

Trends in pharmaceutical stimulant use among a sample of people who regularly use ecstasy and/or other illicit stimulants in Perth, WA, 2007-2022

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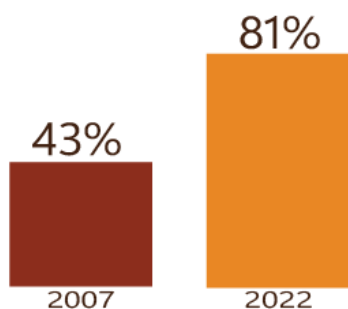
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Data was collected as part of the Ecstasy and Related Drugs Reporting System (EDRS). Annual interviews were conducted with people residing in Perth who used ecstasy and/or other illicit stimulants monthly or more frequently and were aged 18 or older.

Key Findings

Western Australia 



Past six-month non-prescribed pharmaceutical stimulant use almost doubled between 2007 (43%) and 2022 (81%).



Between 2007-2020, the frequency of non-prescribed pharmaceutical stimulant use remained stable (i.e., approx. monthly), but increased in 2021 and 2022 to a median of 10 days in the past six months.



Typical quantities of non-prescribed pharmaceutical stimulants used per session remained relatively stable between 2007-2022 at 2 pills, while maximum quantities have fluctuated between 3-6 pills.



Dexamphetamine has been the most commonly used form of non-prescribed pharmaceutical stimulant since 2015, although reported use of lisdexamphetamine doubled between 2021 and 2022.



In 2022, one-third (32%) of participants (who had used ANY non-prescribed pharmaceutical stimulant in the past 6 months), reported 'snorting' as a route of administration.

Introduction



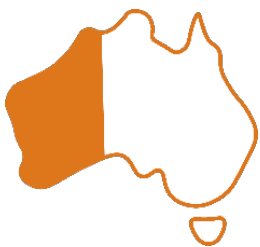
Non-prescribed use of pharmaceutical stimulants (e.g., methylphenidate; Ritalin and dexamphetamine) for cognitive enhancement, physical enhancement and recreation is a growing concern in Australia and internationally (e.g. 1, 2, 3). Although considered relatively safe when used as prescribed for attention-deficit/hyperactivity syndrome (ADHD), non-medical use is associated with a variety of short and long-term health risks (e.g. 4, 5, 6). For example, excessive doses are associated with adverse cardiovascular and psychiatric outcomes.

Over the past decade, new formulations of ADHD medications have been engineered to help combat non-medical use. This has led to a diversification in the types of pharmaceutical stimulants prescribed and diverted into the illicit market. For example, in Australia, lisdexamphetamine (branded Vyvanse) – a slower release prodrug (i.e., a pharmacologically inactive medication that is metabolized into a pharmacologically active drug *after* intake) – was approved by the Therapeutic Goods Administration (TGA) in 2013, added to the Pharmaceutical Benefits Scheme (PBS) for adults in 2021 (6), and is increasingly prescribed (e.g., 20mg prescriptions reportedly increased 2300% between 2019-20 and 2020-21) (7). However, it is unclear to what extent consumers are aware of the differing pharmacokinetics of newer formulations and potential risks associated with intranasal use (i.e., snorting). For example, snorting lisdexamphetamine will not result in a more rapid or intense onset of effects (as occurs with active forms) because it requires absorption by the gastrointestinal (GI) tract (8), which may encourage premature redosing if unaware. Moreover, snorting any form is associated with physical harms (e.g., nasal/sinus damage) and snorting also heightens the risks associated with active forms of pharmaceutical stimulants (e.g., cardiovascular, psychiatric and reinforcing effects) due to a faster onset of action and higher bioavailability (1, 9, 10).

Thus, the aim of this bulletin is to investigate trends in non-prescribed pharmaceutical stimulant use, including forms used and routes of administration, among sentinel samples of people who regularly use ecstasy and/or other illicit stimulants in Perth between 2007-2022.

Methods

Data was collected as part of the Ecstasy and Related Drugs Reporting System (EDRS). Annual interviews were conducted with people residing in capital city areas of Australia who used ecstasy and/or other illicit stimulants on a monthly or more frequent basis and were aged 18 or older.

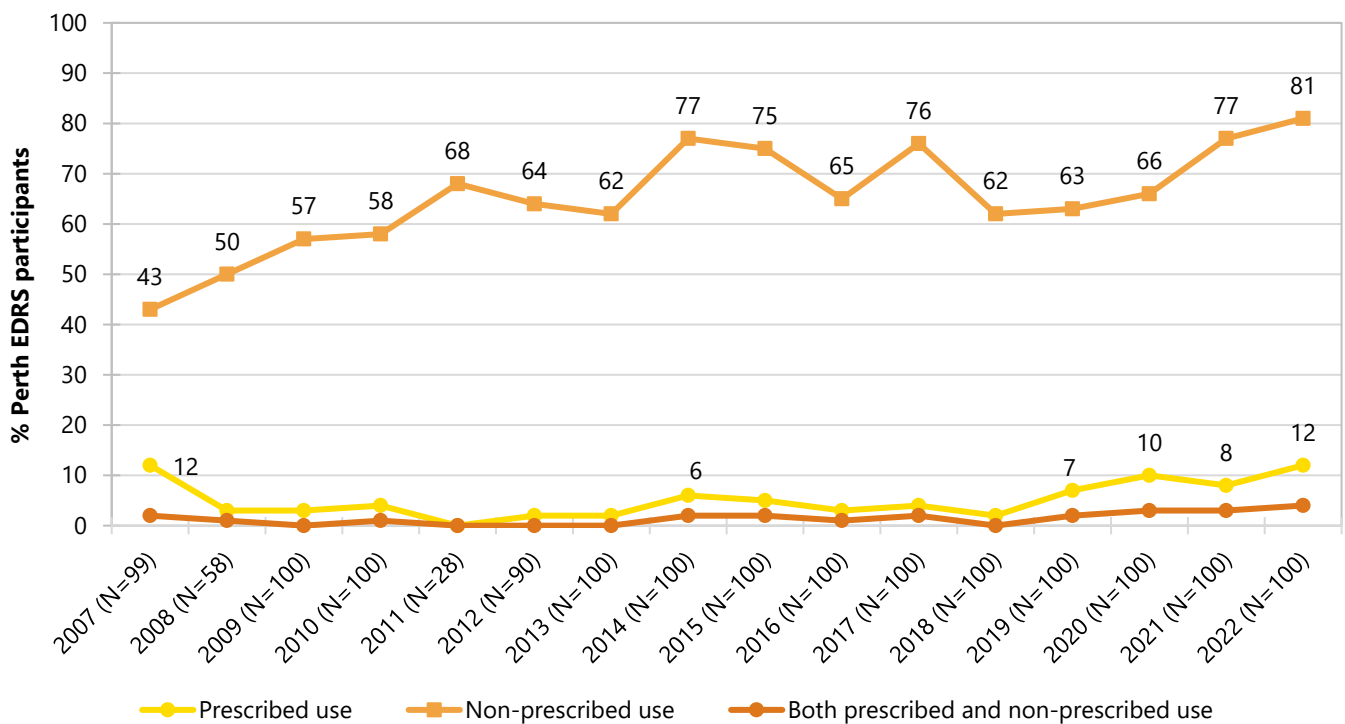


The data obtained from the Perth EDRS sample consisted of 1475 interviews (n=~100 per year), collected between 2007 and 2022. These interviews were conducted predominately via face-to-face surveys as well as telephone surveys where COVID-19 restrictions applied. Please refer to the [EDRS Background and Methods](#) document for further details. Since 2007, data on recent (past 6 month) use of prescribed and non-prescribed pharmaceutical stimulant use has been collected, including frequency of recent use, quantity used per session (typical and maximum; since 2013), routes of administration (e.g., snorting and swallowing) and the form/s used (since 2015).

Descriptive statistics were used to analyse the data over time, focusing on pharmaceutical stimulant use as a percentage of Perth EDRS sample. Chi-square tests were performed to investigate significant differences in categorical outcomes between 2022 and 2021, while Mann Whitney U-tests were used to investigate significant differences in continuous outcomes. For information regarding the characteristics of the Perth EDRS sample, please refer to the [WA 2022 EDRS report](#).

Results

Figure 1. Past six month pharmaceutical stimulant use, Perth EDRS, 2007-2022



Note. No data labels provided with small cell size (i.e., $n \leq 5$ but not 0). Statistical significance for 2021 versus 2022 presented in figure/table; * $p < 0.050$; ** $p < 0.010$; *** $p < 0.001$



NON-PRESCRIBED

There has been an increase in non-prescribed pharmaceutical stimulant use in the Perth EDRS samples between 2007 and 2022.

Past six month use increased between 2007 (43%) and 2014 (77%), declined to 62% in 2018, and then steadily increased.

In 2022, 81% reported recent use, marking the highest per cent observed in Perth since monitoring began.

The percentage of participants reporting use of both prescribed and non-prescribed pharmaceutical stimulants has remained very low ($n \leq 5$ in each year).



PRESCRIBED

Reported use of prescribed pharmaceutical stimulants has remained considerably lower than non-prescribed use since monitoring began.

Prescribed use was low between 2008 and 2019 ($n \leq 6$), but gradually increased from 2019 (7%), consistent with trends in non-prescribed use.

In 2022, 12% reported prescribed use, marking the equal highest per cent observed in Perth since monitoring began.

Results

1-2
pills in a
'typical' session



Between 2007 and 2020, the median frequency of non-prescribed pharmaceutical stimulant use in the preceding six months remained stable at approximately 6 days (i.e., monthly), before increasing to a median of 10 days in 2021 and 2022 (IQR=4-20 and IQR=4-27, respectively). Meanwhile, the median quantity used in a 'typical' session remained relatively consistent between 2007-2022, fluctuating between a median of 1-2 pills/tablets (mgs per pill not quantified). However, the median maximum has fluctuated between 3-6 pills/tablets (mgs per pill not quantified), with a median of 3 pills in 2021 (IQR=2-6) and 4 pills in 2022 (IQR=2-6; $p=0.107$).

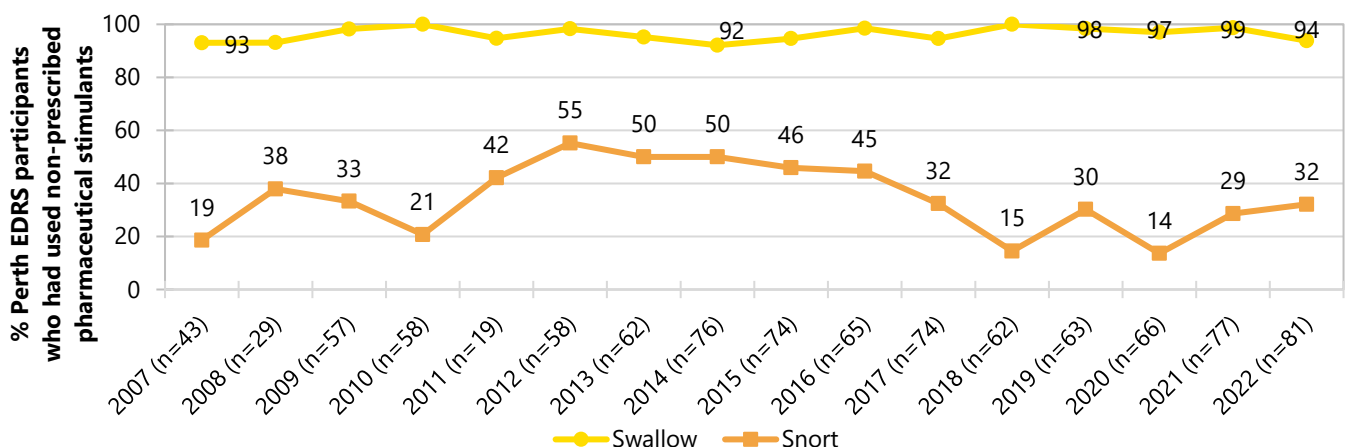
Table 1. Forms of non-prescribed pharmaceutical stimulants used in the past six months among those reporting non-prescribed pharmaceutical stimulants, Perth and National EDRS, 2015-2022

	Perth, WA								National
	2015 N=46	2016 N=65	2017 N=76	2018 N=62	2019 N=63	2020 N=63	2021 N=77	2022 N=81	2022 N=367
Ritalin® (methylphenidate, Concerta®)	39	/	40	23	51	/	21	28	39
Dexamphetamine (dexies)	85	/	92	95	84	/	96	94	78
Lisdexamphetamine (Vyvanse®)	/	/	/	/	18	/	16	31*	16
Modafinil (modavigil®)	20	/	13	11	-	/	-	9	14
Other	/	/	/	-	-	/	0	0	-

Note. The EDRS did not ask about specific forms of pharmaceutical stimulants used before 2015 or in 2016 or 2020. / did not ask about this form in this year. No data labels provided with small cell size (i.e., $n \leq 5$ but not 0). In 2015, only 46 of 75 commented on form used. The response options 'Don't know' and 'Skip' were excluded from analysis. Statistical significance for 2021 versus 2022 presented in figure/table; * $p < 0.050$; ** $p < 0.010$; *** $p < 0.001$

Dexamphetamine has remained the most commonly used form of non-prescribed pharmaceutical stimulant (85-96% of those who reported recent non-prescribed pharmaceutical stimulant use) (Table 1). However, reported use of lisdexamphetamine (Vyvanse) doubled between 2021 and 2022 ($p=0.038$). In 2022, one-third (32%) reported snorting non-prescribed pharmaceutical stimulants in the past 6 months.

Figure 2: Route/s of administration for past six month use of non-prescribed pharmaceutical stimulants, Perth EDRS, 2007-2022



Note. Other routes of administration (i.e., inject, smoke and snort/shaft) are not reported due to low numbers. Statistical significance for 2021 versus 2022 presented in figure/table; * $p < 0.050$; ** $p < 0.010$; *** $p < 0.001$.

Discussion

In response to growing concern about non-prescribed pharmaceutical stimulant use and market diversification (e.g., increased prescribing of Vyvanse) (7), this bulletin investigated trends in the use of this class of drugs among the Perth EDRS sample. We found recent (past six month) use has almost doubled since monitoring began, starting at 43% in 2007 and peaking at 81% in 2022. Additionally, frequency of recent use has increased from a median of monthly or less frequent use between 2007-2020, to a median of 10 occasions in the past 6 months in both 2021 and 2022. Meanwhile, typical quantities reportedly used per session have remained stable at a median of 2 pills, while maximum median quantities have fluctuated between 3-6 pills (median of 4 pills in 2022). However, the mgs per pill has not been quantified, limiting ability to investigate whether dosages used per session have changed since monitoring began. Nevertheless, there are indications of an increasing trend in non-prescribed pharmaceutical stimulant use in Perth samples in terms of the per cent reporting recent use and frequency of recent use.

Given the EDRS only started asking about form/s of non-prescribed pharmaceutical stimulant in 2015, and the questions have not been consistently asked across years, our ability to investigate trends in the form/s used is limited. Nevertheless, since 2015, dexamphetamine has been reported by the vast majority of participants reporting non-prescribed use. Meanwhile, methylphenidate (Ritalin) has consistently been the second most commonly reported form used until 2022, at which time the per cent reporting lisdexamphetamine (Vyvanse) surpassed methylphenidate. Specifically, recent use of lisdexamphetamine significantly increased from 16% in 2021 to 31% in 2022 (i.e., doubled), while 28% reported methylphenidate use.

Increased non-medical use of lisdexamphetamine raises questions about awareness of the differing pharmacokinetics of this formulation. Specifically, it is unclear whether participants using this form are aware that, as a prodrug (i.e., a pharmacologically inactive medication that is metabolized into a pharmacologically active drug *after* intake), snorting lisdexamphetamine will not result in a more rapid or intense onset (as occurs with active forms) (8). While snorting was relatively common among this sample, reported by one-third (32%) of participants who reported any non-prescribed pharmaceutical stimulant use in 2022, we did not collect data on routes of administration for specific forms and are therefore unable to determine what per cent had used lisdexamphetamine intranasally. Nevertheless, given there is a potential risk that people may redose lisdexamphetamine prematurely after snorting (i.e., before GI tract absorption and the onset of effects at 45-60 minutes), when the desired/expected effects are not achieved (within 15-30 minutes after snorting) (10), there are implications for raising awareness of risks associated with different formulations available in the Australian market. Additionally, given intranasal use is associated with other physical harms, including nasal and sinus damage, and snorting is known to exacerbate risks associated with active forms of pharmaceutical stimulants (9, 10), there may be merit in harm reduction messaging relating to routes of administration.

This study did not explicitly examine harms associated with pharmaceutical stimulant use. However, pharmaceutical stimulants are commonly used in conjunction with other illicit stimulants (e.g., ecstasy and cocaine), which has the potential to increase toxicity and the risk of cardiovascular complications (11). Given these potential risks, and the upwards trend identified in use, it is critical that trends in non-prescribed pharmaceutical stimulant use continue to be monitored and that harms associated with use be investigated.

Note. Questions on the involvement of pharmaceutical stimulant use in drug binges and overdoses/adverse drug events have been included in the EDRS surveys and will be investigated in a larger paper drawing on the national data (preparation planned for late 2023).

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