WASHINGTON STATE DEPARTMENT OF HEALTH

Trends in Central Nervous System (CNS) Stimulant Prescription Drugs, 2012-2022

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Executive Summary

The Washington State Prescription Monitoring Program is a repository which includes controlled substance schedule II - V prescription drugs dispensed to patients in Washington State since October of 2011. Controlled substance prescription drugs that are scheduled II-V include drugs that have the potential for misuse. This includes drugs such as hydrocodone, oxycodone, alprazolam, amphetamine, tramadol, and codeine, among others. This report examines trends in prescription rates of psychostimulants, also known as CNS (Central Nervous System) stimulants.

The purpose of this report is to assess prescribing and treatment practices associated with psychostimulant prescription drugs in Washington State given the rise in psychostimulant-related drug poisoning in recent years and a recent shortage of amphetamine prescription drugs.

Main Takeaways

- Stimulants are the only major classification of controlled substance prescription drug where both the number of patients and prescriptions in Washington have been increasing over the past decade.
- The increasing trend continued until a national shortage of amphetamine prescription drugs in the United States was announced in late 2022.
- The increase in stimulant prescription is primarily attributable to amphetamine prescriptions that are FDA-approved for the treatment of Attention-Deficit and Hyperactivity Disorder (ADHD).
- Historically, male patients were more often prescribed amphetamine prescriptions, but since the declaration of the COVID-19 pandemic public health emergency in March 2020 female patients started to receive more amphetamine prescriptions than male patients.

Introduction

Controlled substance prescription drug rates have been falling steadily over the past decade for most drug classes, including opioids, benzodiazepines, and sedatives. This is due to heightened awareness of the high risks of misuse and targeted campaigns to reduce unnecessary or unsafe opioid prescriptions. Data from the Washington State Prescription Monitoring Program (PMP) shows that prescription stimulants are the exception to this trend and are increasing over time.

Nationally, nearly 3 out of 4 commercially insured people ages 5 to 64 years of age with at least one stimulant prescription has received an ADHD diagnosis. This indicates that more people receiving treatment for ADHD is a driving force behind increased stimulant prescribing nationally (Danielson et al. 2023). Although the Washington State PMP data does not include diagnosis codes, it provides valuable insight on the state of prescription stimulants more locally.

What are Central Nervous System (CNS) Stimulants?

Central nervous system stimulants (i.e., CNS stimulants or psychostimulants) are drugs that increase the activity of the brain chemicals dopamine and norepinephrine resulting in the increase of alertness, attention, and energy. They are prescribed to treat conditions such as ADHD, sleep-wake disorders, and obesity due to their effects of stimulating attention, focus, wakefulness, and metabolism. When used appropriately, they can have significant health benefits for individuals.

Attention-Deficit and Hyperactivity Disorder (ADHD)

According to the Centers for Disease Control and Prevention (CDC), ADHD is among the most common developmental disorders in children (CDC 2021). The National Health Interview Survey estimates that the prevalence of ADHD is 8.8% among children ages 3-17 and diagnosed more often among boys (11.7%) than girls (5.7%) (Ng and Black 2021). For adults, the prevalence of ADHD decreases with each decade of age (Song et al. 2021).

The core symptoms of ADHD fall within two categories: (1) being overly active and impulsive, and (2) having trouble paying attention. To be diagnosed with ADHD, the symptoms must be present to a degree that interferes with daily life and school activities. Recommended treatment for ADHD can include both behavioral interventions and prescription medications. Prescription stimulants, which are the first line medications for ADHD, are the most frequently prescribed of all stimulants. These include amphetamines and methylphenidate-based medications. Increased prescribing of amphetamines that are FDA approved for the treatment of ADHD will be a strong theme in this report.

Public Health Risks of Using CNS Stimulants

Prescription CNS stimulants can lead to harmful consequences when misused or diverted for nonmedical purposes. One review of multiple studies notes that 5-10% of high school students and 5-35% of college students have used prescriptions prescribed for ADHD for non-medical purposes (i.e., using prescriptions not prescribed to them) (Clemow and Walker 2014). One study using data from the National Survey of Drug Use and Health (NSDUH) found an association between misusing prescription stimulant in the past year and cocaine usage (Shearer et al. 2022). Common stimulant adverse effects include decreased appetite and sleep disturbance. Large doses of stimulants can cause dizziness, sweating, vomiting, and abdominal cramps. In the case of an overdose, convulsions and stress on the cardiovascular system can lead to death (DEA n.d.).

Methodology

The PMP is a repository of dispensed controlled substance prescription drug used by public health to assess prescribing and treatment practices and morbidity and mortality related to the use of controlled substances and developing and implementing initiatives to protect the public health. A controlled substance prescription drug includes any drug considered by the Drug Enforcement Administration (DEA) as a Schedule II to Schedule V drugs (DEA 2018). This database is important to inform decision-making that improves patient care and reduces prescription drug misuse. It is a crucial tool in the state's integrated approach to reducing prescription opioid and other related drug poisoning and misuse.

The Washington PMP does not collect the following and therefore, these prescriptions are not included in this analysis except as indicated:

- Prescriptions dispensed outside the state.
- Prescriptions prescribed for ≤ 24 hours.
- Prescriptions prescribed/administered to a patient in a hospital.
- Prescriptions dispensed to offenders from a Department of Corrections pharmacy except when they are released with a prescription.
- Prescriptions dispensed from federally operated pharmacies, with exceptions*
- Prescriptions dispensed or administered in an Opioid Treatment Program (OTP), including drug treatment and methadone programs.

PMP data access is governed by RCW 70.225.40 and WAC 246-470.

* Indian Health Services and Veterans Affairs pharmacies do report voluntarily and were included in analysis.

Grouping of Stimulants for this Report

For this report, we will use the term CNS stimulant and psychostimulant interchangeably to refer to the drugs listed below. We have organized psychostimulant drugs according to their FDA approved uses and grouped by the most prevalent indications shown in the table below.

Most psychostimulant drugs have both amphetamine and dexamphetamine; thus, we have combined them in this report as amphetamine. All data around the purpose of prescribing substances include inferences based on the most prevalent FDA-approved uses of each prescribed substance.

Drug Name	FDA Approved Use	Additional FDA Approved Use	DEA Drug Schedule
Amphetamine / Dexamphetamine	ADHD	Narcolepsy	II
Lisdexamfetamine	ADHD	Binge Eating Disorder	II
Methylphenidate	ADHD	Narcolepsy	II
Dexmethylphenidate	ADHD	-	II
Cocaine hydrochloride	Local Anesthesia	-	II
Phendimetrazine	Weight Loss / Appetite suppression	-	III
Benzphetamine	Weight Loss / Appetite suppression	-	III
Diethylpropion	Weight Loss / Appetite suppression	-	IV
Lorcaserin	Weight Loss / Appetite suppression	-	IV
Phentermine	Weight Loss / Appetite suppression	-	IV
Modafinil	Sleep-Wake Disorders	-	IV
Armodafinil	Sleep-Wake Disorders	-	IV

Stimulants prescribed for weight loss work by stimulating metabolism and lowering appetite. FDA-approved drugs for weight loss include benzphetamine, diethylpropion, lorcaserin, phendimetrazine, and phentermine. The FDA recalled and removed lorcaserin from the market in February of 2020 (FDA 2020). These drugs range from Schedule III to Schedule IV, suggesting a moderate to low potential for abuse according to the DEA.

Modafinil (brand name Provigil) and armodafinil (brand name Nuvagil) are two drugs that promote wakefulness and have FDA approval for sleep-wake disorder conditions, such as narcolepsy, hypersomnia, and shift-work sleep disorder. The DEA classified both drugs as a schedule IV drug suggesting a low potential for misuse.

Cocaine hydrochloride shown here is a rare prescription CNS stimulant and is allowed by the FDA as a topical anesthetic for the mucous membranes of the nose, mouth, and throat. The DEA classifies it as a schedule II drug, suggesting a high potential for misuse.

The most prescribed stimulants are those that are FDA approved for the treatment of ADHD. This includes the four drugs amphetamine (more commonly known by the brand name ‘Adderall’), lisdexamphetamine (brand name ‘Vyvanse’), methylphenidate (brand name ‘Ritalin’), and a methylphenidate derivative called dexmethylphenidate (brand name ‘Focalin’) (FDA 2016). These drugs are all considered schedule II drugs, which have a high potential for

misuse. The FDA has also approved three non-stimulant drugs for the treatment of ADHD, including atomoxetine (brand name Strattera), guanfacine (Intuniv), and clonidine (Kapvay). These drugs are not scheduled drugs and thus not reported to the PMP. The two most prescribed drugs, amphetamine and methylphenidate, also have FDA approval for the sleep disorder narcolepsy. Narcolepsy is a rare sleep disorder, with a prevalence estimate of between 25 and 50 cases per 100,000, and treated with a variety of different stimulants (Longstreth et al. 2007). Because the prevalence of ADHD is significantly higher, estimated around 8.8% of all children, we have grouped amphetamine and methylphenidate as ADHD approved drugs for this report.

Data and Statistical Analysis

For this report we used dispensation records reported to the WA PMP from January 1, 2012 to December 31, 2022 to calculate quarterly sex-age adjusted and sex-age specific prescriptions rates. We excluded data from non-Washington residents and non-human animal prescriptions. We also excluded any records whose age was outside of the 0 to 115 age range. We also excluded records where gender was missing in order to calculate age-sex adjusted and age-sex specific rates. Gender data in the WA PMP may include both sex and gender data. The final dataset excluded 3.4% of prescription records with these characteristics.

Population data are used to calculate rates of disease, risk, and protective factors. The Office of Financial Management (OFM) produces Small Area Data Estimates (SADE) to help meet these data needs. Unfortunately, the release of several 2020 Census products has been delayed. This has interrupted the production of SADE. The latest SADE estimates available are for 2020 and use 2010 US Census data.

Public Health - Seattle and King County (PHSKC) has developed population interim estimates (PIE). These have been vetted by a multi-disciplinary group of subject matter experts and stakeholders from the Department of Health, local health jurisdictions and Tribal Epidemiology Centers. PIE are available for 2000-2022 so that a consistent series of population data is available. You can read about how PIE were created in this report.

Because DOH has applied PIE to historic data, some rates will be different from what we published previously.

DOH recommends using PIE to calculate rates for any new work or to update existing dashboards as a best practice until OFM can resume development of the SADE in 2024.

We used the 2000 U.S. Census data and direct-standardization methods for sex and the following age categories (00-05, 06-12, 13-17, 18-24, 25-34, 35-44, 45-54, 55-64, 65-74, and 75+). Health conditions vary by sex and age, and therefore prescriptions also vary by sex and age. Age-sex adjustment allows the comparison across prescriptions and geographic areas independent of any differences in age- or sex distribution. Rates were reported as per 100 population using 95% approximate normal confidence interval. Quarterly percent change (QPC) was calculated using Joinpoint Regression Program, version 4.9.1.0.

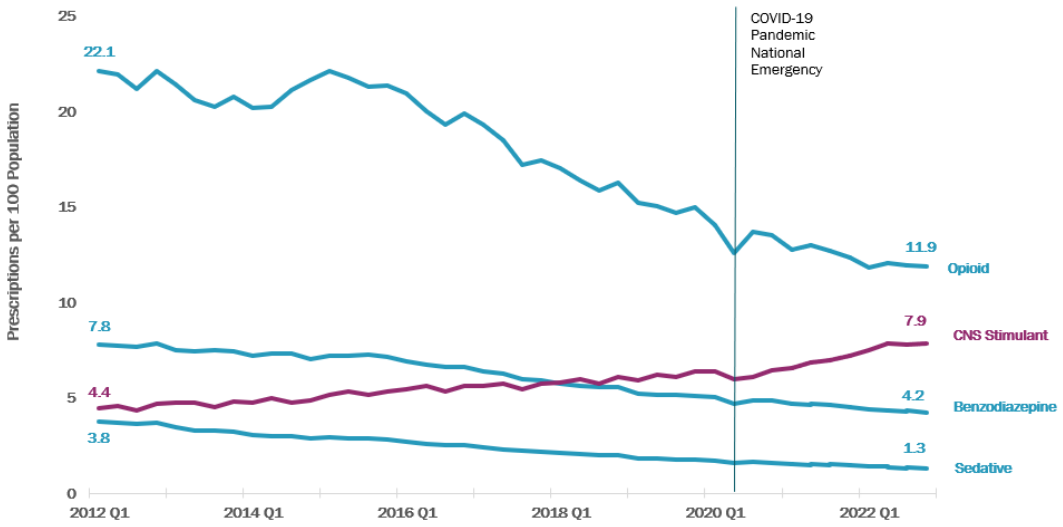
Limitations

The Washington state PMP does not collect information on diagnoses or patient racial or ethnic groups. Patient sex is collected as 'male' or 'female' and can include both sex and gender data.

Prescription Drug Trends

CNS stimulant prescriptions are the only major controlled drug class with an increasing prescription rate.

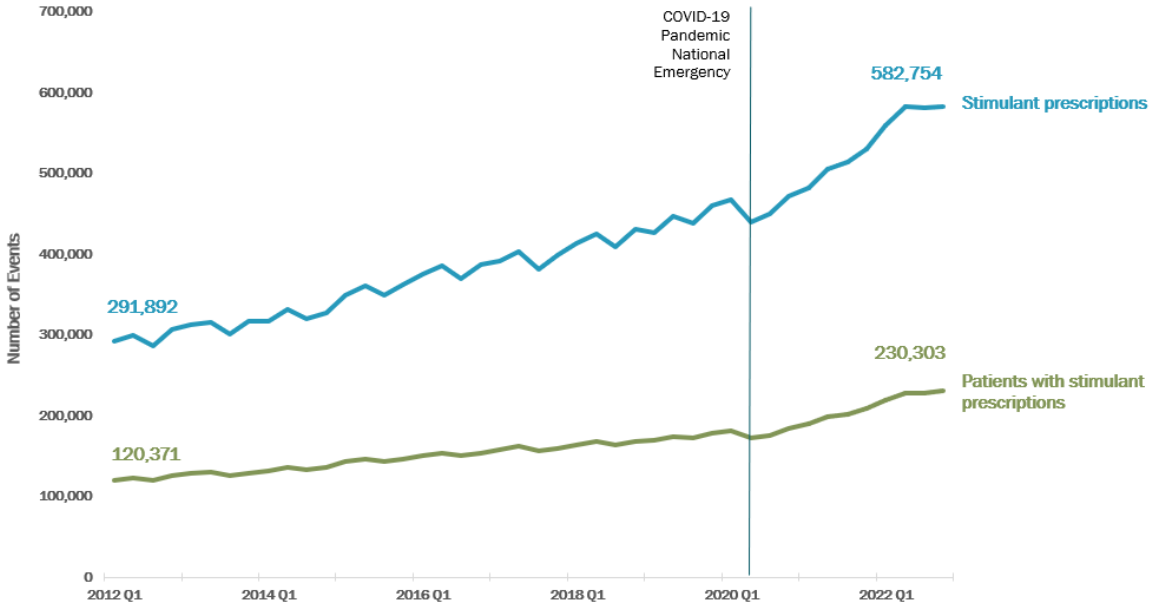
Figure 1. Sex-age adjusted prescription rate per 100 population for all major drug class by year and quarter.



- There has been a steady decline in the prescription rates of all Schedule II-V prescription drugs combined (data not shown).
- Most of this decline was due to a reduction in opioid prescriptions, which have steadily declined from 22.1 per 100 (95% CL: 22.1 – 22.1) to 11.9 per 100 (95% CL: 11.9 – 11.9).
- CNS stimulants are the only major drug class in which prescriptions have been steadily increasing over this period, from 4.4 (95% CL: 4.4 – 4.5) in in the first quarter of 2012 to 7.9 (95% CL: 7.8 – 7.9) in the fourth quarter of 2022.
    - Before COVID-19, the prescription rate was increasing by 1.1% per quarter (95% CL: 1.0% - 1.2%, $p < 0.001$).
    - During the COVID-19 period from 2020 Q4 to 2022 Q4, the rate of CNS stimulant prescriptions statistically significantly increased on average by 2.7% (95% CL: 2.0% - 3.5%, $p < 0.001$) per quarter.

Both the number of prescriptions and patients with CNS stimulant prescriptions have increased.

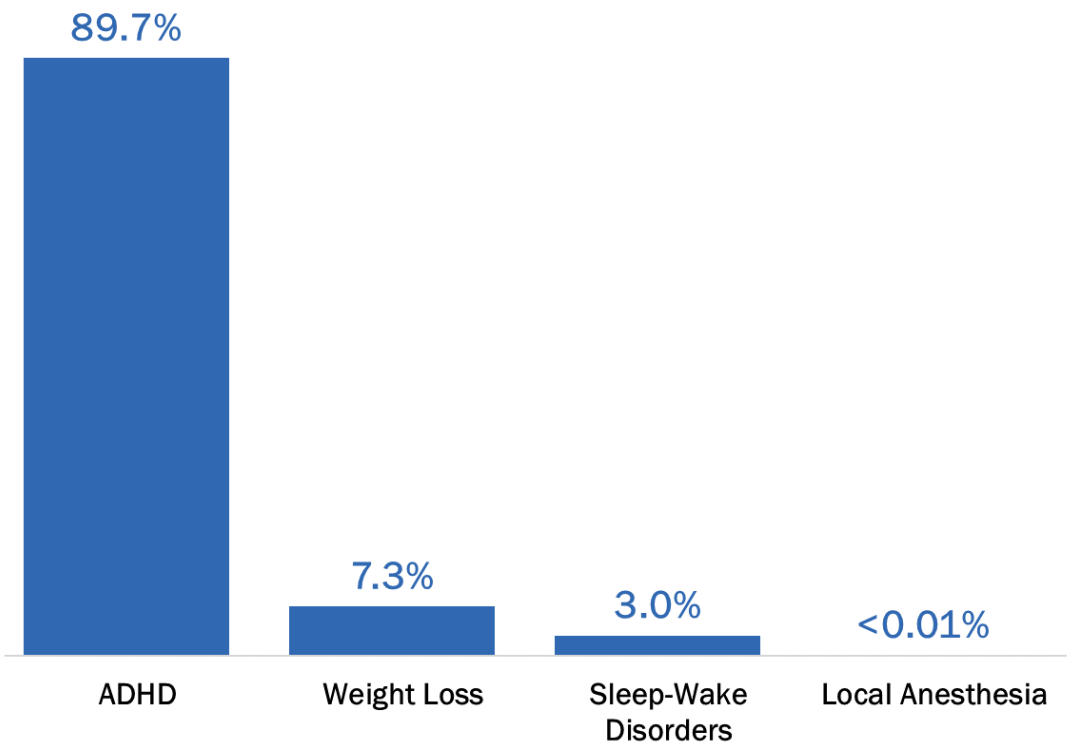
Figure 2. Count of CNS stimulant prescriptions and patients by year and quarter.



- The number of CNS stimulant prescriptions increased from 291,892 in 2012Q1 to 582,754 in 2022Q4.
    - Stimulant prescriptions increased by 100% over this time period.
- The number of patients with a CNS stimulant prescription rose from 120,371 in 2012Q1 to 230,303 at the end of 2022Q4.
    - This is a 91% increase in patients dispensing CNS stimulant prescriptions.

FDA-approved CNS stimulant prescriptions for the treatment of ADHD make up almost 90% of all stimulant prescriptions.

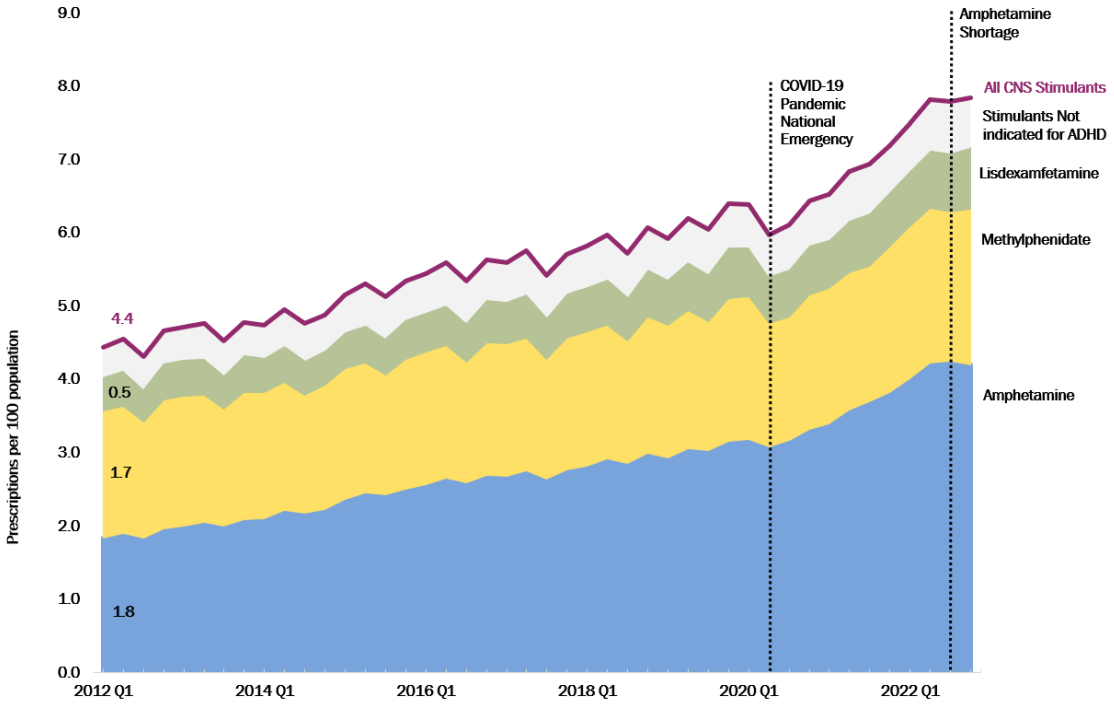
Figure 3. Percentage of all CNS stimulants dispensed from 2012 to 2022, stratified by primary FDA indication.



- CNS stimulants primarily indicated to treat ADHD make up most stimulants prescribed, at 89.7% (Total prescriptions: 16,250,488).
- CNS stimulants indicated for weight loss and sleep-wake disorders combined make up another 10.3% (Total prescriptions: 1,865,568).
- CNS stimulants indicated for local anesthesia were very rare (Total prescriptions: 107).

Half of all CNS stimulant prescriptions are amphetamine prescriptions.

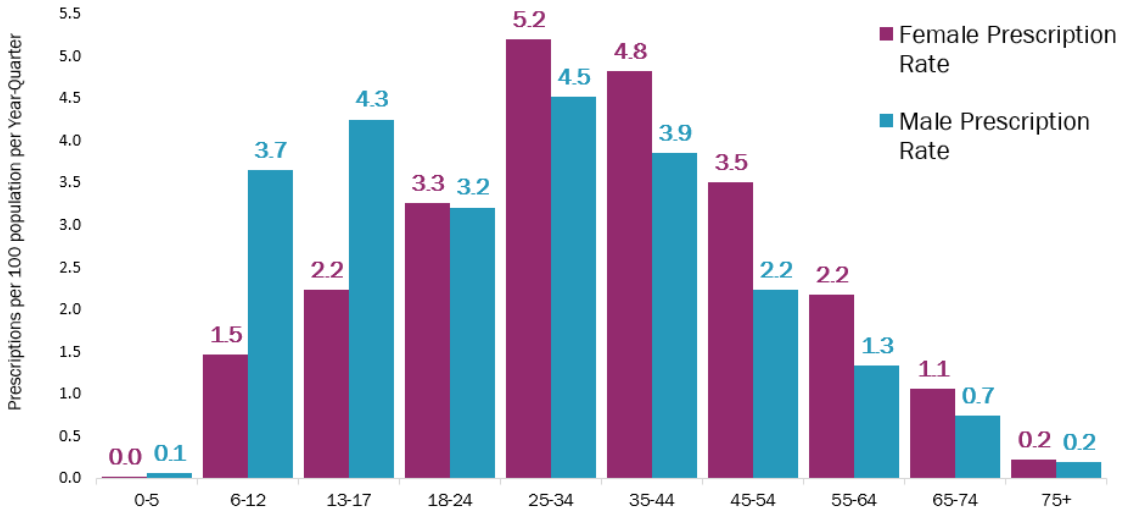
Figure 4. Sex-age adjusted prescription rate per 100 population by selected primary active ingredient, year, and quarter.



- The two most common CNS stimulants dispensed in Washington are amphetamine and methylphenidate.
- Amphetamines are the primary driver of the increase in CNS stimulant prescriptions. The rate of amphetamine prescriptions has more than doubled in the past decade. In 2012 Q1 the rate of prescription of amphetamines compared to methylphenidate were similar. By 2022 Q4, more than half of all CNS stimulants were amphetamine prescriptions.
- During the COVID-19 period from 2020 Q3 to 2022 Q2, the rate of amphetamine prescriptions statistically significantly increased by 4.7% (95% CL: 4.0% -6.2%, $p < 0.001$) on average per quarter before leveling in 2022Q3 to 2022Q4.
- This plateau in late 2022 reflects the nationwide shortage in amphetamine drugs confirmed by the Food and Drug Administration (FDA) in October 2022 (FDA 2022).

Amphetamine prescriptions vary significantly by sex and age.

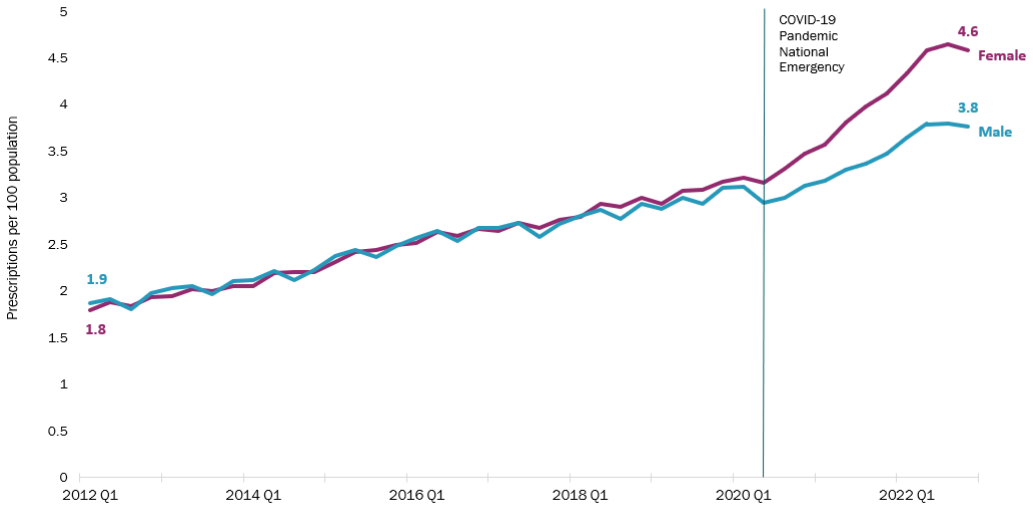
Figure 5. Quarterly average age-sex specific amphetamine prescription rate per 100 population from 2012Q1 to 2022Q4.



- Twice as many males ages 6-12 and 13-17 years old have an amphetamine prescription compared to females in the same age groups.
- Females between the ages of 25 and 34 years old have the highest quarterly average rate of amphetamine prescriptions in the past decade.
- According to the American Academy of Pediatrics, amphetamine prescriptions are not recommended for the treatment of ADHD in children under the age of 6 (Wolraich et al. 2019).

Females are more likely than males to have received an amphetamine prescription.

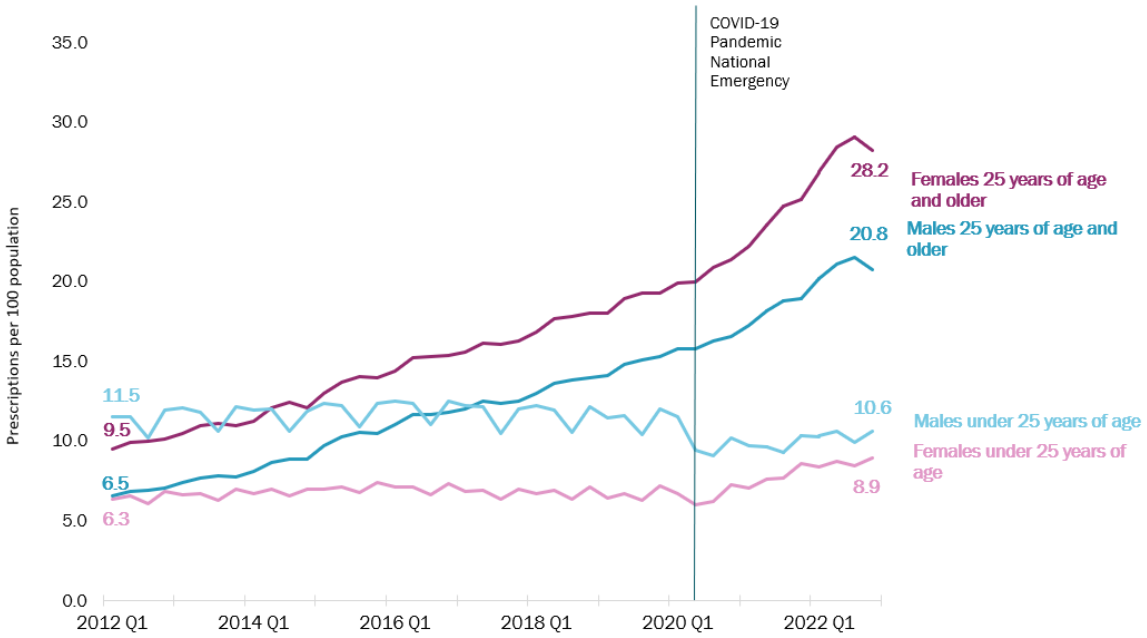
Figure 6. Age-adjusted amphetamine prescription rate per 100 population by year, quarter*, and sex.*



- Males and females had similar rates of amphetamine stimulant prescription until mid-2020, which is when the COVID-19 pandemic caused a major disruption in all aspects of society, including the economy, education, and health care, with recommendations to socially distanced or self-quarantine.
- The amphetamine prescription rate among males increased from 1.9 per 100 population (95% CL: 1.9 to 1.9) to 3.8 per 100 population (95% CL: 3.7 to 3.8) from 2012 Q1 to 2022 Q4 respectively. Among females, the prescription rate doubled from 1.8 per 100 population (95% CL: 1.8 to 1.8) to 4.6 per 100 population (95% CL: 4.6 to 4.6) over the same period.
- During the COVID-19 period from 2020 Q2 to 2022 Q4, the amphetamine prescription rate among females increased by 4.1% (95% CL: 3.6% - 4.7%, $p < 0.001$) on average per quarter after 2020 Q2. In comparison, the amphetamine prescription rate among males increased by 2.8% (95% CL: 2.4% - 43.2%, $p < 0.001$) on average per quarter after 2020 Q2.

Amphetamine prescriptions to patients, both males and females, aged 25 years and older have significantly increased over time.

Figure 7. Age-specific quarterly rate of amphetamine prescriptions, by year, quarter, sex, and age group.



- Female patients ages 25 and older have consistently had higher rates of amphetamine prescriptions than male patients in the same age range, though the rate of prescriptions among patients over age 24 of both genders has tripled over the past decade.

- There is a seasonal pattern of a slight decline in patients under 25 years of age receiving amphetamine prescriptions in the third quarter of each year. This seasonal trend has been reported elsewhere, and is potentially due to the academic calendar where classes are not held over the summer months and some people with ADHD choose to temporarily discontinue their medication (Shyu et al. 2016).

Conclusion

While prescriptions of other drug classes of controlled substances like opioids, benzodiazepines, and sedatives have decreased throughout the past decade, the number of prescription stimulants as well as the number of patients with prescriptions for stimulants has increased. Prescription stimulants remain the only major controlled substance drug class in which both the number of patients and prescription in Washington State have increased over the past decade. Prescription stimulants have multiple potential benefits such as treating ADHD, sleep-wake disorders, supporting weight loss through medications, and used as local anesthesia. Stimulants used to treat ADHD comprise the majority of prescription stimulants, with amphetamines comprising half of all CNS stimulant prescriptions.

Recently, there has been a notable increase in the amphetamine prescription rate for people 25 years of age and older, with female patients in that age group having higher amphetamine prescription rates than male patients. A report by the CDC from March of 2023 has noted that similar trends of increased stimulant prescribing are occurring nationwide (Danielson et al. 2023). In October of 2022, the FDA announced that there was a shortage of prescription amphetamine due to manufacturers being unable to meet the increase in market demand for the drug (FDA 2022). This shortage may impact the ability to receive stimulant medication for those who need it most.

This increase in prescribing is most likely driven by an increase of treatment for ADHD in the population, an increase in those newly diagnosed with ADHD and receiving medication treatment with stimulants, or a change in treatment or prescribing practices, though it may also be true that other conditions contribute to the trend. Currently, there are no official guidelines around ADHD diagnosis in adults in the United States, although the American Professional Society of ADHD and Related Disorders (APSARD) has plans to publish guidelines in the future (Winkler 2022). In the meantime, more research is needed to better understand if these medications are prescribed appropriately.

Additional Resources

- Center for Disease Control and Prevention Stimulant Guide: https://www.cdc.gov/drugoverdose/featured-topics/stimulant-guide.html
- Center for Disease Control and Prevention Health Equity in Drug Overdoses: https://www.cdc.gov/drugoverdose/health-equity/index.html
- National Resource Center for ADHD: https://chadd.org/understanding-adhd/
- National Institute for Neurological Disorders and Stroke: https://www.ninds.nih.gov/
- National Institute of Mental Health - ADHD: https://www.nimh.nih.gov/health/topics/attention-deficit-hyperactivity-disorder-adhd

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Appendices

Table 1. Sex-age adjusted prescription rate per 100 population for all major drug class by year and quarter.

Time Period	Opioids		CNS Stimulants		Benzodiazepines		Sedatives	
Year and quarter	Total prescriptions	Sex-age adjusted rate per 100 population	Total prescriptions	Sex-age adjusted rate per 100 population	Total prescriptions	Sex-age adjusted rate per 100 population	Total prescriptions	Sex-age adjusted rate per 100 population
2012 Q1	1,596,282	22.1 (95% CL: 22.1-22.1)	291,892	4.4 (95% CL: 4.4-4.5)	565,507	7.8 (95% CL: 7.8-7.8)	277,794	3.8 (95% CL: 3.7-3.8)
2012 Q2	1,584,561	21.9 (95% CL: 21.9-22)	299,964	4.6 (95% CL: 4.5-4.6)	560,732	7.7 (95% CL: 7.7-7.8)	271,105	3.7 (95% CL: 3.7-3.7)
2012 Q3	1,532,765	21.2 (95% CL: 21.2-21.2)	285,435	4.3 (95% CL: 4.3-4.3)	554,144	7.6 (95% CL: 7.6-7.7)	267,492	3.6 (95% CL: 3.6-3.6)
2012 Q4	1,598,069	22.1 (95% CL: 22.1-22.1)	306,429	4.7 (95% CL: 4.6-4.7)	567,421	7.8 (95% CL: 7.8-7.9)	272,683	3.7 (95% CL: 3.7-3.7)
2013 Q1	1,573,596	21.4 (95% CL: 21.4-21.4)	312,315	4.7 (95% CL: 4.7-4.7)	553,018	7.5 (95% CL: 7.5-7.5)	259,346	3.4 (95% CL: 3.4-3.5)
2013 Q2	1,513,678	20.6 (95% CL: 20.5-20.6)	315,902	4.8 (95% CL: 4.8-4.8)	546,949	7.4 (95% CL: 7.4-7.5)	247,665	3.3 (95% CL: 3.3-3.3)
2013 Q3	1,491,317	20.3 (95% CL: 20.2-20.3)	301,173	4.5 (95% CL: 4.5-4.5)	551,321	7.5 (95% CL: 7.5-7.5)	247,223	3.3 (95% CL: 3.3-3.3)
2013 Q4	1,527,791	20.7 (95% CL: 20.7-20.8)	316,297	4.8 (95% CL: 4.8-4.8)	548,902	7.5 (95% CL: 7.4-7.5)	243,899	3.2 (95% CL: 3.2-3.2)
2014 Q1	1,510,541	20.2 (95% CL: 20.1-20.2)	317,185	4.7 (95% CL: 4.7-4.8)	541,123	7.2 (95% CL: 7.2-7.2)	234,913	3.1 (95% CL: 3-3.1)
2014 Q2	1,515,091	20.2 (95% CL: 20.2-20.2)	331,802	5 (95% CL: 4.9-5)	547,774	7.3 (95% CL: 7.3-7.3)	232,602	3.0 (95% CL: 3.0-3.0)
2014 Q3	1,580,772	21.1 (95% CL: 21.1-21.1)	320,369	4.8 (95% CL: 4.7-4.8)	548,439	7.3 (95% CL: 7.3-7.3)	230,798	3.0 (95% CL: 3.0-3.0)
2014 Q4	1,622,566	21.7 (95% CL: 21.6-21.7)	326,967	4.9 (95% CL: 4.9-4.9)	526,939	7 (95% CL: 7-7.1)	219,949	2.9 (95% CL: 2.8-2.9)
2015 Q1	1,693,297	22.1 (95% CL: 22.1-22.1)	349,456	5.2 (95% CL: 5.1-5.2)	551,866	7.2 (95% CL: 7.2-7.2)	230,956	2.9 (95% CL: 2.9-2.9)
2015 Q2	1,670,086	21.8 (95% CL: 21.7-21.8)	360,287	5.3 (95% CL: 5.3-5.3)	552,470	7.2 (95% CL: 7.2-7.2)	227,127	2.9 (95% CL: 2.9-2.9)
2015 Q3	1,634,931	21.3 (95% CL: 21.3-21.3)	349,359	5.1 (95% CL: 5.1-5.1)	553,366	7.2 (95% CL: 7.2-7.3)	226,624	2.9 (95% CL: 2.9-2.9)
2015 Q4	1,640,431	21.3 (95% CL: 21.3-21.4)	361,665	5.3 (95% CL: 5.3-5.4)	545,083	7.1 (95% CL: 7.1-7.1)	220,770	2.8 (95% CL: 2.8-2.8)
2016 Q1	1,643,842	20.9 (95% CL: 20.9-21)	374,471	5.5 (95% CL: 5.4-5.5)	540,879	6.9 (95% CL: 6.9-6.9)	215,965	2.7 (95% CL: 2.7-2.7)
2016 Q2	1,573,024	20.0 (95% CL: 20.0-20.0)	384,801	5.6 (95% CL: 5.6-5.6)	527,269	6.8 (95% CL: 6.7-6.8)	208,395	2.6 (95% CL: 2.6-2.6)
2016 Q3	1,518,710	19.3 (95% CL: 19.3-19.3)	369,311	5.4 (95% CL: 5.3-5.4)	514,072	6.6 (95% CL: 6.6-6.6)	203,356	2.5 (95% CL: 2.5-2.5)
2016 Q4	1,567,593	19.9 (95% CL: 19.9-19.9)	386,597	5.6 (95% CL: 5.6-5.6)	514,728	6.6 (95% CL: 6.6-6.6)	202,302	2.5 (95% CL: 2.5-2.5)
2017 Q1	1,555,387	19.3 (95% CL: 19.3-19.3)	391,231	5.6 (95% CL: 5.6-5.6)	508,036	6.4 (95% CL: 6.4-6.4)	197,407	2.4 (95% CL: 2.4-2.4)
2017 Q2	1,491,357	18.5 (95% CL: 18.5-18.5)	402,281	5.8 (95% CL: 5.7-5.8)	498,440	6.3 (95% CL: 6.2-6.3)	190,893	2.3 (95% CL: 2.3-2.3)
2017 Q3	1,388,190	17.2 (95% CL: 17.2-17.2)	380,478	5.4 (95% CL: 5.4-5.4)	476,247	6.0 (95% CL: 6.0-6.0)	183,602	2.2 (95% CL: 2.2-2.2)
2017 Q4	1,409,146	17.4 (95% CL: 17.4-17.5)	398,936	5.7 (95% CL: 5.7-5.7)	471,480	5.9 (95% CL: 5.9-5.9)	180,809	2.2 (95% CL: 2.2-2.2)
2018 Q1	1,406,098	17.0 (95% CL: 17.0-17.1)	412,645	5.8 (95% CL: 5.8-5.8)	468,672	5.8 (95% CL: 5.7-5.8)	178,133	2.1 (95% CL: 2.1-2.1)
2018 Q2	1,353,395	16.4 (95% CL: 16.3-16.4)	424,217	6.0 (95% CL: 6.0-6.0)	458,580	5.6 (95% CL: 5.6-5.7)	172,432	2.0 (95% CL: 2.0-2.0)
2018 Q3	1,310,095	15.8 (95% CL: 15.8-15.9)	408,357	5.7 (95% CL: 5.7-5.7)	450,262	5.5 (95% CL: 5.5-5.6)	168,156	2.0 (95% CL: 2.0-2.0)
2018 Q4	1,342,310	16.2 (95% CL: 16.2-16.3)	430,185	6.1 (95% CL: 6.1-6.1)	451,434	5.6 (95% CL: 5.5-5.6)	167,611	2.0 (95% CL: 2.0-2.0)
2019 Q1	1,286,701	15.2 (95% CL: 15.2-15.2)	426,331	5.9 (95% CL: 5.9-5.9)	429,937	5.2 (95% CL: 5.2-5.2)	158,279	1.8 (95% CL: 1.8-1.8)
2019 Q2	1,272,304	15.0 (95% CL: 15.0-15.1)	447,025	6.2 (95% CL: 6.2-6.2)	428,571	5.2 (95% CL: 5.2-5.2)	155,572	1.8 (95% CL: 1.8-1.8)
2019 Q3	1,242,068	14.7 (95% CL: 14.7-14.7)	438,149	6.1 (95% CL: 6-6.1)	424,889	5.1 (95% CL: 5.1-5.1)	153,310	1.8 (95% CL: 1.8-1.8)
2019 Q4	1,267,803	15.0 (95% CL: 15.0-15.0)	459,882	6.4 (95% CL: 6.4-6.4)	421,689	5.1 (95% CL: 5.1-5.1)	151,243	1.7 (95% CL: 1.7-1.8)
2020 Q1	1,216,125	14.1 (95% CL: 14-14.1)	466,967	6.4 (95% CL: 6.4-6.4)	424,208	5.0 (95% CL: 5.0-5.1)	149,611	1.7 (95% CL: 1.7-1.7)
2020 Q2	1,090,689	12.6 (95% CL: 12.6-12.6)	438,664	6.0 (95% CL: 6.0-6.0)	392,409	4.7 (95% CL: 4.6-4.7)	141,358	1.6 (95% CL: 1.6-1.6)
2020 Q3	1,181,509	13.7 (95% CL: 13.6-13.7)	448,862	6.1 (95% CL: 6.1-6.1)	409,692	4.9 (95% CL: 4.9-4.9)	142,640	1.6 (95% CL: 1.6-1.6)
2020 Q4	1,168,114	13.5 (95% CL: 13.5-13.5)	470,717	6.4 (95% CL: 6.4-6.5)	406,787	4.8 (95% CL: 4.8-4.9)	141,820	1.6 (95% CL: 1.6-1.6)
2021 Q1	1,121,684	12.8 (95% CL: 12.7-12.8)	481,549	6.5 (95% CL: 6.5-6.5)	400,536	4.7 (95% CL: 4.7-4.7)	138,271	1.5 (95% CL: 1.5-1.6)
2021 Q2	1,142,566	13.0 (95% CL: 13.0-13.0)	505,134	6.8 (95% CL: 6.8-6.9)	396,697	4.7 (95% CL: 4.6-4.7)	135,349	1.5 (95% CL: 1.5-1.5)
2021 Q3	1,117,021	12.7 (95% CL: 12.7-12.7)	513,163	6.9 (95% CL: 6.9-7)	392,572	4.6 (95% CL: 4.6-4.6)	135,079	1.5 (95% CL: 1.5-1.5)
2021 Q4	1,087,425	12.3 (95% CL: 12.3-12.4)	529,342	7.2 (95% CL: 7.2-7.2)	381,044	4.5 (95% CL: 4.5-4.5)	131,900	1.5 (95% CL: 1.5-1.5)
2022 Q1	1,061,032	11.8 (95% CL: 11.8-11.8)	558,329	7.5 (95% CL: 7.5-7.5)	381,689	4.4 (95% CL: 4.4-4.4)	129,019	1.4 (95% CL: 1.4-1.4)
2022 Q2	1,084,442	12.1 (95% CL: 12-12.1)	582,517	7.8 (95% CL: 7.8-7.9)	376,577	4.4 (95% CL: 4.3-4.4)	126,081	1.4 (95% CL: 1.4-1.4)
2022 Q3	1,071,988	11.9 (95% CL: 11.9-12)	581,388	7.8 (95% CL: 7.8-7.8)	374,235	4.3 (95% CL: 4.3-4.3)	125,385	1.4 (95% CL: 1.4-1.4)
2022 Q4	1,069,185	11.9 (95% CL: 11.9-11.9)	582,754	7.9 (95% CL: 7.8-7.9)	364,143	4.2 (95% CL: 4.2-4.2)	122,610	1.3 (95% CL: 1.3-1.4)

Data Source: Washington Prescription Monitoring Program. Prescriptions include only human prescriptions reported to the Washington PMP from January 1, 2012 to December 31, 2022. 95% confidence limit (CL) were calculated using the Normal approximation. Rates were adjusted to the U.S. 2000 Census for sex-age standardization. Population denominator for rates were calculated using the Washington State Population Interim Estimates (PIE), December 2022. Rates may differ from previously published rates due to changes in denominators.

Table 2. Drug Class Definitions

Anabolic Stimulant	Benzodiazepine	CNS Stimulant	Opioid	Sedative
Androstenedione	Alprazolam	Amphetamine	Alfentanil	Butabarbital
Fluoxymesterone	Chlordiazepoxide	Armodafinil	Buprenorphine	Butalbital
Methyltestosterone	Clobazam	Benzphetamine	Butorphanol	Carisoprodol
Nandrolone	Clonazepam	Cocaine	Codeine	Chloral Hydrate
Oxandrolone	Clorazepate	Dexmethylphenidate	Dihydrocodeine	Dichloralphenazone
Oxymetholone	Diazepam	Dextroamphetamine	Diphenoxylate	Eszopiclone
Stanozolol	Estazolam	Diethylpropion	Fentanyl	Pentobarbital
Testosterone	Flurazepam	Lisdexamfetamine	Hydrocodone	Phenobarbital
	Lorazepam	Lorcaserin	Hydromorphone	Secobarbital
	Meprobamate	Methamphetamine	Levorphanol	Zaleplon
	Midazolam	Methylphenidate	Meperidine	Zolpidem
	Oxazepam	Modafinil	Methadone	
	Quazepam	Phendimetrazine	Morphine	
	Temazepam	Phentermine	Opium	
	Triazolam		Oxycodone	
			Oxymorphone	
			Pentazocine	
			Sufentanil	
			Tapentadol	
			Tramadol	

Data Source: Washington Prescription Monitoring Program.

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