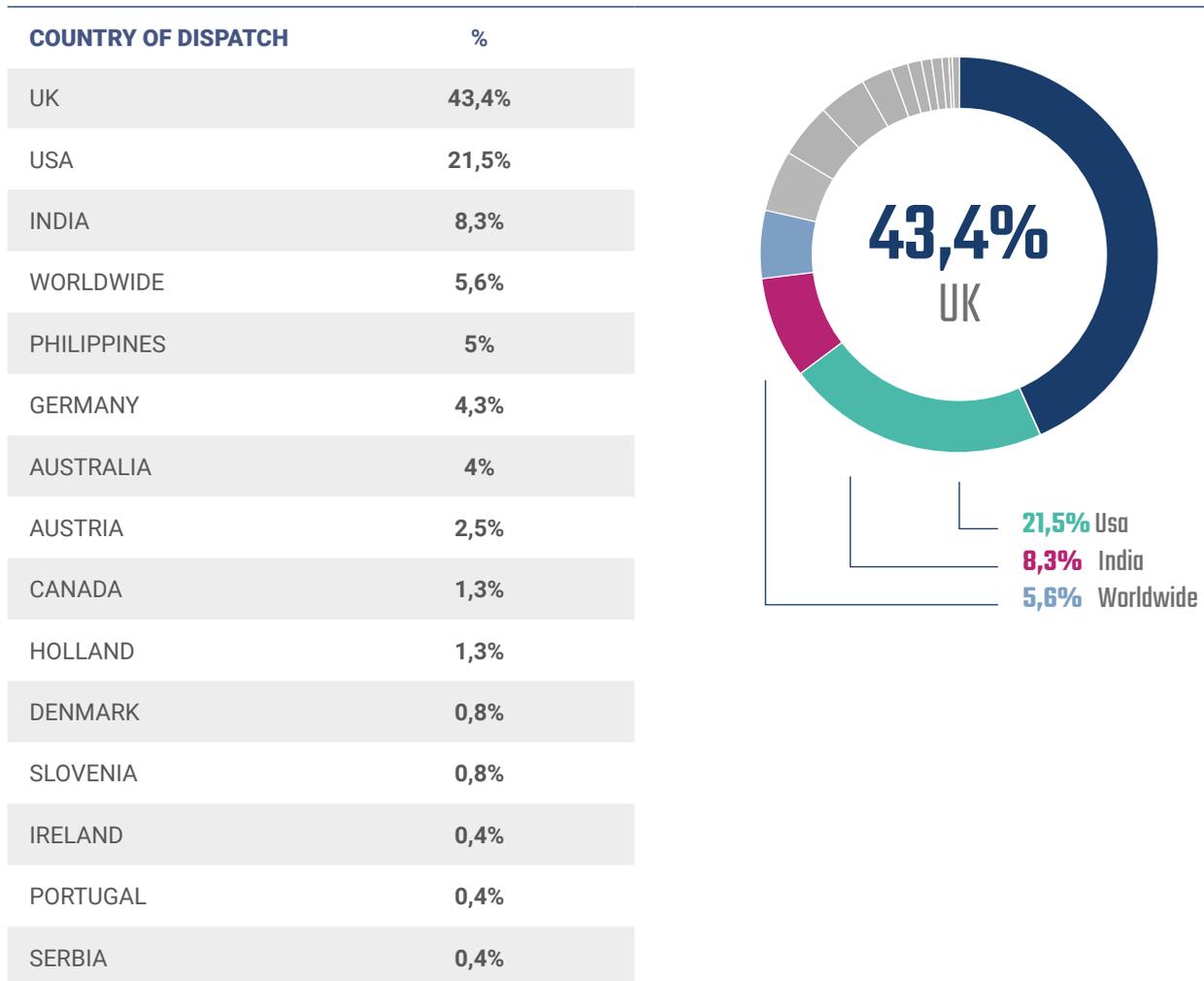
COUNTRY OF DISPATCH	%
USA	42,5%
WORLDWIDE	15%
INDIA	9%
UK	8%
CANADA	6,6%
AUSTRALIA	5%
PHILIPPINES	5%
CHINA	2,5%
SLOVAKIA	1,5%
AUSTRIA	1%
DENMARK	1%
GERMANY	1%
SWEDEN	1%
NORWAY	0,6%
ARGENTINA	0,1%
HOLLAND	0,1%
SERBIA	0,1%



2. DIAZEPAM

Diazepam (22% of the offers in the benzo category) is available as a range of different medicinal products: Valium (Roche), Diazepam (Actavis) and Apaurine (Krka). In this case, the largest number of offers came from the UK (43.4%) and the USA (21.5%), and some also from India (8.3%).

03. RISSC - ALPHABAY DIAZEPAM - COUNTRY OF DISPATCH

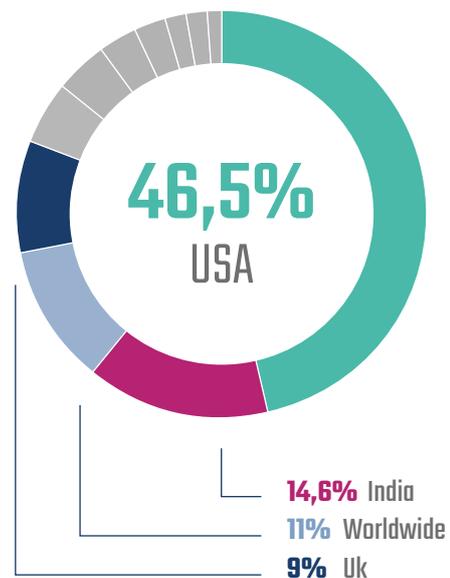


3. CLONAZEPAM

Clonazepam (11% of the items for sale in the benzo category) can be bought as the following two medicinal products: Klonopin (Roche / US) and Rivotril (Roche / Europe, South America, Canada, India, and Australia). The countries from which most of the items on sale originate are the United States (46.5%) and India (14.6%), followed again by a generic reference to "Worldwide" (11%).

04. RISSC – ALPHABAY CLONAZEPAM - COUNTRY OF DISPATCH

COUNTRY OF DISPATCH	%
USA	46,5%
INDIA	14,6%
WORLDWIDE	11%
UK	9%
CHINA	5%
AUSTRALIA	4%
CANADA	3%
AUSTRIA	2,5%
GERMANY	1,7%
ITALY	1,7%
DENMARK	1%

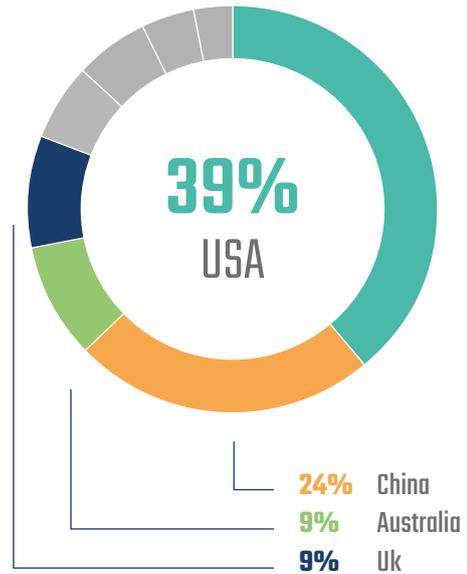


4. ETIZOLAM

Etizolam is sold by the vendors as a “high quality” product and with the name Etizest. Next to the United States (39%), most of this product originates from China (24%).

05. RISSC – ALPHABAY ETIZOLAM – COUNTRY OF DISPATCH

COUNTRY OF DISPATCH	%
USA	39%
CHINA	24%
AUSTRALIA	9%
UK	9%
CANADA	6%
WORLDWIDE	6%
INDIA	4%
NEW ZEALAND	3%

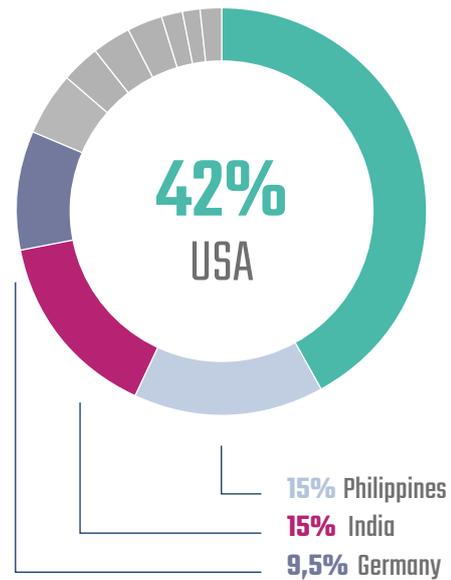


5. LORAZEPAM

Lorazepam – with the brand name Ativan, is generally proposed by individual sellers. The offers come for the most part from the US (42%) but the Asian route is also evident - representing 30% of the total items: the Philippines (15%) and India (15%).

06. RISSC – ALPHABAY LORAZEPAM – COUNTRIES OF DISPATCH

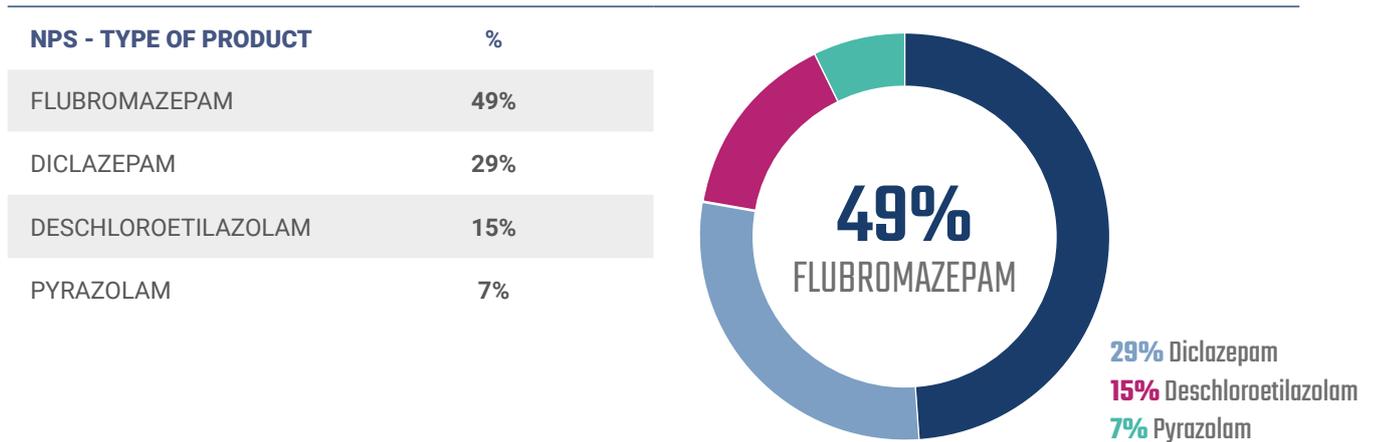
COUNTRY OF DISPATCH	%
USA	42%
PHILIPPINES	15%
INDIA	15%
GERMANY	9,5%
AUSTRALIA	5%
AUSTRIA	3%
CANADA	3%
WORLDWIDE	3%
DENMARK	1,5%
SPAIN	1,5%
UK	1,5%



6. NPS

The category of NPS includes substances which, because of their psychoactive effects, could be classified as benzodiazepines. The offers on AlphaBay include products such as Flubromazepam, Diclazepam, Deschloroetilazolam and Pyrazolam.

07. RISSC – ALPHABAY TYPES OF SUBSTANCES / PRODUCTS IN THE NPS BENZOS CATEGORY



A further examination of the countries of shipping origin reveals that for some substances there are exclusive routes. For example, Pyrazolam is sold exclusively from the Netherlands and Deschloroetilazolam only from China. Flubromazepam is offered to a greater extent from China (60%) and the US (20%), and very small amounts from Australia (10%) and Canada (10%). For Diclazepam, the country of origin is China (42%), followed by the UK (25%) and to a lesser extent the Netherlands (17%), Canada and the ubiquitous label 'worldwide' (8%).

08. RISSC – ALPHABAY NPS – COUNTRIES OF DISPATCH

FLUBROMAZEPAM	%	DICLAZEPAM	%
CHINA	60%	CHINA	42%
USA	20%	UK	25%
AUSTRALIA	10%	HOLLAND	17%
CANADA	10%	CANADA	8%
		WORLDWIDE	8%

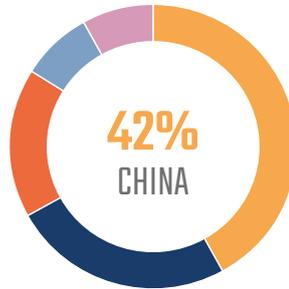
**08. RISSC – ALPHABAY
NPS – COUNTRIES OF DISPATCH**

FLUBROMAZEPAM



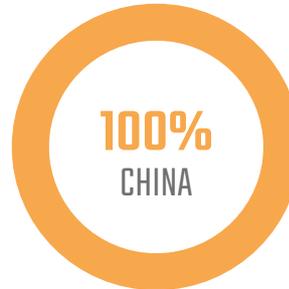
20% USA
10% Australia
10% Canada

DICLAZEPAM



25% UK
17% Holland
10% Worldwide
10% Canada

DESCHLOROETILAZOLAM



100%
CHINA

PYRAZOLAM



100%
HOLLAND

The way in which each product is described changes depending on the product itself. For example, Flubromazepam is listed with only its scientific name, without any further specification by the seller, as if the assumption is that the substance is already well known to buyers. For Diclazepam and Pyrazolam the approach of the seller changes and becomes more commercial. Diclazepam is always listed as having the active ingredient Valium (which contains Diazepam), while the Pyrazolam is referred to as the active ingredient of Xanax (which contains Alprazolam). The aim may be either to confuse the buyers, or possibly to reassure them - suggesting BDZs with a similar name to that of the substance sold in pharmacies. It is also likely that the seller wants to clarify and emphasize the power of the pharmacological substances proposed, in the hope of receiving positive feedback.

7. BROMAZEPAM, NITRAZEPAM AND TEMAZEPAM

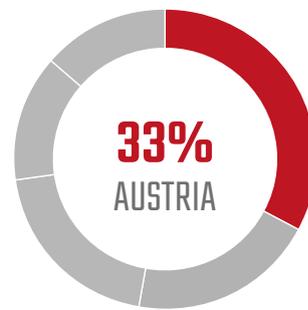
Bromazepam is sold as Lexotan (Roche). The Nitrazepam available has the Mogadon brand name, while the supply of Temazepam is listed as Restoril (which is produced by different pharmaceutical companies).

The Bromazepam comes mainly from Austria (33%), Canada and Germany (20% respectively). The Nitrazepam available comes mainly from India (44%). But the market is also offering products from Denmark and Serbia (13.5% each).

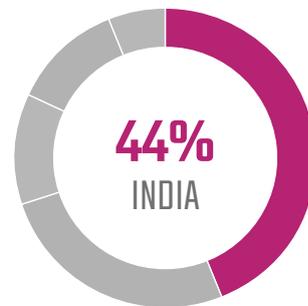
Temazepam is offered by the most part from the United States (68%) but a lower percentage comes from the UK and 'Worldwide' (10% each).

09. RISSC – ALPHABAY BROMAZEPAM, NITRAZEPAM AND TEMAZEPAM – COUNTRIES OF DISPATCH

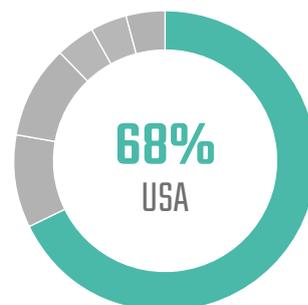
BROMAZEPAM	%
AUSTRIA	33%
CANADA	20%
GERMANY	20%
DENMARK	13,5%
SERBIA	13,5%



NITRAZEPAM	%
INDIA	44%
UK	26%
USA	12%
WORLDWIDE	12%
DENMARK	6%



BROMAZEPAM	%
USA	68%
UK	10%
WW	10%
GERMANY	4%
INDIA	4%
PAKISTAN	4%



8. MINOR BENZODIAZEPINES

Brotizolam, Flunitrazepam, Midazolam and Oxazepam are the BDZs with a smaller number of offers. They represent 2.7% of the offers in the benzos section.

The shipping origin of these items is interesting because of the occasional monopoly of tenders/shipments which start to become clear. Indeed, Midazolam is mainly offered by Serbians (80%), while Oxazepam comes mainly from the Netherlands (50%).

9. OTHER DRUGS PRESENT IN THE BENZODIAZEPINE CATEGORY

As part of the tenders submitted by the AlphaBay sellers in the Benzos section (nr. 329), there are substances and products containing other active substances with similar chemical and pharmacological properties, but which are totally different drugs in their own right.

In particular, there are frequent offers of sedative-hypnotics which are not BDZs, such as Zolpidem and Zopiclone.

These are relatively new molecules, introduced into the market for the treatment of sleep disorders. They are not structurally correlated to BDZ (Zolpidem is an Imidazopyridine and Zopiclone is a Cyclopyrrolone), but they do have similar ways of working that result in uniquely hypnotic effects.

In the Benzo section, there are also the following drugs offered:

Opioid analgesics (Hydrocodone, Oxycodone, Codeine, Tramadol and Tapentadol)

Hydrocodone, Oxycodone and Codeine are opioid analgesics from the Phenanthrene family. They are much more powerful than morphine and generally used in clinical settings (e.g. for the treatment of severe pain persistent in patients with cancer or chronic degenerative diseases) and can result in the onset of physical and psychic dependence, which manifests itself after 2-3 weeks of frequent dosage.

Dissociative anaesthetics (Ketamine)

Ketamine is a dissociative anaesthetic characterized by catatonia, amnesia and analgesia, with or without loss of consciousness. It is well-known in the field of psychoactive substances and is already widely used for recreational purposes. It is the only intravenous anaesthetic that causes both analgesic action and cardiovascular stimulation. It is very often combined with benzodiazepines like Diazepam or Midazolam.

Local anaesthetics (Benzocaine)

Benzocaine is a local anaesthetic.

Anti HIVs (Nevimune, Tenvir-Tenofovir disoproxil fumarate, Lamivir, Efavir)

Antibiotics (Doxycycline)

Doxycycline is an antibiotic belonging to the tetracycline class - a broad spectrum of action drugs. In general, Tetracycline is used to combat various infections, such as Chlamydia, sexually transmitted infections, bacillary infections by cocci and urinary tract infections.

Anti-cancer medicines (Capecitabine)

Capecitabine is an anti-cancer drug, belonging to the pyrimidine family. It is used to treat metastasized Breast Cancer or third stage Colon Cancer.

Anti-depressants (Trazodone and Escitalopram).

Headache medicines (Sumatriptan)

Anti-psychotics (Tisercin, which contains the active ingredient Levomepromazine)

Levomepromazine is a neuroleptic anti-psychotic commonly used for the treatment of schizophrenia, paranoid states and mania. It has strong analgesic properties and is particularly effective in the treatment of severe anxiety disorders resistant to treatment with typical anti-anxiety drugs and is also used to treat depression associated with hysteria and delirium. It is also used as a reinforcement for analgesic and anaesthetic therapies.

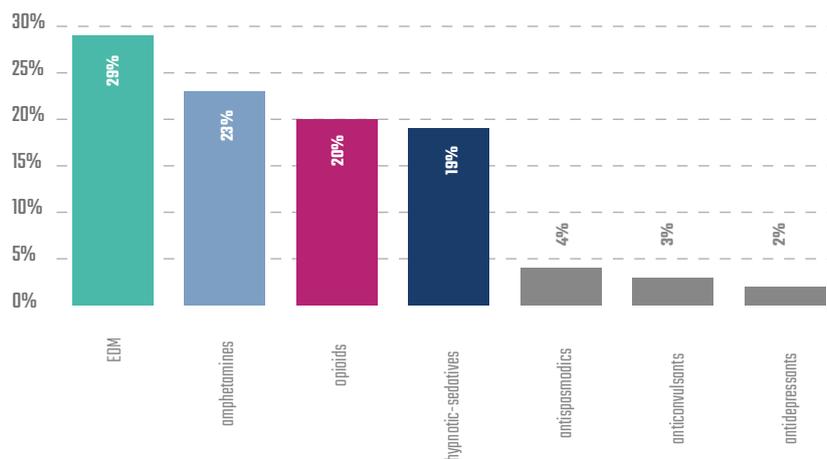
Drugs used for erectile dysfunction, such as Viagra and Cialis.

THE SELECTION OF PRESCRIPTION DRUGS ON ALPHABAY

On AlphaBay, the prescription drugs section offers for sale medicinal products usually subject to medical prescription. It is a category that accounts for almost 7% of the offers available on this cryptomarket.

The types of medication available are diverse and related mainly to drugs for erectile dysfunction (29%), amphetamines (23%), opioids (20%) and hypnotic-sedatives (19%). The remainder of the deals concern antispasmodics (4%), anticonvulsants (3%) and antidepressants (2%).

10. RISSC – ALPHABAY – PRESCRIPTION DRUGS – CATEGORIES OF PRODUCTS



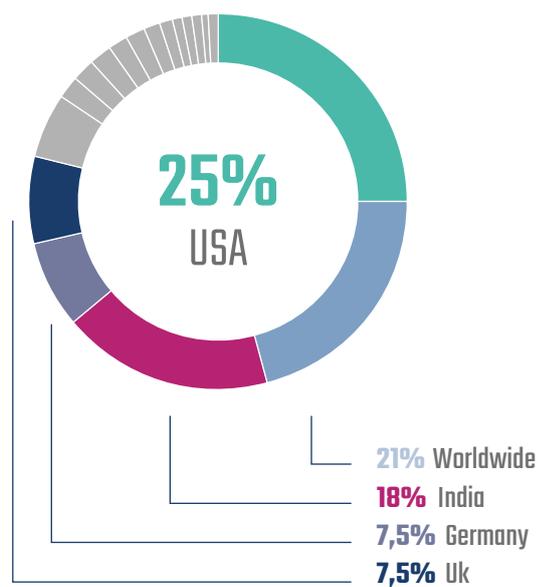
For the most part the offers present in the prescription drug category seem to be made up of so-called lifestyle drugs (e.g. EDM, amphetamines), and products used to increase performance (e.g. in the sexual sphere, for fast weight loss, for doping purposes etc...). It can be seen though, that other needs are also being met – particularly those related to addiction (e.g. opioids, hypnotic-sedatives...).

Delivery routes can be traced according to the countries of origin from which each product is shipped (i.e. those listed as the shipped-from country by vendors themselves) and lead largely to the USA, India, Germany and the UK. It is noteworthy, however, that there are many examples of “Worldwide” as an origin reference, which must be an attempt by the vendors to cover any tracks leading to the country from which the goods were shipped.

**T10. RISSC – ALPHABAY
PRESCRIPTION DRUGS – COUNTRIES OF DISPATCH**

COUNTRY OF DISPATCH	%	COUNTRY OF DISPATCH	%
USA	25%	PHILIPPINES	1,6%
WW	21%	THAILAND	1,6%
INDIA	18%	AUSTRIA	1,5%
GERMANY	7,5%	SINGAPORE	1%
UK	7,5%	SPAIN	1%
AUSTRALIA	5,5%	BELGIUM	0,8%
CANADA	2%	DENMARK	0,8%
HOLLAND	2%	CHINA	0,6%
POLAND	2%	SWEDEN	0,6%

T11. RISSC – ALPHABAY – PRESCRIPTION DRUGS – CATEGORIES OF PRODUCTS



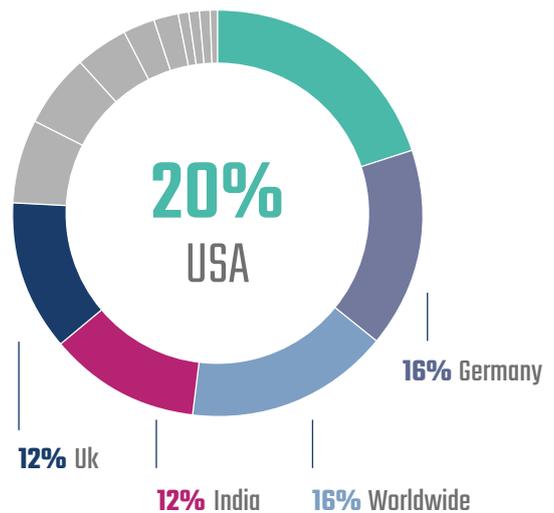
1. DRUGS FOR ERECTILE DYSFUNCTION

Viagra (whose active ingredient is Sildenafil) and Cialis (whose active ingredient is Tadalafil) are the drugs most present. From the analysis of the number of deals per country, excluding the generic data from the “Worldwide” category (16%), our findings clearly show the leading role of the United States as a supplier country (20%) with Germany a close second (16%), along with the UK and India (12%) in third and fourth place respectively. So, according to information provided by vendors these countries represent the four major locations from which shipments originate.

Considering the European context alone, there are several countries that can be considered as logistical hubs for the distribution of products: in addition to Germany (16%) and the UK (12%), there are also Poland (6.5%) and the Netherlands (6%), followed by to a lesser extent Sweden (1%), Spain (0.8%) and Denmark (0.4%). Internationally, however, aside from the United States (20%) and India (16%), the shipments occasionally come via Thailand (4%), Canada (2%) and China (0.8%).

**T11 / G12 RISSC – ALPHABAY
EDM – COUNTRIES OF DISPATCH**

COUNTRY OF DISPATCH	%
USA	20%
GERMANY	16%
WW	16%
INDIA	12%
UK	12%
POLAND	6,5%
HOLLAND	6%
THAILAND	4%
AUSTRALIA	2,5%
CANADA	2%
SWEDEN	1%
CHINA	0,8%
SPAIN	0,8%
DENMARK	0,4%



2. AMPHETAMINES

Sympathomimetics (this term refers to molecules that mimic the action of Catecholamines) are widely present among offers on the cryptomarket; in particular, there are Ephedrine, Pseudoephedrine, Dexamphetamine, Adderall, Modafinil, and the methylphenidate Armodafinil. These compounds, often classified as lifestyle drugs are becoming widely offered in the domain because they alleviate stress and anxiety, especially related to social interactions. They also suppress for example feelings of hunger, fatigue, fear, and improve sexual performance and concentration.

For example, Ephedrine and Pseudoephedrine are clinically used as nasal decongestants, but Ephedrine is the chemical precursor to amphetamines and pseudoephedrine can be rapidly converted by means of a quick reaction back into that same product. These substances are improperly used for the purpose of slimming, to make the weight loss more rapid and easy.

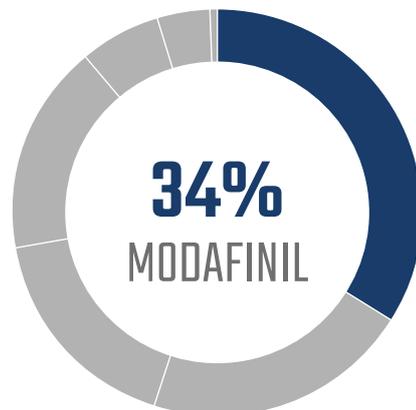
Modafinil, Armodafinil, Dextroamphetamine, Methylphenidate and Lisdexamfetamine are approved for the treatment of narcolepsy and also generally prescribed for Attention Deficit-Hyperactivity Syndrome (ADHD) in children, which is a behavioural disorder characterized by a temporal shortening of the ability to pay attention, learning problems and hyperactivity. These compounds are often used carelessly, especially by students, to enhance their concentration and their speed of understanding. Modafinil for example, is commonly called “Moda” by young people.

The side effects are significant and diverse, especially those affecting the cardiovascular and central nervous systems. After a single dose, amphetamines induce euphoria, excitement and confusion.

Looking at AlphaBay, Modafinil is the most available drug on offer (34%), together with Armodafinil (21%), which is described in the user blogs as the “purest” of Modafinil and with a patent about to expire. Lower percentages are represented by Adderall (17.3%) and Methylphenidate (16.7%).

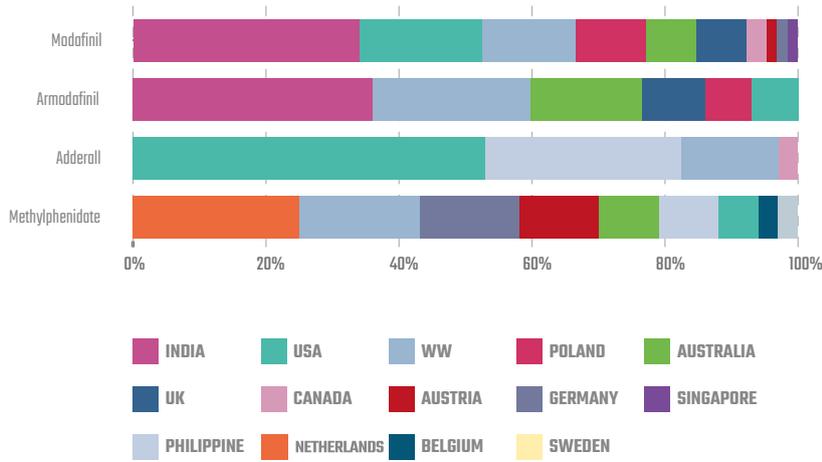
T12 / G13 RISSC – ALPHABAY AMPHETAMINES – PRODUCTS

AMPHETAMINES	%
MODAFINIL	34%
ARMODAFINIL	21%
ADDERALL	17,3%
METILFENIDATO	16,7%
DESTROAMFETAMINA	6,5%
EFEDRINA	4%
PSEUDOEFEDRINA	0,5%



If we consider the four most offered products, there emerges a diversification and specialization of the shipping countries.

14. RISSC – ALPHABAY – AMPHETAMINES – PRODUCTS/COUNTRY OF DISPATCH



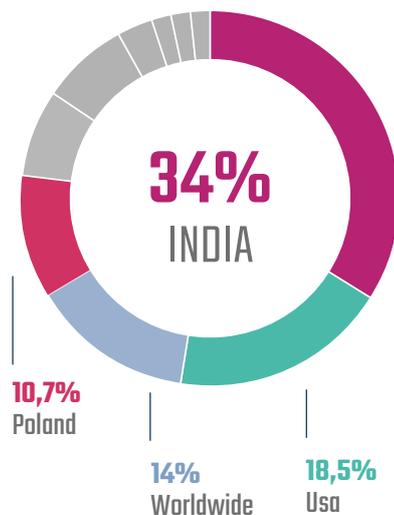
Excluding the generic “Worldwide” category (still significant in percentage terms), Modafinil (34%) and Armodafinil (36%) come mainly from India, while Adderall is shipped from the US (53%) and the Philippines (29.4%). Methylphenidate, however is mostly noted as coming from the Netherlands (25%), Germany (15%) and Austria (12%). Outside Europe, the most relevant countries are Australia (10%) and the Philippines (10%).

In more detail, the offers related to each specific product highlight that there some shipping routes involving both EU and non-EU countries, as well as offers coming exclusively from some specific shipping countries.

Modafinil is a good example of the first type. Modafinil comes mainly from India (34%) - where its generic counterpart (Modalert) is also produced, and where it is not subjected to legal control because it is not classed as a methamphetamine – and from the US (18.5%). A distribution channel is also found in Europe which involves in particular Poland (10,70%), and the UK (7.5%).

T13 / 615 RISSC – ALPHABAY
MODAFINIL – COUNTRIES OF DISPATCH

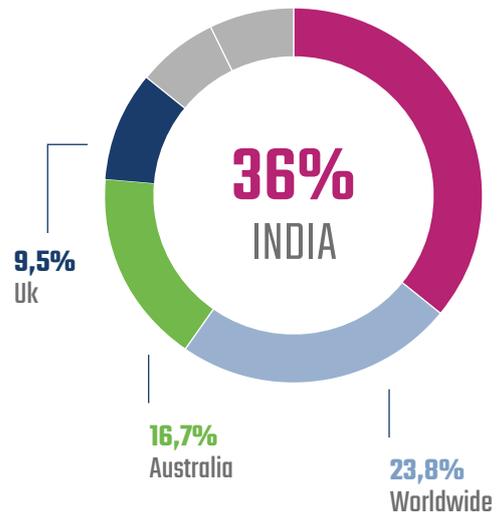
COUNTRY OF DISPATCH	%
INDIA	34%
USA	18,5%
WW	14%
POLAND	10,7%
AUSTRALIA	7,5%
UK	7,5%
CANADA	3%
AUSTRIA	1,6%
GERMANY	1,6%
SINGAPORE	1,6%



An example of the second type is Armodafinil (also known as Nuvigil) which is offered mainly from India (36%), where there is also the production also of generic drugs, and Australia (16.70%). The European environment remains in a rather marginal position with the UK (9.5%) and Poland (7%).

**T14 / G16 RISSC – ALPHABAY
ARMODAFINIL – COUNTRIES OF DISPATCH**

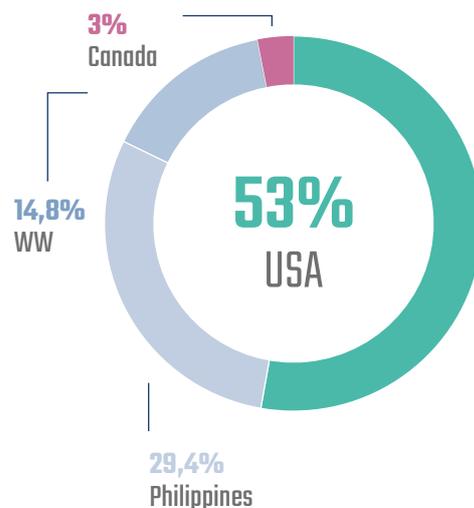
COUNTRY OF DISPATCH	%
INDIA	36%
WORLDWIDE	23,8%
AUSTRALIA	16,7%
UK	9,5%
POLAND	7%
USA	7%



Another example belonging to the second type is Adderall, which happens to come exclusively from the United States (53%) where demand seems to be increasing, and the Philippines (29.40%). Considering that in the Philippines this drug needs a prescription and is very difficult to find in pharmacies, it is conceivable that an internal black market for both contexts has appeared.

**T15 / G17 RISSC – ALPHABAY
ADDERALL – COUNTRIES OF DISPATCH**

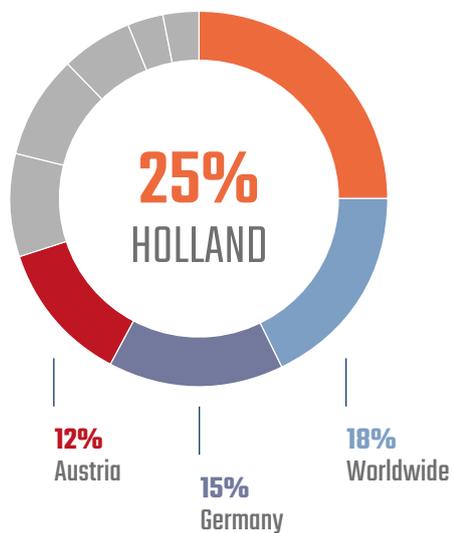
COUNTRY OF DISPATCH	%
USA	53%
PHILIPPINES	29,4%
WW	14,6%
CANADA	3%



Methylphenidate, however, refers once again to the second type, but can be found only in Europe (Netherlands 25%, Germany 15% and Austria 12%), unless you count the “Worldwide” bracket.

**T16 / G18 RISSC – ALPHABAY
METHYLPHENIDATE – COUNTRIES OF DISPATCH**

COUNTRY OF DISPATCH	%
HOLLAND	25%
WORLDWIDE	18%
GERMANY	15%
AUSTRIA	12%
AUSTRALIA	9%
PHILIPPINES	9%
USA	6%
BELGIUM	3%
SWEDEN	3%



3. OPIOIDS

The presence of opioids within the prescription drugs category is significant (20% of the total offers). The main types of products were found to be:

Opioid analgesics: The substances available are Morphine, Oxymorphone and Hydromorphone, but also Tramadol and Tapentadol. Morphine, Hydromorphone and Oxymorphone are very powerful and are used to treat severe pain. They are also drugs capable of inducing physical tolerance and psychic dependence.

Phenanthrenes: Oxycodone, Codeine, Dihydrocodeine, Hydrocodone and Roxycodone belong to this phenanthrene class. These are molecules with a lower potency than morphine, for which reason they are generally inserted into preparations containing aspirin or paracetamol.

Phenethylamine: Propoxyphene is a phenethylamine with much less potency than Codeine.

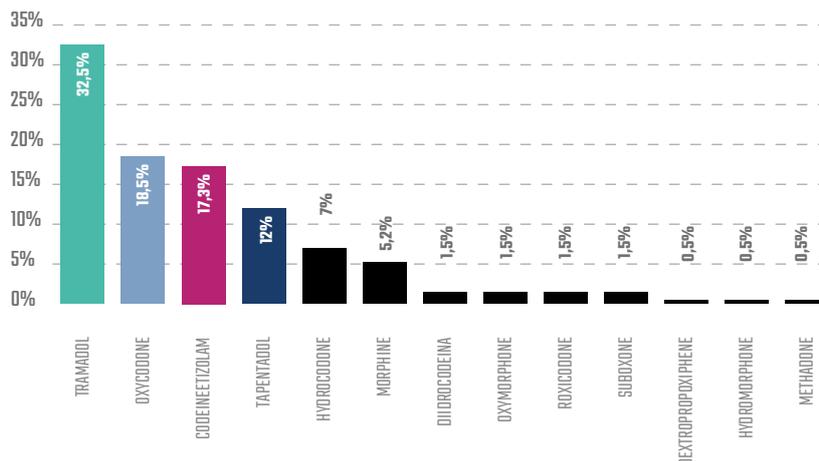
Methadone: Methadone has a power superior to morphine. It is mainly used for the treatment of opioid abuse, because tolerance and dependence develop more slowly than that of morphine.

Suboxone: Suboxone contains two active ingredients: Buprenorphine and Naloxone. It is used to treat addictions to morphine and other opioids. This drug is used to prevent the addict taking drugs intravenously. The Suboxone prescription has, therefore, the purpose of educating the addict and preventing the further dependence induced by other drugs such as methadone which are normally prescribed to combat dependence.

The most offers in this category were for Tramadol, Oxycodone, Codeine and Tapentadol, followed by Hydrocodone and Morphine.

TT7 / G19 RISSC – ALPHABAY - OPIOIDS

OPIOID	%	OPIOID	%
TRAMADOL	32,5%	OXYMORPHONE	1,5%
OXYCODONE	18,5%	ROXICODONE	1,5%
CODEINE	17,3%	SUBOXONE	1,5%
TAPENTADOL	12%	DEXTROPROPOXIPHENE	0,5%
HYDROCODONE	7%	HYDROMORPHONE	0,5%
MORPHINE	5,2%	METHADONE	0,5%
DIIDROCODEINA	1,5%		



TRAMADOL

In almost 40% of cases, sellers prefer to use the generic label “worldwide”. Considering the other cases, the delivery route passes mainly through traceable India (25%) and the US (14%). The roles of Singapore and Germany only account for 9% and 7% of the offers but are still of interest.

OXYCODONE

The selection of Oxycodone available is not disguised in any way with respect to country of origin. In more than half of the offers, Oxycodone appears to be sent from the United States (59%) and from Canada (15%), which clearly marks the North American route as prevalent. For Europe, however, the Netherlands seems to have a monopoly over supply (19%).

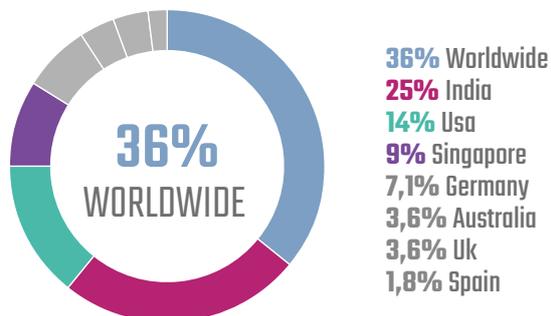
CODEINE

As with Tramadol, most of the offers of Codeine (50%) often do not clearly show the country of dispatch. However, with the remaining cases, it is clear that there is a monopoly of Indian sellers (30%) and, in Europe, of English ones (17%).

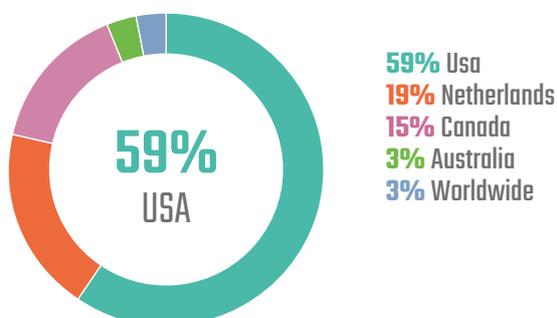
TAPENTADOL

The market for Tapentadol offers is run almost exclusively from India (62%) and the US (14%).

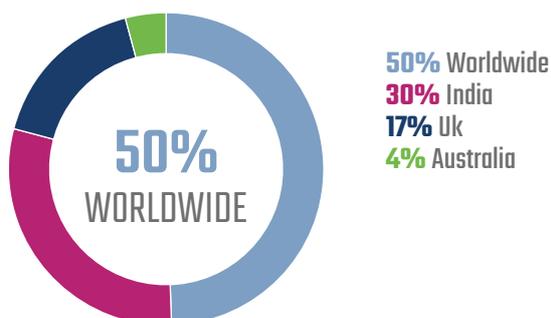
20. RISSC – ALPHABAY OPIOIDS/TRAMADOL COUNTRIES OF DISPATCH



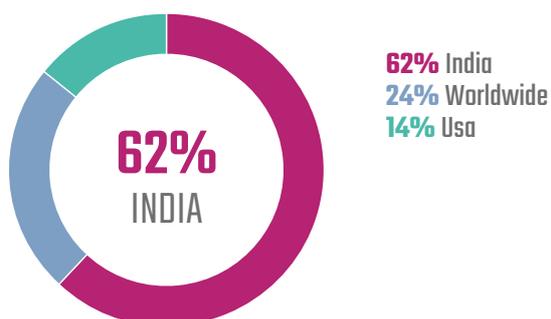
21. RISSC – ALPHABAY OPIOIDS/ OXYCODONE COUNTRIES OF DISPATCH



22. RISSC – ALPHABAY OPIOIDS/CODINE COUNTRIES OF DISPATCH



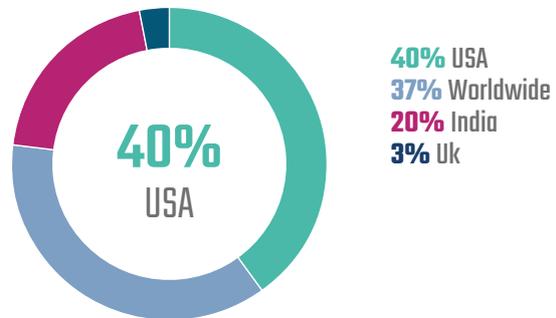
23. RISSC – ALPHABAY OPIOIDS/TAPENTADOL COUNTRIES OF DISPATCH



4. ANTISPASMODICS

Amongst the drugs available for sale, one which occurs frequently is an antispasmodic - Carisoprodol. Marketed under the brand name Soma among others, it is a recommended drug for the treatment of muscle spasms, whose action is mainly at the level of the brainstem. Besides the dearth of explicit references to the country of origin (37%), the predominant roles of the United States (40%) and India (20%) can still be identified.

24. RISSC – ALPHABAY OPIOIDS/CARISOPRODOL COUNTRIES OF DISPATCH



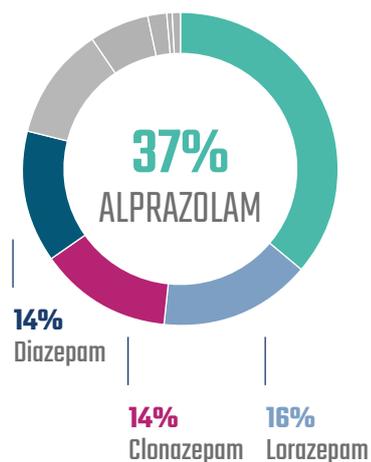
5. SEDATIVE-HYPNOTICS

In the class of sedative-hypnotic drugs, the offers appear to be related to benzodiazepines, although we must remember that in the drugs (non-prescription) section there also exists a specific category for benzos. Regarding the prescriptions drugs on offer, the supply centres around Alprazolam (36.6%), followed by Lorazepam (15.5%), Clonazepam (14%), Diazepam e Temazepam (12%). This distribution of the products differ from those recorded in the framework of the benzo category, where next to the predominant role of Alprazolam (45%), there was a greater availability of Diazepam (22%), followed by Clonazepam (11%).

T18 RISSC – ALPHABAY PERCENTAGES OF BDZS ON SALE IN COMPARISON TO PRESCRIPTION DRUGS AND BENZOS

BDZ	PRESCRIPTION DRUGS	BENZOS
	%	%
ALPRAZOLAM	36,6%	45%
LORAZEPAM	15,5%	6%
CLONAZEPAM	14%	11%
DIAZEPAM	13,5%	22%
TEMAZEPAM	12%	2,40%
ETIZOLAM	5,5%	6%
MIDAZOLAM	1,5%	0,40%
NITRAZEPAM	0,7%	1,40%
OXAZEPAM	0,7%	0,5%

25 RISSC – ALPHABAY PRESCRIPTION DRUGS/BDZ



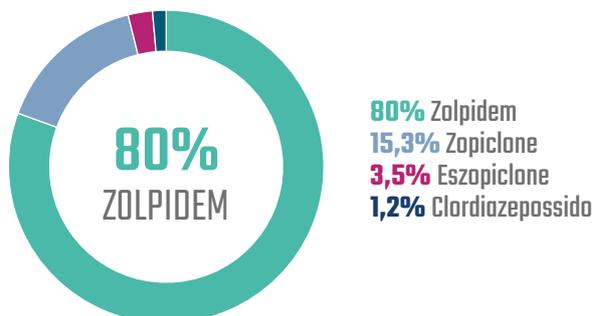
Alongside the BDZs are other non-structurally related compounds also found in the benzos category as part of sedative-hypnotics in the prescription drug section of AlphaBay. In particular, there is Zopiclone, Zolpidem, Eszopiclone and Clordiazepoxide.

These act with the same mechanism as BDZs. The induced and sought after effects are sedation, reduction of cognitive and psychomotor skills, hypnosis, muscle relaxant and anticonvulsant. Barbiturates were also found - such as Gardenale - whose active ingredient is Phenobarbital. This drug is used as antiepileptic, for the treatment of tonic-clonic crisis and, more generally, for any type of convulsion.

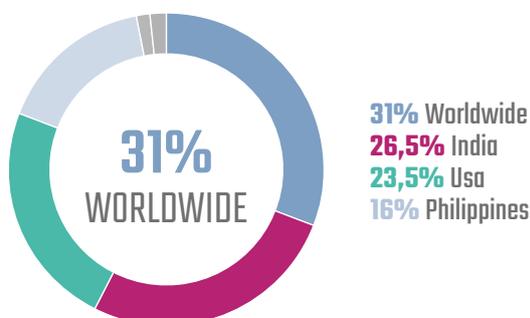
In the case of Eszopiclone however, all the offers use the generic label "worldwide", so it is not possible to track their country of origin. Zolpidem, however, comes mainly from Asia (India - 26.5%, and the Philippines, 16%), but also from the United States (23.5%). In the majority of cases however (33%), offers do not indicate the country of origin.

Zopiclone, however, seems to come largely from India (77%), although interestingly there is a minority presence of references from the UK (8%), the only European country.

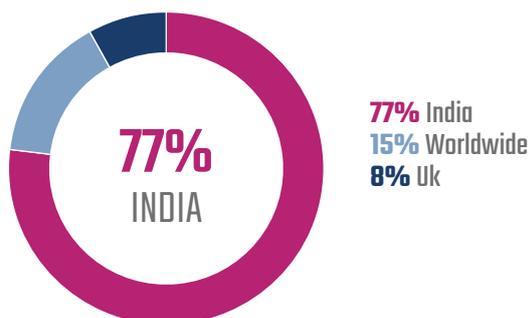
26. RISSC – ALPHABAY PRESCRIPTION DRUGS/NON-BDZ



27. RISSC – ALPHABAY PRESCRIPTION DRUGS/ZOLPIDEM



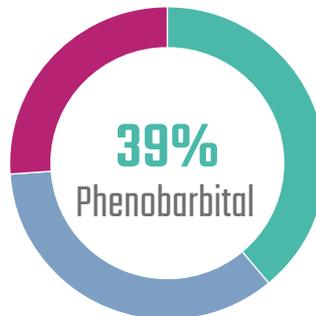
28. RISSC – ALPHABAY PRESCRIPTION DRUGS/ZOPICLONE



6. ANTIEPILEPTICS

In the context of drugs related to antiepileptics, the deals are focused on three main products: Phenobarbital (39%), Pregabalin (35%) and Gabapentin (26%). Phenobarbital is an antiepileptic useful for the treatment of partial seizures and generalized tonic-clonic crisis. It is used for any kind of difficult to treat convulsions. Their action is the same as the BDZs. Gabapentin and Pregabalin are both used for the treatment of partial and generalized epilepsy with tonic-clonic crisis. In the case of anti-epileptics, the United States appears to be the main country of dispatch.

29. RISSC – ALPHABAY PRESCRIPTION DRUGS/ANTIEPILEPTICS

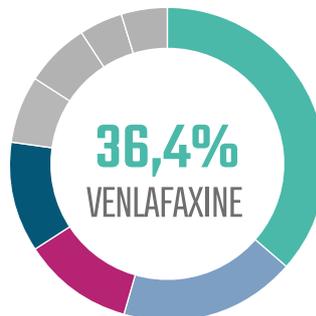


39% Phenobarbital
35% Pregabalin
26% Gabapentin

7. ANTIDEPRESSANTS

As part of the antidepressant category, the substances present in the active offers on AlphaBay are Venlafaxine (36,40% - known under the trade names Efexor, Faxine, Zarelis) and Mirtazapine (18,20% - Remeron). Also significant are the presence of Sertraline (11,40%) and Escitalopram (11.40%).

30. RISSC – ALPHABAY PRESCRIPTION DRUGS/ANTIDEPRESSANTS



36,4% Venlafaxine
18,2% Mirtazapine
11,4% Sertraline
11,4% Escitalopram
6,8% Fluoxetine
6,8% Paroxetine
4,5% Trazodone
4,5% Bupropione

FINAL REMARKS

The results obtained from the analysis of the offers present in the drugs section of AlphaBay in the benzos and prescriptions drug categories respectively (14.5% of the drugs section), confirm that the cryptomarkets operate a wide prescription drugs market. Overall, the types of available substances and products are diverse; among them, benzodiazepines should be considered as the key substances on the market. This because there is a dedicated section created to facilitate and speed up the supply and demand of these substances and because it is also possible to find the same drugs within the separate prescription drugs category.

The benzos category was found to contain mainly Alprazolam, Diazepam and Clonazepam (which together account for 78% of the total offers), but also Etizolam, Lorazepam, NPS (Flubromazepam, Diclazepam, Deschloroetilazolam, Pyrazolam - about 3.5 % of the tender), Temazepam, Nitrazepam, Bromazepam, Flunitrazepam, Oxazepam, Midazolam and Brotizolam. Next to the benzodiazepines, there are also: opioid analgesics; a dissociative anaesthetic (ketamine); a local anaesthetic (Benzocaine); HIV (Nevimune, Tenofovir Disoproxil Fumarate-Tenvir, Lamivir, Efavir); antibiotics (Doxycycline); an anticancer (Capecitabine); antidepressants (Trazodone, Escitalopram); medicines for headaches (Sumatriptan); antipsychotics (Tisercin) and drugs for erectile dysfunction (Viagra and Cialis).

From a pharmacological perspective, benzodiazepines are unwieldy molecules, which require a certain degree of expertise in their handling, because if consumed together with other medicines or drugs, their consumption can lead to overdose and/or fatality. The specific characteristics of these substances suggest that vendors are selling to a specific audience and possibly to experts with at least some basic knowledge of the substances. It is conceivable that sales are

aimed at a particular figure or type or person such as a 'user-dealer', who in turn will resell the products that they use in specific contexts.

The composition of the offers concerning BDZs differ depending on the sale category:

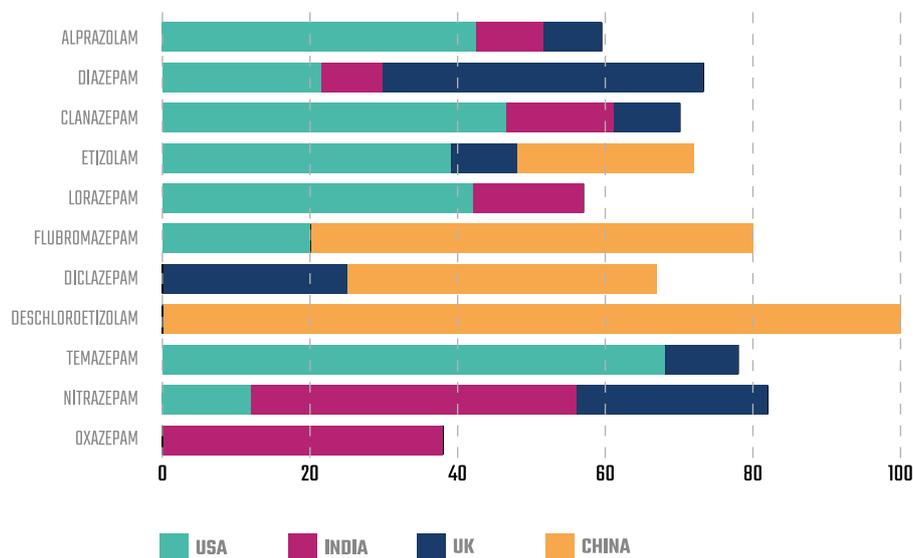
- In the benzos section, the vast majority of offers are particularly focused on two substances: Alprazolam (45%) and Diazepam (22%), followed to a lesser extent by Clonazepam (11%). The predominance of these BDZs might be because the relevant medicinal products, respectively, Xanax and Valium (often cited in the text of the offer), are well known and widely prescribed drugs;
- In the prescriptions drug section however, offers confirm the prevalence of Alprazolam (37%), but there is a fairly even distribution between the substances Lorazepam (15.50%), Clonazepam (14%), Diazepam (13.50%) and Temazepam (12%).

By following the routes traced by the given country of dispatch (the data indicating the country of dispatch as well as that entered by the vendor is taken into account), we can see certain elements of particular interest:

- Some countries seem to have a monopoly over the sale of certain substances, particularly substances with a limited availability of offers:
 - + China - Deschloroetilazolam (NPS - 3.5% of the total category BDZ offers)
 - + The Netherlands - Pyrazolam (NPS - 3.5% of the total category BDZ offers)
 - + Sweden - Flunitrazepam (0.60% total BDZ offers)
 - + Serbia - Brotizolam (0.20% total BDZ offers)
- The new generations of substances, similar to NPS, come almost exclusively from China, the Netherlands and the UK. China has the predominant role, and is followed by the Netherlands.

- The main shipping routes of these substances and products in the benzos category seem to go through a limited number of countries, such as the USA, India, China and the UK. The use of the generic label “worldwide” is quite limited, with no special exceptions with respect to the type of substance.
- Looking at the main shipping routes, it is possible to identify a closer correlation between some countries and some substances. In particular:
 - + The United States - Alprazolam, Clonazepam, Etizolam, Lorazepam, Temazepam
 - + The UK – Diazepam
 - + China - Flubromazepam, Diclazepam
- The role of India is interesting because, with the exception of Nitrazepam and Oxazepam (which only represent 1.40% and 0.50% of the offers), it seems to play a mainly secondary role to the United States. Presumably then, there is a kind of India-US axis, where the latter seems to be a hub for offers which actually originate from India.

31. RISSC – BDZ/DISPATCH COUNTRIES AND SUBSTANCES



The fact that in of part the benzos category there are also other types of drugs (e.g. anti-HIV drugs, opioid painkillers, antibiotics...) can be justified considering the specific types of products and substances. Altogether, these are medicinal solutions often used for the treatment of sexually transmitted infections, offered simultaneously with drugs for erectile dysfunction. It seems likely, therefore, that these offers are requested for the specific needs of dealers/users who can sell/use these products within the gay community or to chem-sexers (people who use drugs as part of group sex, often promiscuous).

In the prescription drug section, the offer is concentrated around a few specific types of drugs, such as those for erectile dysfunction (29%), amphetamines (23%), opioids (20%) and sedative-hypnotic drugs (19%).

From the analysis of the tenders, it emerges that around this category there is a sort of grey area from which it is difficult to clearly grasp the kind of need that is addressed. In fact, the substances and the products available can be either from the so-called performance drugs category (lifestyle drugs – e.g. for sexual performance, fast weight loss, doping ...) or the recreational category, but also in prescription drugs category. The discriminating element seems to be, therefore, the type of use or abuse that is intended at the time of consumption.

Are there any possible combination of drugs that seem to target specific types of users, who are aware of the substances they are buying? The sedative-hypnotic drugs for example are generally associated with opioids because they reduce the effects of the withdrawal symptoms or alleviate the potential side effects. Another combinations may involve amphetamines or opioids used with antidepressants or antipsychotics. During the “down” phase when the desired effect has worn off, the user can experience psychosis or depression. The use of a second substance at this point could be part of a possible framework of self-medication by addicts.

It is possible to assume, therefore, that the supply of drugs on AlphaBay is aimed at experienced users who focus on products able to maintain their substance dependencies.

Into this framework, we can not only add drugs normally prescribed for addiction such as Methadone or Suboxone, which reinforce the hypothesis that the purchasers are individuals with relevant dependencies, but also drugs for erectile dysfunction. It is known, in fact, that the abuse of amphetamines or opioid substances leads to serious sexual disorders. It is possible, therefore, that a percentage the sale of drugs for erectile dysfunction are due to requests from not only people suffering from disease, but also from addicts whose dependency has led to this side effect.

With respect to the geographic routes that emerge from the study of the countries of dispatch, as seen before with the axis of the United States and India, there also appears a new European route in which Germany and in the UK are the leading countries.

Then there are specific national contexts that become significant depending on the specific product/substance type (e.g. Methylphenidate - Austria; Oxycodone - Netherlands).

An important element to be considered, and interesting when compared to the category BDZ, is the much more frequent use of the label “worldwide” in this category, which is seen in 21% of the total offers. Besides the desire for anonymity, it is plausible that sellers do not want to associate the offer to a specific country by creating a correlation that could influence possible buyers.

Shipping routes appear tied to the individual types of substance / product:

EDM (29% of total deals in prescriptions) - United States, Germany, India

Amphetamines (23% of total deals in prescriptions)

Main products:

- + Modafinil and armodafinil: India (respectively 34% and 36% of tenders)
- + Adderall: United States (53%)
- + Methylphenidate: Netherlands (25%), Germany (15%), Austria (12%)

Opioids (20% of total deals in prescriptions)

Main products:

- + Tramadol (32.5%) - (worldwide - 36%), India (25%), US (14%)
- + Oxycodone (18.5%) - US (59%), the Netherlands (19%), Canada (15%)
- + Codeine (17,30%) - (worldwide - 50%), India (30%), UK (17%)
- + Tapentadol (12%) - (worldwide - 24%), India (62%)

Sedative-hypnotics (19% of total deals in prescription drugs) Main products:

- + Zolpidem - (worldwide - 31%), India (26.50%), US (23.50%), Philippines (16%)
- + Zopiclone - India (77%)

As regards to the prices of products available in AlphaBay, an analysis of tenders relating to Xanax has shown that for the same product and dosage, the cost of purchasing via cryptomarkets is economically disadvantageous for the buyer, since the price can be two or even three times the price charged by pharmacies. It can be deduced that, the chance of avoiding the need for a prescription, the ability to make the purchase online and have delivery to your location, along with anonymity, are all part of the price paid by the user.

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