Department of Health
Government of Western Australia

Stimulant Prescribing and Usage Patterns for the Treatment of ADHD in Western Australia

1 August 2003 – 31 December 2004

Department of Health 2005

Suggested Citation
Department of Health, (2005), *Stimulant Prescribing and Usage Patterns for the Treatment of ADHD in Western Australia (1 August 2003 – 31 December 2004),* Pharmaceutical Services Branch, Department of Health, Western Australia

ISBN 1 876999 83 7

Acknowledgements

The Pharmaceutical Services Branch of the Department of Health, Western Australia commissioned the School of Population Health, The University of Western Australia to undertake this investigation.

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The investigators would like to acknowledge Dr Alexandra Bremner from the Biostatistical Consulting Service at the School of Population Health, The University of Western Australia, for her contribution to the statistical analysis for this project.

The Department of Health edited and formatted the report for release. Some additional data and text were included by the Department of Health to provide clarification on information contained within the Report and the order in which the methodologies and results were presented were changed. The Department of Health worked with the School of Population Health to finalise the Summary of Key Findings for each of the sections of analysis and the Executive Summary of the Report.

Glossary of Terms

Term	Definition
'Active' Notification	Group of patients for whom a *Notification of Treatment Using Stimulant Medication* Form had been received by the Department of Health, excluding those for whom the only Notification received advised of termination of stimulant treatment and did not contain any diagnostic information.
ADHD cohort	Population under study. Patients with an 'active' *Notification of Treatment Using Stimulant Medication* Form and at least one prescription for stimulants dispensed between 1 August 2003 and 31 December 2004.
Authorisation	Written approval from the Commissioner of Health required prior to prescribing stimulant medication outside the Stimulant Regulatory Guidelines in Western Australia.
Authorised Prescriber	Medical practitioner who is authorised to *initiate* treatment with stimulant medications in Western Australia.
Base equivalents	The amount of base drug in a particular preparation of stimulant medication. Calculated using conversion factors which compare the molecular weight of the base with the molecular weight of the salt for each preparation.
Co-prescriber	Medical practitioner, Notified to the Department of Health by the Authorised Prescriber, who may also prescribe stimulant medication for a specified patient according to the drug, drug form and dose nominated on the Notification Form.
Dex equivalents	Methylphenidate expressed in same terms as dexamphetamine. *Methylphenidate dex equivalents* *= (methylphenidate in mg)/2*
Dispensed Stimulant Medication Database	Department of Health database which contains records of dispensed stimulant medications from reports submitted each month by every pharmacy in Western Australia.
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders (4th edition). Criteria for diagnosis of ADHD.

ICD-10	International Classification of Disease and Health Related Problems – 10th revision. Criteria for diagnosis of ADHD.
Notification Form	*Notification of Treatment Using Stimulant Medication* Form. Submitted to the Department of Health by Authorised Prescribers when initiating, modifying or terminating treatment with stimulant medication in Western Australia.
Re-Notification	A Notification Form submitted by the Authorised Prescriber to Notify the Department of Health of any change in drug, drug form, dose (where the change leads to an additional standard pack dispensed per month), patient details or co-prescriber for patients for whom the prescriber has a current Notification.
Stimulant Notification Record Database	Department of Health database which contains records of *Notification of Treatment Using Stimulant Medication* Forms submitted by Authorised Prescribers.
Stimulant Prescriber Number	Issued by the Department of Health. Authorises registered and qualified physicians to initiate treatment with stimulant medication in Western Australia.
Stimulant Regulatory Guidelines	Criteria for the prescribing of stimulant medication in Western Australia based upon the *Poisons Regulations 1965.*
Stimulant Regulatory Scheme	Framework developed to regulate the prescribing of stimulant drugs in Western Australia – commenced in 2003.
Stimulants Assessment Panel	Panel of clinicians, convened by the Department of Health, to provide clinical advice on applications to prescribe stimulant medication outside the Stimulant Regulatory Guidelines in Western Australia.
Termination	Cessation of treatment with stimulants for a specified patient by an Authorised Prescriber.

Executive Summary

Section 1: Project Overview

In 2002 the Minister for Health released the policy 'Attentional Problems in Children: Diagnosis and Management of Attention Deficit Hyperactivity Disorder (ADHD) and Associated Disorders'. The policy required the Department of Health to revise the existing regulatory scheme for stimulants (dexamphetamine and methylphenidate) used in the treatment of ADHD. The new scheme was introduced in August 2003.

Commonwealth data indicate a higher level of stimulant use in Western Australia (WA) compared with other States and Territories.* The new Stimulant Regulatory Scheme in WA provides for the collection of comprehensive data to enable a better understanding of stimulant use in this State.

Treatment with stimulant medication can only be initiated by an Authorised Prescriber who must submit a *Notification of Treatment Using Stimulant Medication Form* to the Department of Health when initiating stimulant medication.

The purpose of this report was to describe stimulant prescribing patterns and use within WA from 1 August 2003 to 31 December 2004.

Section 2: Stimulant Use in WA

Notification Forms were received for 16,686 patients. Over 20,000 Notification Forms (n=20,576) were received consisting of 16,731 Notifications, 3,192 Re-Notifications (advising of change in drug, drug form, dose, co-prescriber or patient details), 313 Termination Notifications and 340 Notifications for patients being treated outside the Stimulant Regulatory Guidelines (due to age, dose or patient co-morbidities).

There were 172 medical practitioners 'authorised' to prescribe stimulant medication with the majority being either adult psychiatrists (n=60, 34.9%), paediatricians (n=57, 33.1%) or child and adolescent psychiatrists (n=25, 14.5%). The number of Notification Forms completed per Authorised Prescriber was heavily skewed, with a median of 17 and range of 1 to 2,640. Nine Authorised Prescribers (representing the top 5% of prescribers) submitted a total of 8,680 Notifications (range: 479-2,640), which represented 42.2% of all Notifications submitted to the Department of Health during the study period.

There were 54 Authorised Prescribers who prescribed outside the Stimulant Regulatory Guidelines during the study period.

The vast majority of Notifications were submitted for patients diagnosed with ADHD (n=19,699, 97.2%), and a small number also had additional diagnoses (n=110) at some point throughout the 17-month study period. There were 19,062 patients who had a prescription dispensed for a stimulant during the study period. Of these, 15,695 were patients who had an Active Notification with a diagnosis of ADHD.

* Data on transaction movements of Schedule 8 medications on a State and Territory basis provided by the Therapeutic Goods Administration (TGA) Treaties and Compliance Area.

Section 3: The ADHD Cohort

A more detailed analysis was undertaken for patients being treated for ADHD. The cohort studied consisted of all records in the Stimulant Notification Record Database with a diagnosis of ADHD and in the Dispensed Stimulant Medication Database with at least one record of a stimulant prescription (for this diagnosis) during the period 1 August 2003 to 31 December 2004. A total of 15,695 patients met the criteria for cohort inclusion.

The cohort had 160,707 stimulant prescriptions dispensed during the study period. There were 2.8-times more males (n=11,532, 73.5%) than females (n=4,163, 26.5%) in the cohort. Age distributions showed differences between genders, especially for ages 7 to 17 years which had a much higher proportion of males than females. For 18 years and above, the proportion of females was slightly higher than males in each age group.

There were 143 Authorised Prescribers who submitted Notification Forms for patients in the ADHD cohort. Patients were treated by paediatricians (n=8,953, 57.0%), child and adolescent psychiatrists (n=3,882, 24.7%) and adult psychiatrists (n=2,681, 17.1%). The number of patients Notified per Authorised Prescriber was heavily skewed with a median of 22 and a range to 1 to 2,077.

The majority of patients (n=9,664, 61.6%) were under the age of 18 years, with a mean age of 12.0 years (SD=3.2 years). The highest proportion of children were between the ages of 7 and 11 years (n=4,191, 43.4%), with a relatively high number of patients also found in the 12 to 15 year age group (n=3,622, 37.5%). The remaining patients (n=6,031, 38.4%) were 18 years or older with a mean age of 31.7 years (SD=11.6).

Patients resided in the North Metropolitan Health Service Area (n=6,549, 41.7%), South Metropolitan Health Service Area (n=6,328, 40.3%), WA Country Health Service Area (n=1,450, 9.2%) and South West Health Service Area (n=713, 4.5%).

Over 30% of patients (n=4,778, 30.4%) were Notified with a co-prescriber. The WA Country Health Service Area had the highest proportion of patients with a co-prescriber (n=1,061, 73.2%).

The majority of patients were treated with dexamphetamine (n=12,451, 79.3%). Methylphenidate (immediate action or long acting) was used in the treatment of 4,183 patients (26.7%). A comparatively small number of patients were treated with both dexamphetamine and methylphenidate.

There were 3,547 (22.6%) patients who were concurrently prescribed other psychotropic medications. Of these patients, 2,099 (59.2%) were prescribed antidepressants, 202 (5.7%) antipsychotics, 185 (5.2%) anxiolytics, 322 (9.1%) mood stabilising drugs, with the remainder (n=739, 20.8%) reported as being prescribed some other type of psychotropic medication.

Rates per 1,000 population of stimulant Notification and usage were calculated for the study cohort across the 17-month study period. For the 15,695 patients in the ADHD cohort, the number of patients Notified was 8.3 per 1,000 population. There were 22.2 children per 1,000 population (2-17 years) which was greater than the rate in adults = 18 years (4.1 per 1,000 population). There were more males than females (12.1 and 4.4 per

1,000 population respectively). The gender difference was marked in children. For all age groups up to 20 years, the number of male stimulant users (per 1,000 population) was 2 to 5 times the rate in females.

Wide variations in the number of patients per 1,000 population were seen between the 34 Health Districts in WA with a range of 1.1 to 11.6 per 1,000 population. A quarter of Health Districts had patient treatment rates of <3.6 per 1,000 population, while 25% had rates of >8.6 patients per 1,000 population. Three health districts, Armadale, Rockingham-Kwinana and Geraldton had treatment rates exceeding 10 patients per 1,000 population.

The overall average daily Notified dose of dexamphetamine was 25.1mg/day (SD=14.5mg/day). The average daily dose in children was 17.7 mg/day (SD=9.6mg/day) and in adults was 33.9 mg/day (SD=14.4mg/day). Similar doses for males and females were seen in the children and adult groups. The number of males treated with dexamphetamine per 1,000 population showed a large increase in younger age groups (from 1.9 per 1,000 population for 3 to 4 years to 34.7 per 1,000 population for 12 to 15 years) followed by a rapid decline, compared with a lower and more consistent level across age groups for females.

The average daily methylphenidate dose in children was 32.4 mg/day (SD=15.1mg/day) and in adults was 47.5 mg/day (SD=26.9mg/day). Similar doses for males and females were seen in the children and adult groups.

To assess total stimulant use in WA, regardless of which medication was being used, doses of stimulant medication were converted to "dex equivalents". The average daily Notified dose of stimulant medication (expressed in dex equivalents) for children (2 to 17 years) in the ADHD cohort was 17.6mg/day (SD=9.1), with a median dose of 15mg/day. The average daily Notified dose of stimulant medication (expressed as dex equivalents) for adults (= 18 years) in the ADHD cohort was 33.5 mg/day (SD=14.4), with a median of 30 mg/day. Average doses, in dex equivalents, and variation in dosage tended to increase with age. The average dose per kilogram of body weight (expressed in dex equivalents) was similar for children (0.42mg/kg/day) and adults (0.47mg/kg/day), as well as males (0.43 mg/kg/day) and females (0.47mg/kg/day).

Section 4: Comparison with NSW Data

A broad comparison was performed against published New South Wales (NSW) Department of Health data. It was not an in-depth statistical comparison of WA and NSW data. The WA data were converted to annual counts to enable the comparison and are different to those presented in the other sections of the report.

WA had a total of 11,078 patients treated annually with stimulant medications compared with 19,476 in NSW. Overall the annual number of patients using stimulant medication for ADHD (per 1,000 population) was greater for all age groups in WA than for NSW.

There were 15,927 children treated with stimulant medication in NSW at a rate of 11.3 patients per 1,000 population. WA treated 6,821 children at a rate of 15.6 children per 1,000 population. Adults were treated at a rate of 0.7 patients per 1,000 population (n=3,549) in NSW compared with 2.9 patients per 1,000 population (n=4,257) in WA.

The highest number of stimulant users (per 1,000 population) for treatment of ADHD were those aged between 7 and 15 years in both States. Also, male stimulant users outnumbered females in both States, although a slightly higher ratio of males to females was observed for most age groups in NSW compared with WA.

Dexamphetamine was prescribed more frequently in WA adults (91.2% of stimulant users, n=3,882) compared with NSW adults (73.3%, n=2,602). Dexamphetamine was also prescribed more frequently in WA children (62.2%, n=4,244) compared with children in NSW (48%, n= 7,638).

The average daily dose of dexamphetamine in children (expressed in number of tablets per day) was 3.6 in WA and 2.9 in NSW. The average daily dose of dexamphetamine in children was 24.1% higher in WA than NSW. The average daily dose of methylphenidate (in number of tablets) in children was 3.3 in WA and 2.9 in NSW. The average daily dose of methylphenidate in children was 13.8% higher in WA than NSW. For both States the average daily dose of dexamphetamine and methylphenidate progressively increased with age.

Section 5: Comparisons with Commonwealth Data

Data on the supply of dexamphetamine and methylphenidate products by State is provided by the Therapeutic Goods Administration (TGA). The Commonwealth data are provided in base medication in grams. An attempt was made to compare WA prescription data and supply data provided by the TGA.

A comparison between WA stimulant prescription data and data on the dexamphetamine and methylphenidate products supplied in WA, as provided by the TGA, was undertaken by converting the amount of stimulant medication dispensed to base medication. To compare with 2004 TGA data, the 17 months of data collected during the study period was converted to annual figures using a correction factor of 0.71.

Based on date prescribed, a 9% difference between the TGA supply data and WA dispensed medication was identified with 8,607g more supplied than dispensed. However, this is likely to be an artefact of the methodology used to calculate dispensed quantities as subsequent analysis conducted by the Department of Health, which extracted data by calendar year and by date dispensed rather than date prescribed, revealed a smaller difference (2.1%, 1,930g) for 2004.

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Section 1: Project Overview

1.1 Background to Report

In 2002 the Minister for Health released the policy entitled 'Attentional Problems in Children: Diagnosis and Management of Attention Deficit Hyperactivity Disorder (ADHD) and Associated Disorders'. The policy required the Department of Health Western Australia (WA) to revise the existing regulatory scheme for stimulants (dexamphetamine and methylphenidate) used in the treatment of ADHD.

Data from the Commonwealth have indicated a higher level of stimulant use in WA compared with other States and Territories.[†] The new Stimulant Regulatory Scheme in WA provides for the collection of comprehensive data to enable a better understanding of stimulant use in this State. The previous stimulant regulatory scheme, which was based on 'en-bloc' authorisations for prescribers, did not collect sufficient information to allow for detailed analysis of stimulant use.

The legislative framework for the Stimulant Regulatory Scheme is contained in the *Poisons Regulations 1965*. Under the Scheme, which commenced on 1 August 2003, the Stimulant Regulatory Guidelines ('the Guidelines') set out the criteria for the prescribing of stimulant medication in WA.

This project was a collaborative research endeavour between Pharmaceutical Services at the Department of Health and the School of Population Health at The University of Western Australia (UWA), and represents the first detailed attempt at enumerating and estimating the rates of treatment with stimulant medication for people with ADHD in WA.

1.2 Project Objectives

The purpose of this report was to describe the stimulant prescribing patterns and use within WA from 1 August 2003 to 31 December 2004, based on administrative data contained within the Stimulant Notification Record Database and the Dispensed Stimulant Medication Database, maintained by the Department of Health. There were three primary objectives, which are as follows:

Objective One: To quantify and describe all patients within WA who had a completed Stimulant Notification Form and/or a dispensed stimulant prescription during the defined observation period.

Objective Two: To describe the prescribing patterns and population-adjusted rates of stimulant use for dexamphetamine and methylphenidate for patients identified in the Stimulant Notification Record Database with a diagnosis of ADHD and with at least one record of a stimulant prescription during the observation period.

[†] Data on transaction movements of Schedule 8 medications on a State and Territory basis provided by the Therapeutic Goods Administration (TGA) Treaties and Compliance Area.

Objective Three: To compare the current WA results for stimulant prescription in the treatment of ADHD with those published by the NSW Department of Health and Commonwealth supply data.

1.3 Stimulant Prescribing in Western Australia

The Stimulant Regulatory Guidelines (Appendix 1) set out the criteria for the prescribing of stimulant medication in WA. The Guidelines outline the requirements for the registration of Authorised Prescribers, conditions that can be treated, minimum age requirements, maximum allowable doses and patient co-morbidities (bi-polar, psychosis and substance abuse) that are relative contraindications for treatment with stimulants.

Stimulant medication may only be prescribed for the treatment of ADHD, depression, brain damage, narcolepsy, and other conditions as approved by the Commissioner of Health.

Treatment with stimulant medication may only be initiated by an Authorised Prescriber who is registered with the Medical Board of WA with specialist qualifications in psychiatry, paediatrics, neurology, or other approved qualifications, and has obtained a Stimulant Prescriber Number from the Department of Health.

For patients meeting the specific criteria set out in the Guidelines, the Authorised Prescriber must submit a *Notification of Treatment Using Stimulant Medication Form* (hereafter known as a 'Notification Form') to the Department of Health at the time stimulant treatment is initiated. It should be noted that all Authorised Prescribers who were currently prescribing stimulant medication for a particular patient at the time the Scheme commenced were required to submit a Notification Form for that patient. Therefore, completion of a Notification Form is more likely to represent continuation of Stimulant Treatment under the new Scheme, rather than the commencement of stimulant treatment.

Once a Notification Form is submitted it remains in force until:

i) a Re-Notification is submitted by the Authorised Prescriber;
ii) a Notification of Termination is submitted by the Authorised Prescriber;
iii) a Notification Form is submitted by a different Authorised Prescriber for the same patient (whereby the Department of Health terminates the original Notification); or
iv) the Notification is revoked by the Department of Health.

Authorised Prescribers must submit a Re-Notification Form for patients when there are changes to dose (where the change will lead to the dispensing of an additional standard pack per month), drug, drug form, co-prescriber or patient details.

Authorised Prescribers may nominate a medical practitioner (usually a general practitioner (GP)) to co-prescribe a stimulant medication for a particular patient. Co-prescribers may only prescribe according to the Notification Form submitted to the Department of Health by the Authorised Prescriber and cannot vary the dose, drug or drug form prescribed.

The Stimulant Regulatory Guidelines state that children under the age of 2 years cannot be prescribed stimulant medication under any circumstances. Children from the age of 2 years and up to 4 years fall outside the Stimulant Regulatory Guidelines but may be prescribed stimulant medication with prior written approval from the Commissioner of Health. Children aged 4 years and over can be prescribed stimulant medication within the

Stimulant Regulatory Guidelines with the completion of a Notification Form by the Authorised Prescriber at the initiation of stimulant treatment.

The maximum doses of stimulant medication that can be prescribed within the Stimulant Regulatory Guidelines are:

Children (4 to 17 years)
- dexamphetamine: 1 mg/kg/day to a maximum dose of 60 mg/day
- methylphenidate: 2 mg/kg/day to a maximum dose of 120 mg/day

Adults (≥18 years)
- dexamphetamine: 60 mg/day
- methylphenidate: 120 mg/day

These doses apply when dexamphetamine or methylphenidate is used alone. When both methylphenidate and dexamphetamine are prescribed for a patient, the methylphenidate dose is converted to the 'dex equivalent' (see Section 3 Methodology) dose and applied accordingly.

Authorised Prescribers who wish to treat patients outside the criteria set out in the Guidelines must receive prior written Authorisation from the Commissioner of Health and are required to provide additional information to justify stimulant use. Applications to prescribe stimulant medication outside the Guidelines for the treatment of ADHD may be referred to the Stimulants Assessment Panel for ADHD for clinical advice.

The Department of Health maintains records relating to the Stimulant Regulatory Scheme in two databases: the Stimulant Notification Record Database and the Dispensed Stimulant Medication Database.

1.4 Data Sources

Identification of stimulant use

There is no single optimum method for estimating stimulant usage in WA at the current time, owing to the limited duration for which the Stimulant Regulatory Scheme has been operational. Consequently, use of stimulants was estimated from two administrative data sources, with the true estimate expected to fall somewhere between the two. First, data from the Stimulant Notification Record Database were used as a proxy for the use of stimulants. The second source were data from the Dispensed Stimulant Medication Database. Estimates from both sources have their limitations.

The Notification data have two potential sources of inaccuracy. Firstly, a Stimulant Notification Form may not be completed (as required) by Authorised Prescribers for all patients receiving stimulant medication, leading to an underestimation of stimulant use based on Notification data. Secondly, it is not until the prescription is dispensed that the patient becomes an actual user of stimulants. If a delay occurs between diagnosis/Notification and the dispensing of stimulant medication, then the true count of users in a pre-defined reporting period would be overestimated from Notification data.

Whilst the user data supplied by pharmacists overcomes this problem to some extent, for the purposes of this study complete data were available only for the same period as the introductory Stimulant Notification phase (1 August 2003 to 31 December 2004).

Preliminary examination of the medication usage data showed that some patients did not have their prescription dispensed until up to three months after it was written. Therefore, this approach would potentially underestimate rates of stimulant use, particularly for patients who were issued with prescriptions towards the end of the introductory phase (eg, November - December 2004). Improvements on this method of estimation will be possible once data for longer periods of observation become available, but it is a recognised limitation of the current analysis.

Completeness of administrative data

The data which are routinely collected for both the Stimulant Notification Record Database and Dispensed Stimulant Medication Database should, ideally, contain complete information on all patients prescribed and dispensed a stimulant medication within WA since August 2003. Therefore, while the analysis here should provide correct estimates of stimulant prescribing and dispensing patterns in WA from 2003-2004, at this point in time no formal validation or extensive clerical audit of the completeness and accuracy of these data have been performed. A formal validation of the data was beyond the scope of this project and caution is therefore recommended when interpreting the results presented.

Stimulant Notification Record Database

Notification Forms are required to be forwarded to the Department of Health and the data contained on the Form are entered into the Stimulant Notification Record Database. The following information is collected:

- Patient demographic information, name, address, date of birth;
- Authorised Prescriber's Stimulant Prescriber Number;
- Date that Notification was signed by the Authorised Prescriber;
- Date that Notification was entered into the Stimulant Notification Record Database;
- Whether the Form is for a Notification or Re-Notification and reason;
- If record comprised a stimulant Termination;
    - Reason for Termination & Termination date
- Whether patient is being treated within the Stimulant Regulatory Guidelines;
- Patient diagnosis requiring stimulant medication;
    - ADHD, brain damage, narcolepsy, depression, other conditions(s);
- If ADHD is the primary diagnosis:
    - Whether diagnosis was by ICD-10 and/or DSM-IV criteria;
    - Whether other psychotropic drugs are being used, and class of drug;
- Stimulant(s) used (dexamphetamine or methylphenidate; all forms) and doses prescribed;
- Whether stimulant preparation has been compounded;
- Specific questions relating to children aged 4-12 years with a diagnosis of ADHD; and
- Co-prescriber details (if applicable).

A copy of the Stimulant Notification Form is included in Appendix 2.

For this study, data were extracted from the database using the following criteria:
01/08/2003 $\leq$ Date Notification signed by Authorised Prescriber $\leq$ 31/12/2004

Dispensed Stimulant Medication Database

The Dispensed Stimulant Medication Database includes patient and prescriber information obtained from the dispensing of a stimulant medication (dexamphetamine and/or methylphenidate) provided by pharmacies in WA. Dispensing data are recorded electronically at each pharmacy using commercially developed pharmacy dispensing software that can report on prescriptions for all Schedule 8 medications (including dexamphetamine and methylphenidate). It is a mandatory requirement for this report to be forwarded from each pharmacy to the Department of Health at the end of each month.

Specific data captured in the report include:

- Pharmacy identification;
- Drug name;
- Drug form;
- Drug strength;
- Quantity of drug dispensed;
- Date the prescription was dispensed;
- Prescription identification number;
- Prescriber identification;
- Date that the prescription was written; and
- Patient identification, name and address.

For this study data were extracted from the database using the following criteria:
01/08/2003 $\leq$ Date prescription written $\leq$ 31/12/2004

All estimates were calculated from these two administrative datasets that are collected and maintained by the Department of Health.

Methodological specifications

The Department specified all outputs included in this report and all methodological decisions relating to the case definition of patients under investigation, observation period employed, variable stratification and inclusion of outlier data in the analyses.

Section 2: Stimulant Use in WA

Methodology

This section provides an initial descriptive analysis of data collected by the Stimulant Notification Form and the dispensed stimulant prescriptions in WA from 1 August 2003 to 31 December 2004. Descriptive statistics have been generated for each of the patient subgroups identified in Figure 1 and all combinations of stimulant Notification and/or dispensing records as identified in Figure 2.

Figure 1: Stimulant Notification, medication use and diagnosis for the study sample

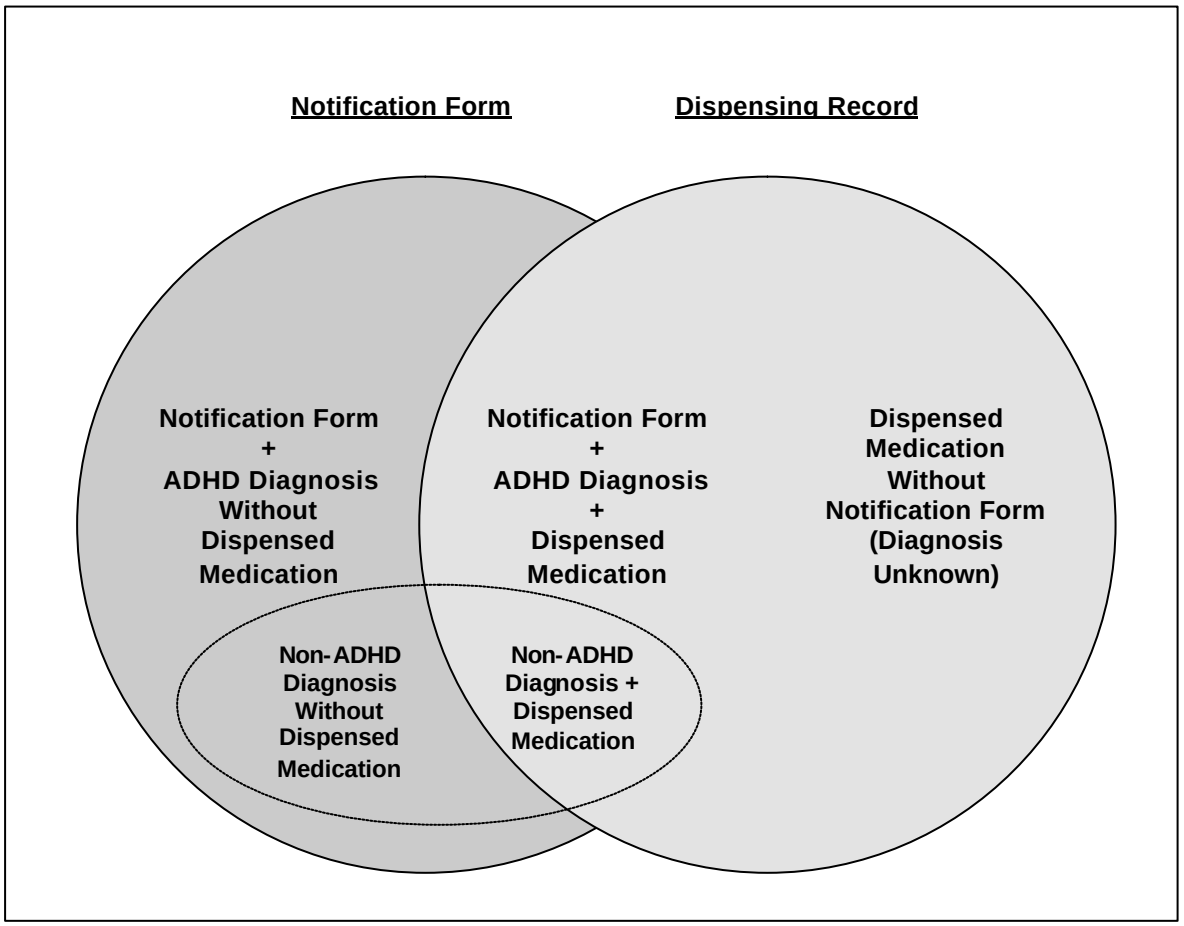
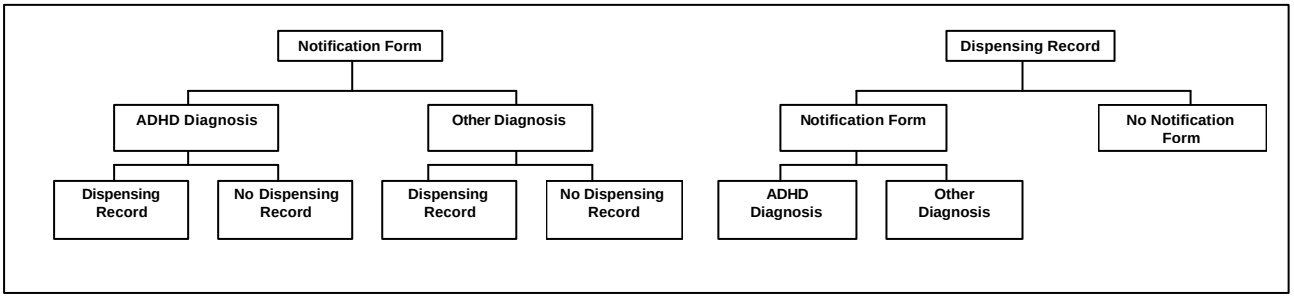


Figure 2: Patient Notification and usage subgroups described in Section 2



2.1 Findings from the analysis of Stimulant Notification Record data

Number of Stimulant Notification Forms

A total of 20,576 Notification Forms were received by the Department of Health during the study period (Table 1). Of these, there were 16,731 Notification Forms including 16,243 initial Notification Forms and 488 Notifications for patients who had previously been treated with stimulant medication (and a Notification Form previously completed) but were commencing treatment with a new Authorised Prescriber. There were 3,192 Re-Notifications (advising of change in drug, drug form, dose, co-prescriber or patient details) and 340 Notifications for patients being treated outside the Stimulant Regulatory Guidelines (due to age, dose or patient co-morbidities).

Of the 313 Termination Notifications received, 157 were for patients who had not been previously Notified under the new Scheme (ie, patients who had been treated with stimulant medication prior to 1 August 2003 but not treated after the introduction of the new Scheme), 139 were received for patients previously Notified as being treated within the Guidelines and 17 for patients Notified as being treated outside the Guidelines.

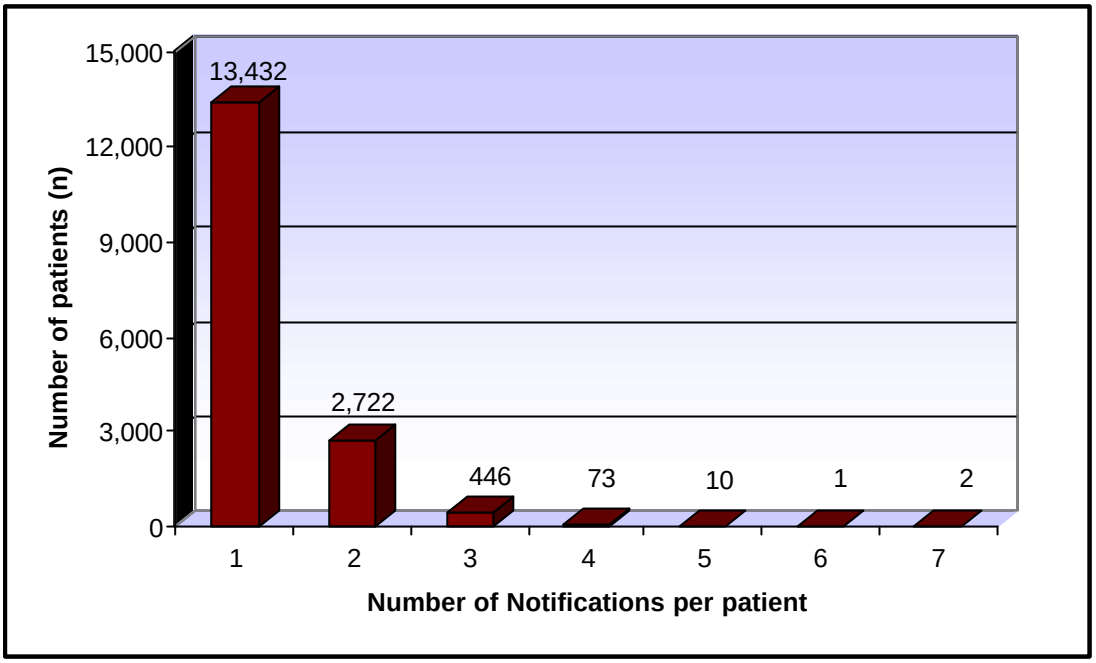
Table 1: Number and type of stimulant Notifications

Notification 'type'	Frequency	Percent
Notification	16,731	81.3
Re-Notification	3,192	15.5
Termination	313	1.5
Outside the guidelines	340	1.7
TOTAL	20,576	100.0

Number of patients with a Stimulant Notification Form

The total number of Notification Forms received by the Department of Health (Table 1) does not represent the number of patients treated with stimulant medication as some patients had multiple Notification Forms completed during the 17-month study period. Notification Forms were received for 16,686 patients. The majority of individuals (n=13,432, 80.5%) had only one Notification Form completed during the study period, while a maximum of seven Notification Forms were received by the Department of Health for two patients. The distribution of Notification Forms per patient is displayed in Figure 3.

Figure 3: Number of stimulant Notifications per patient



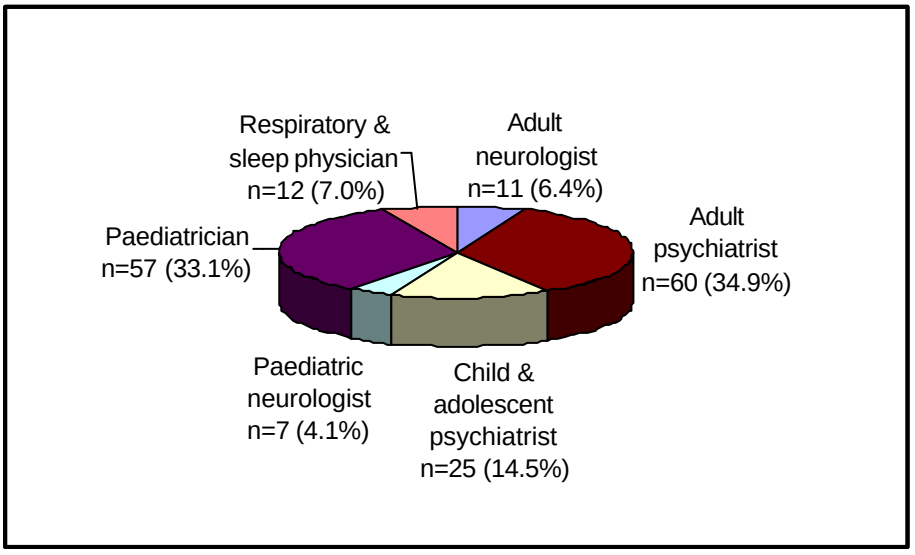
Number of Authorised Prescribers and professional category

There were 172 medical practitioners 'authorised' (Authorised Prescribers) to prescribe stimulant medication during the study period.

Analysis of the Stimulant Notification data indicates the majority of prescribers of stimulant medications within WA were adult psychiatrists (n=60, 34.9%) or paediatricians (n=57, 33.1%), followed by child and adolescent psychiatrists (n=25, 14.5%). A proportional breakdown of prescriber professional category is displayed in Figure 4.

There were 54 Authorised Prescribers who prescribed outside the Guidelines (see Appendix 1) at some point during the study period, the majority of whom were adult psychiatrists (n=28, 51.9%) and paediatricians (n=16, 29.6%), with the remainder being child and adolescent psychiatrists (n=10, 18.5%).

Figure 4: Professional category of Authorised Prescribers



Number of Notification Forms Completed per Prescriber

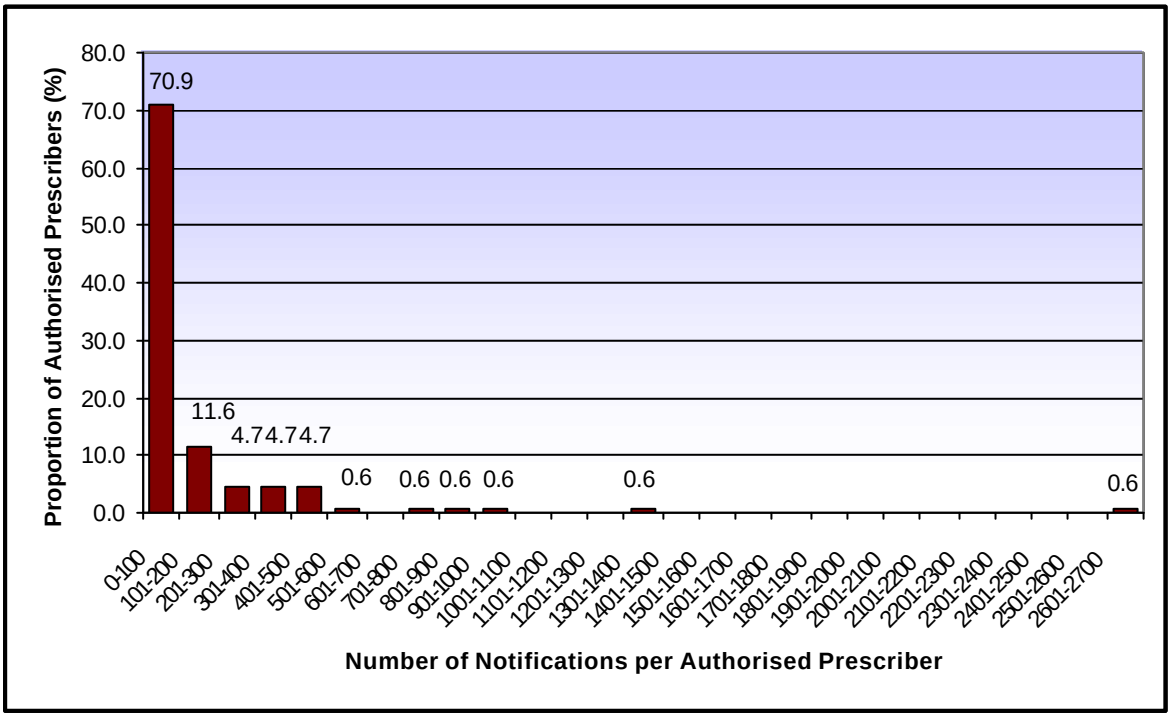
The number of Notification Forms completed per Authorised Prescriber was heavily skewed, with a median of 17 and range of 1 – 2,640. As a result, in this instance the average number of Notifications completed per prescriber, 119.6, is not a useful statistic. For example, nine Authorised Prescribers (representing the top 5% of prescribers, based on number of Notifications completed) submitted 8,680 Notifications (range: 479 – 2,640), which represented 42.2% of all Notifications submitted. Percentiles for the number of Notifications per Authorised Prescriber are shown in Table 2.

Table 2: Distribution of Stimulant Notification Forms per Authorised Prescriber

	Percentile						
	5	10	25	50	75	90	95
Notifications per Prescriber	1	1	4	17	120	366	479

To further explain Table 2 above, Figure 5 shows the Number of Notifications completed per Authorised Prescriber. Over 70% of Authorised Prescribers (n=122, 70.9%) each completed 100 or less Notifications.

Figure 5: Number of Notifications Completed per Authorised Prescriber[‡]



Number of Stimulant Notification Forms by diagnosis

Diagnoses were reported on all stimulant Notification Forms (except for Termination Notifications (n=313)). A breakdown of patient diagnoses as reported on the Notification

[‡] Figure 5 and associated text were added to the final report by the Department of Health to further explain the information contained in Table 2.

Form is shown in Table 3. The vast majority of Notifications were submitted for patients diagnosed with ADHD (n=19,699, 97.2%), and a small number also had additional diagnoses (n=110) at some point throughout the 17-month study period.

Table 3: Number of Notification Forms received per diagnosis

Diagnosis	Frequency	Percent
ADHD only	19,699	97.2
Brain damage only	48	0.2
Narcolepsy only	192	0.9
Depression only	205	1.0
Other condition only	8	<0.1
ADHD with co-existing condition(s)	110	0.5
Non-ADHD diagnosis combination	1	<0.1
TOTAL	20,263*	100

*Total excludes Notifications for Terminations of stimulant medication use (n=313).

Number of Notified patients by diagnosis

Diagnosis data reported on stimulant Notification Forms were available for a total of 16,528 patients. Of these, 16,158 (97.8%) patients had a diagnosis of ADHD (Table 4).

Table 4: Number of patients Notified per diagnosis

Diagnosis	Frequency*	Percent
ADHD	16,158	97.0
Brain damage	63	0.4
Narcolepsy	180	1.1
Depression	211	1.3
Other condition	42	0.3
TOTAL	16,654*	100

* Sums to greater than 16,528, as some patients had >1 reported diagnosis.

2.2 Patients dispensed stimulant medication

There were a total of 19,062 patients with at least one record of a dispensed stimulant prescription during the study period. For these patients, a total of 178,369 prescriptions were dispensed. The average number of prescriptions for a stimulant medication dispensed per patient was 9.4, with a range of 1 to 100.

2.3 Findings from the Stimulant Notification data and the Dispensing Record data

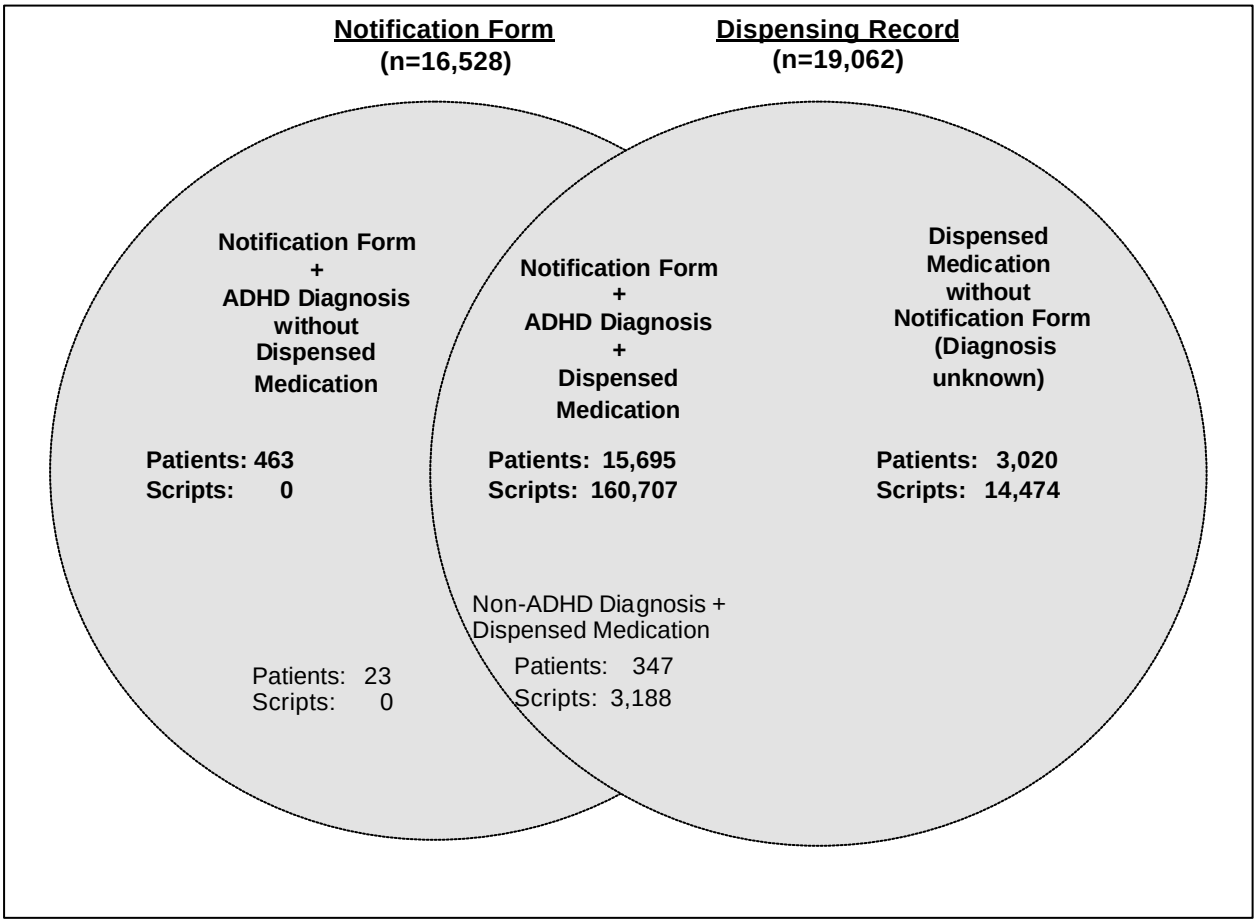
2.3.1 Methodology

For this section of the analysis, patients who had at least one 'active' Stimulant Notification Form with diagnostic information (see Glossary) were counted as being a 'Notified Stimulant User' (n=16,528). Patients were categorised by a diagnosis as recorded on the Notification Form during the study period.

2.3.2 Results

Figure 6 summarises the number of patients who were dispensed stimulants based on whether or not they had an 'Active' Notification Form.

Figure 6: Number of patients with Active Notification Form and/or dispensing of stimulant medication



Of the 16,528 identified stimulant users with an Active Notification Form, 97.1% (n=16,042) had at least one dispensed stimulant medication record. A total of 163,895 prescriptions were dispensed to these patients, which represented 91.9% of all stimulant prescriptions dispensed during the study period.

For the 16,158 patients with at least one Active Notification Form and diagnosis of ADHD, 15,695 (97.1%) were dispensed at least one stimulant drug, with a total of 160,707 stimulant prescriptions dispensed during the study period. Of the 370 people with an

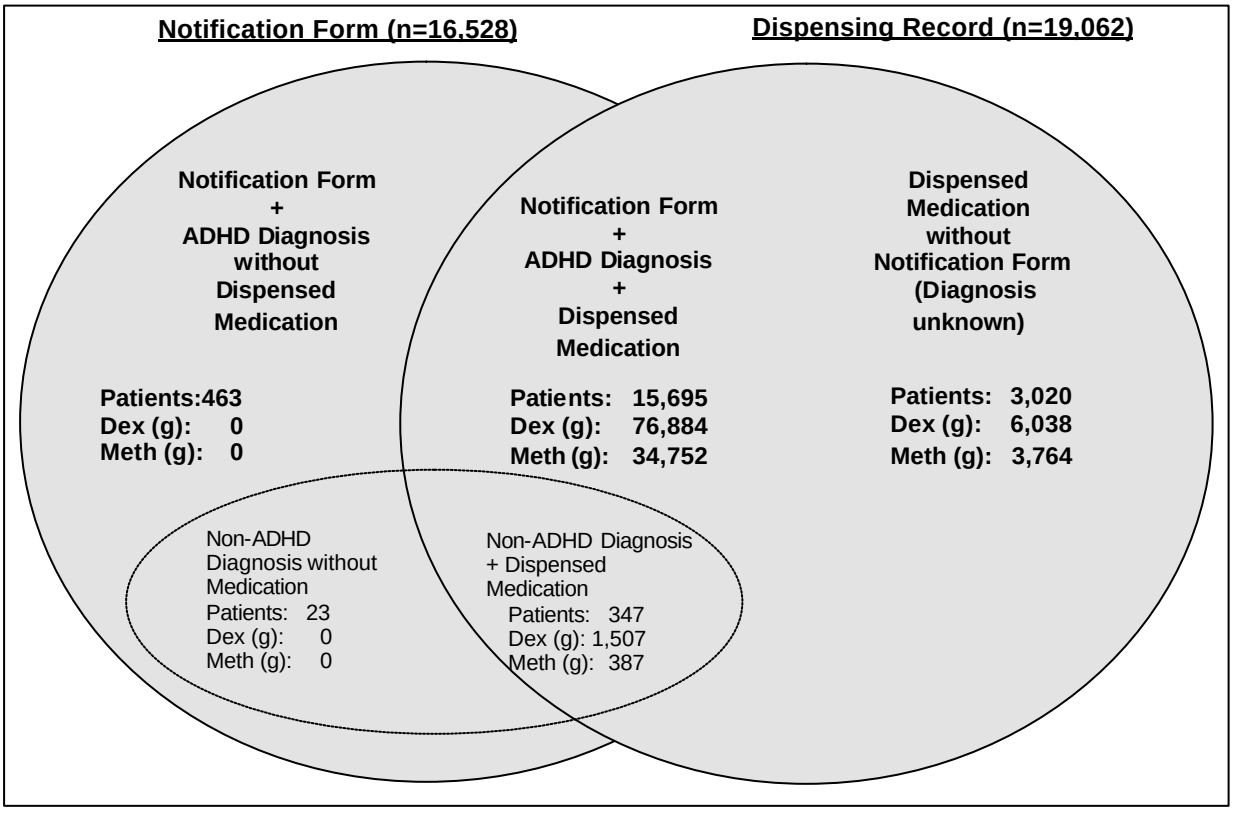
Active Notification Form and diagnosis other than ADHD, 347 (93.8%) were dispensed a total of 3,188 stimulant prescriptions.

A relatively small proportion of patients with at least one Active Notification Form and diagnosis of ADHD did not have a stimulant prescription dispensed (2.9%, n=463). Additionally, there were 23 patients who had an Active Notification Form with a diagnosis other than ADHD who did not have a stimulant prescription dispensed during the study period. There were 3,020 patients dispensed a total of 14,474 stimulant prescriptions who did not have an Active Notification Form.[§]

Quantity of stimulants dispensed to WA patients

For patients with an Active Notification Form and reported diagnosis, the vast majority of dexamphetamine (91.1%) and/or methylphenidate (89.3%) dispensed in WA, during the study period, was for the treatment of ADHD (Figure 7). Almost 8% of stimulant prescriptions were dispensed to patients for whom a Notification Form had not yet been received by the Department of Health.

Figure 7: Quantity of dexamphetamine and methylphenidate (expressed in base medication) dispensed to patients



[§] There were 3,020 patients identified during the data cleaning process for the current investigation that had not yet had a Notification form submitted to the Department of Health. These patients were subsequently followed up by the Department of Health, but excluded from certain parts of the analysis for this report.

2.4 Summary of Key Findings

- A total of 20,576 Notification Forms, completed by Authorised Prescribers, were received by the Department of Health during the study period. This consisted of 16,731 Notifications, 3,192 Re-Notifications (advising of change in drug, drug form, dose, co-prescriber or patient details), 313 Termination Notifications and 340 Notifications for patients being treated outside the Stimulant Regulatory Guidelines (due to age, dose or patient co-morbidities).

- Notification Forms were received for 16,686 patients.

- 80.5% of patients had a single Notification record.

- There were 172 medical practitioners 'authorised' (Authorised Prescribers) to prescribe stimulant medication during the study period.

- The majority of prescribers of stimulant medications within WA were adult psychiatrists (n=60, 34.9%) or paediatricians (n=57, 33.1%), followed by child and adolescent psychiatrists (n=25, 14.5%).

- 52% of prescribers specialised in the treatment of children (child and adolescent psychiatrists, paediatricians or paediatric neurologists).

- The number of Notification Forms completed per Authorised Prescriber was heavily skewed, with a median of 17 and range of 1 to 2,640. Nine Authorised Prescribers (representing the top 5% of prescribers) submitted a total of 8,680 Notifications, which represented 42.3% of all Notifications submitted to the Department of Health during the study period.

- Over 95% of all Notification Forms received (n=19,699, 97.2%) were for patients diagnosed with ADHD.

- There were 19,062 patients who had a dispensed stimulant prescription during the study period. Of these, 15,695 were patients with a diagnosis of ADHD.

- 486 (2.9%) patients with an Active Notification for any diagnosis were not dispensed any stimulant medications during the study period.

- 3,020 patients had 14,474 stimulant prescriptions dispensed for them, without an Active Notification Form.

Section 3: The ADHD Cohort

A more detailed analysis was undertaken of data in the Stimulant Notification Record Database and the Dispensed Stimulant Medication Database for patients being treated for ADHD.

Methodology

The cohort studied consisted of all Western Australians who were identified in the Stimulant Notification Record Database with a diagnosis of ADHD and in the Dispensed Stimulant Medication Database with at least one record of a stimulant prescription (for this diagnosis) during the period 1 August 2003 to 31 December 2004.

This study population corresponds to the region of intersection between the two databases shown in Figure 1 for patients with a diagnosis of ADHD. Patients identified for diagnoses other than ADHD were excluded from the analysis. For patients with multiple Stimulant Notifications/Re-Notification, entry to the cohort began upon their first Active Notification for treatment of ADHD.

The cohort was defined over a 17-month period to coincide with the introductory phase of the new Stimulant Regulatory Scheme. Whilst the majority of people already receiving stimulant treatment were enumerated during this period, internal validation processes performed as pilot work to this project identified that Notifications were not received for approximately 15% of patients with a stimulant prescription.[**] In addition, a small proportion of patients (<3%) were identified who had a Stimulant Notification record, but did not have any stimulant medication dispensing/usage data. Records pertaining to these individuals were excluded from any analyses in this section of the study.

Calculation of 'Dex equivalents'

The *Poisons Regulations 1965* restrict the prescribing of dexamphetamine and methylphenidate to the treatment of ADHD and other conditions. To allow for an assessment of total stimulant use, comparisons of stimulant usage between patient groups in WA, and comparisons with published data available nationally and overseas, doses of methylphenidate have been expressed in *'dex equivalents'* for some sections of the report.

Converting a methylphenidate dose to a 'dex equivalent' allows the total dose of stimulant to be represented as a single number. This allows for comparisons to be made between patient groups regardless of which stimulant medication or preparation is prescribed. For this purpose, it has been assumed that 10 mg methylphenidate is equivalent to 5 mg of dexamphetamine.

'Dex equivalent' doses were calculated as follows:

Dex equivalents (mg) for patients using dexamphetamine only
= dose of dexamphetamine SO_4 in mg

[**] There were 3,020 patients identified during the data cleaning process for the current investigation that had not yet had a Notification Form submitted to the Department of Health. These patients were subsequently followed up by the Department of Health, but excluded for certain parts of the analysis for this report.

Dex equivalents (mg) for patients using methylphenidate only
= (methylphenidate HCL immediate action in mg + methylphenidate HCL long acting in mg)/2

Dex equivalents (mg) for patients using both drug types
= (dexamphetamine SO_4 in mg) + ((methylphenidate HCL immediate action in mg + methylphenidate HCL long acting in mg)/2)

Age groupings
The age groupings used for this section were specified by the Department of Health to allow comparisons to be made with published NSW data on stimulant use. Age-specific analyses are based on the age (calculated) at first receipt of a Notification with a diagnosis of ADHD.

Dose
For patients with multiple Notifications, a mean value was calculated for dexamphetamine dose, methylphenidate (immediate action) dose and methylphenidate (long acting) dose, as well as patient weight. Hence, each patient in the cohort had only one record and only one dose for each stimulant drug type, and one value for body weight.

A total of 15,695 (94% of all patients) met the criteria for inclusion in the ADHD cohort.

3.1 General descriptive statistics for the 'ADHD cohort'

3.1.1 Methodology

Health District and Health Service Area

Where this section of the analysis required the data to be displayed by Health District and Health Service Area, the categorisation was based on geocoded data. The geocoding was performed by the Data Linkage Unit at the Department of Health using the address fields on the Stimulant Notification Form. For a full list of Health Districts/Service Areas and their corresponding WA postcodes, refer to Appendix 3.

To determine patient Health Service residential locality, postcodes were stratified into the following:

a)	North Metropolitan	6000 to 6090, 6500, 6555 to 6558
b)	South Metropolitan	6100 to 6215
c)	South West	6220 to 6290
d)	WA Country	6300 and over (excluding those postcodes listed as North Metropolitan)

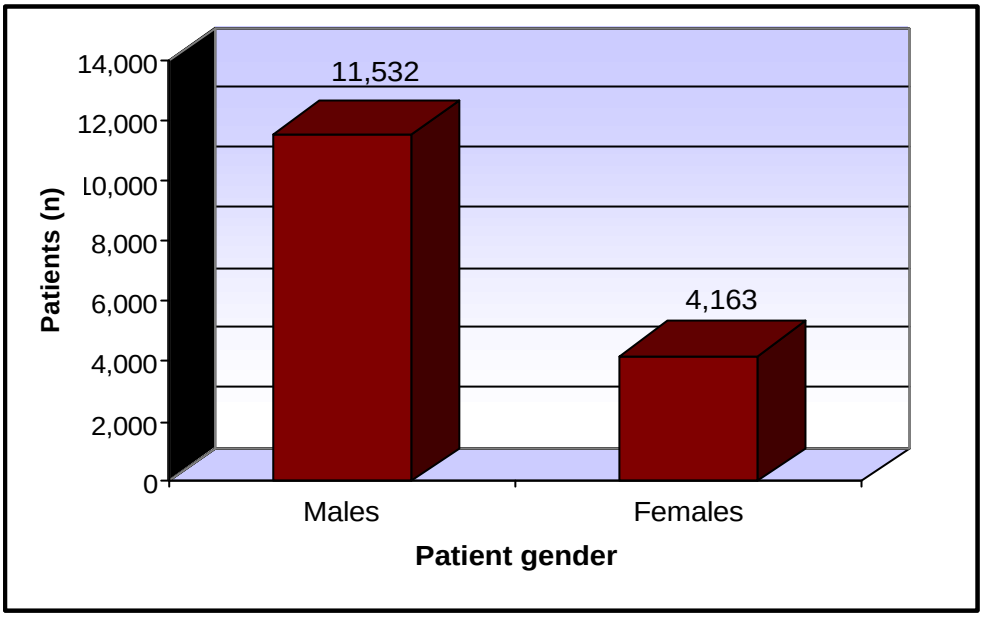
Due to the geocoding and analysis performed, 2 Health Districts (Midlands and Valley) were misrepresented as having 0 stimulant users and so were presented n combination with the Central Health District in Table 8 and Table 17.

3.1.2 Results

Patient gender

There were a total of 15,695 patients in the ADHD cohort. Of these patients, the large majority were male (n=11,532, 73.5%), and 4,163 (26.5%) were female (Figure 8). The overall ratio of males to females in the ADHD cohort was 2.8.

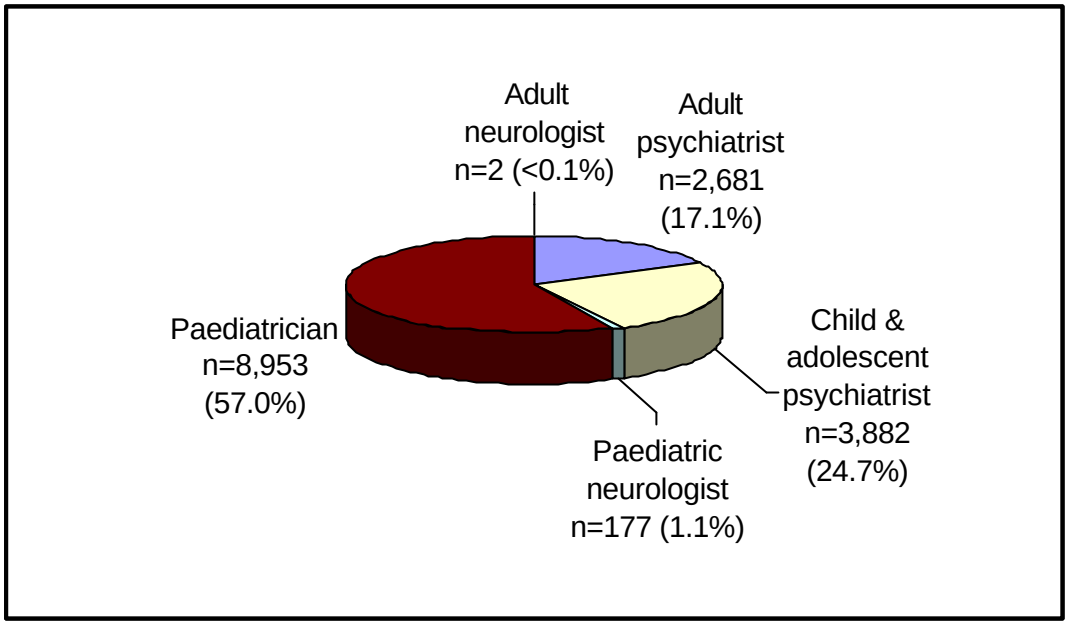
Figure 8: Gender distribution in the ADHD cohort



Number of patients in the ADHD cohort by prescriber specialty

In terms of patient treatment by Authorised Prescribers, the majority of patients within the ADHD cohort were treated by paediatricians (n=8,953, 57.0%), followed by child and adolescent psychiatrists (n=3,882, 24.7%) and adult psychiatrists (n=2,681, 17.1%). A breakdown of prescriber professional category for the ADHD cohort is displayed in Figure 9.

Figure 9: Number and proportion of patients in the ADHD cohort per Authorised Prescriber speciality



Number of patients in the ADHD cohort per Authorised Prescriber

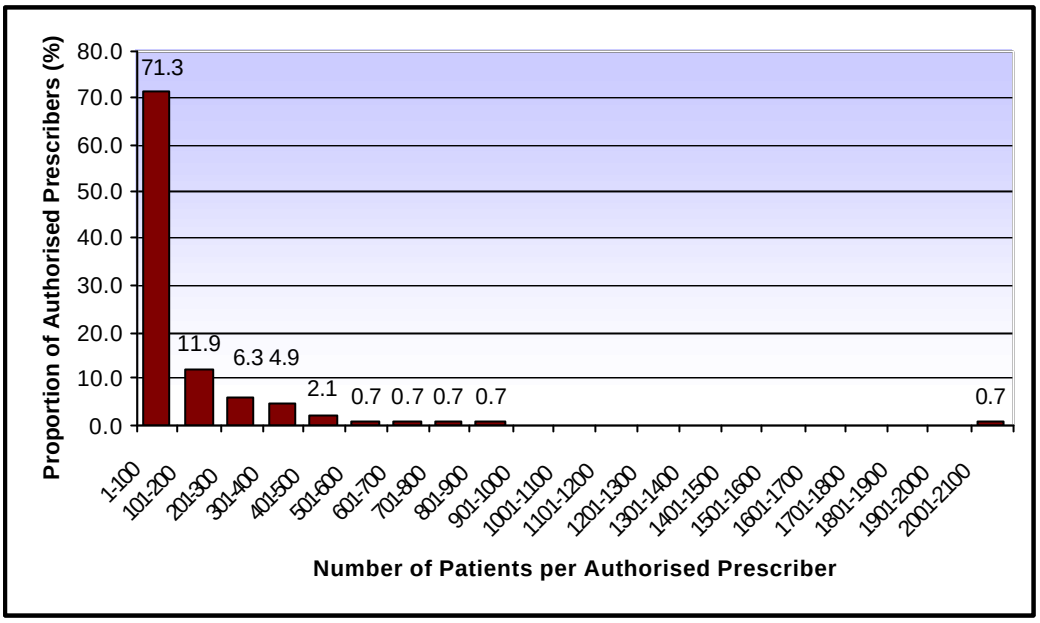
There were 143 Authorised Prescribers who submitted Notification Forms for patients in the ADHD cohort. The number of patients Notified per Authorised Prescriber was heavily skewed with a median of 22 and a range of 1 to 2,077 (mean=109.8, SD=227.6). Seventy-five percent of the prescribers treated less than 138 patients each. At least half of all prescribers treated 22 patients each, while 10% treated only one patient each in the ADHD cohort. Table 5 shows the percentile distribution of the number of ADHD cohort patients treated per Authorised Prescriber.

Table 5: Distribution of patients in the ADHD cohort treated per Authorised Prescriber

	Percentile						
	5	10	25	50	75	90	95
Patients per prescriber	1	1	3	22	137	310	441

To further explain Table 5, Figure 10 shows the number of patients in the ADHD cohort per Authorised Prescriber. Over 70% (n=102, 71.3%) of Authorised Prescribers each Notified 100 or less patients.

Figure 10: Number of patients in the ADHD cohort per Authorised Prescriber[††]

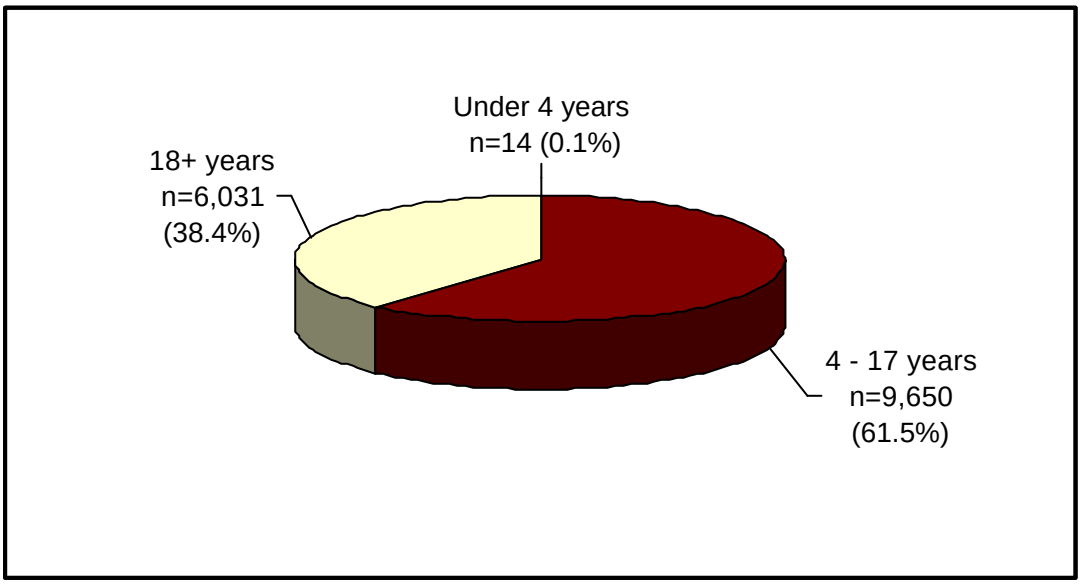


Age characteristics in the ADHD cohort

Stimulant Regulatory Guidelines

The Stimulant Regulatory Guidelines specify a lower age limit of 4 years for treatment of ADHD. The majority of patients in the ADHD cohort were aged between 4 to 17 years (n=9,650, 61.5%) with a minimal number (n=14) below four years of age (Figure 11).

Figure 11: Number and proportion of patients in the ADHD cohort by age



As outlined previously, the age groupings used for the present analyses allow for comparisons with findings of other research on stimulant use in Australia. Specifically, the age groupings shown here are the same as those used for the NSW Department of Health reports on stimulant medication prescribing patterns in children and adults. The comparisons can be found in Section 4.

[††] Figure 10 and associated text were added to the final report by the Department of Health to further explain the information contained in Table 5.

All patients

For all patients in the ADHD cohort (n=15,695), the mean age was 19.6 years (SD=12.3) with a range from 2 to 79 years. The data were skewed such that 53.6% of all patients treated were = 15 years of age and only 17.8% were aged = 30 years. The number and proportion of ADHD cohort patients, by specified age group, are shown in Table 6.

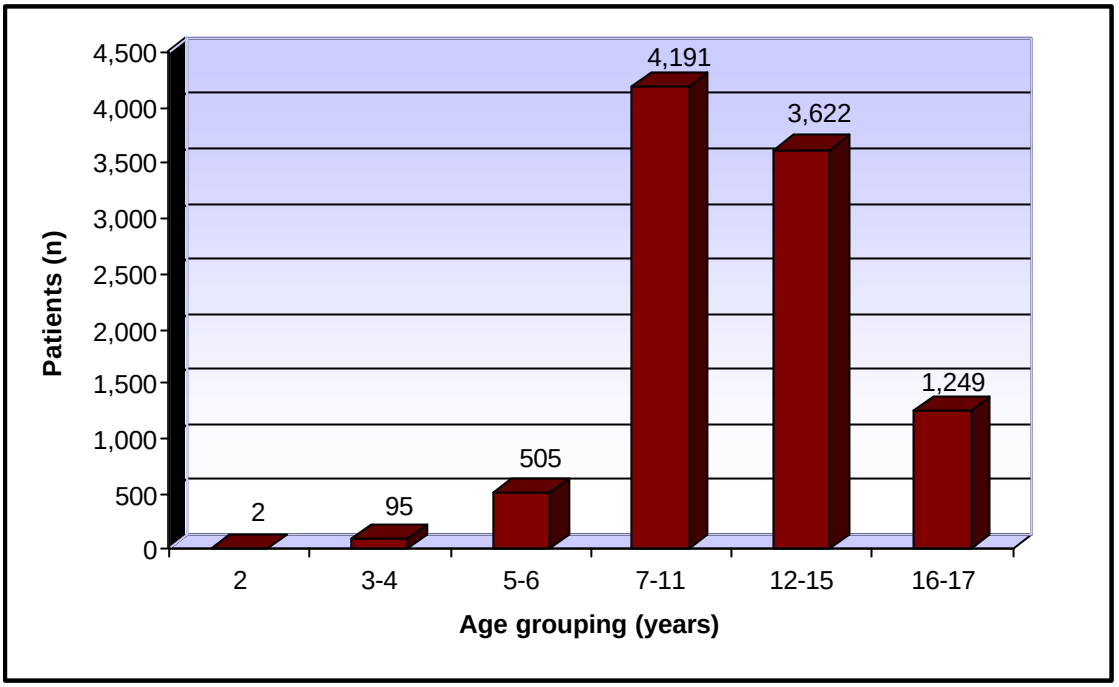
Table 6: Age distribution for all patients identified in the ADHD cohort

Age grouping (years)	All patients	Percent	Cumulative Percent
2	2	< 0.1	< 0.1
3-4	95	0.6	0.6
5-6	505	3.2	3.8
7-11	4,191	26.7	30.5
12-15	3,622	23.1	53.6
16-17	1,249	8.0	61.6
18	464	3.0	64.5
19	408	2.6	67.1
20	405	2.6	69.7
21	341	2.2	71.9
22-24	806	5.1	77.0
25-29	809	5.2	82.2
30-34	690	4.4	86.6
35-39	584	3.7	90.3
40-44	553	3.5	93.8
45-49	442	2.8	96.6
50+	529	3.4	100.0
TOTAL	15,695	100.0	

Children (2 to 17 years)

Of those patients identified in the ADHD cohort, 9,664 (61.6%) were under the age of 18 years, with a mean age of 12.0 years (SD=3.2 years). The youngest cohort member was two years of age, with only two patients (both males) less than three years of age. As shown in Figure 12, the highest proportion of children in the ADHD cohort were between the ages of 7 and 11 years (n=4,191, 43.4%), with a relatively high number of patients also found in the 12 to 15 year age group (n=3,622, 37.5%).

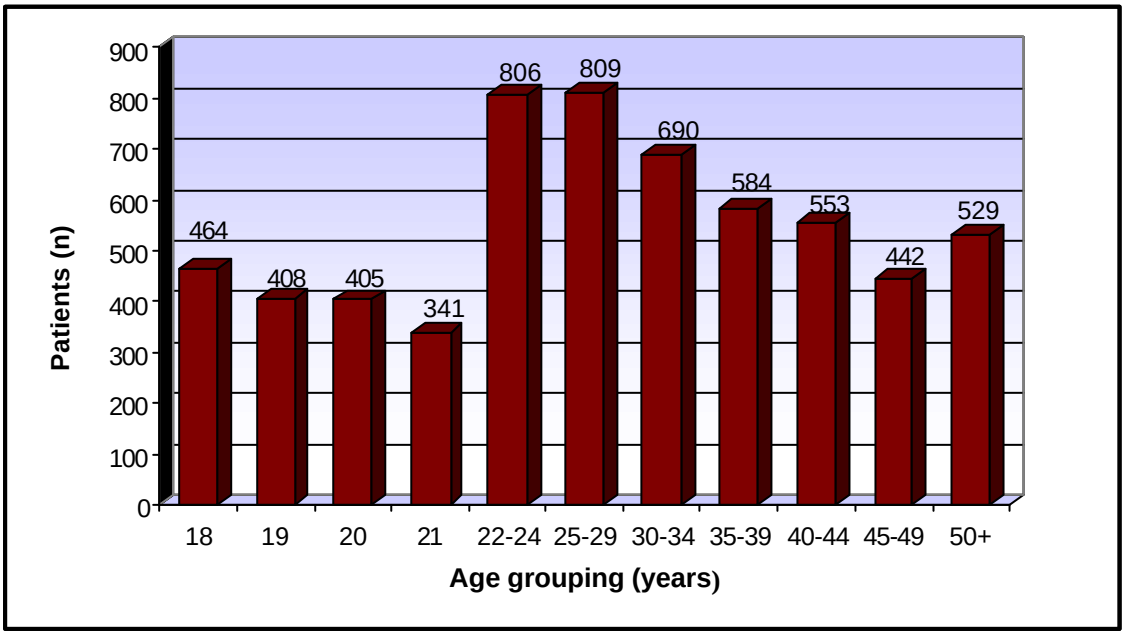
Figure 12: Age of children in the ADHD cohort



Adults (= 18 years)

A total of 6,031 (38.4%) patients in the ADHD cohort were 18 years of age or older with a mean age of 31.7 years (SD=11.6). The oldest cohort member was 79 years of age. As shown in Figure 13, the highest proportion of adults in the ADHD cohort were between the ages of 25 and 29 years (n=809, 13.4%), although similar counts were seen in the 22 to 24 year age bracket (n=806, 13.4%).

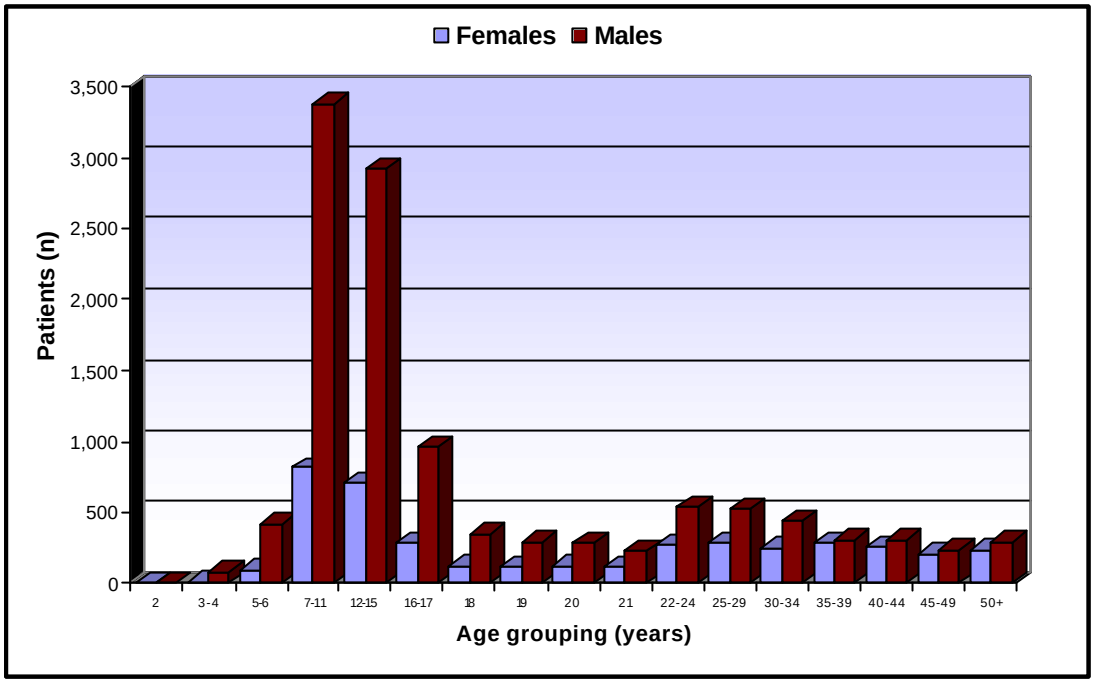
Figure 13: Age of adults in the ADHD cohort



Age grouping by gender

There were approximately 2.8-times the number of males (n=11,532, 73.5% of cohort) than females (n=4,163, 26.5%) in the ADHD cohort. Age distributions showed differences between genders especially for patients aged 7 to 17 years (Figure 14).

Figure 14: Age distribution for males and females in the ADHD cohort



The proportion of male stimulant users exceeded females in all age groups up until age 19. Of males in the ADHD cohort, 67.3% were aged 2 to 17; of females, 45.8% were aged 2 to 17. The number and proportion of males and females in the ADHD cohort for each age group is shown in Table 7.

Section continued over page

Table 7: Age and gender distribution in the ADHD cohort

Age grouping (years)	Males	Percent	Cumulative Percent		Females	Percent	Cumulative Percent
2	2	< 0.1	< 0.1		0	0.0	0.0
3-4	80	0.7	0.7		15	0.4	0.4
5-6	418	3.6	4.3		87	2.1	2.5
7-11	3,380	29.3	33.6		811	19.5	21.9
12-15	2,914	25.3	58.9		708	17.0	38.9
16-17	964	8.4	67.3		285	6.8	45.8
18	343	3.0	70.2		121	2.9	48.7
19	289	2.5	72.8		119	2.9	51.5
20	280	2.4	75.2		125	3.0	54.6
21	228	2.0	77.2		113	2.7	57.3
22-24	533	4.6	81.8		273	6.6	63.8
25-29	523	4.5	86.3		286	6.9	70.7
30-34	442	3.8	90.1		248	6.0	76.7
35-39	306	2.7	92.8		278	6.7	83.3
40-44	300	2.6	95.4		253	6.1	89.4
45-49	238	2.1	97.5		204	4.9	94.3
50+	292	2.5	100.0		237	5.7	100.0
TOTAL	11,532	100.0			4,163	100.0	

Outcome of Notification Form questions for children aged 4 to 12 years

This section of analysis relates to specific questions on the Stimulant Notification Form (Appendix 2) which Authorised Prescribers of stimulants complete for children diagnosed with ADHD between the ages of 4 and 12 years. These questions are:

a) Have alternative diagnoses been considered?

b) Has a management plan been developed?

c) Have parents requested no management plan?

A total of 4,779 children (49.5% of all children) in the ADHD cohort were aged from 4 to 12 years. Alternative diagnoses had been considered for the majority of these children (n=4,627, 96.8%). Furthermore, 4,370 (91.4%) had a management plan developed according to the Stimulant Regulatory Guidelines, while only a relatively small number of children had parents who specifically requested that no management plan be developed for their child (n=49, 1.0%).

Missing data for these questions were minimal. Specifically, 28 (0.6%), 38 (0.8%) and 288 (6.0%) patients had missing data for the three Notification Form questions, respectively.

Stimulant use by residential location

Health Service Area and Health District

The data needed to determine residential locality were missing for 655 (4.2%) patients in the ADHD cohort, due to factors such as non-recorded, invalid or interstate postcodes.

In terms of Health Service Area, 12,877 (82.0%) ADHD cohort patients resided within the WA metropolitan area, while 2,163 (13.8%) had a rural residential address. Figure 15 and Table 8 show the distribution of residential location within WA (by Health Service Area and Health District respectively) for patients in the ADHD cohort.

Figure 15: WA Health Service Area for patients in the ADHD cohort

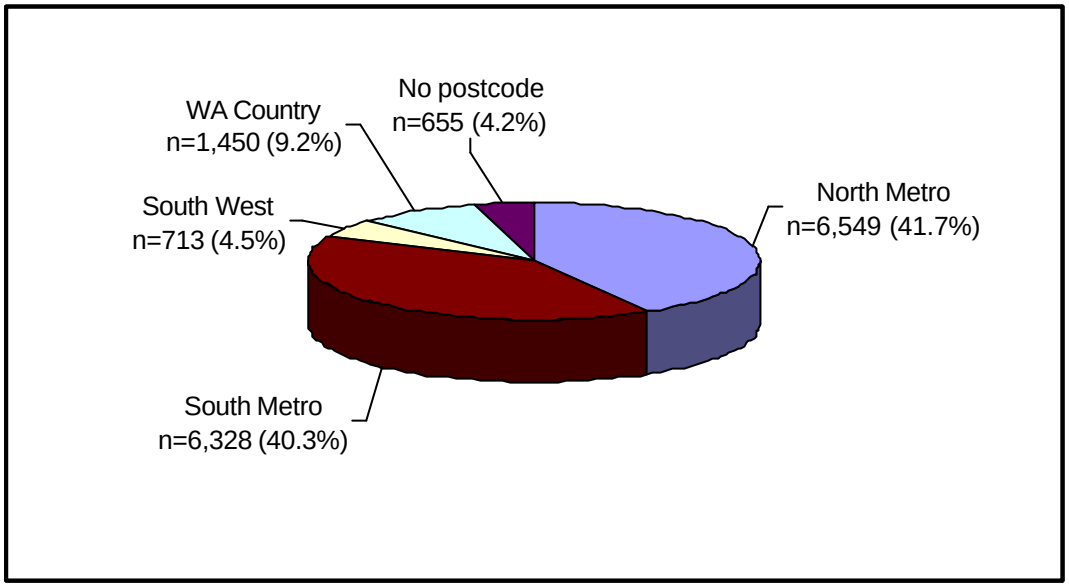


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Table 8: Number of patients in the ADHD cohort per residential WA Health District

Health District	All patients	Percent	Males	Females
NMAHS - Central/Midlands/Valley*	2,280	14.5	1,667	613
NMAHS - Coastal	1,404	8.9	1,066	338
NMAHS - Hills	707	4.5	521	186
NMAHS - Lower	1,302	8.3	858	444
NMAHS - Perth City	339	2.2	233	106
NMAHS - Upper	517	3.3	383	134
SMAHS - Armadale	1,765	11.2	1,315	450
SMAHS - Bentley	1,266	8.1	921	345
SMAHS - Fremantle	1,624	10.3	1,174	450
SMAHS - Peel	637	4.1	469	168
SMAHS - Rockingham-Kwinana	1,036	6.6	764	272
SWAHS - Blackwood	37	0.2	29	8
SWAHS - Bunbury	244	1.6	200	44
SWAHS - Busselton	91	0.6	69	22
SWAHS - Leeuwin	29	0.2	23	6
SWAHS - Leschenault	159	1.0	127	32
SWAHS - Warren	58	0.4	45	13
SWAHS - Wellington	95	0.6	74	21
WACHS - Central Great Southern	55	0.4	47	8
WACHS - East Pilbara	60	0.4	48	12
WACHS - Eastern Wheatbelt	56	0.4	43	13
WACHS - Gascoyne	41	0.3	33	8
WACHS - Geraldton	325	2.1	223	102
WACHS - Kimberley	38	0.2	31	7
WACHS - Lower Great Southern	181	1.2	146	35
WACHS - Midwest	56	0.4	43	13
WACHS - Murchison	8	0.1	5	3
WACHS - Northern Goldfields	136	0.9	95	41
WACHS - South East Coastal	46	0.3	39	7
WACHS - Southern Wheatbelt	103	0.7	81	22
WACHS - West Pilbara	88	0.6	71	17
WACHS - Western Wheatbelt	257	1.6	202	55
No district recorded	655	4.2	487	168
TOTAL	15,695	100.0	11,532	4,163

* Due to the geocoding and analysis performed, 2 Health Districts (Midlands and Valley) were misrepresented as having 0 stimulant users and so were presented n combination with the Central Health District.

Stimulant co-prescribers

A total of 4,778 patients in the ADHD cohort (30.4%) were Notified with a co-prescriber nominated by the Authorised Prescriber. Of these, 3,783 (79.2%) had co-prescribers who were not an Authorised Prescriber (ie, usually a GP). The remaining 995 (20.8%) patients had an Authorised Prescriber as a co-prescriber, the majority of whom were paediatricians (n=977) (Table 9).

Table 9: Number of patients in the ADHD cohort with each type of stimulant co-prescriber

Type of co-prescriber	Frequency	Percent
Non-Authorised Prescriber (ie, no SPN)*	3,783	79.2
Authorised Prescribers (ie, with SPN) (n=995)		
- Adult psychiatrist	6	0.1
- Child & adolescent psychiatrist	9	0.2
- Paediatric neurologist	2	< 0.1
- Paediatrician	977	20.4
- Respiratory & sleep physician	1	< 0.1
TOTAL	4,778	100.0

SPN = stimulant prescriber number, * Non-authorised co-prescribers were usually a GP.

Residential location of patients with a co-prescriber

Of those patients Notified with a nominated co-prescriber, 3,651 (76.4%) resided within the Perth metropolitan area, while co-prescribers were nominated for 1,120 (23.4%) rural patients. Table 10 shows the residential distribution within WA of patients in the ADHD cohort for whom a co-prescriber was nominated. The proportion of patients who had a nominated co-prescriber was highest for WA Country patients (73.2%) and lowest for patients in the South West Health Service Area (8.3%).

Table 10: Patients in the ADHD cohort with a nominated stimulant co-prescriber by WA Health Service Area

WA location	Patients with a co-prescriber (a)	Patients in cohort (b)	Proportion (%) with a co-prescriber (a/b)
North Metropolitan	1,965	6,549	30.0
South Metropolitan	1,686	6,328	26.6
South West	59	713	8.3
WA Country	1,061	1,450	73.2
No location identified	7	655	1.1
TOTAL	4,778	15,695	30.4

Number of patients per Authorised Prescriber (with a nominated co-prescriber for any of their ADHD patients)

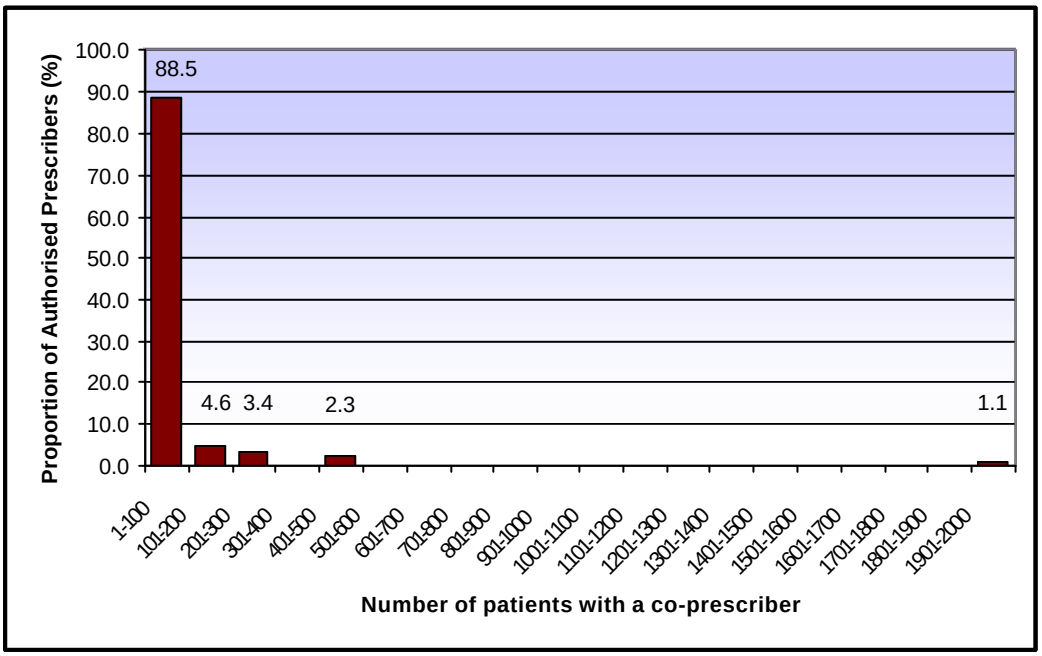
This section deals with the 87 Authorised Prescribers (60.8% of all Authorised Prescribers who treated patients with ADHD) who nominated at least one co-prescriber for any of their ADHD cohort patients. Each of these prescribers nominated a co-prescriber for an average of 55 patients (SD=217.7). The distribution was heavily skewed with a median of 3 and range of 1 to 1,925 patients. The percentile distribution of the number of patients in the ADHD cohort per Authorised Prescriber with a nominated co-prescriber is shown in Table 11.

Table 11: Number of patients in the ADHD cohort per Authorised Prescriber (with a nominated co-prescriber)

	Percentile						
	5	10	25	50	75	90	95
Number of patients per Authorised Prescriber (who have a nominated co-prescriber)	1	1	1	3	19	122	229

To further explain Table 11, Figure 16 shows the number of patients per Authorised Prescriber with a nominated co-prescriber. Almost 90% of Authorised Prescribers (n=77, 88.5%) had nominated a co-prescriber for 100 or less patients.

Figure 16: Number of Patients treated per Authorised Prescriber with a nominated co-prescriber[‡‡]



Patients in the ADHD cohort with a nominated co-prescriber

There were 4,778 patients (30.4%) in the ADHD cohort whose Authorised Prescriber had nominated a co-prescriber. The Authorised Prescriber was a paediatrician for 3,411

[‡‡] Figure 16 and associated text were added to the final report by the Department of Health to further explain the information contained in Table 11.

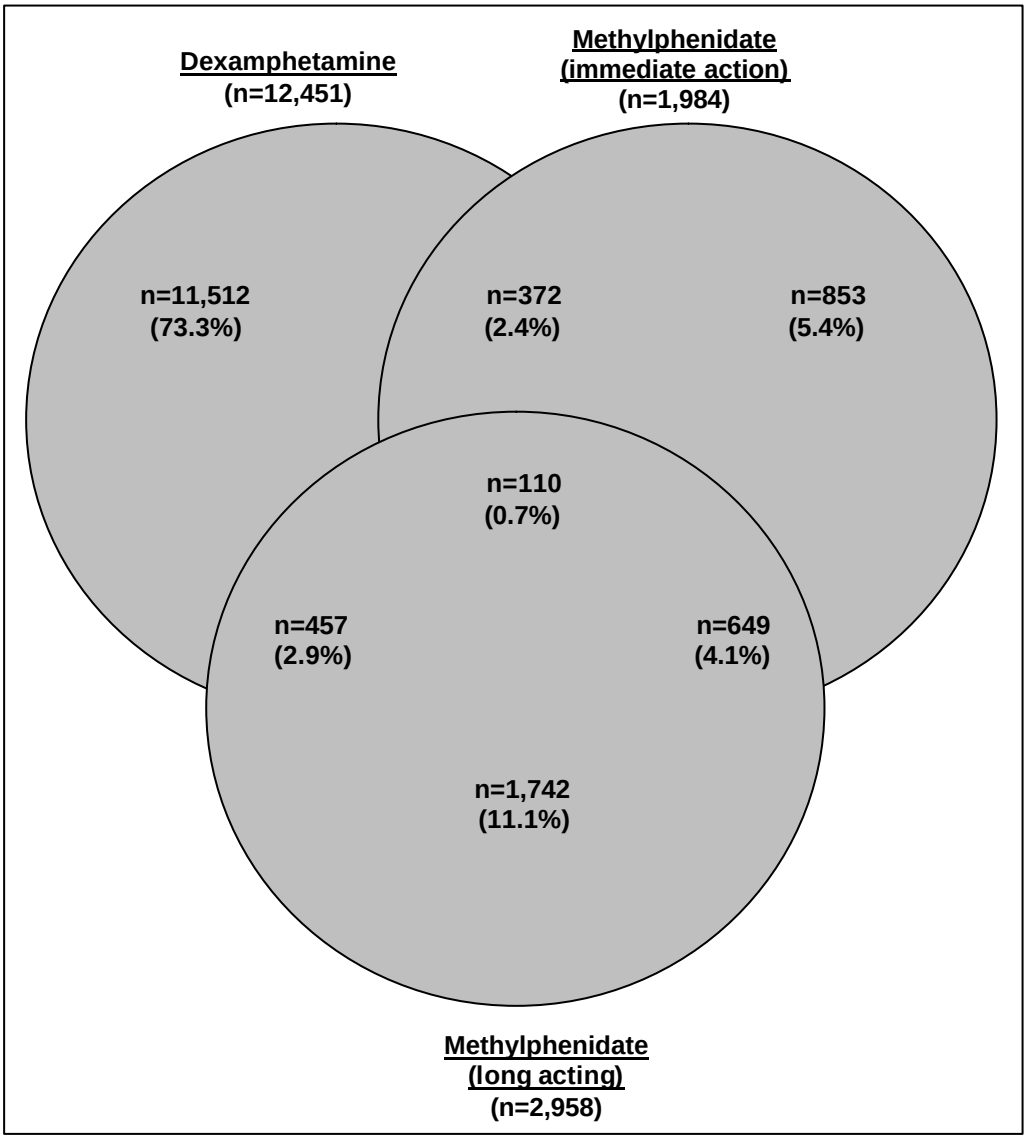
patients (71.4%). Adult psychiatrists were the Authorised Prescriber for 711 (14.9%) patients with a nominated co-prescriber and child and adolescent psychiatrists were the Authorised Prescriber for 632 (13.2%) patients. Adult and paediatric neurologists were the Authorised Prescribers for 1 and 23 patients with a nominated co-prescriber respectively.

Number of patients by drug type (dexamphetamine and/or methylphenidate)

Type of stimulant(s) used

The majority of patients in the ADHD cohort were treated with dexamphetamine (n=12,451, 79.3%). Immediate action methylphenidate was used in the treatment of 1,984 (12.6%) patients, while long acting methylphenidate was used in the treatment of 2,958 (18.8%) patients.[§§] The majority of patients were being treated with one type of medication only (n=14,107, 89.9%). The specific number and proportion of patients being treated with each form of stimulant medication is displayed in Figure 17.

Figure 17: Type of stimulant medication(s) on Notification Form used in the treatment of patients in the ADHD cohort

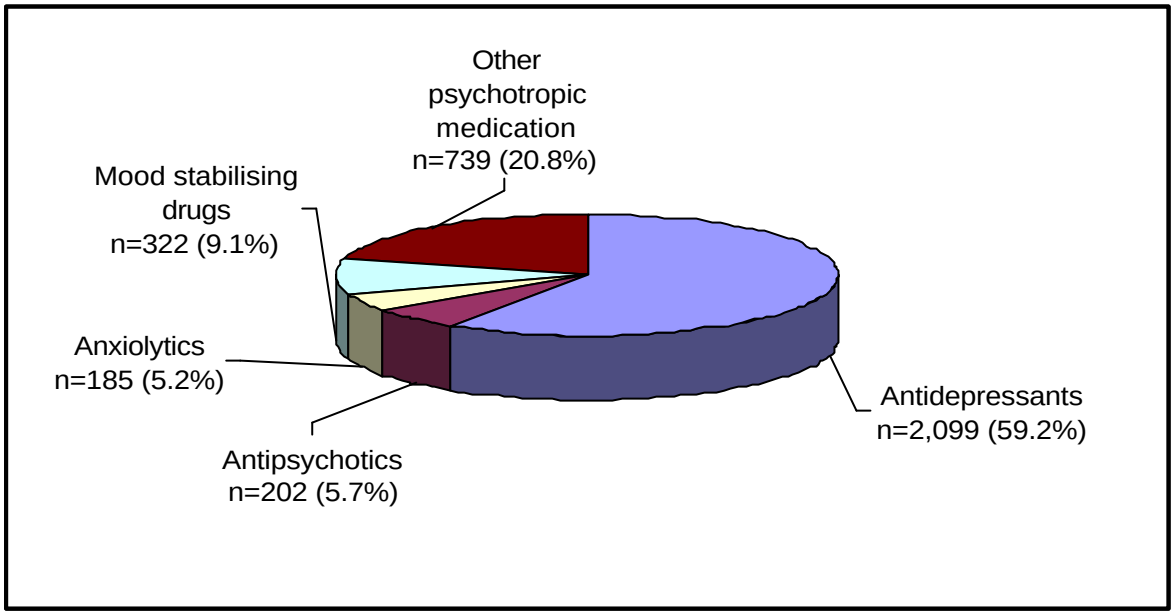


[§§] Note: totals sum to greater than 15,695 due to combined stimulant therapy for some patients.

Other psychotropic drugs prescribed with stimulant medications

In addition to stimulant medications, it was reported in the Notification Form that a total of 3,547 (22.6%) patients in the ADHD cohort were concurrently being prescribed other psychotropic medications (Figure 18). Of these patients, 2,099 (59.2%) were prescribed antidepressants, 202 (5.7%) antipsychotics, 185 (5.2%) anxiolytics, 322 (9.1%) mood stabilising drugs, with the remainder (n=739, 20.8%) reported as being prescribed some other type of psychotropic medication.

Figure 18: Patients in the ADHD cohort prescribed other psychotropic medications concurrently with stimulant medication



Average daily Notified dose of stimulant medication (mg/day)

Average daily Notified dose of stimulants in children

The average daily Notified dose of stimulant medication (expressed in dex equivalents – see Section 3 Methodology) for children (2 to 17 years) in the ADHD cohort was 17.6mg/day (SD=9.1), with a median dose of 15mg/day (Table 12). Daily Notified doses per patient ranged from 1.0 to 85.0mg/day. Average daily dose in children increased from 10.2mg/day (SD=5.7) for 3 to 4 year olds to 25.3mg/day (SD=11.4) for 16 to 17 year olds. Variation in Notified dosage also tended to increase with age, and the greatest range of 80mg/day occurred for 16 to 17 year olds.

Average daily Notified dose of stimulants in adults

The average daily Notified dose of stimulant medication (expressed as dex equivalents – see Section 3 Methodology) for adults (≥ 18 years) in the ADHD cohort was 33.5mg/day (SD=14.4), with a median of 30 mg/day (Table 12). The maximum daily dose per patient was 75.0mg/day. In addition, both the averages and range of Notified daily doses increased slightly with age. The lowest average Notified dose of 28.9mg/day (SD=12.4) occurred in the 18 year age group, and the highest of 35.4mg (SD=14.8) occurred in the 35 to 39 year age group.

Larger variations in daily doses were seen for adults than with children. Similar results were seen for males and females (Table 13).

Table 12: Average daily Notified dose (mg/day) of stimulant medication (in dex equivalents) by age for the ADHD cohort

Age grouping (years)	Mean dose (mg/day)	SD	Median dose (mg/day)	Min – Max (mg/day)	Dose range (mg/day)
2	12.5	3.5	12.5	10.0 - 15.0	5.0
3-4	10.2	5.7	10.0	2.5 - 40.0	37.5
5-6	11.0	5.2	10.0	1.5 - 35.0	33.5
7-11	14.0	6.1	13.8	1.0 - 55.0	54.0
12-15	20.2	8.9	20.0	2.5 - 67.5	65.0
16-17	25.3	11.4	25.0	5.0 - 85.0	80.0
Children (2-17 years)	17.6	9.1	15.0	1.0 - 85.0	84.0
18	28.9	12.4	27.9	5.0 - 60.0	55.0
19	29.9	12.4	30.0	5.0 - 60.0	55.0
20	32.7	13.8	30.0	7.5 - 60.0	52.5
21	33.1	13.8	30.0	5.0 - 60.0	55.0
22-24	32.8	13.7	30.0	3.0 - 60.0	57.0
25-29	34.1	14.4	30.0	5.0 - 60.0	55.0
30-34	34.9	14.3	30.0	5.0 - 75.0	70.0
35-39	35.4	14.8	30.0	5.0 - 75.0	70.0
40-44	35.1	14.6	30.0	5.0 - 60.0	55.0
45-49	34.1	15.3	30.0	5.0 - 60.0	55.0
50+	35.1	16.8	30.0	5.0 - 75.0	70.0
Adults (= 18 years)	33.5	14.4	30.0	3.0 - 75.0	72.0

SD = standard deviation

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Table 13: Average daily Notified dose (mg/day) of all stimulant medications (dex equivalents) for children and adults in the ADHD cohort

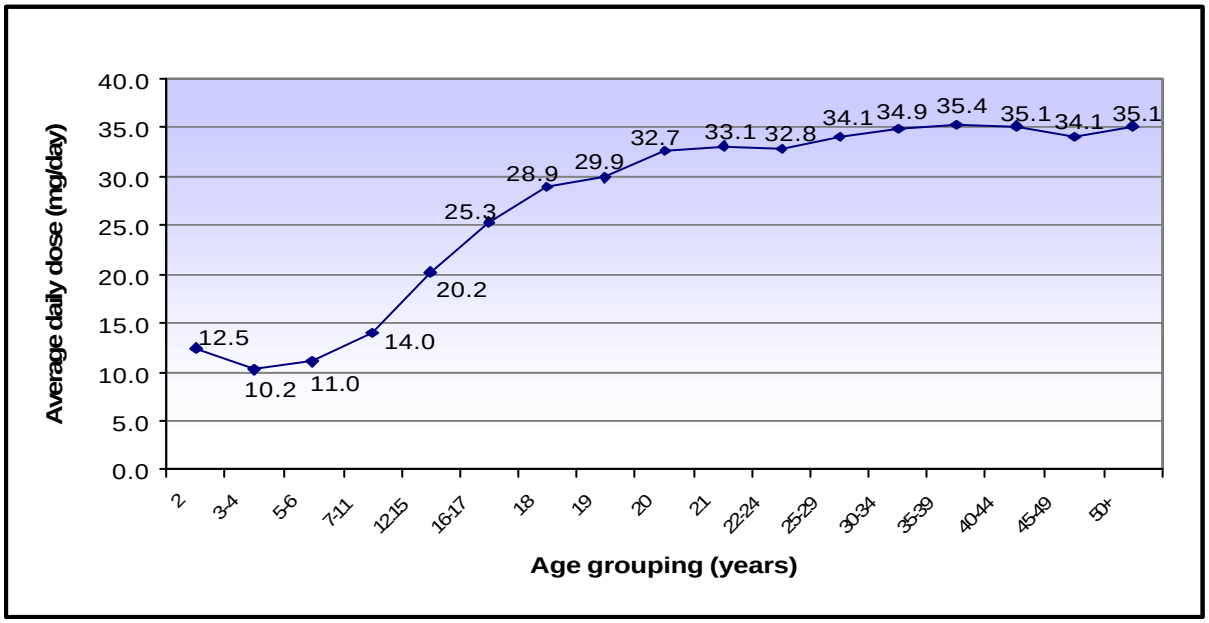
Patient group	Patients	Mean Dex equivalents (mg/day)	SD	Range* (mg/day)
All patients				
Children (2-17 years)	9,664	17.6	9.1	1.0 - 85.0
Adults (= 18 years)	6,031	33.5	14.4	3.0 - 75.0
Total	15,695	23.7	13.8	1.0 - 85.0
Males				
Children (2-17 years)	7,758	17.7	9.2	1.0 - 85.0
Adults (= 18 years)	3,774	33.6	14.0	3.0 - 75.0
Total	11,532	22.9	13.2	1.0 - 85.0
Females				
Children (2-17 years)	1,906	17.1	8.9	1.2 - 60.0
Adults (= 18 years)	2,257	33.4	15.2	5.0 - 75.0
TOTAL	4,163	25.9	15.0	1.2 - 75.0

SD=standard deviation, Dex=dexamphetamine

Daily Notified dose of stimulant medications by age

Average daily Notified doses of stimulant medication (expressed in dex equivalents) were higher in adult age groups than in children, with an increasing average dose generally observed as age increased (Figure 19 & Table 13).

Figure 19: Average daily Notified dose (mg/day) of stimulant medication (dex equivalents) for patients in the ADHD cohort by age



Similar findings to the overall cohort results were observed for both male and female patients (Table 14). The average daily Notified dose of stimulant medications was similar for both males and females for all age groups.

Section continued over page

Table 14: Average daily dose (mg/day) by age and gender, of stimulant medication (dex equivalents) for patients in the ADHD cohort

	All patients			Males			Females		
Age grouping (years)	Mean Dex equivalents (mg/day)	SD	Range (mg/day)	Mean Dex equivalents (mg/day)	SD	Range (mg/day)	Mean Dex equivalents (mg/day)	SD	Range (mg/day)
2	12.5	3.5	10.0 - 15.0	12.5	3.5	10.0 - 15.0	-	-	-
3-4	10.2	5.7	2.5 - 40.0	10.2	5.9	2.5 - 40.0	10.3	4.1	2.5 - 15.0
5-6	11.0	5.2	1.5 - 35.0	11.2	5.2	1.5 - 35.0	10.1	4.8	2.5 - 25.0
7-11	14.0	6.1	1.0 - 55.0	14.2	6.2	1.0 - 55.0	13.4	5.9	1.2 - 40.0
12-15	20.2	8.9	2.5 - 67.5	20.4	9.0	2.5 - 67.5	19.5	8.4	5.0 - 60.0
16-17	25.3	11.4	5.0 - 85.0	25.5	11.5	5.0 - 85.0	24.4	11.1	5.0 - 60.0
18	28.9	12.4	5.0 - 60.0	29.4	12.1	5.0 - 60.0	27.4	13.2	10.0 - 60.0
19	29.9	12.4	5.0 - 60.0	30.1	12.1	5.0 - 60.0	29.4	13.0	5.0 - 60.0
20	32.7	13.8	7.5 - 60.0	32.8	13.8	7.5 - 60.0	32.5	14.1	10.0 - 60.0
21	33.1	13.8	5.0 - 60.0	33.9	13.8	5.0 - 60.0	31.5	13.6	5.0 - 60.0
22-24	32.8	13.7	3.0 - 60.0	32.5	13.2	3.0 - 60.0	33.3	14.6	5.0 - 60.0
25-29	34.1	14.4	5.0 - 60.0	34.8	14.0	5.0 - 60.0	32.8	14.9	5.0 - 60.0
30-34	34.9	14.3	5.0 - 75.0	34.9	13.8	5.0 - 60.0	35.0	15.1	5.0 - 75.0
35-39	35.4	14.8	5.0 - 75.0	35.9	14.3	5.0 - 75.0	34.9	15.3	5.0 - 60.0
40-44	35.1	14.6	5.0 - 60.0	35.7	13.9	5.0 - 60.0	34.4	15.4	5.0 - 60.0
45-49	34.1	15.3	5.0 - 60.0	34.3	15.0	5.0 - 60.0	33.8	15.7	8.8 - 60.0
50+	35.1	16.8	5.0 - 75.0	34.6	16.4	7.0 - 75.0	35.6	17.4	5.0 - 60.0
TOTAL	23.7	13.8	1.0 - 85.0	22.9	13.2	1.0 - 85.0	25.9	15.0	1.2 - 75.0

SD=standard deviation, Dex=dexamphetamine

Daily Notified dose of stimulant medication (mg/kg/day)

Descriptive statistics for daily doses of stimulant medication per kilogram of body weight, for patients in the ADHD cohort as reported in the Notification Form, are presented in Tables 15 and 16. The average dose per kilogram of body weight was similar for children (0.42mg/kg/day) and adults (0.47mg/kg/day), although a larger range of doses was observed in children.

Table 15: Average daily Notified dose of stimulant medication (mg/kg/day of dex equivalents) for children and adult patients in the ADHD cohort

Patient group	Patients*	Mean Dex equivalents (mg/kg/day)	SD	Range (mg/kg/day)
All patients				
Children (2-17 years)	9,228	0.42	0.20	0.04 - 2.16
Adults (= 18 years)	4,238	0.47	0.22	0.04 - 1.28
Total	13,466	0.44	0.21	0.04 - 2.16
Males				
Children (2-17 years)	7,406	0.43	0.20	0.04 - 2.16
Adults (= 18 years)	2,647	0.44	0.19	0.04 - 1.15
Total	10,053	0.43	0.20	0.04 - 2.16
Females				
Children (2-17 years)	1,822	0.41	0.19	0.04 - 1.23
Adults (= 18 years)	1,591	0.54	0.26	0.08 - 1.28
Total	3,413	0.47	0.23	0.04 - 1.28

* Body weight was not recorded for all patients in the Notification data. Further, recording of body weight is not mandatory for adults as doses prescribed per kg are only required for children. As such, patient counts differ to that presented elsewhere.
Dex=dexamphetamine, SD=standard deviation.

Table 16: Average daily Notified dose of stimulant medication (mg/kg/day of dex equivalents) for patients in the ADHD cohort by age

Age group (years)	Patients*	Mean Dex equivalents (mg/kg/day)	SD	Range (mg/kg/day)
2	1	0.79	-	0.79 - 0.79
3-4	91	0.46	0.18	0.13 - 1.00
5-6	488	0.48	0.21	0.08 - 1.43
7-11	4,016	0.44	0.20	0.04 - 1.67
12-15	3,468	0.41	0.19	0.06 - 2.16
16-17	1,164	0.39	0.18	0.05 - 1.13
18	357	0.42	0.19	0.11 - 1.11
19	298	0.43	0.20	0.07 - 1.15
20	277	0.47	0.22	0.07 - 1.10
21	224	0.47	0.20	0.04 - 1.05
22-24	546	0.46	0.21	0.07 - 1.20
25-29	570	0.47	0.21	0.08 - 1.20
30-34	512	0.49	0.21	0.08 - 1.11
35-39	418	0.49	0.23	0.11 - 1.28
40-44	393	0.50	0.24	0.10 - 1.15
45-49	302	0.48	0.23	0.07 - 1.10
50+	341	0.52	0.26	0.10 - 1.18
TOTAL	13,466	0.44	0.21	0.04 - 2.16

* Body weight was not recorded for all patients in the Notification data. Further, recording of body weight is not mandatory for adults as doses prescribed per kg are only required for children. As such, patient counts differ to that presented elsewhere.

Dex=dexamphetamine, SD=standard deviation.

3.2 Crude 'rates' of stimulant usage for treatment of ADHD

3.2.1 Methodology

Rates

Rates per 1,000 population of stimulant Notification and usage were calculated for the cohort across the 17-month study period. 'Rates' in this project were calculated per 1,000 population rather than with person-time denominators, which better account for the duration that the population was treated with stimulant medication. Consequently, the rates presented here are the cumulative incidence of stimulant Notification and/or usage rather than 'true' rates, which take account of time. Western Australian population denominators (total and for sex and age) were obtained from the Australian Bureau of Statistics (ABS), for estimates of the population at 30 June 2003. At the time of analysis, these represented the most current WA population estimates provided by the ABS. Actual population sizes used in the analyses are included in Appendix 4.

Age-specific patient rates per 1,000 population were calculated as follows:

Patients per 1,000 population (age group i) =
((No. in age group i)/(WA population in age group i)) x 1,000

Population denominators for Health Districts and Health Service Areas in WA, used for calculations of stimulant treatment rates per patient locality, were supplied by the Epidemiology Branch of the Department of Health. The actual population estimates used in the current project were those determined for each location as of 30 June 2003. Health area population counts used by this project are listed in Appendix 3.

Note that results from the analysis of stimulant use by postcode are not presented in this report, as some WA postcodes contained fewer than five patients, thus potentially raising privacy and confidentiality concerns if they had been included.

Age groupings

The age groupings used for this project were those specified by the Department of Health to allow comparisons with findings from NSW research in which these specific age groups were used. As results express age group rates per 1,000 population, the uneven age groups employed do not misrepresent the data.

Children under the age of 2 years are unable to be prescribed stimulant medication in WA. Therefore, rates calculated for the cohort as a whole used a population denominator of = 2 years.

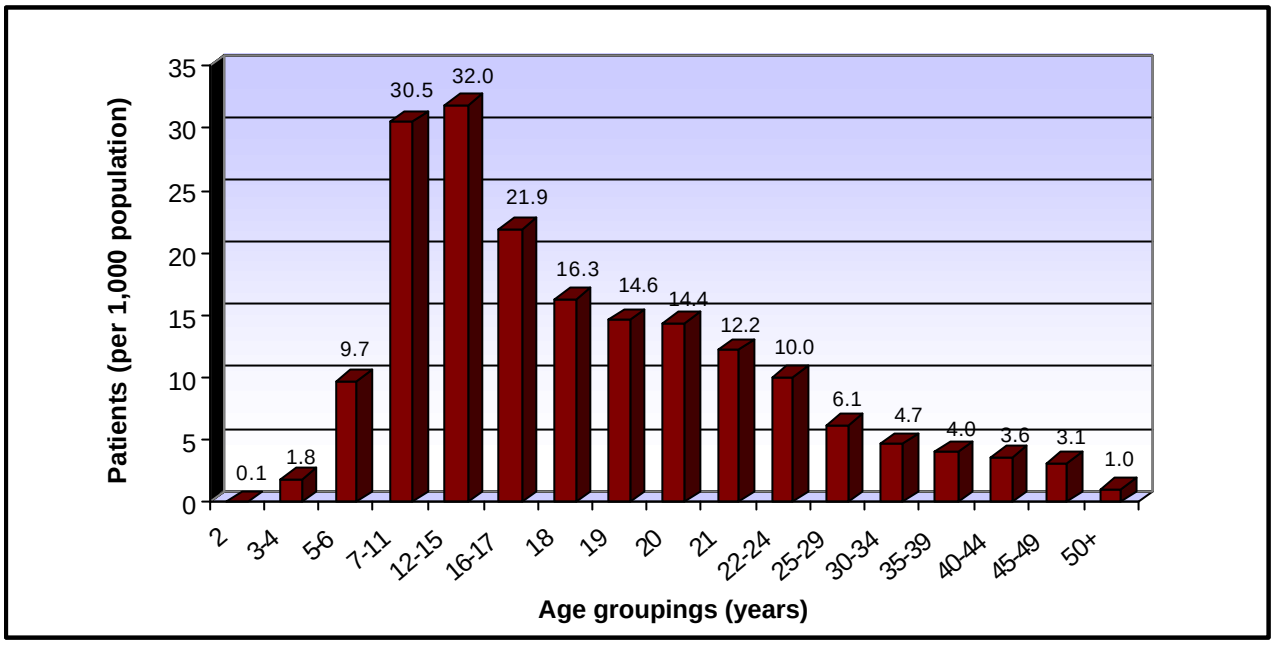
3.2.2 Results

Number of patients in the ADHD cohort Notified per 1,000 population

For the 15,695 patients in the ADHD cohort, the number of patients Notified was 8.3 per 1,000 population. Stratifying by age group, the highest rate was seen for children between 12 to 15 years of age (32.0 per 1,000 population), after which rates of Notification decreased as age increased (Figure 20).

Overall, 22.2 children per 1,000 population in the 2 to 17 year old age group used stimulants for the treatment of ADHD which was greater than the rate in adults = 18 years (4.1 per 1,000 population). For children, the number treated per 1,000 population rose considerably after the age of four, peaking in the 12 to 15 year age group (Figure 20).

Figure 20: Patients (per 1,000 population) in the ADHD cohort by age



Number of patients in the ADHD cohort per 1,000 population by age and gender

As demonstrated in Figures 21, 22 and 23, there were more males per 1,000 population than females in the ADHD cohort (12.1 per 1,000 population and 4.4 per 1,000 population respectively). This difference was particularly noticeable in children. For all age groupings up to 20 years, the rate of males in the ADHD cohort was more than double the rate in females, after which there was less difference between genders (Figure 23). However, little difference was seen between males and females after 35 years of age. While the absolute magnitudes were different, the pattern of stimulant treatment rates was similar between genders, with the 12 to 15 year age group having the highest rate per 1,000 population for both males and females.

Figure 21: Number of patients (per 1,000 population) in the ADHD cohort by gender

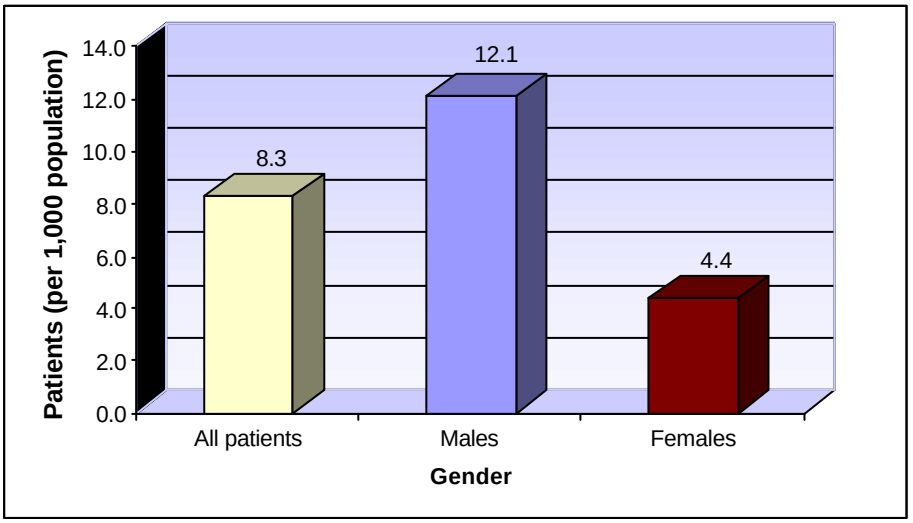


Figure 22: Number of patients (per 1,000 population) in the ADHD cohort by age group (children and adults) and gender

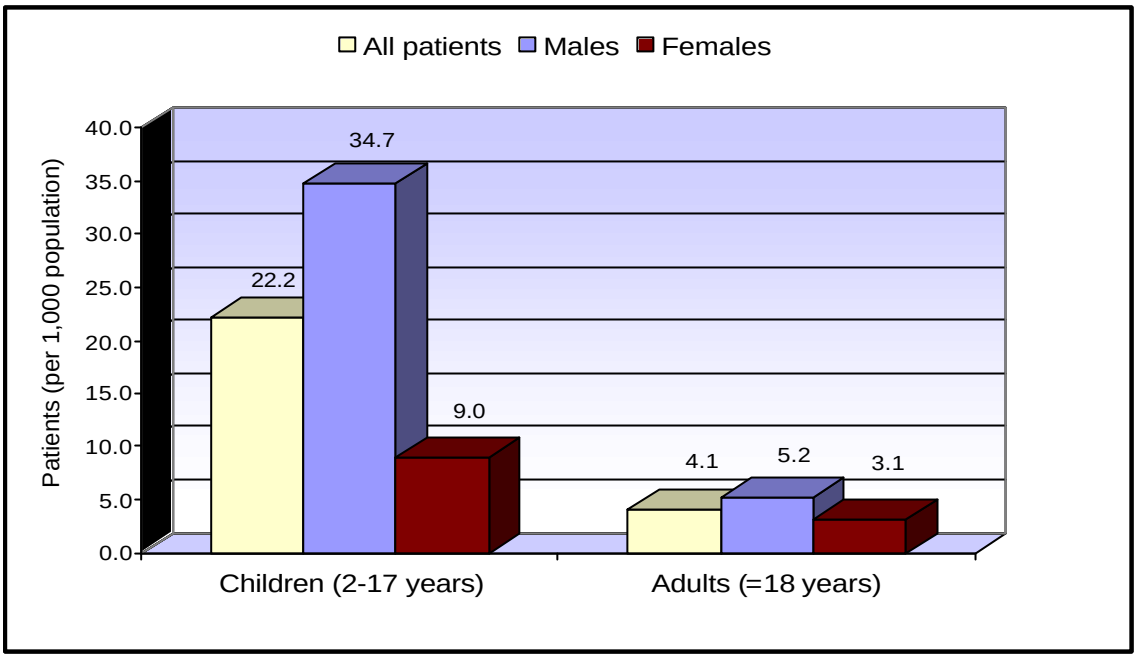
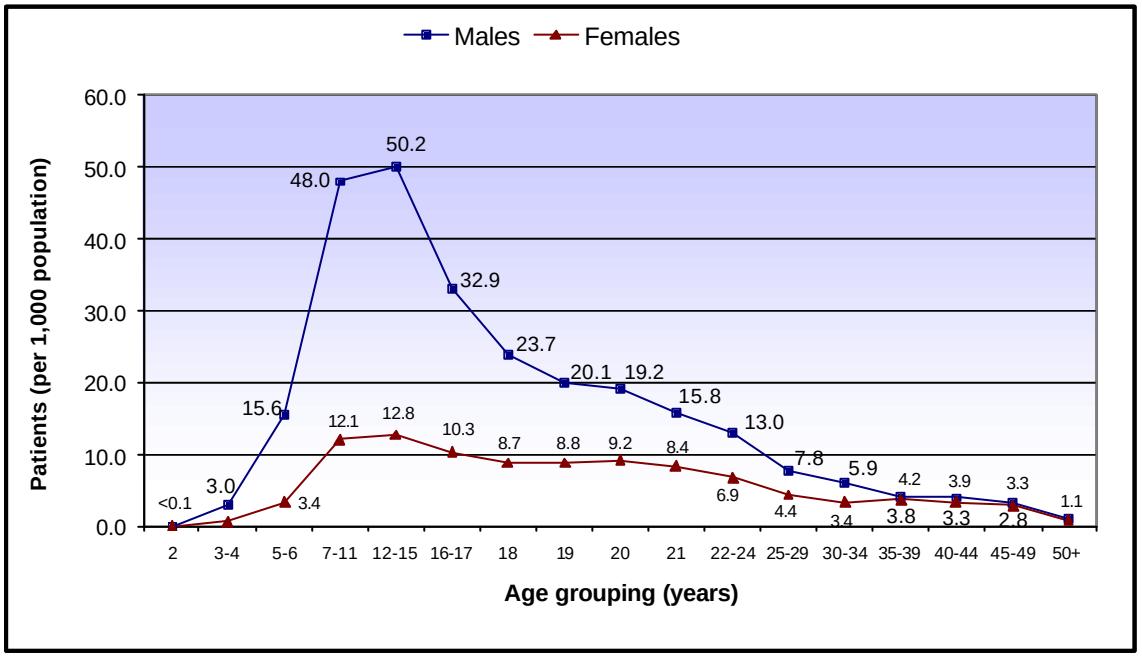


Figure 23: Number of patients (per 1,000 population) in the ADHD cohort, by age and gender



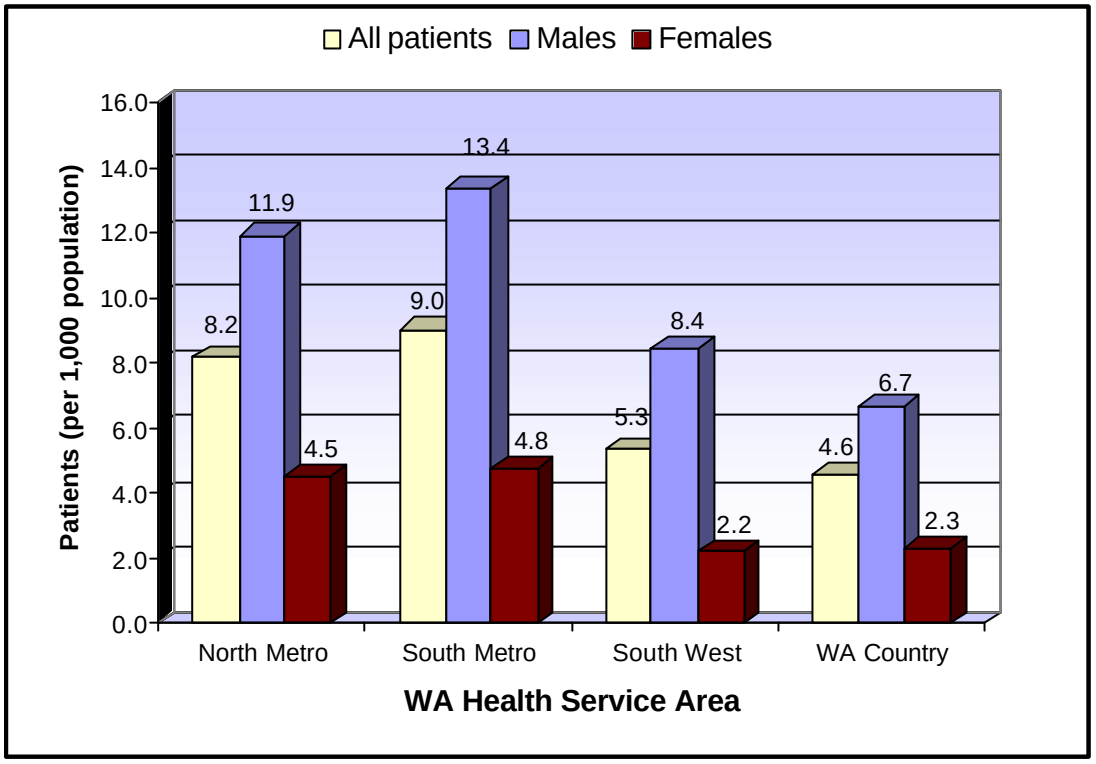
Number of patients (per 1,000 population) per residential location

The data required to determine patient residential locality were missing for 655 (4.2%) patients in the ADHD cohort due to factors such as non-recorded, invalid or interstate postcodes. Consequently, these patients were excluded from analysis of stimulant use by residential location.

Health Service Area

For all patients, higher rates of inclusion in the ADHD cohort per 1,000 population were observed in the metropolitan area, with the greatest rate seen in the South Metropolitan Health Service Area (9.0 per 1,000 population)(Figure 24). Considerably lower rates of 5.3 and 4.6 per 1,000 population were seen for South West and WA Country patient populations respectively. Similar trends were seen for both male and female patients.

Figure 24: Number of patients (per 1,000 population) in the ADHD cohort by WA Health Service Area



Health District

Wide variations in the number of patients per 1,000 population included in the ADHD cohort were seen between the 34 Health Districts in WA. The median rate was 5.6 patients per 1,000 population, with a range of 1.1 to 11.6 per 1,000 population (Table 17). A quarter of all Health Districts had patient treatment rates of <3.6 per 1,000 population, while a further 25% had rates of >8.6 patients per 1,000 population. Three Health Districts, namely Armadale, Rockingham-Kwinana and Geraldton had treatment rates = 10 patients per 1,000 population (range 10.0 to 11.6 per 1,000).

Table 17: Number of patients (per 1,000 population) in the ADHD cohort by WA Health District

Health District	All patients (per 1,000 population)	Males (per 1,000 population)	Females (per 1,000 population)
NMAHS - Central/Midlands/Valley*	7.0	10.4	3.8
NMAHS - Coastal	8.9	13.6	4.3
NMAHS - Hills	9.8	14.6	5.1
NMAHS - Lower	9.8	13.4	6.5
NMAHS - Perth City	6.0	9.9	4.5
NMAHS - Upper	8.6	12.8	4.5
SMAHS - Armadale	11.6	17.3	5.9
SMAHS - Bentley	7.2	10.7	3.9
SMAHS - Fremantle	8.0	11.8	4.4
SMAHS - Peel	9.2	13.6	4.8
SMAHS - Rockingham-Kwinana	10.2	15.0	5.4
SWAHS - Blackwood	5.4	8.2	2.4
SWAHS - Bunbury	6.3	10.3	2.3
SWAHS - Busselton	3.6	5.6	1.7
SWAHS - Leeuwin	2.6	4.0	1.1
SWAHS - Leschenault	5.7	9.0	2.3
SWAHS - Warren	5.8	8.8	2.7
SWAHS - Wellington	6.9	10.6	3.1
WACHS - Central Great Southern	5.3	8.7	1.6
WACHS - East Pilbara	3.2	4.7	1.5
WACHS - Eastern Wheatbelt	5.1	7.5	2.5
WACHS - Gascoyne	4.0	6.1	1.7
WACHS - Geraldton	10.0	13.8	6.3
WACHS - Kimberley	1.1	1.7	0.4
WACHS - Lower Great Southern	4.2	6.7	1.6
WACHS - Midwest	4.2	6.0	2.1
WACHS - Murchison	1.9	2.0	1.9
WACHS - Northern Goldfields	3.5	4.5	2.3
WACHS - South East Coastal	2.9	4.7	0.9
WACHS - Southern Wheatbelt	5.2	7.9	2.3
WACHS - West Pilbara	4.2	6.2	1.8
WACHS - Western Wheatbelt	6.1	9.2	2.7

* Due to the geocoding and analysis performed, 2 Health Districts (Midlands and Valley) were misrepresented as having 0 stimulant users and so were presented n combination with the Central Health District.

Number of patients treated per 1,000 population by medication type

Patients in the ADHD cohort were more likely to be treated with dexamphetamine (6.5 patients per 1,000 population) compared with methylphenidate (2.2 patients per 1,000 population) (Figure 25). The rate of males treated with either form of stimulant medication was more than 2.5-times higher than in females.

The highest rate of patients in the ADHD cohort being treated with dexamphetamine was seen in children between the ages of 12 and 15 years (22.3 per 1,000 population). In comparison, the rate of treatment with methylphenidate was highest for children from 7 to 11 years (12.4 per 1,000 population) (Table 18).

Figure 25: Number of males and females in the ADHD cohort (per 1,000 population) by drug type

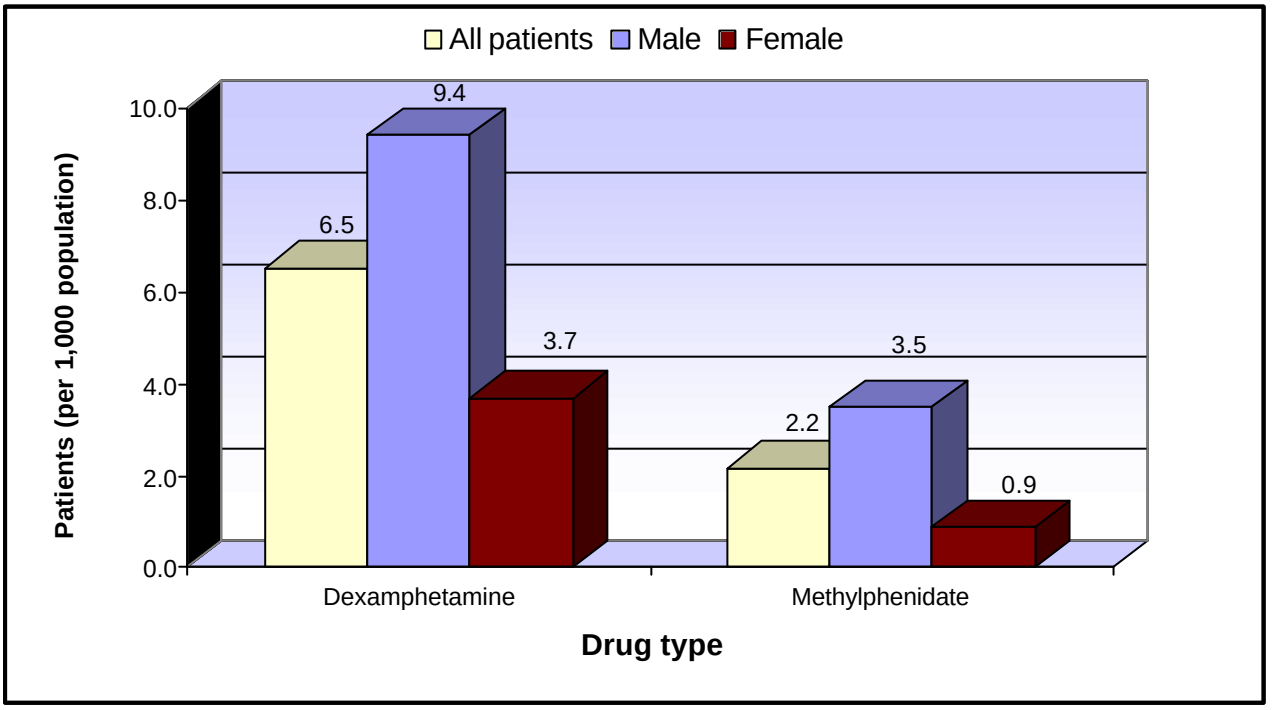


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Table 18: Number of patients in the ADHD cohort using dexamphetamine or methylphenidate (per 1,000 population) by age

	Dexamphetamine			Methylphenidate	
Age grouping (years)	Patients	Number treated per 1,000 population		Patients	Number treated per 1,000 population
2	1	< 0.1		1	< 0.1
3-4	60	1.2		52	1.0
5-6	325	6.3		234	4.5
7-11	2,819	20.6		1,694	12.4
12-15	2,523	22.3		1,343	11.9
16-17	1,004	17.6		327	5.7
18	421	14.8		66	2.3
19	375	13.4		46	1.6
20	379	13.5		44	1.6
21	327	11.7		26	0.9
22-24	778	9.7		57	0.7
25-29	778	5.9		46	0.4
30-34	665	4.5		46	0.3
35-39	564	3.9		44	0.3
40-44	527	3.4		49	0.3
45-49	417	2.9		43	0.3
50+	488	0.9		65	0.1
TOTAL*	12,451	6.5		4,183	2.2

* The sum of patient totals exceeds the number in the ADHD cohort as some patients were treated with both types of stimulant medication.

Number of patients per 1,000 population using single and combined stimulant therapy

The number of patients in the ADHD cohort (per 1,000 population) overall and per age grouping, being treated with dexamphetamine, methylphenidate or a combination of both is shown in Table 19. The majority (73.3%) of the ADHD cohort used dexamphetamine as their sole medication, and only 0.5 patients per 1000 population were treated with a combination of dexamphetamine and methylphenidate.

Similar trends to the overall cohort rates were seen in both male and female patients (Tables 20 and 21). However, the relative magnitude of peak rates were far greater for males than females, who demonstrated a more even distribution of both dexamphetamine and methylphenidate use across age groupings. Gender differences were particularly marked for patients between 7 and 24 years of age.

Table 19: Number of patients (per 1,000 population) in the ADHD cohort by age and medication type

	Number of patients					Number of patients per 1,000 population				
Age grouping (years)	Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use	Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use
2	1	1	1	1	0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
3-4	60	43	52	35	17	1.2	0.8	1.0	0.7	0.3
5-6	325	271	234	180	54	6.3	5.2	4.5	3.5	1.0
7-11	2,819	2,497	1,694	1,372	322	20.6	18.2	12.4	10.0	2.4
12-15	2,523	2,279	1,343	1,099	244	22.3	20.1	11.9	9.7	2.2
16-17	1,004	922	327	245	82	17.6	16.2	5.7	4.3	1.4
18	421	398	66	43	23	14.8	14.0	2.3	1.5	0.8
19	375	362	46	33	13	13.4	13.0	1.6	1.2	0.5
20	379	361	44	26	18	13.5	12.8	1.6	0.9	0.6
21	327	315	26	14	12	11.7	11.3	0.9	0.5	0.4
22-24	778	749	57	28	29	9.7	9.3	0.7	0.4	0.4
25-29	778	763	46	31	15	5.9	5.8	0.4	0.2	0.1
30-34	665	644	46	25	21	4.5	4.3	0.3	0.2	0.1
35-39	564	540	44	20	24	3.9	3.7	0.3	0.1	0.2
40-44	527	504	49	26	23	3.4	3.3	0.3	0.2	0.2
45-49	417	399	43	25	18	2.9	2.8	0.3	0.2	0.1
50+	488	464	65	41	24	0.9	0.8	0.1	0.1	0.0
TOTAL	12,451	11,512	4,183	3,244	939	6.5	6.1	2.2	1.7	0.5

Dex = dexamphetamine, Meth = methylphenidate

Table 20: Number of male patients (per 1,000 population) in the ADHD cohort by age and medication type

	Number of males					Number of males per 1,000 population				
Age grouping (years)	Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use	Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use
2	1	1	1	1	0	< 0.1	< 0.1	< 0.1	< 0.1	<0.1
3-4	50	35	45	30	15	1.9	1.3	1.7	1.1	0.6
5-6	266	223	195	152	43	10.0	8.3	7.3	5.7	1.6
7-11	2,251	1,994	1,386	1,129	257	32.0	28.3	19.7	16.0	3.7
12-15	2,015	1,810	1,104	899	205	34.7	31.2	19.0	15.5	3.5
16-17	769	708	256	195	61	26.3	24.2	8.7	6.7	2.1
18	307	293	50	36	14	21.2	20.2	3.4	2.5	1.0
19	265	255	34	24	10	18.4	17.7	2.4	1.7	0.7
20	258	245	35	22	13	17.7	16.9	2.4	1.5	0.9
21	216	209	19	12	7	15.0	14.5	1.3	0.8	0.5
22-24	517	495	38	16	22	12.6	12.1	0.9	0.4	0.5
25-29	507	500	23	16	7	7.5	7.4	0.3	0.2	0.1
30-34	430	417	25	12	13	5.8	5.6	0.3	0.2	0.2
35-39	297	286	20	9	11	4.1	3.9	0.3	0.1	0.2
40-44	286	274	26	14	12	3.7	3.6	0.3	0.2	0.2
45-49	224	213	25	14	11	3.2	3.0	0.4	0.2	0.2
50+	267	256	36	25	11	1.0	1.0	0.1	0.1	0.0
TOTAL	8,926	8,214	3,318	2,606	712	9.4	8.5	3.5	2.7	0.8

Dex = dexamphetamine, Meth = methylphenidate

Table 21: Number of female patients (per 1,000 population) in the ADHD cohort by age and medication type

	Number of females						Number of females per 1,000 population				
Age grouping (years)	Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use		Any Dex use	Dex use only	Any Meth use	Meth use only	Combined Dex & Meth use
2	0	0	0	0	0		0.0	0.0	0.0	0.0	0.0
3-4	10	8	7	5	2		0.4	0.3	0.3	0.2	0.1
5-6	59	48	39	28	11		2.3	1.9	1.6	1.1	0.4
7-11	568	503	308	243	65		8.5	7.5	4.6	3.6	1.0
12-15	508	469	239	200	39		9.2	8.5	4.3	3.6	0.7
16-17	235	214	71	50	21		8.5	7.7	2.6	1.8	0.8
18	114	105	16	7	9		8.2	7.5	1.2	0.5	0.6
19	110	107	12	9	3		8.1	7.9	0.9	0.7	0.2
20	121	116	9	4	5		8.9	8.5	0.7	0.3	0.4
21	111	106	7	2	5		8.2	7.8	0.5	0.2	0.4
22-24	261	254	19	12	7		6.6	6.4	0.5	0.3	0.2
25-29	271	263	23	15	8		4.2	4.0	0.4	0.2	0.1
30-34	235	227	21	13	8		3.2	3.1	0.3	0.2	0.1
35-39	267	254	24	11	13		3.6	3.5	0.3	0.2	0.2
40-44	241	230	23	12	11		3.1	3.0	0.3	0.2	0.1
45-49	193	186	18	11	7		2.7	2.6	0.2	0.2	0.1
50+	221	208	29	16	13		0.8	0.7	0.1	0.1	0.1
TOTAL	3,525	3,298	865	638	227		3.7	3.5	0.9	0.7	0.2

Dex = dexamphetamine, Meth = methylphenidate

Number of patients (per 1,000 population) in the ADHD cohort by immediate action and long acting medication

There were 7.3 patients per 1,000 population in the ADHD cohort treated with immediate action stimulant medication (dexamphetamine and/or methylphenidate) (Table 22). The majority of these patients were treated with dexamphetamine, while considerably fewer patients were treated with immediate action methylphenidate. Long acting methylphenidate had lower rates of patient treatment than immediate action stimulants. Peak rates of treatment with either immediate action or long acting stimulants were seen for children from 12-15 years of age.

Table 22: **Number of patients (per 1,000 population) in the ADHD cohort by immediate action and long acting stimulants**

	Immediate action medication (Dex and/or Meth)		Long acting medication† (Meth)	
Age grouping (years)	Patients	Number treated per 1,000 population	Patients	Number treated per 1,000 population
2	1	< 0.1	1	< 0.1
3-4	82	1.6	22	0.4
5-6	433	8.3	138	2.7
7-11	3,434	25.0	1,259	9.2
12-15	2,957	26.1	1,074	9.5
16-17	1,123	19.7	209	3.7
18	440	15.5	41	1.4
19	398	14.2	22	0.8
20	391	13.9	30	1.1
21	338	12.1	11	0.4
22-24	798	9.9	21	0.3
25-29	801	6.0	20	0.2
30-34	684	4.6	25	0.2
35-39	576	4.0	19	0.1
40-44	548	3.6	19	0.1
45-49	432	3.0	20	0.1
50+	517	0.9	27	0.1
TOTAL*	13,953	7.3	2,958	1.6

*The sum of patient totals exceeds the number in the ADHD cohort as some patients were treated with both types of stimulant medication.

† Long acting form only available for methylphenidate

Dex = dexamphetamine, Meth = methylphenidate

3.3 Subgroup analysis: ADHD cohort patients prescribed dexamphetamine

3.3.1 Methodology

In this section, doses of dexamphetamine have been taken from the Notification Form and they have not been converted to base medication or dex equivalents. Therefore, data presented in this section will differ to that presented in previous sections of the report.

3.3.2 Results

Number of patient in the ADHD Cohort treated with dexamphetamine

There were 12,451 patients in the ADHD cohort being treated with dexamphetamine (with or without methylphenidate). The majority of patients treated with dexamphetamine were children aged between 7 and 17 years (n= 6,346, 51.0%) and over 70% were males (n=8,926, 71.7%), (Figures 26 and 27).

Figure 26: Gender distribution of patients in the ADHD cohort treated with dexamphetamine (with or without methylphenidate)

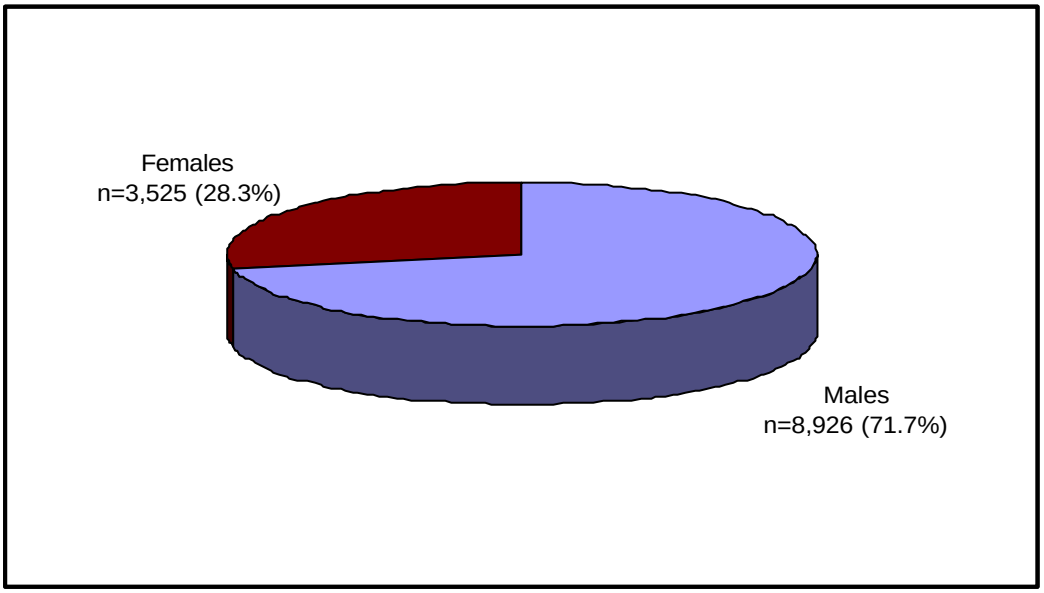

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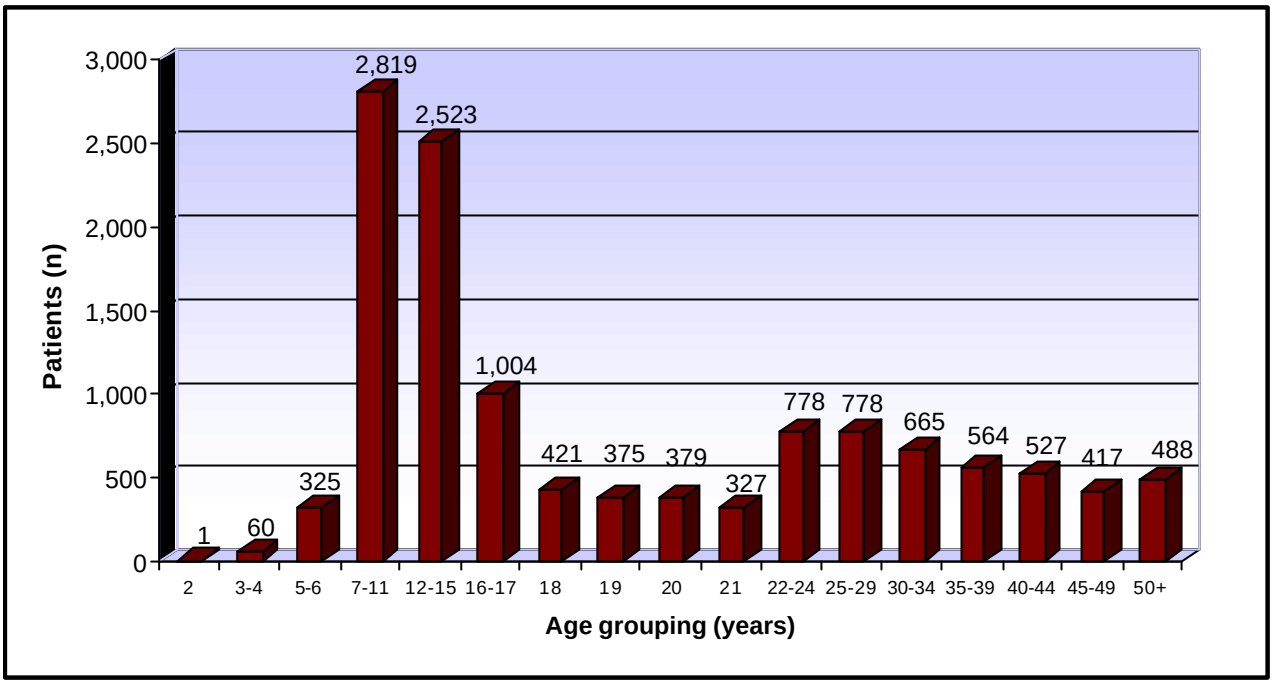
Figure 27: Patients in the ADHD cohort treated with dexamphetamine (with or without methylphenidate) by age



The age and gender distribution of patients in the ADHD cohort being treated with dexamphetamine is shown in Table 23. A higher relative proportion of females than males was observed in adult age groups (= 18 years), whereas males were seen to dominate the younger age groups (2 to 17 years), particularly the age range from 7 to 17 years.

Table 23: Patients treated with dexamphetamine (with or without methylphenidate) in the ADHD cohort by age and gender

Age grouping (years)	Males	Percent	Cumulative Percent		Females	Percent	Cumulative Percent
2	1	< 0.1	< 0.1		0	0.0	0.0
3-4	50	0.6	0.6		10	0.3	0.3
5-6	266	3.0	3.6		59	1.7	2.0
7-11	2,251	25.2	28.8		568	16.1	18.1
12-15	2,015	22.6	51.4		508	14.4	32.5
16-17	769	8.6	60.0		235	6.7	39.2
18	307	3.4	63.4		114	3.2	42.4
19	265	3.0	66.4		110	3.1	45.5
20	258	2.9	69.3		121	3.4	48.9
21	216	2.4	71.7		111	3.1	52.0
22-24	517	5.8	77.5		261	7.4	59.4
25-29	507	5.7	83.2		271	7.7	67.1
30-34	430	4.8	88.0		235	6.7	73.8
35-39	297	3.3	91.3		267	7.6	81.4
40-44	286	3.2	94.5		241	6.8	88.2
45-49	224	2.5	97.0		193	5.5	93.7
50+	267	3.0	100.0		221	6.3	100.0
TOTAL	8,926	100.0			3,525	100.0	

Number of patients in the ADHD cohort treated with dexamphetamine per 1,000 population by age and gender

As illustrated previously (see Table 19), the overall rate of patients in the ADHD cohort being treated with dexamphetamine (with or without methylphenidate) was 6.5 per 1,000 population. The number of males treated per 1,000 population increased with age to peak at 34.7 for males aged 12 to 15 (Table 24). Females had lower and more consistent levels across age groups. A similar number of males and females were treated per 1,000 population for ages 35 years and above.

Table 24: Number of patients (per 1,000 population) in the ADHD cohort treated with dexamphetamine (with or without methylphenidate) by age and gender

	Males			Females	
Age grouping (years)	Patients	Number treated per 1,000 population		Patients	Number treated per 1,000 population
2	1	0.1		0	0.0
3-4	50	1.9		10	0.4
5-6	266	10.0		59	2.3
7-11	2,251	32.0		568	8.5
12-15	2,015	34.7		508	9.2
16-17	769	26.3		235	8.5
18	307	21.2		114	8.2
19	265	18.4		110	8.1
20	258	17.7		121	8.9
21	216	15.0		111	8.2
22-24	517	12.6		261	6.6
25-29	507	7.5		271	4.2
30-34	430	5.8		235	3.2
35-39	297	4.1		267	3.6
40-44	286	3.7		241	3.1
45-49	224	3.2		193	2.7
50+	267	1.0		221	0.8
TOTAL	8,926	9.4		3,525	3.7

Dexamphetamine daily Notified dose (mg/day) by age

As shown in Table 25, the average daily Notified dose of dexamphetamine (with or without methylphenidate) for patients in the ADHD cohort was 1.9-times greater for adults than children (33.9mg/day compared with 17.7mg/day, respectively).

The overall average daily Notified dose of dexamphetamine for patients in the ADHD cohort was 25.1mg/day (SD=14.5mg/day). The average daily dose increased up to an age of 21 years, after which the average daily dose remained relatively unchanged (Table 26).

Table 25: Average daily Notified dose of dexamphetamine for children and adults in the ADHD cohort

Patient group	Patients	Mean Dex dose (mg/day)	SD	Median Dex dose (mg/day)	Range (mg/day)
Children (2-17 years)					
- Male	5,352	17.8	9.6	15.0	1.0 – 85.0
- Female	1,380	17.1	9.5	15.0	2.5 – 60.0
- All	6,732	17.7	9.6	15.0	1.0 – 85.0
Adults (= 18 years)					
- Male	3,574	34.0	13.9	30.0	3.0 – 75.0
- Female	2,145	33.7	15.2	30.0	5.0 – 75.0
- All	5,719	33.9	14.4	30.0	3.0 – 75.0

SD = standard deviation, Dex = dexamphetamine

Table 26: Average daily Notified doses of dexamphetamine (mg/day) for patients in the ADHD cohort by age

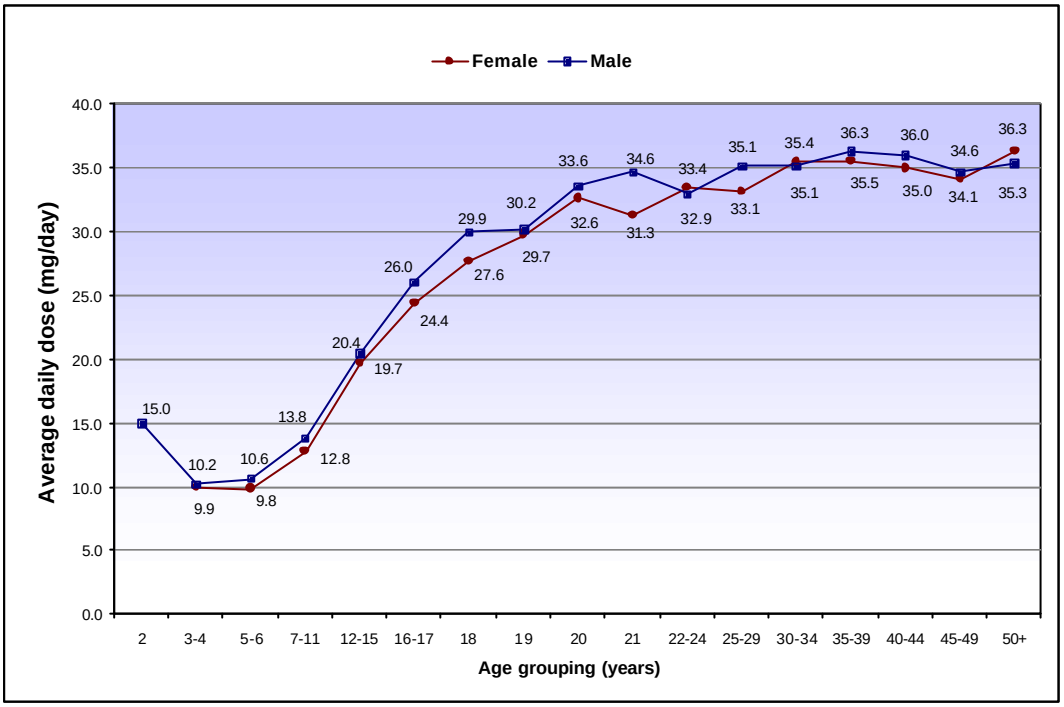
Age grouping (years)	Patients	Mean Dex doses (mg/day)	SD	Median Dex doses (mg/day)	Range (mg/day)
2	1	15.0	-	15.0	-
3-4	60	10.2	6.5	9.4	2.5 - 40.0
5-6	325	10.5	5.4	10.0	1.5 - 35.0
7-11	2,819	13.6	6.4	12.5	1.0 - 55.0
12-15	2,523	20.3	9.3	20.0	2.5 - 60.0
16-17	1,004	25.6	11.4	25.0	2.5 - 85.0
18	421	29.3	12.6	30.0	5.0 - 60.0
19	375	30.0	12.0	30.0	5.0 - 60.0
20	379	33.3	14.0	30.0	7.5 - 60.0
21	327	33.5	13.8	30.0	5.0 - 60.0
22-24	778	33.1	13.8	30.0	3.0 - 60.0
25-29	778	34.4	14.3	30.0	5.0 - 60.0
30-34	665	35.2	14.1	30.0	5.0 - 75.0
35-39	564	35.9	14.8	30.0	5.0 - 75.0
40-44	527	35.6	14.5	30.0	5.0 - 60.0
45-49	417	34.4	15.2	30.0	5.0 - 60.0
50+	488	35.7	17.0	30.0	7.0 - 75.0
TOTAL	12,451	25.1	14.5	20.0	1.0 - 85.0

SD = standard deviation, Dex = dexamphetamine

Dexamphetamine daily Notified dose (mg/day) by age and gender

Average daily doses of dexamphetamine were similar for males and females of all age groups in the ADHD cohort (Figure 28). The mean daily Notified dose increased with increasing age up to approximately 20 years for both females and males, after which it remained relatively unchanged.

Figure 28: Average daily Notified doses of dexamphetamine for patients in the ADHD cohort by gender



Dexamphetamine daily Notified dose (mg/kg/day) for children

The average daily Notified dose of dexamphetamine per kilogram of body weight was similar for all child age groups (Table 27). The peak average daily dose was seen for children between the ages of 5 and 6 years, with doses slightly declining thereafter.

Table 27: Daily Notified doses of dexamphetamine (mg/kg/day) by age, for children in the ADHD cohort

Age grouping (years)	Patients*	Mean Dex dose (mg/kg/day)	SD	Median Dex dose (mg/kg/day)	Range (mg/kg/day)
2	1	0.79	-	0.79	-
3-4	57	0.44	0.18	0.39	0.15 – 0.83
5-6	313	0.45	0.21	0.43	0.08 – 1.43
7-11	2,705	0.43	0.21	0.39	0.04 – 1.82
12-15	2,424	0.40	0.19	0.37	0.06 – 1.72
16-17	926	0.39	0.18	0.36	0.04 – 1.13
Children (2-17 years)	6,426	0.42	0.20	0.38	0.04 – 1.82

* Body weight was not recorded for all patients within the Stimulant Notification database. Hence, patient counts differ to that presented elsewhere. SD = standard deviation, Dex = dexamphetamine

3.4 Subgroup analysis: ADHD cohort patients prescribed methylphenidate

3.4.1 Methodology

In this section, doses of methylphenidate have been taken from the Notification Form and they have not been converted to base medication or dex equivalents. Therefore, data presented in this section will differ to that presented in previous sections of the report.

3.4.2 Results

Number of patients in the ADHD cohort treated with methylphenidate by age and gender

There were 4,183 patients in the ADHD cohort being treated with methylphenidate (with or without dexamphetamine), the majority of whom were male (n=3,318, 79.3%), (Figure 29). Over three-quarters (n=3364, 80.4%) were between 7 and 17 years (Figure 30).

Figure 29: Gender distribution of patients in the ADHD cohort treated with methylphenidate (with or without dexamphetamine)

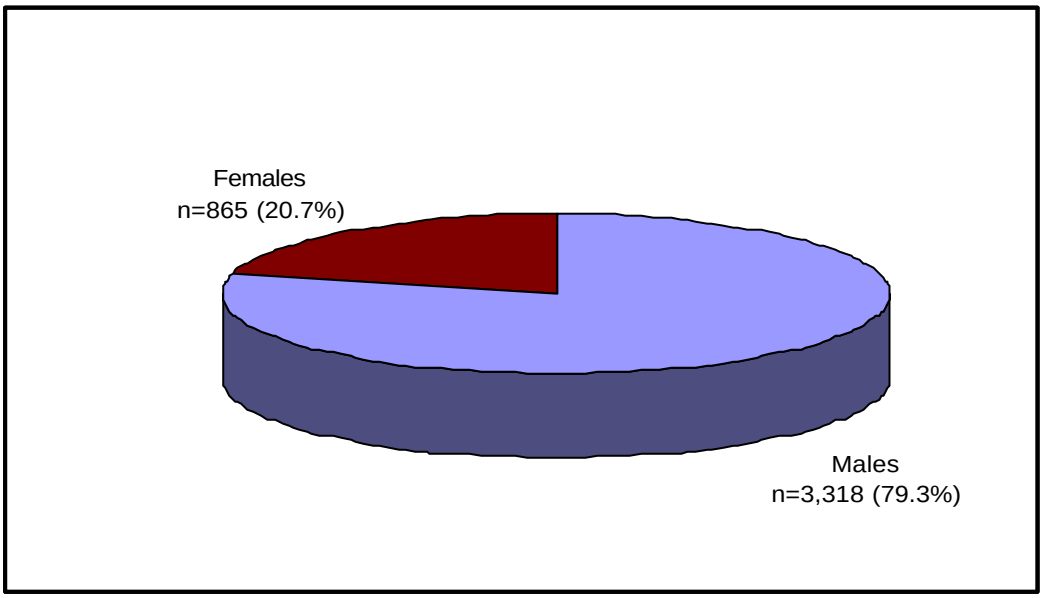
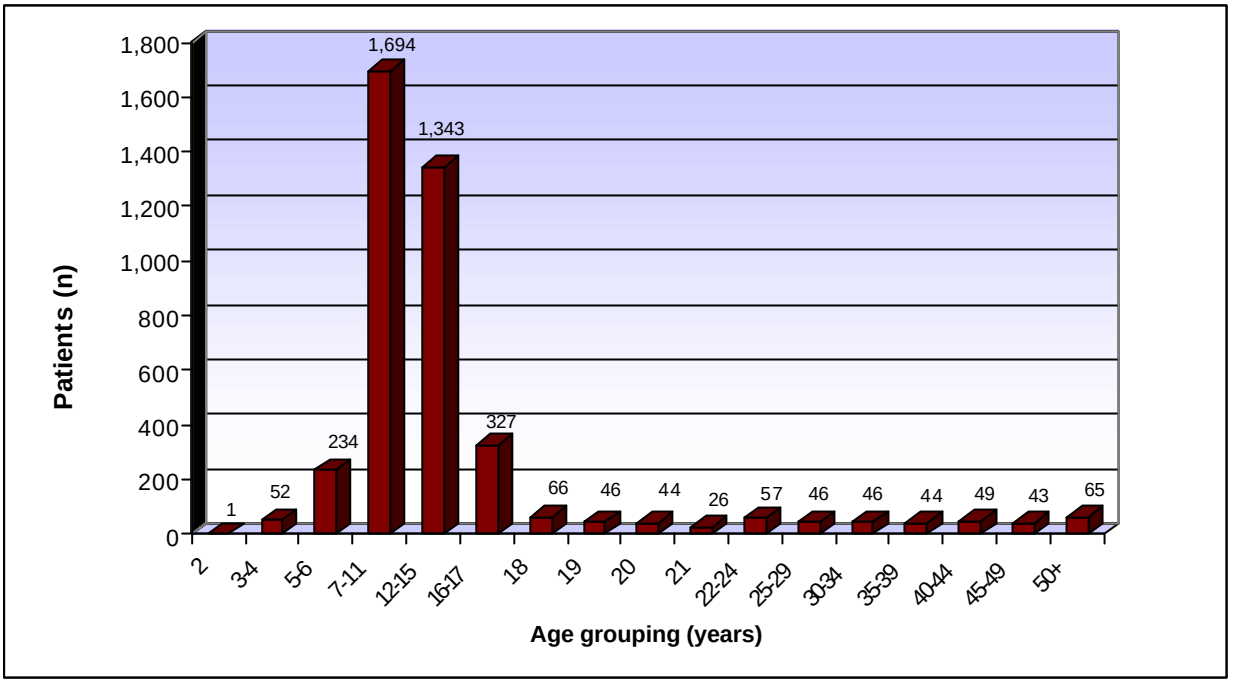


Figure 30: Patients in the ADHD cohort treated with dexamphetamine (with or without methylphenidate) by age



The age distribution of patients in the ADHD cohort notified as being treated with methylphenidate by age and gender is shown in Table 28. Similar proportions of males and females were observed in each age group up to 21 years, after which there was a higher proportion of females than males.

Table 28: Patients treated with methylphenidate (with or without dexamphetamine) in the ADHD cohort by age and gender

	Males			Females		
Age grouping (years)	**Patients**	**Percent**	**Cumulative Percent**	**Patients**	**Percent**	**Cumulative Percent**
2	1	< 0.1	< 0.1	0	0.0	0.0
3-4	45	1.4	1.4	7	0.8	0.8
5-6	195	5.9	7.2	39	4.5	5.3
7-11	1,386	41.8	49.0	308	35.6	40.9
12-15	1,104	33.3	82.3	239	27.6	68.6
16-17	256	7.7	90.0	71	8.2	76.8
18	50	1.5	91.5	16	1.8	78.6
19	34	1.0	92.6	12	1.4	80.0
20	35	1.1	93.6	9	1.0	81.0
21	19	0.6	94.2	7	0.8	81.8
22-24	38	1.1	95.3	19	2.2	84.0
25-29	23	0.7	96.0	23	2.7	86.7
30-34	25	0.8	96.8	21	2.4	89.1
35-39	20	0.6	97.4	24	2.8	91.9
40-44	26	0.8	98.2	23	2.7	94.6
45-49	25	0.8	98.9	18	2.1	96.6
50+	36	1.1	100.0	29	3.4	100.0
TOTAL	**3,318**	**100.0**		**865**	**100.0**	

Number of patients (per 1,000 population) in the ADHD cohort treated with methylphenidate by age and gender

As illustrated previously (Table 19), the overall rate of patients in the ADHD cohort Notified as being treated with methylphenidate (with or without dexamphetamine) was 2.2 per 1,000 population.

The number of males treated with methylphenidate (with or without dexamphetamine) per 1,000 population showed a large increase in younger age groups followed by a rapid decline (Table 29). A similar pattern was seen in females, but with much lower proportions for ages up to 21 years. A similar number of males and females were treated per 1,000 population for ages 25 years and above during the 17-month observation period.

Table 29: Patients using methylphenidate (with or without dexamphetamine) per 1,000 population in the ADHD cohort by age and gender

	Males		Females	
Age grouping (years)	Patients	Number treated per 1,000 population	Patients	Number treated per 1,000 population
2	1	0.1	0	0.0
3-4	45	1.7	7	0.3
5-6	195	7.3	39	1.6
7-11	1,386	19.7	308	4.6
12-15	1,104	19.0	239	4.3
16-17	256	8.7	71	2.6
18	50	3.4	16	1.2
19	34	2.4	12	0.9
20	35	2.4	9	0.7
21	19	1.3	7	0.5
22-24	38	0.9	19	0.5
25-29	23	0.3	23	0.4
30-34	25	0.3	21	0.3
35-39	20	0.3	24	0.3
40-44	26	0.3	23	0.3
45-49	25	0.4	18	0.2
50+	36	0.1	29	0.1
TOTAL	3,318	3.5	865	0.9

Methylphenidate daily Notified dose (mg/day) by age

Table 30 shows that adults had a higher average daily dose of methylphenidate than children (47.5 mg/day compared with 32.4mg/day respectively). However, the maximum daily dose of methylphenidate was higher in children than adults. The average daily doses showed the same pattern in males and females as they did for combined sexes, with the exception that the maximum daily dose was higher in male children than adults (160mg/day compared with 120mg/day respectively).

The average daily dose of methylphenidate for patients with ADHD was 34.3mg/day (SD=17.8mg/day), and increased with increasing age up to 34 years, after which the average dose remained relatively unchanged (Table 31).

Table 30: Average daily Notified dose of methylphenidate for children and adults, in the ADHD cohort

Patient group	Patients	Mean Meth dose (mg/day)	SD	Median Meth dose (mg/day)	Range (mg/day)
Children (2-17 years)					
- Male	2,987	32.6	15.2	30.0	5.0 - 160.0
- Female	664	31.6	14.6	30.0	2.5 - 120.0
- All	3,651	32.4	15.1	30.0	2.5 - 160.0
Adults (= 18 years)					
- Male	331	47.4	26.3	40.0	10.0 - 120.0
- Female	201	47.6	27.8	40.0	5.0 - 120.0
- All	532	47.5	26.9	40.0	5.0 - 120.0

Meth = methylphenidate, SD = standard deviation

Table 31: Average daily Notified doses of methylphenidate (mg/day) in the ADHD cohort by age

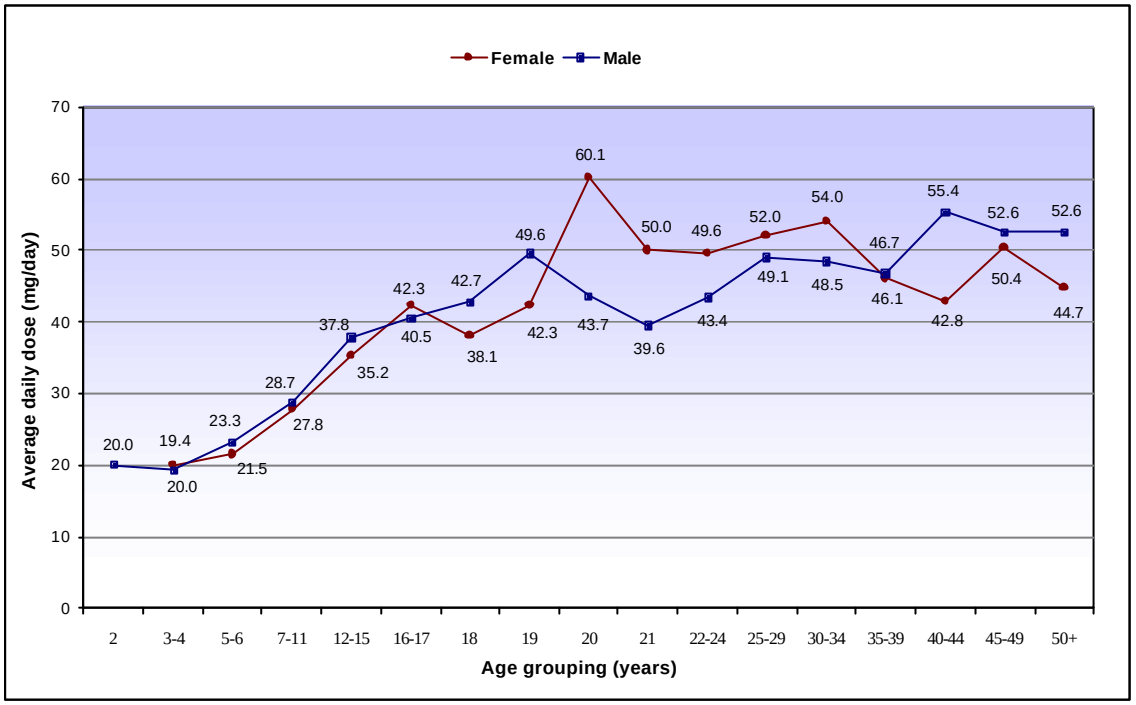
Age grouping (years)	Patients	Mean Meth doses (mg/day)	SD	Median Meth doses (mg/day)	Range (mg/day)
2	1	20.0	-	20.0	-
3-4	52	19.5	8.3	20.0	5.0 - 40.0
5-6	234	23.0	9.5	20.0	5.0 - 60.0
7-11	1,694	28.6	10.9	30.0	2.5 - 95.0
12-15	1,343	37.3	15.9	40.0	5.0 - 160.0
16-17	327	40.9	22.0	40.0	10.0 - 120.0
18	66	41.6	19.1	40.0	10.0 - 100.0
19	46	47.7	27.1	40.0	10.0 - 120.0
20	44	47.1	25.2	40.0	20.0 - 120.0
21	26	42.4	26.2	32.5	10.0 - 108.0
22-24	57	45.5	25.9	40.0	5.0 - 100.0
25-29	46	50.5	30.9	40.0	10.0 - 120.0
30-34	46	51.0	28.1	40.0	20.0 - 120.0
35-39	44	46.4	26.2	40.0	10.0 - 120.0
40-44	49	49.5	30.5	40.0	10.0 - 120.0
45-49	43	51.7	30.8	40.0	10.0 - 120.0
50+	65	49.1	27.0	40.0	10.0 - 120.0
TOTAL	4,183	34.3	17.8	30.0	2.5 - 160.0

Meth = methylphenidate. SD = standard deviation

Methylphenidate daily Notified dose (mg/day) by age and gender

Average daily Notified doses of methylphenidate by age and gender are shown in Figure 31. Average daily doses were similar between females and males, except for the 20 and 21 year-old age groups in which females had considerably higher mean daily doses than males, and the 19 and 40 to 44 year age groups, in which males had higher average doses than females.

Figure 31: Average daily Notified doses of methylphenidate (mg/day) for males and females in the ADHD cohort



Methylphenidate daily Notified dose (mg/kg/day) for children

The average daily Notified dose of methylphenidate per kilogram of body weight was highest in the younger child age groups, with the peak average dose seen for 5 to 6 year olds (1.01mg/kg/day) (Table 32). For older age groups, the average daily methylphenidate dose decreased and the lowest average daily dose was observed for children between 16 to 17 years (0.64mg/kg/day). The maximum daily dose of 4mg/kg/day was seen in the 12 to 15 year age group.

Table 32: Daily Notified doses of methylphenidate (mg/kg/day) by age, for children in the ADHD cohort

Age grouping (years)	Patients*	Mean Meth dose (mg/kg/day)	SD	Median Meth dose (mg/kg/day)	Range (mg/kg/day)
2	0	-	-	-	-
3-4	51	0.97	0.42	0.94	0.25 – 2.35
5-6	229	1.01	0.42	0.91	0.25 – 2.40
7-11	1,629	0.91	0.38	0.83	0.09 – 2.54
12-15	1,280	0.76	0.37	0.71	0.10 – 4.00
16-17	313	0.64	0.35	0.60	0.10 – 2.00
Children (2-17 years)	3,502	0.84	0.39	0.77	0.09 – 4.00

* Body weight was not recorded for all patients within the Stimulant Notification database. Hence, patient counts differ to that presented elsewhere. SD = standard deviation, Meth = methylphenidate

3.5 Summary of Key Findings

A more detailed analysis was undertaken of data in the Stimulant Notification Record Database and the Dispensed Stimulant Medication Database for patients being treated for ADHD. The cohort studied consisted of all Western Australians who were identified in the Stimulant Notification Record Database with a diagnosis of ADHD and in the Dispensed Stimulant Medication Database with at least one record of a stimulant prescription (for this diagnosis) during the period 1 August 2003 to 31 December 2004.

- A total of 15,695 patients (94% of all patients) met the criteria for inclusion in the cohort.
- The majority of patients within the ADHD cohort were treated by paediatricians (n=8,953, 57.0%), followed by child and adolescent psychiatrists (n=3,882, 24.7%) and adult psychiatrists (n=2,681, 17.1%).
- There were 143 Authorised Prescribers who submitted Notification Forms for patients in the ADHD cohort.
- The number of patients Notified per Authorised Prescriber was heavily skewed with a median of 22 and a range from 1 to 2,077.
- The large majority of patients in the cohort were male (n=11,532, 73.5%), while 4,163 (26.5%) were female. The overall ratio of males to females in the ADHD cohort was 2.8. Large differences in the number of males and females treated with stimulant medication were observed for patients aged from 7 to 17 years.
- The average age of cohort patients was 19.6 years. Of those patients identified in the ADHD cohort, 9,664 (61.6%) were under the age of 18 years, with a mean age of 12.0 years (SD=3.2 years). The highest proportion of children in the ADHD cohort was between the ages of 7 and 11 years (n=4,191, 43.4%), with a relatively high number of patients also found in the 12 to 15 year age group (n=3,622, 37.5%).

- A total of 6,031 (38.4%) patients in the ADHD cohort were 18 years of age or older with a mean age of 31.7 years (SD=11.6).

- The majority of patients in the ADHD cohort resided in the North Metropolitan Health Service Area (n=6,549, 41.7%) and South Metropolitan Health Service Area (n=6,328, 40.3%). A small proportion of patients resided in the WA Country Health Service Area (n=1,450, 9.2%) and South West Health Service Area (n=713, 4.5%).

- A total of 4,778 (30.4%) patients in the ADHD cohort were Notified with a co-prescriber nominated by the Authorised Prescriber. The WA Country Health Service Area had the highest proportion of patients with a nominated co-prescriber (n=1,061, 73.2%).

- The majority of patients in the cohort (n=12,451, 79%) were treated with dexamphetamine for ADHD. There were 4,183 patients (27%) treated with some form of methylphenidate during the study period 939 (6%) patient patients were treated with combined dexamphetamine and methylphenidate therapy.

- In addition to stimulant medications, a total of 3,547 (22.6%) patients in the ADHD cohort were concurrently prescribed psychotropic medications. Of these patients, 2,099 (59.2%) were prescribed antidepressants, 202 (5.7%) antipsychotics, 185 (5.2%) anxiolytics, 322 (9.1%) mood stabilising drugs, with the remainder (n=739, 20.8%) reported as being prescribed some other type of psychotropic medication.

To assess total stimulant use in WA, regardless of which medication was being used, doses of stimulant medication were converted to 'dex equivalents'. Converting a methylphenidate dose to a 'dex equivalent' dose allows the total dose of stimulant medication to be represented as a single number. For this purpose it has been assumed that 10 mg of methylphenidate equals 5 mg of dexamphetamine.

- The average daily Notified dose of stimulant medication (expressed in dex equivalents) for children (2 to 17 years) in the ADHD cohort was 17.6 mg/day (SD=9.1), with a median dose of 15 mg/day.

- The average daily Notified dose of stimulant medication (expressed as dex equivalents) for adults (= 18 years) in the ADHD cohort was 33.5 mg/day (SD=14.4), with a median of 30 mg/day.

- The average dose per kilogram of body weight (expressed in dex equivalents) was similar for children (0.42mg/kg/day) and adults (0.47mg/kg/day), as well as males (0.43 mg/kg/day) and females (0.47mg/kg/day).

Rates per 1,000 population of stimulant Notification and usage were calculated for the study cohort across the 17-month study period. 'Rates' in this project were calculated per 1,000 population rather than with person-time denominators. Therefore, the rates presented here are the cumulative incidence of stimulant Notification and/or usage rather than 'true' rates, which take account of time.

- The population-adjusted number of patients Notified as being treated with stimulant medication for ADHD was 8.3 per 1,000 population.

- Overall, 22.2 children per 1,000 population (2 to 17 years) were in the ADHD cohort which was greater than the rate in adults = 18 years (4.1 per 1,000 population).

- There were more males per 1,000 population than females in the ADHD cohort (12.1 and 4.4 respectively). Male rates were higher than females for both dexamphetamine and methylphenidate use.

- Wide variations in the number of patients per 1,000 population included in the ADHD cohort were seen between the 34 Health Districts in WA with a range of 1.1 to 11.6 per 1,000 population. The South Metropolitan WA Health Service Area had the highest rate of patients using stimulant medication (9.0 patients per 1,000 population).

- There were 6.5 patients per 1,000 population in the ADHD cohort being treated with dexamphetamine, 2.2 patients per 1,000 population being treated with methylphenidate and 0.5 patients per 1,000 population being treated with combined therapy.

For the remainder of this section, doses of dexamphetamine and methylphenidate were taken from the Notification Form and not converted to 'dex equivalents'.

- There were 12,451 patients in the ADHD cohort being treated with dexamphetamine (with or without methylphenidate). The majority of patients treated with dexamphetamine were children aged between 7 and 17 years (n=6,346, 51.0%) and over 70% were males (n=8,926, 71.7%).

- The overall average daily Notified dose of dexamphetamine (with or without methylphenidate) for patients in the ADHD cohort was 25.1mg/day (SD=14.5mg/day). The average daily Notified dose of dexamphetamine in children was 17.7mg/day (SD=9.6mg/day) and in adults was 33.9mg/day (SD=14.4mg/day). Similar doses for males and females were seen in children and adults.

- There were 4,183 patients in the ADHD cohort being treated with methylphenidate (with or without dexamphetamine), the majority of whom were male (n=3,318, 79.3%).

- The average daily Notified dose of methylphenidate in children was 32.4mg/day (SD=15.1mg/day) and in adults was 47.5mg/day (SD=26.9mg/day). Similar doses for males and females were seen in the children and adult groups.

Section 4: Comparison with NSW Data

4.1 Methodology and Scope

Scope of interstate comparison

A broad comparison was performed between the output of the present analysis and that published by the NSW Department of Health pertaining to the use of stimulant medication for the treatment of ADHD. Specifically, a comparison was made with data from the following NSW publications relating to stimulant prescribing patterns for children and adults:

- NSW Department of Health. Trends in the prescribing of stimulant medication for the treatment of attention deficit hyperactivity disorder in children and adolescents in NSW. ***NSW Public Health Bulletin*** 2002; 13(S1). ISBN 0 7347 33690.

- NSW Department of Health. Trends in the prescribing of stimulant medication for the treatment of attention deficit hyperactivity disorder in adults in NSW. ***NSW Public Health Bulletin*** 2004; 15(S3). ISSN 1034 7674.

For the purposes of this study, work was undertaken with the understanding that it did not constitute an in-depth statistical comparison of WA and NSW data at the person level. As such, this aspect of the project involved the simple comparison of aggregated results between that reported by the NSW Department of Health and that found by the present investigation, where such comparisons were possible. Consequently, only broad comparisons were made and readers are cautioned that any differences observed may be the result of variations in the analytical techniques employed, the time periods studied, underlying differences in the population structures or other potential confounding factors.

Additionally, due to differences in the type of data collected and duration of collection between WA and NSW, certain comparisons are impossible at this time. Due to the relatively short period for which the WA stimulant data collections have been in operation (ie, from 1 August 2003), insufficient lookback periods exist in the WA data to *accurately* determine the time of first stimulant medication prescription, especially for older age groups. Similarly, the limited duration of WA data prevented investigation of adult patients who were first treated with stimulant drugs for ADHD as a child. Lastly, no estimates of duration of continuous treatment are possible with the WA data at this point in time.

Readers are further cautioned that the time periods used in the WA and NSW reports differ. For the purposes of this comparison, the WA data analysed from 1 August 2003 to 31 December 2004 were compared with that presented for children in NSW in 2000 and for adults in 2003. To allow comparison of annual proportions and rates of stimulant use, it was assumed that the findings from the WA analysis would be equally distributed across the 17-month observation period. As a result, aggregate results for the 17-month period in WA were converted to their corresponding 12-month equivalents by multiplying the 17-

month results by 12/17 (0.71) to allow comparisons with the annual data presented in both NSW reports.

The NSW counts and rates are based on the total number of patients treated at a specified *point in time* (1 December 2000 for children and 30 June 2003 for adults). However the WA counts and rates in this section are based on the number of patients Notified during a specified one year *time period* (2004, see above for conversion factors). Thus, WA counts and rates in this section are an *underestimate* compared with previous sections of the report and readers should bear this in mind when viewing the data presented. Please refer to Section 3.2 for a more accurate representation of rates of stimulant treatment of ADHD in WA.

Additionally, the age groups in the following section have been adjusted to allow comparison with the NSW report. However, the NSW reports did not always provide count data for each age group, thus preventing certain interstate comparisons for some patient ages.

Comparison of average daily dose of stimulant medication (in 'tablets')

For the purpose of comparing the present WA results pertaining to average daily drug dose with NSW data, comparison is limited to stimulant dose in number of tablets. As a result, the average daily dosage data (mg/day) of each drug for WA stimulant users was converted to daily dose in tablets. Doses of dexamphetamine, which is available only in 5mg tablets, were calculated from the WA data as follows:

Mean daily dexamphetamine dose (in tablets) =
Mean daily dexamphetamine dose (mg/day)/5

Methylphenidate is available in tablets of varying strengths due to the availability of both immediate action and long acting forms of the drug. However, data for the 2002 NSW report were extracted in 2000, prior to the time that long acting methylphenidate became available. Consequently, it is likely that the 2002 NSW report presented findings for immediate action methylphenidate only, which is dispensed in tablets of 10mg. As such, average daily doses of methylphenidate (in tablets) were calculated from the WA data as follows:

Mean daily methylphenidate dose (in tablets) =
Mean daily methylphenidate dose (mg/day)/10

Moreover, based on information provided by the NSW Department of Health, it was considered unlikely that children in NSW would be concurrently prescribed both dexamphetamine and methylphenidate for treatment of ADHD. Therefore, in order to provide meaningful interstate comparisons, doses of each type of stimulant were calculated for WA patients prescribed *dexamphetamine only* or *methylphenidate only*. Further, comparisons are only provided for children, as equivalent data for NSW adults have not been published to date.

4.2 Results

Age and gender of stimulant users

The WA data do not technically allow determination of age at commencement of treatment with stimulant medications, as reported in the NSW publications. However, assuming that the initial Notification of stimulant use was the 'first-ever' use of such medications, a loose comparison is possible.

As shown in Table 33, NSW had a considerably greater proportion of child stimulant users (81.8%) compared with WA (61.6%). For children, the majority of stimulant users were aged between 7 and 15 years for both WA (80.9%) and NSW (83.6%). In contrast, stimulant use for adults was more evenly distributed across age groups. Overall, the ratio of males to female users was greater for NSW (3.6) compared with WA (2.8). However, WA had a higher male-to-female ratio for several age groups, with the largest absolute difference occurring in 5 to 6 year olds.

Table 33: Number of patients treated with stimulant medications annually for ADHD by age and gender in NSW and WA

Age group (years)	NSW		WA*	
	N(%)	Ratio M/F	N(%)	Ratio M/F
Children[a]				
2	0	-	1 (<0.1%)	-
3-4	174 (1.1%)	4.6	67 (1.0%)	5.1
5-6	1,187 (7.5%)	4.0	356 (5.2%)	4.8
7-11	7,930 (49.8%)	4.4	2,958 (43.4%)	4.2
12-15	5,389 (33.8%)	4.8	2,557 (37.5%)	4.1
16-17	1,247 (7.8%)	3.9	882 (12.9%)	3.4
All Children	15,927 (100%)	4.5	6,821 (100%)	4.1
Adults[b]				
18	339 (9.6%)	2.2	328 (7.7%)	2.8
19	234 (6.6%)	2.3	288 (6.8%)	2.4
20	212 (6.0%)	2.5	286 (6.7%)	2.2
21	169 (4.8%)	3.0	241 (5.7%)	2.0
22-24	374 (10.5%)	1.9	569 (13.4%)	1.9
25-29	414 (11.7%)	1.6	571 (13.4%)	1.8
30-34	401 (11.3%)	1.7	487 (11.4%)	1.8
35-39	348 (9.8%)	1.5	412 (9.7%)	1.1
40-44	355 (10.0%)	1.3	390 (9.2%)	1.2
45-49	308 (8.7%)	1.4	312 (7.3%)	1.2
50+	395 (11.1%)	1.5	373 (8.8%)	1.2
All adults	**3,549 (100%)**	**1.7**	**4,257 (100%)**	**1.7**
TOTAL	19,476	3.6	11,078	2.8

* WA data converted to 2004 annual counts (as described in main text). Hence, counts will be lower than those presented for previously. [a]NSW data as at 1 December 2000, [b]NSW data as at 30 June 2003. M = males, F = females, N = number of patients.

The number of patients treated annually with stimulants for ADHD (per 1,000 population) demonstrated a similar trend across age groups for both NSW and WA, with peaks seen between 7 and 15 years of age, and then a marked reduction from 16 years onwards (Table 34 & Figure 32). However, this decline was far greater in NSW than in WA.

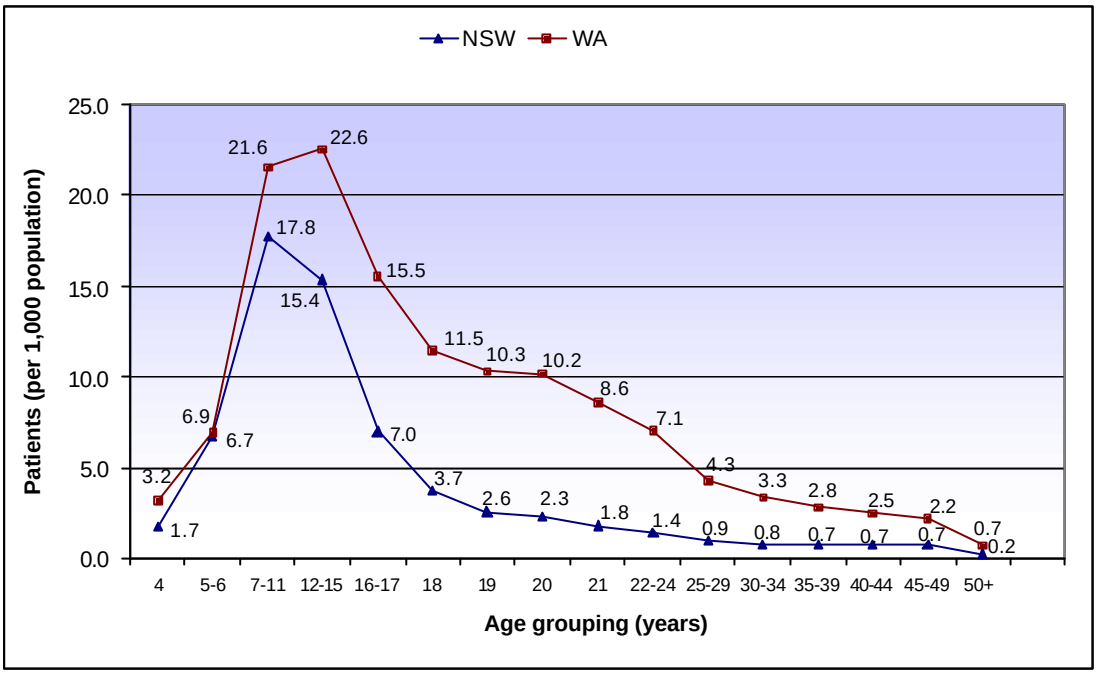
The rates of stimulant treatment for ADHD were higher in WA than in NSW for all age groups. From seven years of age, the number treated per 1,000 population was considerably higher in WA children than in NSW children, with the rate in WA being more than double that in NSW for 16 to 17 year olds. Overall, the relative difference in rates of treatment between WA and NSW was greater in adults than children (4.1-and 1.4-times, respectively). This was most noticeable in early adulthood (18 to 29 years), where the rate of treatment was approximately 3 to 5 times greater than for NSW stimulant users of the same age groups.

Table 34: Number of patients (per 1,000 population) treated annually with stimulant medications by age and gender in NSW and WA

Age group (years)	NSW		WA*	
	Patients (per 1,000 population)	Ratio M/F	Patients (per 1,000 population)	Ratio M/F
Children[a]				
<4	0.2	7.3	0.3	3.7
4	1.7	4.1	3.2	5.9
5-6	6.7	3.8	6.9	4.5
7-11	17.8	4.2	21.6	4.0
12-15	15.4	4.5	22.6	3.9
16-17	7.0	3.7	15.5	3.2
All children	11.3	4.2	15.6	3.9
Adults[b]				
18	3.7	2.1	11.5	2.7
19	2.6	2.2	10.3	2.3
20	2.3	2.4	10.2	2.1
21	1.8	2.9	8.6	1.9
22-24	1.4	1.8	7.1	1.9
25-29	0.9	1.6	4.3	1.8
30-34	0.8	1.7	3.3	1.8
35-39	0.7	1.5	2.8	1.1
40-44	0.7	1.3	2.5	1.2
45-49	0.7	1.4	2.2	1.2
50+	0.2	1.6	0.7	1.3
All adults	0.7	1.8	2.9	1.7

* WA data converted to 2004 annual counts (as described in main text). Hence, counts will be lower than those presented previously. [a]NSW data as at 1 December 2000, [b]NSW data as at 30 June 2003. M = males, F = females.

Figure 32: Number (per 1,000 population) treated annually with stimulants for ADHD: comparison of NSW and WA.



Type of stimulant medication by age

As mentioned previously, in certain instances the age groups in the WA results have been adjusted to match those used in the NSW analysis to allow comparability. Additionally, the NSW report has described stimulant users as receiving either dexamphetamine or methylphenidate only. However, in the WA data, some patients received a combination of both drugs. Therefore, in Table 35, WA results have been presented for those receiving dexamphetamine only, methylphenidate only or a combined therapy of dexamphetamine and methylphenidate, to allow more detailed interstate comparisons to be made.

With the exception of very young children (3 and 4 years), the proportion of child stimulant users treated with dexamphetamine only was higher in WA compared with NSW, with overall proportions of 62.2% and 48.0% respectively (Table 35). In children, the difference was most noticeable in 16-17 year olds (WA 73.8%, NSW 50.2%).

Western Australian adults were more likely to be treated with dexamphetamine compared with NSW adults (overall proportions of 91.2% and 73.3% respectively). The differences were more pronounced than those seen with children, ranging from 85.8% to 94.3% in WA adults compared with 46.0% to 84.3% in NSW adults. Additionally, 'dexamphetamine only' use peaked for adults aged = 50 years in NSW compared with 25-29 year olds in WA. A greater proportion of patients with ADHD were treated with methylphenidate in all age groups in NSW compared with WA, particularly in adults.

Table 35: Annual number and proportion of children and adult stimulant users with ADHD by age and drug type (dexamphetamine and/or methylphenidate) in NSW and WA

Age group (years)	NSW		WA*		
	Dexamphetamine	Methylphenidate	Dexamphetamine	Methylphenidate	Combined
Children[a]					
2	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	0 (0.0)
3-4	98 (56.3)	76 (43.7)	30 (45.3)	25 (36.8)	12 (17.9)
5-6	604 (50.9)	583 (49.1)	191 (53.7)	127 (35.6)	38 (10.7)
7-11	3,707 (46.7)	4,223 (53.3)	1,763 (59.6)	968 (32.7)	227 (7.7)
12-15	2,603 (48.3)	2,786 (51.7)	1,609 (62.9)	776 (30.3)	172 (6.7)
16-17	626 (50.2)	621 (49.8)	651 (73.8)	173 (19.6)	58 (6.6)
All children	7,638 (48.0)	8,289 (52.0)	4,244 (62.2)	2,070 (30.3)	508 (7.4)
Adults[b]					
18	156 (46.0)	183 (54.0)	281 (85.8)	30 (9.3)	16 (5.0)
19	124 (53.0)	110 (47.0)	256 (88.7)	23 (8.1)	9 (3.2)
20	130 (61.3)	82 (38.7)	255 (89.1)	18 (6.4)	13 (4.4)
21	104 (61.5)	65 (38.5)	222 (92.4)	10 (4.1)	8 (3.5)
22-24	272 (72.7)	102 (27.3)	529 (92.9)	20 (3.5)	20 (3.6)
25-29	332 (80.2)	82 (19.8)	539 (94.3)	22 (3.8)	11 (1.9)
30-34	326 (81.3)	75 (18.7)	455 (93.3)	18 (3.6)	15 (3.0)
35-39	283 (81.3)	65 (18.7)	381 (92.5)	14 (3.4)	17 (4.1)
40-44	295 (83.1)	60 (16.9)	356 (91.1)	18 (4.7)	16 (4.2)
45-49	247 (80.2)	61 (19.8)	282 (90.3)	18 (5.7)	13 (4.1)
50+	333 (84.3)	62 (15.7)	328 (87.7)	29 (7.8)	17 (4.5)
All adults	2,602 (73.3)	947 (26.7)	3,882 (91.2)	220 (5.2)	155 (3.6)

* WA data converted to 2004 annual counts (as described in main text). Hence, counts will be lower than those presented previously. [a]NSW data as at 1 December 2000, [b]NSW data as at 30 June 2003. Proportions represent row percents.

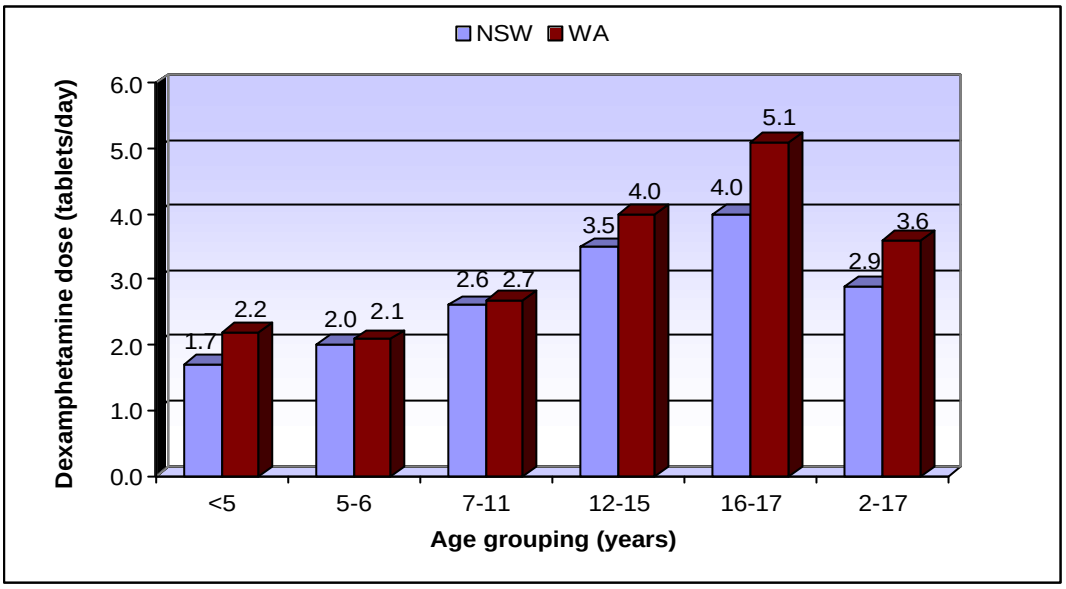
Average daily dose of dexamphetamine and methylphenidate (in 'tablets')

Dexamphetamine

Both States appeared to have similar average daily doses of dexamphetamine for children between 5 and 12 years of age. However, for ages 12 to 17 years, higher average daily doses were seen for WA patients compared with NSW (Figure 33). As a consequence, the average daily dose of dexamphetamine for all children was 24.1% higher in WA (3.6 tablets per day) than seen in NSW (2.9 tablets per day). Peak average daily doses were seen in older children (16-17 years) for both Australian populations, but were 27.5% higher in WA compared with NSW.

However, readers should exercise caution when interpreting these results as this comparison (measuring daily dose in tablets per day) does not account for a number of confounding factors, most importantly patient body weight. Refer to Section 3.3 for more accurate calculations of average daily doses of dexamphetamine for patients within WA.

Figure 33: Average daily dose of dexamphetamine (number of tablets) for the treatment of ADHD in NSW and WA children (2 to 17 years)



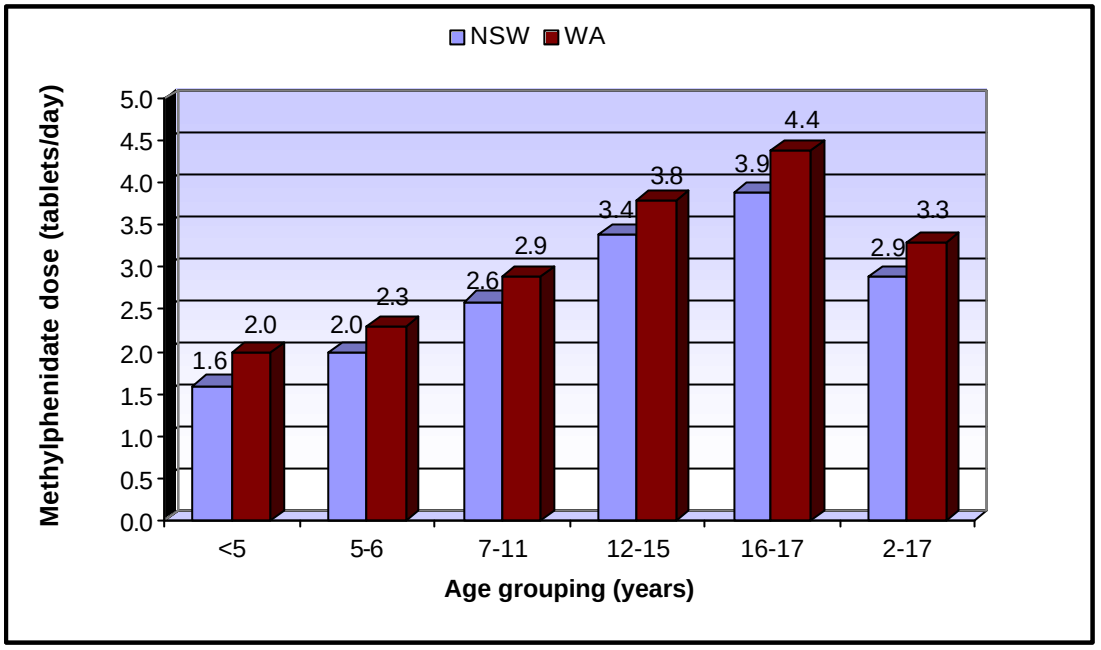
NSW data as at 1 December 2000. Data presented for patients prescribed dexamphetamine only for treatment of ADHD.
1 tablet = 5mg dexamphetamine.

Methylphenidate

The average daily dose of methylphenidate (in tablets) was higher for children of all ages in WA than seen for NSW (range: 11.5% to 25.0% higher). Overall, the average daily dose for all children was 13.8% greater in WA (3.3 tablets per day) than seen for NSW (2.9 tablets per day)(Figure 34). For both Australian populations the average daily dose of methylphenidate progressively increased with age, such that peak average daily doses were seen in older children (16 to 17 years) for both States. Average daily doses for this age group were 12.8% higher in WA compared with NSW.

Readers should exercise caution when interpreting these results as this comparison (measuring daily dose in tablets per day) does not account for a number of confounding factors, most importantly patient body weight. Refer to Section 3.4 for more precise calculations of average daily doses of methylphenidate for patients within WA.

Figure 34: Average daily dose of methylphenidate (number of tablets) for the treatment of ADHD in NSW and WA children (2 to 17 years)



Data presented for patients prescribed methylphenidate only for treatment of ADHD.
1 tablet = 10mg methylphenidate.
NSW data as at 1 December 2000

4.3 Summary of Key Findings

A broad comparison was performed between the present analysis and that published by the NSW Department of Health pertaining to the use of stimulant medication for the treatment of ADHD. For the purposes of this study, work was undertaken with the understanding that it did not constitute an in-depth statistical comparison of WA and NSW data at the person level. The WA data were converted to annual counts, and so counts are different to those presented in previous sections of this report.

- WA had a total of 11,078 patients treated annually with stimulant medications compared with 19,476 in NSW. The number of patients using stimulant medication for the treatment of ADHD (per 1,000 population) was greater for all age groups in WA than NSW.

- Almost 16,000 children were treated with stimulant medication in NSW (n=15,927), at a rate of 11.3 patients per 1,000 population. WA had 6,821 children treated with stimulant medication, giving a rate of 15.6 patients per 1,000 population.

- Adults were treated with stimulant medication at a rate of 0.7 patients per 1,000 population (n=3,549) in NSW compared with 2.9 patients per 1,000 population (n=4,257) in WA.

- Of children in NSW treated with stimulant medication, 48% (n= 7,638) were treated with dexamphetamine compared with 62.2% (n=4,244) of children in WA. Over

50% of children in NSW treated with stimulant medication were treated with methylphenidate (52%, n=8,289) compared with 30.3% (n=2,070) in WA treated with methylphenidate alone and 7.4% (n=508) treated with combined dexamphetamine and methylphenidate therapy.

- Of adults in NSW treated with stimulant medication, 73.3% (n=2,602) were treated with dexamphetamine compared with 91.2% (n=3,882) of adults in WA. Over 25% of adults in NSW treated with stimulant medication were treated with methylphenidate (26.7%, n=947) compared with 5.2% (n=220) in WA treated with methylphenidate alone and 3.6% (n=155) treated with combined dexamphetamine and methylphenidate therapy.

- The average daily dose of dexamphetamine (expressed in number of tablets per day) for children was 3.6 in WA and 2.9 in NSW. The average daily dose of dexamphetamine for children was 24.1% higher in WA than NSW.

- The average daily dose of methylphenidate (expressed in number of tablets per day) was 3.3 in WA and 2.9 in NSW. The average daily dose of methylphenidate for children was 13.8% higher in WA than NSW.

Section 5: Comparison with Commonwealth Data

5.1 Methodology

The Therapeutic Goods Administration (TGA) provides data on the supply of dexamphetamine and methylphenidate products by State. The data are provided as base medication in grams.

To compare the quantity of stimulant medication dispensed in WA during the study period with data provided by the TGA, the sum of dexamphetamine and methylphenidate quantities dispensed has been expressed as a total quantity in grams (g) of base medication. The dexamphetamine and methylphenidate formulations dispensed were converted to the equivalent base medication (g) using conversion factors listed in Appendix 5.[***]

To allow a meaningful comparison of WA results with Commonwealth TGA data available for 2004, the aggregated 17-month results for all stimulant users were converted to annual figures using a correction factor of 0.71 (ie, 12 months divided by 17 months). Readers are cautioned that some discrepancy in results between the TGA and Department of Health is to be expected because:

- The 17 months of data provided by the Department of Health from the Dispensed Stimulant Medication Database, were extracted using the date of stimulant *prescription* and not the date each drug was *dispensed*. Data based upon date of prescription rather than date dispensed were used for the comparison since a single data set extracted from the Dispensed Stimulant Medication Database was used throughout the study.

- TGA data for dexamphetamine and methylphenidate (in grams of base equivalents for 2004) were provided by the TGA of the Commonwealth Department of Health and Aged Care and represent the *supply* of Schedule 8 drugs from importers, manufactures and wholesalers, as opposed to patient dispensing data.

- The conversion of 17-month data to annual data assumed that stimulant usage was uniformly distributed across the study period.

[***] The conversion factors for calculating base equivalent quantities were supplied by the Department of Health from data obtained via the Australian Therapeutic Goods Administration (Chemicals and Non-Prescription Drugs Branch).

Due to the limitations of the above methodology, the Department of Health subsequently conducted further analysis of data contained within the Dispensed Stimulant Medication Database to make more valid comparisons with the Commonwealth TGA supply data. Data were extracted from the Dispensed Stimulant Medication Database per calendar year based on date dispensed rather than date prescribed. This subsequent analysis was conducted on data from 2000 to 2004, rather than the 17 month dataset used for the original analysis.

5.2 Results

The comparison between Commonwealth supply data and the WA dispensing data is shown in Table 36. According to the initial analysis of Commonwealth data, the supply of stimulants to WA (expressed in base medication), was 9.0% (8,607g) greater than that dispensed within WA during 2004. By drug type, a difference of 4,907g of dexamphetamine and of 3,700g of methylphenidate (base medication) was seen (Table 36).

Table 36: Comparison of annual quantities of dexamphetamine and methylphenidate (expressed in base equivalents) between WA 'dispensing' data from prescribed date and Commonwealth 'supply' data for 2004.

	Quantity dispensed or supplied		
	Dex (g)	Meth (g)	Total stimulants (g)
WA 'dispensing' data*	59,597	27,461	87,058
Commonwealth 'supply' data	64,504	31,161	95,665
Absolute difference (g)	-4,907	-3,700	-8,607
Relative difference (%)	-7.6	-11.9	-9.0

Dex = dexamphetamine base equivalents, Meth = methylphenidate base equivalents.
* WA data from Dispensed Stimulant Medication Database (based on prescribed date) converted to annual counts (as described in Methods), g=grams.

Subsequent Analysis of Commonwealth 'supply' data by Department of Health

The subsequent analysis by the Department of Health, where data were extracted per calendar year from 2000 to 2004 based on date dispensed rather than date prescribed, was more representative of the Commonwealth supply data (Figures 35 and 36). In 2004, there was a 2.1% (1,930g) difference between the amount of stimulant medication supplied to wholesalers (95,665g) and the amount dispensed (93,735g) in WA. The 9% difference illustrated in Table 36 is likely to have been an artefact of the methodology used. Figures 35 and 36 illustrate the comparison between Commonwealth TGA supply data and WA dispensing data for dexamphetamine and methylphenidate from 2000 to 2004.

Figure 35: Consumption of dexamphetamine (in grams of base medication) in WA 2000-2004

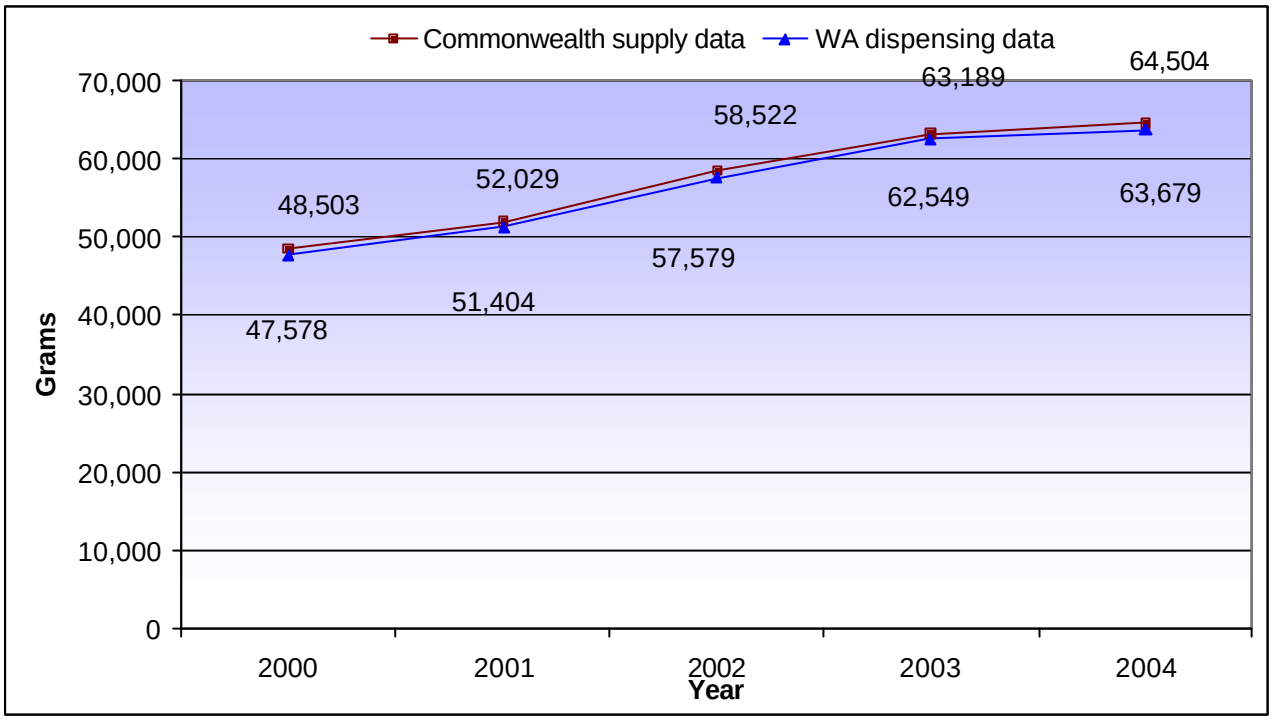
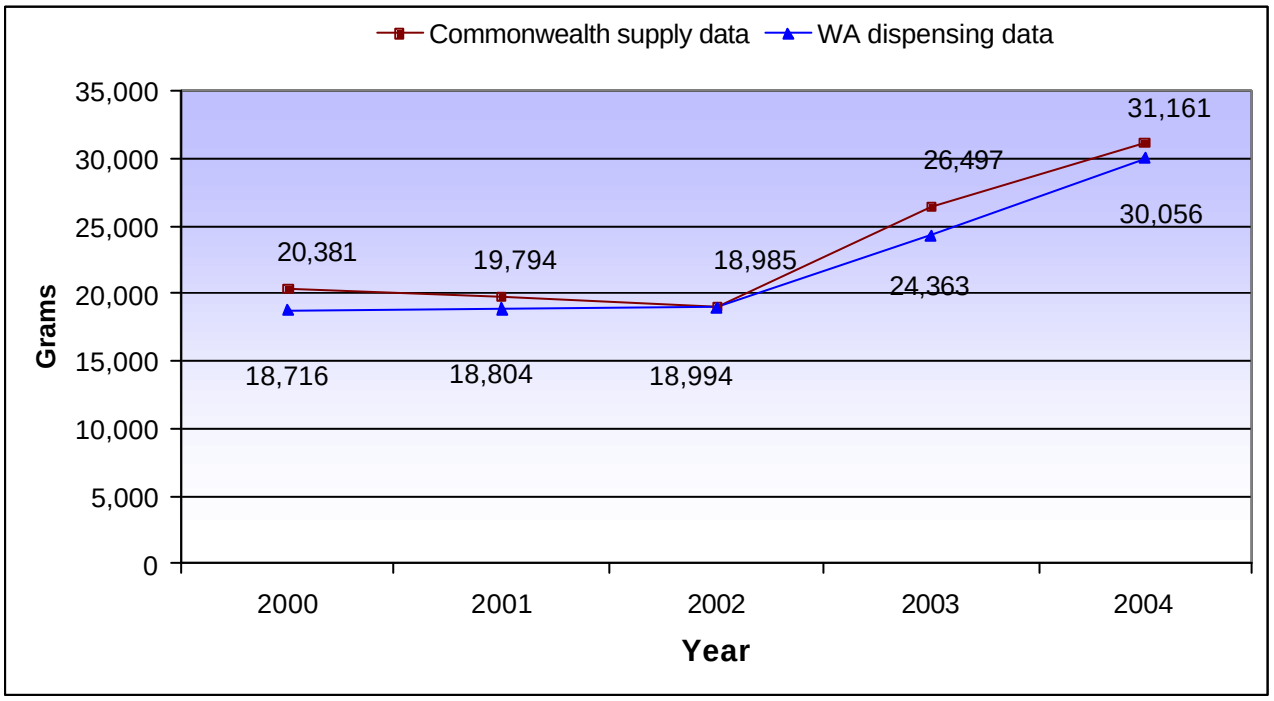


Figure 36: Consumption of methylphenidate (in grams of base medication) in WA 2000-2004



In 2004 there was a 1.30% difference between the amount of dexamphetamine supplied (64,504g in base medication) and dispensed in (63,679g in base medication) WA. In 2004

there was a 3.67% difference between the amount of methylphenidate supplied (31,161g in base medication) and dispensed in (30,056g in base medication) in WA.

5.3 Summary of Key Findings

Data on the supply of dexamphetamine and methylphenidate products by State are provided by the TGA. The data are provided in base medication in grams.

A comparison between WA stimulant prescription data and data on the dexamphetamine and methylphenidate products supplied in WA, as provided by the TGA, was undertaken by converting the amount of stimulant medication dispensed to base medication. To compare with 2004 Commonwealth data the 17 months of data collected during the study period were converted to annual figures using a correction factor of 0.71.

Initial analysis showed a 9% difference between the Commonwealth supply data and WA dispensed medication, with 8,607g more supplied than dispensed. However, this was likely to be an artefact of the methodologies used to calculate dispensed quantities, which was based on date of prescribing rather than dispensed date.

Subsequent analysis conducted by the Department of Health, which extracted data on a calendar year basis and by date dispensed rather than date prescribed, revealed a smaller overall difference (2.1%, 1,930g) between quantity supplied and quantity dispensed.

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APPENDIX 1:
Stimulant Regulatory Guidelines
Western Australian Department of Health

STIMULANT REGULATORY GUIDELINES

A reference to a stimulant drug in these Guidelines means dexamphetamine and methylphenidate in any form.

1. Overview

The regulatory control framework for stimulants requires prescribers initiating treatment with a stimulant to apply to the Department of Health (DOH) and obtain a 'Stimulant Prescriber Number'. Authorised Prescribers can initiate treatment for patients who meet the criteria set out in these Regulatory Guidelines by forwarding a completed 'Notification Form' to the DOH. Where a patient does not meet the criteria set out in these Regulatory Guidelines an authorisation from the Commissioner of Health (COH) is required before treatment can be initiated.

2. Registration of Prescribers

2.1 A medical practitioner must apply to the Department of Health and obtain a unique Stimulant Prescriber Number (SPN) to initiate treatment with a stimulant drug.

2.2 To apply for a SPN, a medical practitioner must be registered with the Medical Board of Western Australia and be recognised as having specialist qualifications as a paediatrician, paediatric neurologist, neurologist, thoracic medicine physician, rehabilitation physician, psychiatrist, child and adolescent psychiatrist or other approved qualification as determined by the Commissioner of Health.

2.3 An Application to obtain a Stimulant Prescriber Number (SPN1) is to be completed and forwarded to the Department of Health.

2.4 Medical practitioners requesting a SPN will be required to be familiar with and comply with the Stimulant Regulatory Guidelines (WA) and agree to participate in a clinical audit of patients at a later date. This, or any future audits will be based upon research principals including the requirement for informed patient consent to access medical records.

3. Criteria for the Prescribing of a Stimulant

3.1 Diagnosis

Patients must be diagnosed as having ADHD, brain damage, narcolepsy or depression.

3.1.1 Treatment of narcolepsy with stimulants may only be initiated by a paediatric neurologist, neurologist or a medical practitioner approved by the COH.

3.1.2 Treatment of brain damage with stimulants may only be initiated by a neurologist, paediatric neurologist or a medical practitioner approved by the COH.

3.1.3 Treatment of depression with stimulants may only be initiated by psychiatrist, a child and adolescent psychiatrist or a medical practitioner approved by the COH.

3.1.4 Treatment of ADHD with stimulants may only be initiated by a neurologist, paediatric neurologist, paediatrician, psychiatrist, a child and adolescent psychiatrist or a medical practitioner approved by the COH. Patients are required to meet the ICD-10 or DSM-IV diagnostic criteria.

3.1.5 A urine drug screen should be undertaken by all patients aged 13 years and above before treatment with a stimulant is initiated. Further testing is recommended annually or as clinically appropriate.

3.2 Requirements for patients diagnosed with ADHD

3.2.1 Dose

All patients must be started on a low dose that is titrated according to the patient's response.

Doses must not be greater than 1mg/kg/day for dexamphetamine up to a maximum of 60mg per day; or be greater than 2mg/kg/day for methylphenidate up to a maximum of 120mg per day.

Where both dexamphetamine and methylphenidate are prescribed for the same patient there is a maximum of 12 tablets per day.

3.2.2 Age

Treatment of ADHD with a stimulant may be initiated in children between 4 years and 18 years by a medical practitioner specialising in children in accordance with section 3.1.4.

For patients aged 17 years and over, treatment with a stimulant must be initiated by a medical practitioner specialising in adults in accordance with section 3.1.4.
Treatment of ADHD with a stimulant may be continued in patients aged between 18 to 25 years by a medical practitioner specialising in children in accordance with section 3.1.4.

Treatment of ADHD with a stimulant in children aged between 2 and 4 years by a medical practitioner in accordance with section 3.1.4 will require an authorisation from the COH (see section 4).

Treatment with a stimulant for ADHD in children below 2 years of age will not be authorised.

3.2.3 Co-morbidity

Patients with a history of psychosis, bipolar disorder, or sustained significant substance abuse will require an authorisation from the COH. Applications will be forwarded to the Stimulant Assessment Panel for consideration.

4. Application for an Authorisation to Prescribe a Stimulant

4.1. To prescribe stimulants for the treatment of a patient diagnosed with a disorder not approved in section 3.1 requires a comprehensive clinical report to be forwarded to the COH. If possible reports should include the published literature for treating the condition proposed with stimulants. Treatment cannot be commenced with stimulants until the medical practitioner has received written authorisation from the COH.

4.2. To prescribe stimulants for clinical research, will require a copy of the research proposal with approval from an Ethics Committee constituted in accordance with the Guidelines issued by the National and Medial Research Council (NHMRC) to be submitted. A comprehensive report for each patient should be submitted. Treatment cannot be commenced with stimulants until the medical practitioner has received written authorisation from the COH.

4.3. Application to prescribe stimulants for ADHD where a patient does not meet the criteria set out in section 3.2 is to be forwarded to the COH for consideration by the Stimulants Assessment Panel. Treatment cannot be commenced with stimulants until the medical practitioner has received written authorisation from the COH.

5. Notification Form

5.1. An authorised medical practitioner (SPN) will be required to complete a Notification Form for each patient for whom they wish to initiate treatment with a stimulant where the patient meets the criteria set out in section 3.

5.2. A Notification of Treatment Using Stimulant Medication Form (SNF1) is to be completed and forwarded to the Department of Health at the same time as the first prescription for a patient is written.

5.3. A new notification will be required to be completed when there is a change in:

- dose, when the quantity of drug required for the new dose will result in an additional standard pack to be supplied per month;
- drug;
- drug form (ie, immediate action or sustained release);
- nominated co-prescriber (when the nominated co-prescriber is not at the same medical practice as the Authorised Prescriber);
- Authorised medical practitioner (with a SPN);
- Treatment is discontinued; or
- Patients details change (ie, surname and/or address)

5.4. The authorised medical practitioner should provide a copy of the Notification Form to the nominated co-prescriber to ensure they are aware of the patient's current treatment regime.

5.5. A co-prescriber is not permitted to change a patient's treatment; only the authorised medical practitioner (SPN) may do this.

6. General Regulatory Matters

6.1. The COH may revoke an authorisation or cancel a notification forwarded to the DOH.

6.2. A medical practitioner who has completed a Notification Form or has received a

written authorisation from the COH may request in writing that their notification or authorisation be cancelled.

6.3. Registrars are required to have prescriptions for stimulants countersigned by their supervising consultant except where the registrar has been endorsed as a co-prescriber in the Notification Form by the Authorised Prescriber.

6.4. Medical practitioners should Notify the COH in writing if replacement prescriptions are required for lost, stolen or otherwise inaccessible medication.

6.5. Pharmacists are required to be familiar with the prescriber's handwriting or verify with the medical practitioner that the prescription is valid.

6.6. Medical practitioners are required to include on prescriptions for stimulants, repeat intervals between prescriptions.

7. Authorised medical practitioners on leave

7.1. Any authorised medical practitioner on leave from their practice should advise the DEPARTMENT OF HEALTH in writing of the alternative arrangements they have made for patients to obtain a prescription for stimulants. Information to be included is the time period on leave, the name of the locum specialist and where there is no nominated co-prescriber whether a general medical practitioner may write an interim prescription.

7.2. A locum medical practitioner should ensure they have a SPN and may continue to prescribe based on the notification or authorisation that the authorised medical practitioner has submitted. If they wish to prescribe outside the previously notified details then Re-Notification will be required.

7.3. If a locum authorised medical practitioner wishes to initiate treatment they will be required to complete a Notification Form. If they wish to prescribe outside the Stimulant Regulatory Guidelines, then they will be required to obtain an authorisation.

7.4. Where an authorised medical practitioner has agreed to a general medical practitioner (GP) prescribing stimulant medicine in their absence, the GP must obtain authorisation from the Commissioner of Health prior to writing a prescription. A copy of the authorisation will be sent to the authorised medical practitioner. An authorisation will only be based on the treatment rationale previously notified by the authorised medical practitioner. The GP will not be able to initiate treatment with stimulants.

7.5. Where a notification has not been submitted by an authorised medical practitioner or a notification has been submitted but is pending consideration by the Assessment Panel, no authorisation will be issued to the GP in their absence.

8. Transition

Authorised medical practitioners will be required to review existing patients treated with stimulants by 31 July 2004 and submit a Notification Form to the Department of Health for each patient.

A Quick Guide to the Stimulant Regulatory Guidelines

A medical practitioner must apply to the DOH, WA and obtain a unique Stimulant Prescriber Number (SPN) to initiate treatment with stimulant drugs.

Requirement to complete a notification to prescribe stimulants for:

- patients diagnosed with brain damage ,narcolepsy or depression;
- patients diagnosed with ADHD provided it does not exceed the following:

a) Dose:

Must not be greater than 1mg/kg/day for dexamphetamine up to a maximum of 60mg per day or be greater than 2mg/kg/day for methylphenidate up to a maximum of 120mg per day.

Must not exceed a maximum of 12 tablets per day, where dexamphetamine and methylphenidate are prescribed together.

b) Age:

Between 4-18 years, treatment to be initiated by a medical practitioner specialising in children (see section 3.1.4 of Stimulant Regulatory Guidelines).

Patients aged 17 years and greater, a medical practitioner specialising in adults, (see section 3.1.4 of Stimulant Regulatory Guidelines) must initiate treatment.

Patients aged 18-25 years can have their treatment continued by a medical practitioner specialising in children (see section 3.1.4 of Stimulant Regulatory Guidelines).

Re-Notification is required for change in:

- Dose (when the quantity of drug required for the new dose will result in an additional standard pack to be supplied per month);
- Nominated co-prescriber;
- Drug;
- Authorised medical practitioner (SPN);
- Drug form;
- Termination of treatment; or
- Change in patient details (ie, surname and/or address).

Prior written authorisation from the COH is required for the following situations:

- Patients with ADHD:
  a) Aged between 2 to 4 years;
  b) With a co-morbidity (history of psychosis, bipolar disorder, significant sustained substance abuse); or
  c) Use of doses outside the criteria.

  To prescribe stimulants for an unapproved indication.
- To prescribe stimulants for clinical research (require to have ethics approval).

(Any of the above will require Notification together with a comprehensive clinical report of the patient).

APPENDIX 2:

Notification of Treatment Using Stimulant Medication Form

('Notification Form')

Department of Health
Government of Western Australia

SNF1.3

NOTIFICATION OF TREATMENT USING STIMULANT MEDICATION

Medical practitioners **must** notify the Commissioner of Health (COH) when commencing a patient with methylphenidate or dexamphetamine. Only medical practitioners with a stimulant prescriber number (SPN) may complete this form.

PATIENT DETAILS

First Name	Surname
Full Address	
	Postcode
Medicare No	D.O.B
Weight (kg)	Male ☐ Female ☐

(please tick box)

☐ Notification (for use within Stimulant Regulatory Guidelines)

☐ Re-Notification (please circle the change since last notification) ***Dose Drug Drug Form Co-prescriber Patient Details***

☐ Termination of treatment with stimulants

☐ Prescribing outside the Stimulant Regulatory Guidelines for ADHD
Please circle the reason below, and attach an accompanying comprehensive report

Dose Age Hx Psychosis Hx Bipolar disorder Hx Sustained significant substance abuse

PRIMARY CONDITION BEING TREATED (please tick one condition only)

☐ ADHD* ☐ Brain Damage ☐ Narcolepsy ☐ Depression

☐ Other (unapproved indications/research purposes) _____

Please attach an accompanying comprehensive report. If for research purposes, please also attach a copy of the research proposal, together with Ethics Approval

***If ADHD is the primary diagnosis:**

- Which Diagnostic Criterion was used? *(please tick one box)* ☐ ICD 10 or ☐ DSM – IV
- Is the patient being treated with any other psychotropic drugs? ☐ Yes ☐ No
- If yes, which class(es) of psychotropic drug?

☐ Antidepressants	☐ Mood stabilising Agents
☐ Antipsychotics	☐ Other Psychotropic
☐ Anxiolytics (including Benzodiazepines)	

Children aged 4-12 years with a diagnosis of ADHD:

1. Have alternative diagnoses or explanations such as pervasive development disorder, manic episode, depressive episode, anxiety disorder, oppositional defiant disorder, learning disability, post traumatic stress disorder or conduct disorder been considered? **Yes / No**

2. a) If the child is of school age, has a management plan been developed for the child that includes a communication strategy with the school? **Yes / No**

   b) If the answer to 2 a) is 'No', is this due to a parental request? **Yes / No**

PRESCRIBED STIMULANT
(for both children and adult patients)

☐ Dexamphetamine Total Daily Dose ..... (mg)

☐ Methylphenidate Total Daily Dose ..... (mg)

☐ Methylphenidate LA (Ritalin LA® and Concerta®) Total Daily Dose ..... (mg)

If preparation has been compounded please indicate the drug used.

☐ PATIENT / ☐ PARENT / ☐ GUARDIAN ACKNOWLEDGMENT (Please indicate)

I am aware that the information included in this form will be forwarded to the Department of Health (WA) and is to be held in a secure data base. The information cannot be disclosed without my written authorisation.

First Name _____

Surname _____

Signature _____ Date _____

CONSULTANT ACKNOWLEDGEMENT

I hereby notify the Commissioner of Health that the patient will be treated as described above in accordance with the Stimulant Regulatory Guidelines (WA).

Consultant's Signature _____ Date _____

Consultant's Details

SPN

First Name

Surname

Medical Practice Address

Postcode

Telephone No Facsimile No

Nominated Medical Practitioner to Co-Prescribe

(applies to any GP at that practice)

First Name

Surname

Medical Practice Address

Postcode

Telephone No Facsimile No

Please forward completed form to:
Pharmaceutical Services
Department of Health
PO Box 8172
PERTH BUSINESS CENTRE WA 6849

Enquiries please contact in office hours (8.30am – 4.30pm)
Telephone: 9388 4980
Facsimile: 9388 4988

APPENDIX 3:
Department of Health – Epidemiology Branch
Postcodes and Population Estimates for Western Australian Health Service Areas & Health Districts
30 June 2003

Relationship between WA postcodes, Health Service Areas and Health Districts

Health Service Area & Health District	Postcodes							
North Metro Health Service Areas								
NMAHS - Central	6054	6051	6053	6062	6017	6021	6022	6059
	6060	6061	6050	6052	6063	6066	6090	6064
NMAHS - Coastal	6027	6028	6023	6024	6025	6026		
NMAHS - Hills	6057	6058	6076	6070	6071	6072	6073	6074
	6081	6082	6555	6556	6558			
NMAHS - Lower	6014	6015	6010	6011	6012	6009	6018	6019
	6020	6029						
NMAHS - Perth City	6007	6004	6005	6008	6000	6003	6006	6016
NMAHS - Midlands	6500	6055	6056	6067	6068			
NMAHS - Upper	6031	6032	6033	6065	6030	6034	6035	6036
	6037	6038						
NMAHS - Valley	6069	6083	6084	6085				
South Metro Health Service Areas								
SMAHS - Armadale	6111	6112	6108	6109	6110	6113	6121	6122
	6123	6124	6125	6126	6201	6202	6203	6204
	6205	6206						
SMAHS - Bentley	6103	6104	6105	6102	6106	6107	6147	6148
	6155	6151	6152	6100	6101			
SMAHS - Fremantle	6161	6163	6164	6166	6158	6159	6160	6162
	6149	6150	6153	6154	6156	6157		
SMAHS - Peel	6210	6211	6207	6208	6213	6214	6215	
SMAHS - Rockingham-Kwinana	6165	6167	6170	6168	6169	6171	6172	6173
	6174	6175	6176					
South West Health Service Areas								
SWAHS - Blackwood	6244	6254	6255	6256	6275			
SWAHS - Bunbury	6229	6230	6231	6237	6271			
SWAHS - Busselton	6280	6281	6282					
SWAHS - Leeuwin	6284	6285	6286	6288	6290			
SWAHS - Leschenault	6232	6227	6228	6236	6233	6218	6220	6221
	6223	6224	6226					
SWAHS - Warren	6258	6260	6262	6398				
SWAHS - Wellington	6225	6239	6240	6243	6251	6252	6253	

Continued over page

Health Service Area & Health District	Postcodes							
WA Country Health Service Areas								
WACHS - Central Great Southern	6318	6335	6336	6317	6341	6343	6394	6395
	6316	6320						
WACHS - East Pilbara	6723	6724	6753	6758	6760	6761	6762	6721
	6722							
WACHS - Eastern Wheatbelt	6385	6386	6417	6418	6419	6428	6410	6411
	6412	6413	6414	6415	6421	6480	6472	6473
	6476	6477	6479	6368	6369	6420	6423	6490
	6487	6488	6489	6422	6424	6425	6426	6427
	6484							
WACHS - Gascoyne	6701	6707	6537	6705				
WACHS - Geraldton	6530	6531	6532	6528				
WACHS - Kimberley	6725	6726	6728	6731	6733	6765	6770	6740
	6743							
WACHS - Lower Great Southern	6330	6331	6332	6327	6328	6321	6322	6396
	6333	6337	6338	6323	6324	6326	6397	
WACHS - Midwest	6517	6518	6514	6515	6525	6522	6623	6625
	6628	6630	6631	6632	6535	6536	6614	6616
	6620	6519	6627	6618				
WACHS - Murchison	6640	6642	6638	6439	6639	6646	6635	
WACHS - Northern Goldfields	6429	6442	6444	6430	6432	6433	6434	6440
	6435	6437	6438	6436	6431			
WACHS - South East Coastal	6443	6445	6446	6447	6448	6450	6452	6346
	6348							
WACHS - Southern Wheatbelt	6390	6306	6373	6375	6309	6311	6350	6351
	6352	6358	6359	6367	6357	6363	6365	6353
	6355	6356	6313	6312	6308	6315	6392	6393
	6361	6370	6372	6391				
WACHS - West Pilbara	6710	6711	6712	6716	6751	6752	6754	6713
	6714	6715	6718	6720				
WACHS - Western Wheatbelt	6304	6501	6502	6504	6505	6405	6407	6468
	6608	6609	6612	6613	6507	6508	6511	6516
	6521	6461	6462	6464	6465	6041	6042	6043
	6044	6503	6460	6470	6471	6475	6510	6512
	6513	6574	6575	6403	6560	6562	6564	6401
	6383	6384	6409	6566	6567	6506	6509	6568
	6569	6571	6572	6466	6467	6603	6604	6605
	6606	6463	6485	6302	6380			

Population Estimates for Western Australian Health Service Areas & Health Districts (30 June 2003)

Area	Population counts		
	Males	Females	Total
Health Service Area			
North Metro	396,524	404,774	801,298
South Metro	347,193	354,103	701,296
South West	67,141	66,249	133,390
WA Country	165,990	150,264	316,254
Health District			
NMAHS - Central	129,063	132,481	261,544
NMAHS - Coastal	78,115	79,362	157,477
NMAHS - Hills	35,631	36,151	71,782
NMAHS - Lower	64,214	68,337	132,551
NMAHS - Midlands	23,450	23,439	46,889
NMAHS - Perth City	28,539	27,513	56,052
NMAHS - Upper	29,990	29,962	59,952
NMAHS - Valley	7,522	7,529	15,051
SMAHS - Armadale	76,126	75,740	151,866
SMAHS - Bentley	86,283	89,540	175,823
SMAHS - Fremantle	99,485	103,445	202,930
SMAHS - Peel	34,469	34,944	69,413
SMAHS - Rockingham-Kwinana	50,830	50,434	101,264
SWAHS - Blackwood	3,530	3,384	6,914
SWAHS - Bunbury	19,339	19,434	38,773
SWAHS - Busselton	12,338	12,689	25,027
SWAHS - Leeuwin	5,682	5,331	11,013
SWAHS - Leschenault	14,158	13,743	27,901
SWAHS - Warren	5,116	4,886	10,002
SWAHS - Wellington	6,978	6,782	13,760
WACHS - Central Great Southern	5,385	4,964	10,349
WACHS - East Pilbara	10,238	8,229	18,467
WACHS - Eastern Wheatbelt	5,733	5,142	10,875
WACHS - Gascoyne	5,411	4,841	10,252
WACHS - Geraldton	16,218	16,273	32,491
WACHS - Kimberley	18,309	16,060	34,369
WACHS - Lower Great Southern	21,814	21,662	43,476
WACHS - Midwest	7,171	6,287	13,458
WACHS - Murchison	2,529	1,593	4,122
WACHS - Northern Goldfields	21,129	17,893	39,022
WACHS - South East Coastal	8,255	7,673	15,928
WACHS - Southern Wheatbelt	10,268	9,670	19,938
WACHS - West Pilbara	11,494	9,568	21,062
WACHS - Western Wheatbelt	22,036	20,409	42,445

APPENDIX 4:
Australian Bureau of Statistics (ABS) Population estimates for Western Australia, 30 June 2003

Estimated Resident Population by Single Year of Age, Western Australia (30 June 2003)

	Population counts				Population counts		
Age (years)	Males	Females	Total	Age (years)	Males	Females	Total
0	12,107	11,619	23,726	51	13,528	13,442	26,970
1	12,279	11,741	24,020	52	13,567	13,228	26,795
2	12,767	12,227	24,994	53	13,064	12,842	25,906
3	13,009	12,647	25,656	54	13,059	12,695	25,754
4	13,279	12,733	26,012	55	13,105	12,301	25,406
5	13,230	12,482	25,712	56	13,224	12,582	25,806
6	13,505	12,707	26,212	57	10,775	9,881	20,656
7	13,799	12,966	26,765	58	10,336	9,729	20,065
8	13,993	13,304	27,297	59	10,049	9,432	19,481
9	14,081	13,394	27,475	60	9,009	8,508	17,517
10	14,237	13,626	27,863	61	8,936	8,505	17,441
11	14,267	13,520	27,787	62	8,284	8,145	16,429
12	14,481	13,817	28,298	63	8,002	7,788	15,790
13	14,567	13,858	28,425	64	7,852	7,688	15,540
14	14,516	13,854	28,370	65	7,476	7,354	14,830
15	14,481	13,737	28,218	66	6,987	7,007	13,994
16	14,688	13,762	28,450	67	6,704	6,870	13,574
17	14,606	13,983	28,589	68	6,149	6,347	12,496
18	14,495	13,956	28,451	69	5,727	6,135	11,862
19	14,376	13,587	27,963	70	5,514	5,920	11,434
20	14,544	13,616	28,160	71	5,552	5,772	11,324
21	14,418	13,518	27,936	72	5,700	5,917	11,617
22	14,051	13,538	27,589	73	5,238	5,686	10,924
23	13,520	12,966	26,486	74	4,990	5,529	10,519
24	13,452	12,926	26,378	75	4,722	5,427	10,149
25	13,549	12,634	26,183	76	4,442	5,191	9,633
26	12,965	12,787	25,752	77	4,234	5,028	9,262
27	13,498	13,060	26,558	78	3,788	4,827	8,615
28	13,429	13,263	26,692	79	3,408	4,352	7,760
29	13,828	13,504	27,332	80	3,177	4,236	7,413
30	14,250	14,120	28,370	81	2,775	4,080	6,855
31	15,236	15,001	30,237	82	2,494	3,912	6,406
32	15,609	15,314	30,923	83	2,124	3,444	5,568
33	14,784	14,663	29,447	84	1,579	2,620	4,199
34	14,693	14,618	29,311	85	1,329	2,329	3,658
35	14,263	14,224	28,487	86	1,218	2,276	3,494
36	14,239	14,356	28,595	87	1,084	2,227	3,311
37	14,474	14,558	29,032	88	889	2,009	2,898
38	14,583	14,691	29,274	89	738	1,692	2,430
39	15,267	15,258	30,525	90	576	1,388	1,964
40	15,592	15,459	31,051	91	468	1,135	1,603
41	15,472	15,309	30,781	92	342	895	1,237
42	15,464	15,518	30,982	93	234	746	980
43	15,252	15,437	30,689	94	212	581	793
44	15,055	15,315	30,370	95	144	413	557
45	14,622	14,659	29,281	96	108	275	383
46	14,321	14,178	28,499	97	67	244	311
47	14,567	14,738	29,305	98	56	170	226
48	13,927	14,390	28,317	99	51	136	187
49	13,722	13,768	27,490	=100	122	190	312
50	13,633	13,666	27,299				
				TOTAL	976,250	973,698	1,949,948

Estimated Resident Population by Project-Specific Age Grouping, Western Australia (30 June 2003)

	Population counts		
Age group (years)	Males	Females	Total
Children			
2	12,767	12,227	24,994
3 to 4	26,288	25,380	51,668
5 to 6	26,735	25,189	51,924
7 to 11	70,377	66,810	137,187
12 to 15	58,045	55,266	113,311
16 to 17	29,294	27,745	57,039
Adults			
18	14,495	13,956	28,451
19	14,376	13,587	27,963
20	14,544	13,616	28,160
21	14,418	13,518	27,936
22 to 24	41,023	39,430	80,453
25 to 29	67,269	65,248	132,517
30 to 34	74,572	73,716	148,288
35 to 39	72,826	73,087	145,913
40 to 44	76,835	77,038	153,873
45 to 49	71,159	71,733	142,892
50+	266,841	282,792	549,633
TOTAL	951,864	950,338	1,902,202

APPENDIX 5:

Conversion factors supplied by Therapeutic Goods Administration used in the calculation of base medication

Conversion factors supplied by Therapeutic Goods Administration used in the calculation of base medication.

Dexamphetamine base equivalent (g) = (No. of dexamphetamine 5mg tablets) x 0.00365

Methylphenidate base equivalent (g) = (No. of methylphenidate 10mg tablets (Ritalin 10mg)) x 0.0087

Methylphenidate base equivalent (g) = (No. of methylphenidate 20mg capsules (Ritalin LA 20mg)) x 0.0174

Methylphenidate base equivalent (g) = (No. of methylphenidate 30mg capsules (Ritalin LA 30mg)) x 0.0261

Methylphenidate base equivalent (g) =(No. of methylphenidate 40mg capsules (Ritalin LA 40mg)) x 0.0348

Methylphenidate base equivalent (g) =(No. of methylphenidate 18mg tablets (Concerta ER 18mg)) x 0.0157

Methylphenidate base equivalent (g) =(No. of methylphenidate 36mg tablets (Concerta ER 36mg)) x 0.0313

Methylphenidate base equivalent (g) =(No. of methylphenidate 54mg tablets (Concerta ER 54mg)) x 0.0470