

DRUGS AND THE INTERNET

Issue 4, March 2015

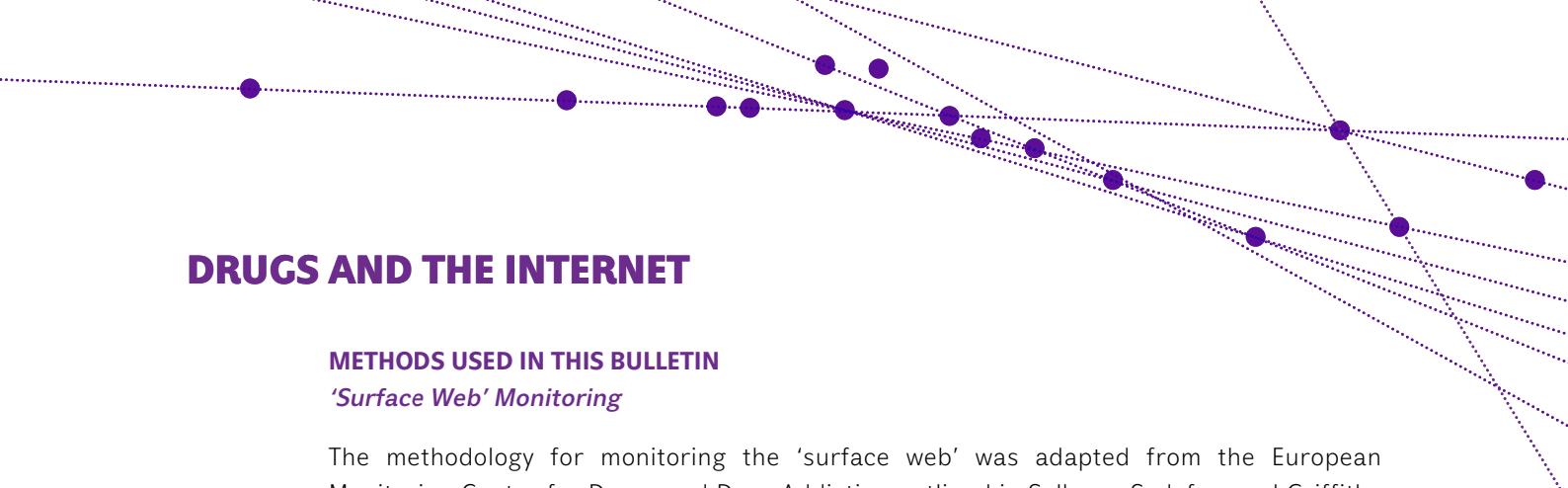
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To date the availability of illicit drugs in Australia has largely been examined through household surveys and interviews with people who use drugs; indicators such as drug seizures and arrests; and analyses of hospital admissions and drug-related deaths. However, over the past decade the Internet has developed as an additional source of information for discussion about and purchase of drugs (Walsh, 2011). In particular, the advent of the Silk Road in 2011 as an online marketplace, broadened out the availability of new psychoactive substances (NPS) and other more conventional illicit substances (such as cannabis and MDMA). After the closure of the Silk Road in October 2013, multiple new marketplaces emerged to take its place (Van Buskirk, Roxburgh, Farrell, & Burns, 2014a). Most recently the closure of Silk Road 2.0 and a large international law enforcement operation in November 2014 (dubbed Operation Onymous) have seen major changes in remaining dark web marketplaces.

This bulletin is the fourth in a series by the Drug Trends Unit that provides analysis of trends over time in the availability and type of substances sold via the internet to Australia. The current bulletin reports for the time period July 2014 to December 2014.

Key findings

- **Two large marketplaces** remain in the wake of Operation Onymous: Agora and Evolution, with many of the other, smaller marketplaces seeing an increase in retailer numbers following the operation.
- **Cannabis and pharmaceuticals** continued to be the most commonly sold substances across all marketplaces, followed by MDMA (3,4-methylenedioxy-N-methylamphetamine), cocaine and NPS, with slight variations in rank across marketplaces.
- **Twenty three marketplaces** were actively monitored over the period, eleven of which were first identified during the current monitoring period.
- By the final data point in this bulletin **twelve marketplaces had been closed**, either as a result of Operation Onymous, scams, or other reasons, reinforcing the volatility of these marketplaces.



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METHODS USED IN THIS BULLETIN

'Surface Web' Monitoring

The methodology for monitoring the 'surface web' was adapted from the European Monitoring Centre for Drugs and Drug Addiction outlined in Solberg, Sedefov, and Griffiths (2011). 'Surface web' sites are those that are registered with search engines, and hence can be identified using tools such as Google web searches. Retailers were located by using a generic list of search terms (e.g. "herbal highs", "research chemicals", "legal ecstasy", etc.) on the Zoo search engine (<http://www.zoo.com/>).

Expanding on the above methodology employed in previous bulletins, online forums discussing NPS use were also monitored for mention of surface web retailers that offered NPS for sale.

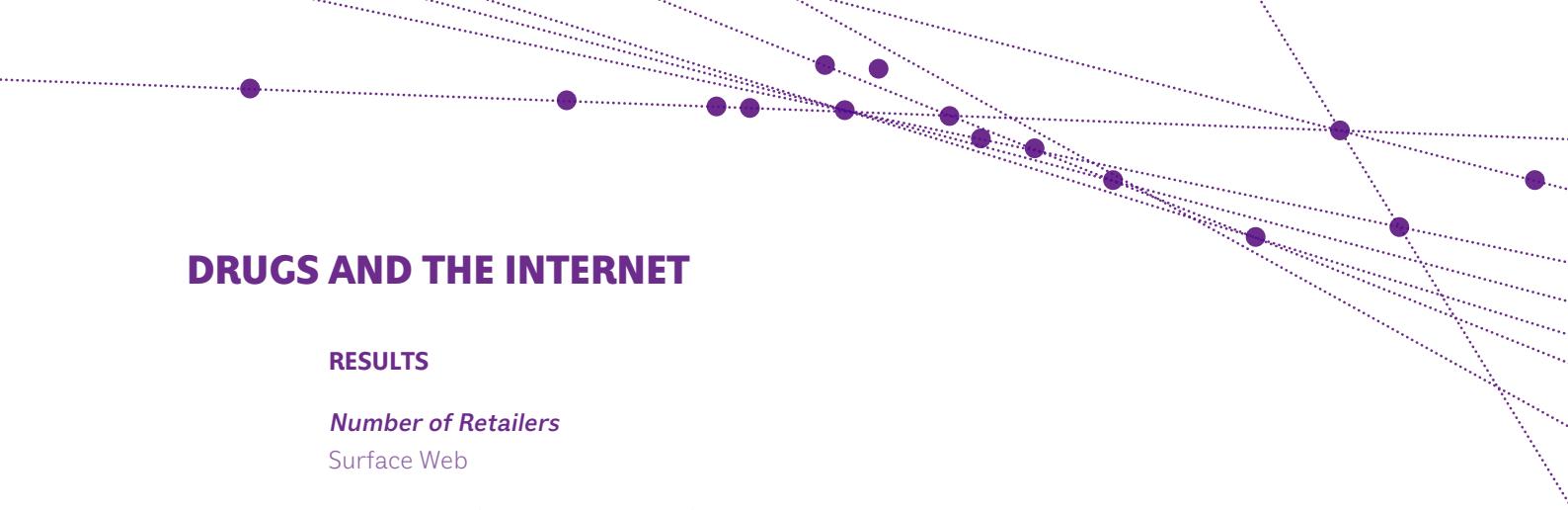
Once retailers were identified, availability of selling and shipping to Australia was confirmed and the substances on offer were recorded. Searches were conducted monthly from July 2014 to December 2014, between the 15th and the 25th of each month. Searches were ceased once saturation point was determined, i.e. when no new retailers were returned within the first 100 search results for each search term. Retailers identified in previous searches were revisited and current activity confirmed, including current availability of substances for sale.

Dark Web Marketplace ('Dark Web') Monitoring

Dark web marketplaces were accessed weekly using a dedicated domestic user account. Available substances are placed in nine categories – cannabis, dissociatives, ecstasy, opioids, precursors, prescription, psychedelics, stimulants and 'other'. Each of these categories is then divided into various subcategories including natural and synthetic substances within the broader class, e.g. LSD, magic mushrooms, and various NPS families under the 'psychedelics' category. See Appendix A for a detailed description of the categories and subcategories of substances available on dark web marketplaces.

Substances sold on these marketplaces are available both from domestic retailers within Australia and international retailers. An Australian retailer is defined as those retailers who list their country of origin as Australia. An international retailer is defined as a retailer with a country of origin either not within Australia or 'undisclosed'. The total number of listings of each available substance under each subcategory was recorded as well as the number of unique retailers selling each substance. A retailer was considered 'active' on the market if there was an identified listing available from that retailer at the monitored time point. To monitor trends each retailer was assigned a unique code based on the time point in which they were first identified.

Marketplaces were excluded from monitoring if they had less than one hundred listings for sale, or only one retailer operating on the marketplace. Marketplaces that were language and country specific were also excluded as many did not ship to Australia.



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RESULTS

Number of Retailers

Surface Web

The number of retailers on the surface web selling to Australia appeared to increase over the current monitoring period, from 67 retailers in July 2014 to 78 in December 2014. This, however, may be due to an expansion of the monitoring methodology (adding web forum mentions to the traditional search engine approach) rather than a true increase in the number of retailers operating on the surface web. It appears likely that the dark web is the preferred source for NPS for consumers due to the higher number of traders operating on the dark net as opposed to the surface web. In addition, the dark web is less likely to be influenced by country-specific changes in legislation making certain substances illegal.

Table 1 : 1 Number of unique Retailers Operating on the Surface Web by Time Point.

Month	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14
Number of surface web retailers	67	66	70	80	82	78

Dark Web Marketplaces

Escrow Systems

Although the Dark Web marketplaces identified in this bulletin sold largely comparable products in terms of illicit substances and NPS, many offered additional products such as erotica, hacking tools, drug paraphernalia and occasionally firearms. In addition, these marketplaces varied in transaction processes, with around half operating on a multi-signature escrow system, and half operating on a centralised escrow system. Escrow is the process of holding funds for a transaction until that transaction is completed and the product delivered, at which point the funds are released (Christin, 2012). In a centralised escrow system, funds are released when the buyer indicates that the product was received, with funds being stored in the marketplace itself. Therefore, if a marketplace's security is compromised, so too are the funds held in escrow. With multi-signature escrow, multiple signatures (encrypted 'keys' used to access funds) are required to release the funds. Two out of three participants in the sale (i.e. the buyer, the seller and the marketplace) must provide their specific keys for the funds to be released. This means that even when a marketplace's security is compromised, funds may still not be released without the approval of two of the three involved parties.

Operation Onymous

From the 5th to the 6th of October (the 7th of October in Australia), an extensive, international law enforcement operation was undertaken seizing websites operating on the dark web (Greenberg, 2014b). Though not all targets were dark web marketplaces, six of the marketplaces actively monitored as part of the current project were seized and subsequently closed (**Table 2**). Many

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additional marketplaces and services on the dark web were seized. The monitored marketplaces, their current status, and their transaction process are outlined in **Table 2**.

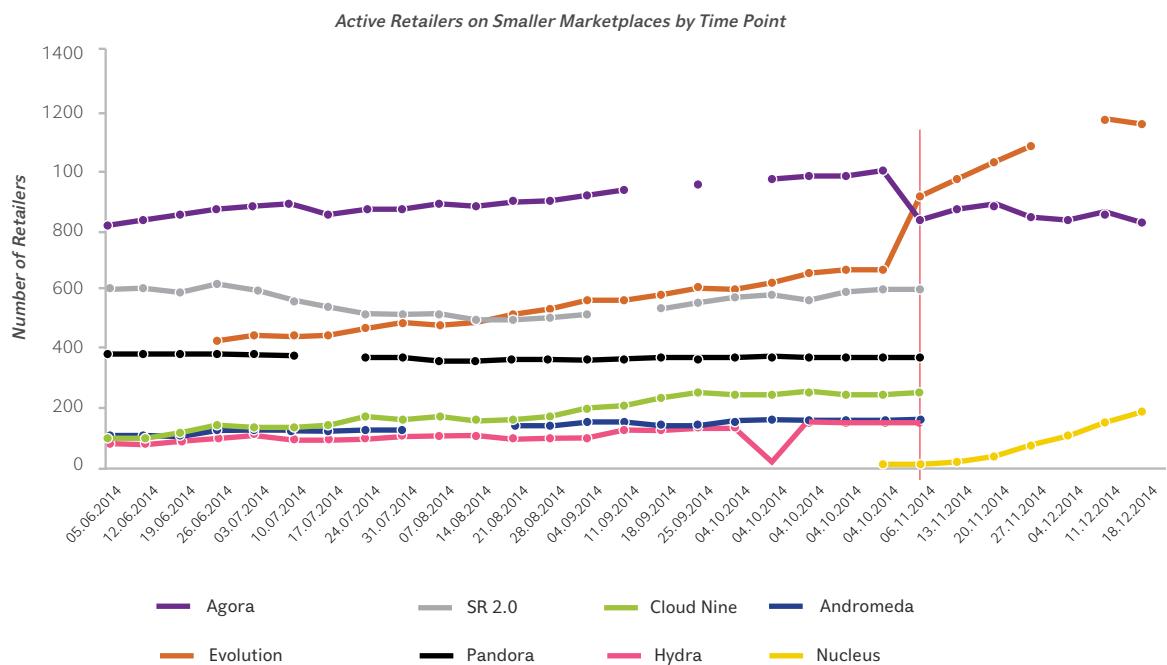
Table 2: Classification and Status of Marketplaces Active during Monitoring Period.

Marketplace	Escrow System	First monitored	Last Monitored	Current Status
<i>Active at Final Time Point</i>				
Agora	Centralised	30/01/2014	Ongoing	Active
Evolution	Multisignature	27/02/2014	Ongoing	Active
Middle Earth	Centralised	7/03/2014	Ongoing	Active
Blackbank	Multisignature	20/03/2014	Ongoing	Active
Outlaw	Centralised	29/05/2014	Ongoing	Active
Area51	Centralised	23/10/2014	Ongoing	Active
Nucleus	Centralised	30/10/2014	Ongoing	Active
Silkkite	Centralised	30/10/2014	Ongoing	Active
Dream Market	Centralised	30/10/2014	Ongoing	Active
Panacea	Multisignature	6/11/2014	Ongoing	Active
System D	Centralised	13/11/2014	Ongoing	Active
<i>Closed During Monitoring Period</i>				
Silk Road 2.0	Centralised	7/11/2013	6/11/2014	Seized during Operation Onymous
Pandora	Centralised	5/12/2013	6/11/2014	Seized during Operation Onymous
The Marketplace	Multisignature	20/03/2014	6/11/2014	Down for unknown reason
The Pirate Marketplace	Multisignature	20/03/2014	18/09/2014	Left with customers' Bitcoins
Cloud Nine	Multisignature	4/04/2014	6/11/2014	Seized during Operation Onymous
TOR Bazaar	Multisignature	17/04/2014	23/10/2014	Down for unknown reason
Hydra	Multisignature	17/04/2014	6/11/2014	Seized during Operation Onymous
Andromeda	Centralised	8/05/2014	13/11/2014	Seized during Operation Onymous
1776	Multisignature	29/05/2014	25/09/2014	Down for unknown reason
Alpaca	Multisignature	10/07/2014	6/11/2014	Seized during Operation Onymous
TOM	Multisignature	28/08/2014	18/12/2014	Left with customers' Bitcoins
Diabolus	Centralised	30/10/2014	18/12/2014	Suspected scam site

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The total number of retailers on each marketplace at each time point for all monitored marketplaces is shown in **Figure 1** and **Figure 2**.

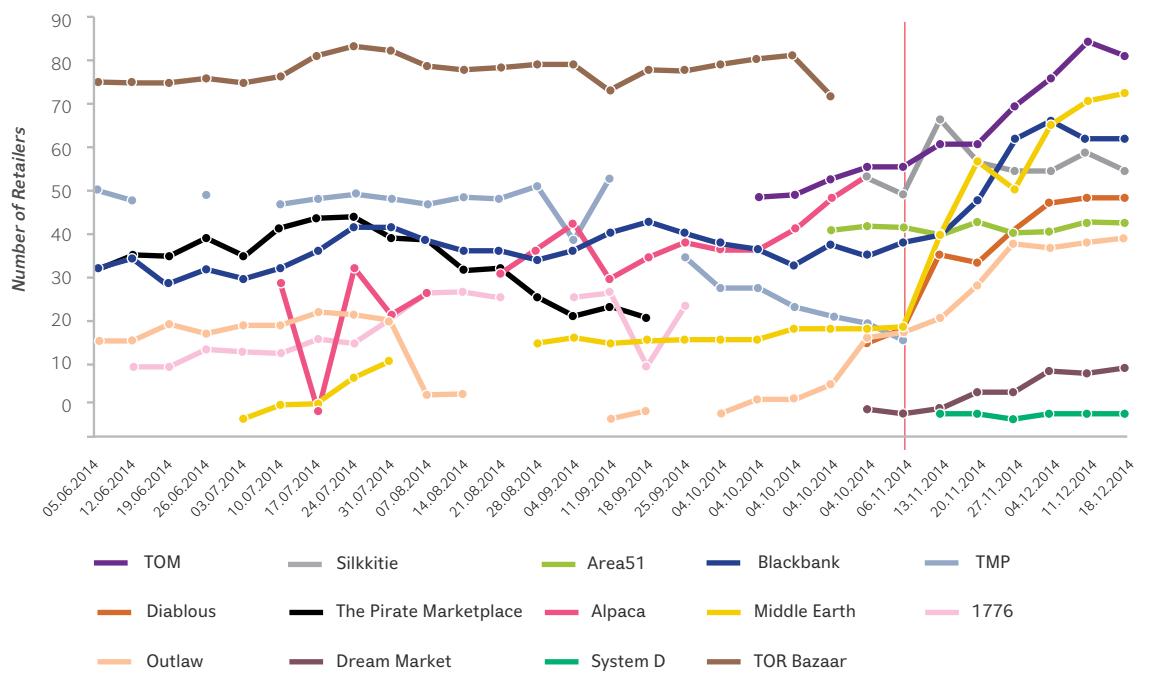
Figure 1: Number of retailers across the largest eight marketplaces by time point.



NB: missing data points indicate temporary marketplace outages or, in certain cases, problems with data collection rendering the data unusable. Empty markers indicate permanent closure of marketplace.

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Figure 2: Number of retailers across smaller marketplaces by time point.



NB: missing data points indicate temporary marketplace outages or, in certain cases, problems with data collection rendering the data unusable. Empty markers indicate permanent closure of marketplace.

Over the current monitoring period, eleven new marketplaces were identified and actively monitored, totalling 23 marketplaces over the monitoring period. Of these, 12 were closed over the same time period, six due to Operation Onymous, three for unknown reasons, two due to suspected scams from the sites' owners, and one being officially closed by the site's owner. It would seem that the proliferation of new marketplaces seen in the previous bulletin has continued (Van Buskirk, Roxburgh, Bruno and Burns, 2014b) though many of these marketplaces have short lifetimes. At the end of the monitoring period, the two main marketplaces remaining were Evolution and Agora, operating at 1154 retailers and 836 retailers, respectively. All smaller marketplaces saw an increase in retailer numbers following Operation Onymous, to varying degrees. Nucleus, especially, saw an accelerated increase in retailers from very few (n=4) on 30 October 2014 (just before Operation Onymous) to almost 200 in December 2014 (Figure 2). It seems likely that this increase is due to retailers dispersing from the marketplaces that were closed to alternative marketplaces, rather than an influx of new retailers on those marketplaces. Overall the total number of unique retailers across all marketplaces appears to have decreased following Operation Onymous, however, the increase in retailers on smaller marketplaces reinforces the need for ongoing monitoring.

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Substances for Sale

Total Substances Available

Table 3 outlines the substances available from the top eight marketplaces by origin (international or Australian) ranked by the number of unique international retailers identified selling each substance. Consistent with previous findings (Van Buskirk, Roxburgh, Bruno and Burns, 2014b), the top three available substances sold by international marketplaces were cannabis, pharmaceuticals and MDMA. This was followed by cocaine, NPS and methamphetamine. Among Australian retailers, MDMA, Cannabis, methamphetamine and pharmaceuticals were the top substances sold. This bulletin only includes data from the largest five marketplaces. Consistent with previous findings, the ranking of individual substances did not vary greatly across all marketplaces, especially among smaller marketplaces, and so it may be assumed the rankings on excluded marketplaces are similar to those seen on included marketplaces. For data on availability across the excluded marketplaces, please contact the lead author.

Table 3: Total number of retailers on the top five marketplaces with numbers and proportions of Australian retailers indicated, in order of unique retailer count by substance type

Substance	Agora			Evolution			SR2.0*			Pandora*			Cloud Nine*		
	I	A	%	I	A	%	I	A	%	I	A	%	I	A	%
Cannabis	841	68	7%	797	48	6%	372	35	9%	177	10	5%	278	18	6%
Pharmaceuticals	644	79	11%	676	53	7%	353	39	10%	176	5	3%	276	14	5%
MDMA	485	92	16%	434	57	12%	295	62	17%	115	10	8%	151	12	7%
Cocaine	377	50	12%	332	36	10%	193	30	13%	114	7	6%	109	5	4%
NPS	342	40	10%	374	37	9%	210	27	11%	72	8	10%	99	12	11%
Methamphetamine	320	74	19%	276	65	19%	169	52	24%	112	14	11%	132	14	10%
Illicit Opioids	182	22	11%	239	18	7%	86	11	11%	62	2	3%	64	2	3%
LSD	174	12	6%	187	9	5%	118	15	11%	51	4	7%	51	4	7%
Magic Mushrooms	104	14	12%	96	10	9%	49	5	9%	17	0	0%	44	2	4%
Ketamine	72	11	13%	58	6	9%	49	7	13%	22	1	4%	20	0	0%
PIEDs	63	26	29%	74	15	17%	38	26	41%	12	3	20%	7	4	36%
Synthetic Cannabinoids	46	2	4%	26	4	13%	23	4	15%	3	0	0%	9	1	10%
GHB	38	6	14%	40	1	2%	23	3	12%	12	0	0%	11	0	0%
Weight Loss	35	5	13%	23	3	12%	0	0	0%	0	0	0%	11	4	27%
Precursors	6	4	40%	5	0	0%	14	7	33%	0	0	0%	5	2	29%
Caffeine	4	0	0%	0	0	0%	3	0	0%	1	0	0%	1	0	0%
Tobacco	2	0	0%	23	2	8%	10	1	9%	4	0	0%	6	0	0%
Total Unique	1565	249	14%	1801	165	8%	894	151	14%	376	35	9%	697	57	8%

NB: I = International country of origin; A = Australian origin; NPS = New Psychoactive Substances; PIEDs = Performance and Image Enhancing Drugs; Asterisks denote marketplaces that were closed during the monitoring period. Percentages listed reflect the proportion of Australian retailers selling each substance class as a percentage of total retailers selling that substance. As retailers often sell multiple substance classes, percentages do not add up to 100%. For a further clarification of the categories used in the above table, please see Appendix A.

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NPS Available from All Retailers

Table 4 details the ten most commonly sold NPS on the top five marketplaces (ranked by unique retailers selling NPS). The categories of 2C-x, NBOMe Family and 5-MeO Family (5-methoxy-substituted) were used for clarity as many of these drugs in these categories (e.g. 2C-B, 2C-I, 2C-E in the 2C-x category) are sold in the same form, and are advertised as having similar effects. Synthetic Cannabinoids were collapsed into one category given the large number of variations of these that exist (Ammann, McLaren, Gerostamoulos, & Beyer, 2012). Additionally, synthetic cannabinoids were often sold as blends, consisting of different combinations of many chemicals, making classification more complex. Although forum discussions appear to reveal preferences among users for a number of specific substances, collapsing synthetic cannabinoids provides the most accurate estimation of their popularity on these marketplaces

Consistent with previous findings, drugs from the 2C-x and NBOMe and DMT categories were the most commonly sold, with slight variations across marketplaces. It is interesting to note that mephedrone, which was not among the ten most commonly available NPS in the previous bulletin, has now returned to fifth most commonly sold. This may indicate either a renewed demand for mephedrone among NPS users, or an increased availability of the substance from retailers. Similarly, the stimulant -PVP has increased in availability, while substances from the 5-MeO Family, as well as the entactogen MDA, have declined in availability.

Table 4: Number of retailers from the top five marketplaces selling the ten most common NPS by average rank across all marketplaces.

Substance	Agora		Evolution		SR2.0*		Pandora*		Cloud Nine*	
	n	%	n	%	n	%	n	%	n	%
NBOMe	63	17%	72	18%	45	19%	12	15%	20	18%
2C-x	82	22%	63	16%	54	23%	12	15%	18	16%
DMT	75	20%	68	17%	39	16%	20	25%	22	19%
Methoxetamine	49	13%	39	10%	18	8%	5	6%	11	10%
Mephedrone	38	10%	35	9%	32	13%	5	6%	6	5%
Methylone	27	7%	50	13%	36	15%	9	11%	9	8%
Alpha -PVP	22	6%	25	6%	25	11%	7	9%	7	6%
Synthetic Cannabinoids	46	12%	39	10%	25	11%	3	4%	10	9%
Dox	30	8%	46	12%	8	3%	3	4%	6	5%
Ethylone	29	8%	27	7%	20	8%	4	5%	3	3%
Total Unique	372	21%	392	20%	238	23%	81	20%	114	15%

NB: Percentages indicate proportion of unique NPS retailers on the listed marketplace, while the final row percentage denotes proportion of all unique retailers on that marketplace. For further information on the substances and categories listed, please see Appendix A.

SUMMARY

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- The current monitoring period saw the greatest proliferation of new marketplaces to date, but also the greatest number of marketplace closures.
- In the wake of Operation Onymous, the two largest marketplaces that have continued operating are Agora and Evolution. Increasing numbers of unique retailers were recorded at each time point.
- Evolution appears to be the more trusted marketplace of these two, and saw a substantial increase in retailers following the operation.
- Almost all marketplaces that remained following Operation Onymous saw a spike in retailers after the operation took place, most notably Nucleus and Evolution.
- Substances sold across all marketplaces appeared to be consistent with previous findings in this series, with cannabis, pharmaceuticals and MDMA most commonly sold.
- The specific types of NPS sold across dark web marketplaces were largely consistent with those observed in earlier bulletins, though mephedrone and alpha-PVP appear to be increasing in availability, with MDA and the 5-MeO family declining.
- Consistent with previous findings, the most commonly available substances on these marketplaces are largely traditional illicit substances (cannabis and ecstasy) and pharmaceuticals, rather than NPS, reflecting findings from surveys on people who use drugs.

As in previous bulletins, it is not possible from these results to determine how often, and in what amounts, illicit and emerging substances are being purchased online in Australia. The 2014 EDRS report suggested low usage of the internet for purchasing drugs among existing ecstasy consumers. Only 7% of the sample had used the internet for their most recent drug purchase, preferring instead to purchase from friends and dealers (Sindicich & Burns, 2014). Consistent with this, published findings from the Global Drug Survey (GDS – an online survey of people who use drugs) also reported that 7% of Australians had purchased drugs on the Silk Road (Barratt, Ferris, & Winstock, 2014).

IMPLICATIONS

The effect of Operation Onymous on dark web marketplaces was tangible. In the wake of the operation, as with previous closures, consumers discussing the operation on related forums were concerned about their anonymity, those arrested, and the future of dark web marketplace trading as a whole. Currently only two large marketplaces now exist, Agora and Evolution, with Evolution appearing to be the preferred option among consumers. At the final monitored time point, these two marketplaces together had over three times as many unique retailers operating on them as all other active marketplaces combined.

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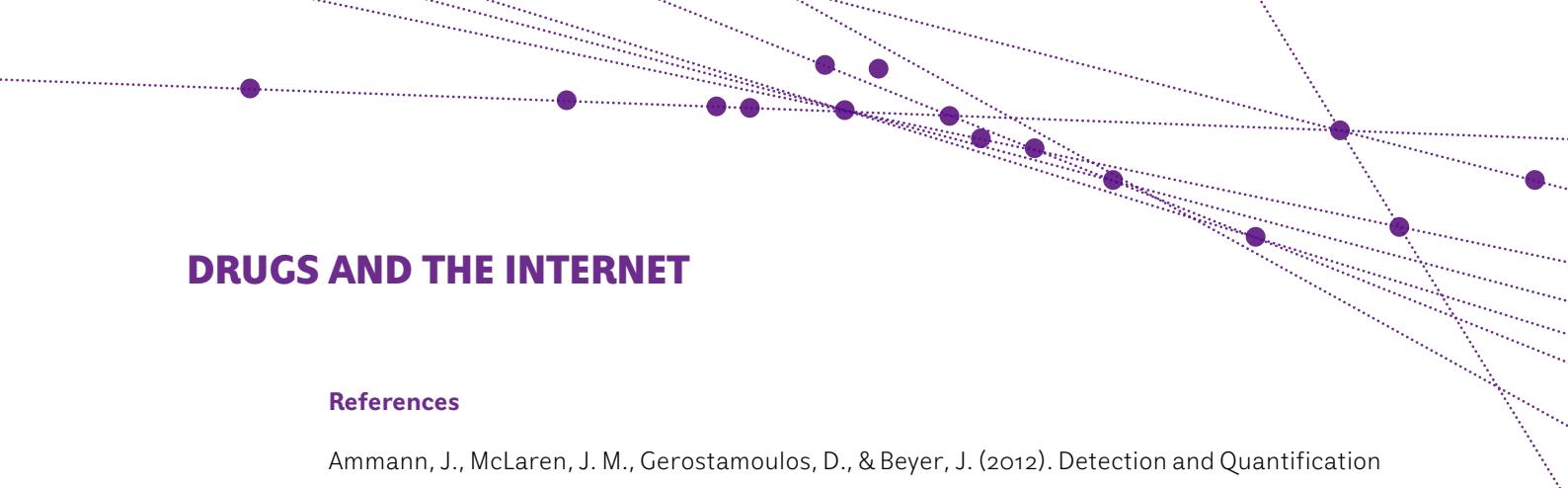
The multisignature escrow system offered on Evolution is likely to be the main reason for consumer preference, as this system limits the vulnerability of consumer funds being lost during scams or marketplaces closures. Additionally, Evolution has proven more reliable than Agora, with substantially more 'uptime' than Agora at the time of writing (97.16% versus 83.85%, respectively) (DNStats, 2014a, 2014b; Greenberg, 2014c). Future monitoring will reveal whether Evolution will continue to increase and maintain its dominance of the market, or whether fast growing, smaller marketplaces will challenge it.

It is likely that consumers on marketplaces seized during Operation Onymous that employed multisignature escrow systems were able to withdraw funds tied up in pending transactions. This would not have been the case on centralised escrow marketplaces, as law enforcement would have seized all funds. The continued usage of centralised escrow marketplaces appears to be due to their relative ease of use, with multisignature marketplaces requiring additional technical knowledge and software to use (Spotz, 2014). However, it is thought that as the technology develops, so too will the ease of use and popularity of multisignature escrow systems (Spotz, 2014). However, all marketplaces that continued operating after Operation Onymous, using both escrow systems, saw an increase in active retailers, indicating that interest and confidence in both systems has not diminished.

Over time, and predating Operation Onymous, there has been an increasing interest in the development of decentralised marketplaces, which operate without a moderator facilitating transactions, and allow for more direct contact between retailers and consumers. This removal of the 'middle man' appears to be the preferred way forward for dark web drug trading as it may be more resistant to seizures and closures, though its uptake is likely to be slow while potential security flaws are resolved (Greenberg, 2014a; Muadh, 2014). For example, with no moderator to act as a third party in multisignature escrow transactions, a third party arbitrator must be introduced. The trustworthiness of such an arbitrator must be established and assessed (Howell O'Neill, 2014), which will present new challenges for dark web traders. Though these marketplaces are still currently in development, future monitoring will aim to monitor decentralised marketplaces as they emerge, and how these marketplaces may influence the traditional dark web marketplaces already monitored.

Though there appeared to be an increase in surface web retailers over the monitoring period, it is likely that this was due to an expansion of the monitoring methodology to incorporate forum discussion of online marketplaces. Future monitoring will expand further on this methodology, to verify a webstore's validity via online forum discussion, and other sources, to assess whether that web store may be a scam.

Given the rapid rate at which dark web marketplaces appear and subsequently close, continued monitoring of these markets is critical. Future bulletins in this series will continue to provide timely and accurate updates on the state of dark web marketplaces and seek to assess their impact on traditional street marketplaces, as well as the impact of the Internet as a whole on illicit drug use in Australia. In addition to this, methodology will be developed to systematically monitor forum discussion to investigate the impacts of large scale law enforcement operations, as well as the availability and validity of harm reduction information provided on these platforms.



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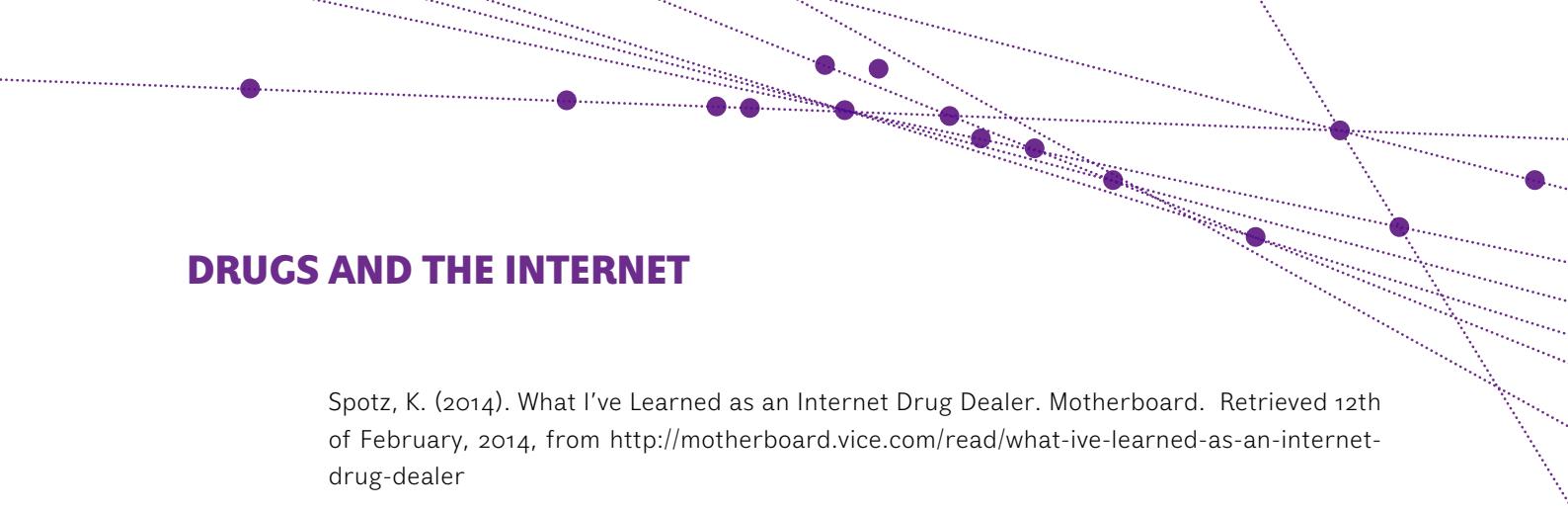
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Appendix A: Chemical classification of substances and explanation of categories used in this bulletin

NPS	Category	Subcategory
2C-x	Phenethylamine	Psychedelic
5-MeO Family	Tryptamine	Psychedelic
Alpha-PVP	Other Stimulant	Norepinephrine-Dopamine Reuptake Inhibitor
DMT	Tryptamine	Psychedelic
DOx	Phenethylamine	Psychedelic Amphetamine
Ethylone	Phenethylamine	Entactogen
Mephedrone	Phenethylamine	Amphetamine Type Stimulant
Methoxetamine	Dissociative	Arylcyclohexylamines
Methylone	Phenethylamine	Entactogen
NBOMe Family	Phenethylamine	Psychedelic

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Table 5: Glossary of categories and abbreviations used in bulletin

Category	Commonly Available Examples
2C-x	2C-B, 2C-E, 2C-I
5-MeO Family	5-MeO-DMT, 5-MeO-DiPT
Cannabis	Marijuana, hash, edibles (THC infused foods)
DOx	DOI, DOM, DOC
Illicit Opioids	Heroin, Opium
MDMA	MDMA powder, 'Ecstasy' pills
Methamphetamine	Powder (Speed), crystal (Ice)
NBOMe Family	25C-NBOMe, 25I-NBOMe, 25E-NBOMe
Pharmaceuticals	Pharmaceutical Opioids, Benzodiazepines, Sildenafil (Viagra)
PIEDs	Performance and Image Enhancing Drugs, eg. Clenbuterol, Nordicor, Biogen
Synthetic Cannabinoids	JWH Family, AM2201, UR144, AB-PINACA