Department of the Parliamentary Library

INFORMATION AND RESEARCH SERVICES

Current Issues Brief
No. 11 2000–01

Medication for Attention Deficit/Hyperactivity Disorder (ADHD): an Analysis by Federal Electorate

ISSN 1440-2009

Published by the Department of the Parliamentary Library, 2001

INFORMATION AND RESEARCH SERVICES

Current Issues Brief
No. 11 2000–01

Medication for Attention Deficit/Hyperactivity Disorder (ADHD): an Analysis by Federal Electorate

Paul Mackey, Social Policy Group
Andrew Kopras, Statistics Group
3 April 2001

Acknowledgments

The authors would like to thank Mr David Theodore, Pharmaceutical Benefits Branch, Commonwealth Department of Health and Aged Care for assistance and advice. Thanks are due also to Parliamentary Library staff, particularly Dr June Verrier, Ms Carol Kempner, Dr Rod Panter, Ms Melinda King, Ms Jan Pearson and publications staff.

Enquiries

Information and Research Services publications are available on the ParlInfo database.
On the Internet the Department of the Parliamentary Library can be found at:
http://www.aph.gov.au/library/

IRS Publications Office
Telephone: (02) 6277 2778

Contents

List of Tables

Major Issues

For some time, considerable disparity has been apparent in the prescribing of medication for children with Attention Deficit/Hyperactivity Disorder (ADHD) in different jurisdictions in Australia. Despite having a smaller population than New South Wales, Victoria, Queensland and South Australia—Western Australia accounts for the highest number of prescriptions dispensed for dexamphetamine sulfate, a drug prescribed to treat ADHD that is subsidised under the Pharmaceutical Benefits Scheme (PBS).

The number of prescriptions dispensed for this drug in Western Australia is around 4 times higher per 1000 population than the Australian average and almost 10 times higher than the jurisdiction with the lowest number of prescriptions, the Northern Territory. It has been suggested that one of the reasons for this disparity is a better understanding of ADHD among medical practitioners in Western Australia, although this is not a view that is universally accepted.

Medication for ADHD has been controversial, arguably for three main reasons. It is children, often young children, who are being medicated, the medication being prescribed is amphetamine-based, and the number of prescriptions for such medication has been increasing at a quite dramatic rate. Between 1991 and 1998, prescriptions dispensed for dexamphetamine sulfate increased by 2400 per cent, while prescriptions for Ritalin increased by 620 per cent over the same period. High rates of increase have been reported also in the United States. However, the level of medication in both countries appears still to be below the estimated prevalence of ADHD, which is believed to affect between 2.3 and 6 per cent of school-aged children.

Data presented in this paper illustrates a possible further area of concern, namely, the disparity in the number of prescriptions for dexamphetamine sulfate dispensed in different parts of Australia. The paper analyses data on the number of prescriptions dispensed for this drug in each Federal electorate. The data reveals that the number of prescriptions dispensed for dexamphetamine sulfate in 1999–2000 ranged from 8463 in the Western Australian electorate of Canning to 271 in the Victorian electorate of Higgins. In addition to differences between jurisdictions, considerable variation is evident within each State. It has been argued that variations such as these indicate that opinion-based treatment is being practiced, rather than evidence-based treatment.

A range of socioeconomic data is utilised to examine whether particular factors can be identified that may explain the variation evident between different electorates. This

analysis of socioeconomic variables such as the proportion of school-aged children, level of household income or unemployment rate reveals that none, either singly or in combination, can provide a consistent explanation for the differences between Federal electorates.

What cannot be discounted is the possibility that a small number of prescribers in each jurisdiction may account for at least some of the differences between electorates. It should be stressed also that while dexamphetamine sulfate represents the majority (72 per cent) of prescriptions for the treatment of ADHD, it is not the only such drug. Ritalin accounts for a substantial number of prescriptions but is not subsidised under the PBS and, accordingly, similar data is not readily available. It is therefore not possible to establish the total number of prescriptions for both drugs in each electorate.

Bearing in mind these caveats, the degree of difference between individual Federal electorates and across the States and Territories is unlikely to be in the best interests of Australia's children and their families. It appears that Australia has some distance to go before achieving best practice in the prescribing of medication for the treatment of ADHD.

Introduction

Attention Deficit/Hyperactivity Disorder (ADHD) is a controversial syndrome. Debate has raged in Australia and other countries over the condition itself, its prevalence and, in particular, over the use of medication to treat ADHD. Although often presented as recent phenomena, attention deficit and hyperactivity disorders have been around for some considerable time as has the use of stimulant medication to treat the symptoms of the condition. For example, as early as 1937, researchers were reporting the use of stimulants in the treatment of children at the Emma Pendleton Bradley Hospital in East Providence, USA.[1]

Ritalin (methylphenidate) is the drug most commonly associated with the treatment of ADHD. In Australia, Ritalin is not listed on the Pharmaceutical Benefits Scheme (PBS) and therefore the cost of the drug is not subsidised by the Commonwealth Government. However, another amphetamine-based drug, dexamphetamine sulfate, is listed on the PBS for the treatment of ADHD.[2] Accordingly, a far greater number of prescriptions are dispensed in Australia for dexamphetamine sulfate compared to Ritalin.

This Current Issues Brief examines the wide disparity in the number of prescriptions dispensed for dexamphetamine sulfate in different parts of Australia. Data made available by the Commonwealth Department of Health and Aged Care on the dispensing of prescriptions for dexamphetamine sulfate, by postcode of the pharmacy dispensing the medication, has been converted into Federal electorates. Electorates have been chosen because they provide an useful base for analysis of differences at the local level. Data on the dispensing of pharmaceuticals is generally only published at the national and State and Territory level.

The analysis in this brief examines the differences between Federal electorates in the number of prescriptions dispensed for medication to treat ADHD. Considerable variation is apparent both across and within the States and Territories.

In order to provide Senators and Members with a context for the discussion around the differences between electorates, some background is provided below about ADHD.

What is ADHD?

The casual observer's understanding of this condition has not been assisted by changes over time in the labels used to describe it. Current thinking uses the term Attention Deficit/Hyperactivity Disorder (ADHD) as a label that embraces three subtypes: ADHD, Combined Type; ADHD, Predominantly Inattentive Type; and ADHD, Predominantly Hyperactive-Impulsivity Type. A recent report on the mental health of Australia's young people drew on the definitions in the 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* issued by the American Psychiatric Association[3] to describe ADHD as follows:

> ADHD is defined as a persistent pattern of inattentive behaviour and/or hyperactivity-impulsivity that is more frequent and severe than is typically observed in individuals of the same developmental level. Children and adolescents with inattentive behaviour problems make careless mistakes with school work, find it hard to persist with tasks and are easily distracted. Those with problems in the area of hyperactivity/impulsivity often fidget and talk excessively, interrupt others, and are constantly 'on the go'. There are three subtypes of ADHD based on the predominate symptom pattern for the past six months.[4]

The names and symptoms of the three sub-types of ADHD are listed below:

ADHD, Combined Type

symptoms of both inattentiveness and hyperactivity-impulsivity

ADHD, Predominantly Inattentive Type

primarily inattentive symptoms

ADHD, Predominantly Hyperactive-Impulsivity Type

primarily hyperactivity-impulsivity symptoms.[5]

Causes and Prevalence of ADHD

A key factor in the controversial nature of ADHD is the type of symptoms and behaviour underlying the condition. The exhibition of inappropriate behaviour by children with ADHD has enabled critics to attribute, for example, child rearing practices and poor parenting skills as prime causes of ADHD. Current knowledge indicates that it is rarely quite that simple and there are likely to be several causes of ADHD. For example, a report by the National Health and Medical Research Council (NH&MRC) argued that 'evidence suggests that many factors, including genetic, neurophysiologic, cognitive, familial and environmental factors are involved'.[6] The relative importance of these factors is yet to be established by research. The NH&MRC concludes from the available evidence that 'it is

likely that a variety of contributing factors may operate in a vulnerable child to result in the behaviours of ADHD'.[7]

Many of the broad range of symptoms that comprise ADHD occur from time to time in normal children. The difference for many children diagnosed with ADHD is that these symptoms 'occur very frequently and in several settings, at home and at school, or when visiting with friends, and they interfere with the child's functioning'.[8]

The extent, or prevalence, of ADHD among school-aged children is not known with any great accuracy. The NH&MRC reported in 1997 that Australian studies had found prevalence rates of between 2.3 per cent and 6 per cent of school-aged children. It noted also that 'widely different prevalence rates of ADHD have been reported, depending on the methodology used, ranging from 1.7 per cent to 6 per cent'.[9]

A recent report on the mental health of Australia's young people surveyed 4500 children and adolescents aged 4 to 17 years of age. The report found a much higher prevalence rate of ADHD, at 11.2 per cent, than found by other studies. Disaggregated by subtype, 5.8 per cent of the sample were found to have ADHD, Predominantly Inattentive Type; 3.3 per cent ADHD, Combined Type; and 2.0 per cent ADHD, Predominantly Hyperactive-Impulsive Type.[10] The report's authors suggest, however, that 'the high prevalence be viewed with caution'. The authors state that they could not incorporate into their assessment two of the formal criteria for a diagnosis of ADHD identified in the *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition.[11]

School-aged children still represent the vast bulk of diagnosed cases, although ADHD is becoming recognised as a condition that may be suffered by adults. In some cases, adult diagnosis of ADHD may occur only after their children have been diagnosed and treated for the condition. For others, childhood ADHD may continue through to the adult years. Research suggests that in about 10 per cent of cases, ADHD may persist into adulthood and it is estimated that adults have a prevalence rate of at least 0.3 per cent.[12]

Medication prescribed to treat ADHD

Although the use of medication for the treatment of ADHD continues to be controversial in the public arena, the safety and efficacy, particularly in the short term, of psycho-stimulants such as dexamphetamine sulfate and Ritalin is well established.[13] However, further research into the long-term safety and efficacy of the drugs is required and at this stage, 'convincing evidence for long-term benefit is lacking'.[14] While studies have suggested that medication alone may be effective as a treatment for ADHD, consensus holds that a multi-pronged treatment regime of medication, behaviour management and educational strategies is likely to provide the most effective results.[15]

One of the concerns about ADHD in Australia is the growth in the use of medication to treat the condition. For example, in 1991, less than 10 000 prescriptions were dispensed

for dexamphetamine sulfate. In 1998, nearly 250 000 prescriptions were dispensed for the same drug, an increase of 2400 per cent. Over the same period, prescriptions dispensed for Ritalin increased from 13 398 to 96 582, an increase of 620 per cent.[16] It has been argued by one commentator that 'Australia appears to be the only nation that has experienced a documented increase in psychostimulant use that parallels that which has occurred in the United States'.[17] However, the NH&MRC notes that overall prescribing rates for ADHD medication in Australia are 'less than one per cent of school-aged children', which is less than the estimated prevalence of the condition.[18]

Similarly, rapid growth in the use of medication to treat ADHD has been a feature of the United States' experience. Media reports have suggested that prescriptions for Ritalin in the USA have increased by some 700 per cent over the past 10 years.[19] The US National Institute of Mental Health notes with regard to ADHD medication that 'stimulant use in the United States has increased substantially over the last 25 years'.[20] A report in 1999 by the US Surgeon General quotes research which indicates that 'there have been major increases in the number of stimulant prescriptions since 1989'. The report notes also that 'most researchers believe that much of the increased use of stimulants reflects better diagnosis and more effective treatment of a prevalent disorder', although 'some of the increase in use may reflect inappropriate diagnosis and treatment'.[21]

Jurisdictional variations in the number of prescriptions dispensed for dexamphetamine sulfate

A feature of the Australian experience with ADHD is the wide disparity between the States and Territories in the number of prescriptions dispensed for medication. An analysis of PBS data for 1999–2000 indicates that the number of prescriptions dispensed for dexamphetamine sulfate was highest in Western Australia and lowest in the Northern Territory. The table below indicates the number of prescriptions dispensed under the PBS for dexamphetamine sulfate in 1999–2000. In addition, an estimate of the number of prescriptions per 1000 population is presented in order to highlight differences between the jurisdictions.

There is no simple explanation for the differences evident in the table below, although it has been suggested that the higher prescription rates in Western Australia reflect a better understanding of ADHD among practitioners in that State.[22] An alternate view expressed by prominent health commentator Dr Norman Swan, is that:

> as soon as you see variations like that in medicine and health, it's usually the fact that there's non-evidence-based treatment going on, that there's opinion-based treatment going on rather than evidence-based treatment going on.[23]

Jurisdictional differences are apparent also in the United States. In a study on the use of psycho-stimulant medication for children with ADHD in Australia, Prosser and Reid commented also on the United States experience. The authors quoted several studies and

reviews, one of which found that 'rates of medication prescription varied greatly between the eastern, midwest and western regions and noted significant increases within these regions over time'.[24] Prosser and Reid concluded from these reviews of the US experience that 'as yet there is no generally accepted rationale behind the pronounced variation in medication use across region. One possible factor may be the rise in specialized ADHD clinics'.[25]

Table 1: Number of PBS prescriptions dispensed for dexamphetamine sulfate, 1999–2000

State/Territory	Number of prescriptions	Population	Number of prescriptions per 1000 population
New South Wales	61 145	6 463 455	9.5
Victoria	31 915	4 765 856	6.7
Queensland	29 359	3 566 357	8.2
Western Australia	64 695	1 497 634	43.2
South Australia	19 225	1 883 860	10.2
Tasmania	7 663	470 376	16.3
Northern Territory	891	195 463	4.6
ACT	2 641	310 839	8.5
Australia	217 534	19 157 037	11.3

Sources: Commonwealth Department of Health and Aged Care; Australian Bureau of Statistics, *Population by Age and Sex*, June 2000 (ABS 3201.0).

Variations between Federal electorates in the number of prescriptions dispensed for dexamphetamine sulfate

It is to be expected that differences will be apparent between Federal electorates with regard to the dispensing of prescriptions for medication to treat ADHD. Electorates differ substantially, for example, in their proportion of school-aged children. Differences may also be influenced by the location of medical practitioners and specialists and to a lesser extent by the location of pharmacies. In addition, the differences between the States and Territories evident in the data presented in Table 1 above could be expected to be reflected to some extent in data on the number of prescriptions by Federal electorate.

Table 2 below provides a ranking of each Federal electorate by the number of prescriptions dispensed for dexamphetamine sulfate under the PBS in 1999–2000. This data has been derived from data on the number of prescriptions dispensed for dexamphetamine sulfate, by postcode, provided by the Commonwealth Department of Health and Aged Care. Similar data is not readily available for Ritalin. It should be noted that the Department of Health and Aged Care collects data by the postcode of the pharmacy dispensing each prescription.

The data in Table 2 reveals that the top ten Federal electorates in terms of the number of prescriptions dispensed for dexamphetamine sulfate in 1999–2000 are all in Western

Australia. This is perhaps not surprising given that more prescriptions for this drug are dispensed in Western Australia than any other jurisdiction. However, considerable differences are apparent within this group. It can be observed, for example, that the number of prescriptions in the top ranked electorate (Canning) are more than double that of the tenth ranked electorate (Fremantle).

Differences are apparent also in the location and characteristics of the top ranked electorates within each of the other jurisdictions. For example, the top ranked electorate in New South Wales is the seat of Chifley, located in the western suburbs of Sydney. Ranked second in New South Wales is the electorate of Cowper, located on that State's rural mid-north coast. Of the top ten electorates in New South Wales, seven are located outside of Sydney.

In Victoria and Queensland, the top ranked electorates are located outside of the State capitals, in the seats of Corio and Oxley respectively. Victoria has only 3 electorates in the national top 50, none of which is located in Melbourne. In South Australia, the top ranking is held by the seat of Bonython, located in Adelaide. This is followed by the metropolitan electorate of Kingston, with the large rural electorate of Grey ranked third of the South Australian electorates. In Tasmania, the seat of Bass in the north of the State is the top ranked electorate.

Even in the ACT, commonly regarded as an homogenous Territory, differences are apparent. The electorate of Canberra is ranked 42nd of the 148 Federal electorates, while the other ACT electorate, Fraser, is ranked 68th. Eden-Monaro, the NSW rural electorate that abuts the ACT, is ranked 43rd. Finally, the large Western Australian electorate of Kalgoorlie had almost twice the number of prescriptions dispensed compared with the electorate of the Northern Territory.

Numbers of prescriptions and socioeconomic factors

The tables at Appendix 1 to 6 present, for each State, the electorates with the highest, second highest and lowest number of prescriptions for dexamphetamine sulfate, together with data on a range of socioeconomic variables gleaned from the most recent Census.[26] These comparisons are provided in order to ascertain whether there are any factors that might help to explain why some electorates have a much higher number of prescriptions for this medication to treat ADHD.

Table 2: Electoral Divisions ranked by the number of prescriptions for dexamphetamine sulfate 1999–2000

Rank	Electoral Division	Party	Number	Rank	Electoral Division	Party	Number
1	Canning (WA)	ALP	8643	75	Bendigo (Vic)	ALP	1027
2	Brand (WA)	ALP	7085	76	Mallee (Vic)	NP	1014
3	Tangney (WA)	LIB	5163	77	McPherson (Qld)	LIB	1012
4	Pearce (WA)	LIB	4799	78	La Trobe (Vic)	LIB	1005
5	O'Connor (WA)	LIB	4536	79	Barker (SA)	LIB	988
6	Cowan (WA)	ALP	4324	80	Fairfax (Qld)	LIB	982
7	Perth (WA)	ALP	4272	81	Cook (NSW)	LIB	979
8	Stirling (WA)	ALP	4237	82	Calwell (Vic)	ALP	977
9	Moore (WA)	LIB	4234	83	Wide Bay (Qld)	NP	971
10	Fremantle (WA)	ALP	4083	84	Fowler (NSW)	ALP	968
11	Bonython (SA)	ALP	4054	85	Capricornia (Qld)	ALP	967
12	Swan (WA)	ALP	4010	86	Moncrieff (Qld)	LIB	955
13	Curtin (WA)	LIB	3848	87	Herbert (Qld)	LIB	947
14	Chifley (NSW)	ALP	3129	88	Fisher (Qld)	LIB	943
15	Oxley (Qld)	ALP	3078	89	Boothby (SA)	LIB	936
16	Forrest (WA)	LIB	3057	90	Bowman (Qld)	ALP	920
17	Kingston (SA)	ALP	3041	91	Casey (Vic)	LIB	908
18	Corio (Vic)	ALP	2747	92	Flinders (Vic)	LIB	907
19	McMillan (Vic)	ALP	2717	93	Sturt (SA)	LIB	904
20	Cowper (NSW)	NP	2564	94	Northern Territory (NT)	ALP	891
21	Lyne (NSW)	NP	2457	95	Berowra (NSW)	LIB	879
22	Hunter (NSW)	ALP	2397	96	Hindmarsh (SA)	LIB	859
23	Paterson (NSW)	ALP	2368	97	Sydney (NSW)	ALP	843
24	Parkes (NSW)	NP	2329	98	Groom (Qld)	LIB	831
25	Bass (TAS)	ALP	2270	99	Dawson (Qld)	NP	817
26	Lindsay (NSW)	LIB	2221	100	Mackellar (NSW)	LIB	811
27	Calare (NSW)	IND	2111	101	Wannon (Vic)	LIB	805
28	Grey (SA)	LIB	1937	102	Braddon (TAS)	ALP	789
29	Rankin (Qld)	ALP	1930	103	Parramatta (NSW)	LIB	774
30	Charlton (NSW)	ALP	1897	104	Isaacs (Vic)	ALP	762
31	Longman (Qld)	LIB	1822	105	Holt (Vic)	ALP	759
32	Blair (Qld)	LIB	1772	106	Mitchell (NSW)	LIB	751
33	Greenway (NSW)	ALP	1726	107	Ballarat (Vic)	LIB	738
34	Dobell (NSW)	ALP	1702	108	Fadden (Qld)	LIB	729
35	Gwydir (NSW)	NP	1676	109	Brisbane (Qld)	ALP	728
36	Kalgoorlie (WA)	LIB	1667	110	Ryan (Qld)	LIB	714
37	Forde (Qld)	LIB	1627	111	Maranoa (Qld)	NP	693
38	Franklin (TAS)	ALP	1554	112	Banks (NSW)	ALP	691
39	Denison (TAS)	ALP	1551	113	Griffith (Qld)	ALP	691
40	Macquarie (NSW)	LIB	1506	114	Prospect (NSW)	ALP	669
41	Lyons (TAS)	ALP	1499	115	Farrer (NSW)	NP	665
42	Canberra (ACT)	ALP	1487	116	Cunningham (NSW)	ALP	657
43	Eden-Monaro (NSW)	LIB	1480	117	Deakin (Vic)	LIB	647
44	Petrie (Qld)	LIB	1452	118	Lilley (Qld)	ALP	633
45	Wakefield (SA)	LIB	1450	119	Moreton (Qld)	LIB	632
46	Werriwa (NSW)	ALP	1444	120	Reid (NSW)	ALP	612
47	Riverina (NSW)	NP	1431	121	Scullin (Vic)	ALP	597

Rank	Electoral Division	Party	Number	Rank	Electoral Division	Party	Number
48	Burke (Vic)	ALP	1427	122	Bradfield (NSW)	LIB	580
49	New England (NSW)	NP	1397	123	North Sydney (NSW)	LIB	571
50	Adelaide (SA)	LIB	1369	124	Chisholm (Vic)	ALP	566
51	Shortland (NSW)	ALP	1359	125	Wentworth (NSW)	LIB	521
52	Gippsland (Vic)	NP	1358	126	Gellibrand (Vic)	ALP	520
53	Macarthur (NSW)	LIB	1335	127	Melbourne (Vic)	ALP	512
54	Newcastle (NSW)	ALP	1333	128	Kingsford-Smith (NSW)	ALP	505
55	Makin (SA)	LIB	1302	129	Bruce (Vic)	ALP	479
56	McEwen (Vic)	LIB	1269	130	Leichhardt (Qld)	LIB	467
57	Dickson (Qld)	ALP	1244	131	Barton (NSW)	ALP	455
58	Hume (NSW)	LIB	1244	132	Wills (Vic)	ALP	455
59	Mayo (SA)	LIB	1223	133	Blaxland (NSW)	ALP	448
60	Corangamite (Vic)	LIB	1216	134	Kennedy (Qld)	NP	439
61	Gilmore (NSW)	LIB	1213	135	Bennelong (NSW)	LIB	434
62	Hughes (NSW)	LIB	1194	136	Batman (Vic)	ALP	421
63	Page (NSW)	NP	1191	137	Jagajaga (Vic)	ALP	412
64	Aston (Vic)	LIB	1179	138	Grayndler (NSW)	ALP	370
65	Throsby (NSW)	ALP	1176	139	Watson (NSW)	ALP	370
66	Robertson (NSW)	LIB	1171	140	Maribyrnong (Vic)	ALP	366
67	Port Adelaide (SA)	ALP	1162	141	Warringah (NSW)	LIB	348
68	Fraser (ACT)	ALP	1154	142	Lowe (NSW)	ALP	346
69	Hinkler (Qld)	NP	1137	143	Menzies (Vic)	LIB	331
70	Lalor (Vic)	ALP	1121	144	Goldstein (Vic)	LIB	292
71	Dunkley (Vic)	LIB	1120	145	Melbourne Ports (Vic)	ALP	292
72	Indi (Vic)	LIB	1097	146	Hotham (Vic)	ALP	286
73	Richmond (NSW)	NP	1061	147	Kooyong (Vic)	LIB	275
74	Murray (Vic)	LIB	1035	148	Higgins (Vic)	LIB	271

Some interesting observations can be drawn from the data in these tables. Electorates covering outer metropolitan areas[27] account for the highest or second highest number of prescriptions in each State except Victoria. Electorates covering inner metropolitan areas account for the lowest number of prescriptions in New South Wales, Victoria and South Australia, but rural electorates account for the lowest number of prescriptions in Western Australia, Queensland and Tasmania. Provincial electorates account for the highest or second highest number of prescriptions in Victoria, Western Australia and Tasmania.

In New South Wales, Victoria and South Australia, the electorate with the lowest number of prescriptions also has a much lower proportion of children in the 5–14 years age range and a much lower proportion of persons attending school. However, the electorates with the lowest number of prescriptions in both Queensland and Western Australia have only slightly lower proportions of children aged 5–14 and persons attending school than the electorates in those States with the highest number of prescriptions. In Tasmania, the electorate of Braddon has a higher proportion of children aged 5–14 and a higher proportion of persons attending school but has around only one-third the number of prescriptions for dexamphetamine sulfate than does the electorate of Bass.

Examining income, the electorates with the highest number of prescriptions in New South Wales, Victoria and Western Australia all have a significantly higher proportion of families with a weekly income below $500 than the electorate with the lowest number of prescriptions. However, this is not the case in Queensland, South Australia and Tasmania. A comparison of the unemployment rate in each electorate reveals a similar picture, with the exception of Queensland. The electorate with the lowest number of prescriptions in Queensland also had a significantly lower rate of unemployment, a situation similar to that in New South Wales, Victoria and Western Australia.

Two caveats need to be placed upon the foregoing discussion. It is possible that the prescribing practices of a small number of practitioners in each jurisdiction could be responsible for some of the variation evident in the figures in table 2 and the appendices. For example, a study on medication for ADHD in Adelaide found that five prescribers accounted for 61 per cent of patients in 1996.[28] It has also been suggested that while there may be a variety of reasons that contribute to the regional differences:

> often it comes down to small numbers of high profile, often academic individuals at a teaching hospital who maybe believe strongly in the benefits of medication, and teaching the trainees for a generation in that particular town that stimulants are good and therefore you get lots of children being prescribed. Whereas you might have in another town more psychologically based clinicians who are less inclined to use medication.[29]

In addition, it was noted earlier that around 96 000 prescriptions for Ritalin were dispensed in Australia in 1999–2000. Because this drug is not subsidised under the PBS, national data similar to that for dexamphetamine sulfate is not readily available. It is likely, however, that a different pattern would be apparent between electorates for prescriptions dispensed for Ritalin than is evident for dexamphetamine sulfate.

Conclusion

It is clear from the data in the attached tables for each State and the discussion above that socioeconomic data alone do not explain why such wide differences exist between electorates in the number of prescriptions dispensed for dexamphetamine sulfate. None of the socioeconomic factors examined in this paper can explain consistently the reasons why such differences exist. Particular factors such as a higher unemployment rate and lower levels of family income appear to be significant in some jurisdictions, but this is not consistent across all States. The picture is similar for the proportion of school-aged children in different electorates.

Outer metropolitan electorates have the highest or second highest numbers of prescriptions in each State except Victoria. This is intriguing, but there do not appear to be any other factors present that help to explain consistently why this should be the case. While the location of particular prescribers cannot conclusively be ruled-out as an important factor,

the mix of electorates with high and low numbers of prescriptions would seem to indicate that it does not consistently explain the variations evident in the data.

If it is accepted that practitioners in Western Australia are more highly skilled in recognising ADHD than their counterparts in other States, it might be expected that greater consistency would be evident in the number of prescriptions dispensed in WA electorates. While this is true to an extent, there is still considerable variation; from in excess of 8000 prescriptions in the electorate of Canning to less than 2000 in Kalgoorlie.

It appears from the data discussed in this paper that decisions on the treatment of ADHD with dexamphetamine sulfate may not always be evidence-based. If this is the case, the one conclusion that does appear to be sustainable is that the interests of Australia's children and their families are unlikely to be well served by such variation between electorates. Australia appears to be some way from best practice in the prescribing of such medication for the treatment of ADHD.

Appendix 1: Western Australia

Variable	Canning	Brand	Kalgoorlie
Demographic rating	Outer metropolitan	Provincial	Rural
Number of prescriptions	8643	7085	1667
Prop. children aged 5–14 years	17.2 %	17.2%	15.1%
Proportion persons attending school*	18.5%	18.2%	14.2%
Proportion couple families with dependent children	41.9%	40.0%	48.1%
Prop. one parent families with dependent children	10.9%	11.2%	10.4%
Prop. families weekly income below $500	33.2%	39.6%	24.2%
Prop. families weekly income $1500 and above	7.8%	7.0%	20.4%
Unemployment rate (Census 1996)	9.6%	11.9%	5.8%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Appendix 2: New South Wales

Variable	Chifley	Cowper	Warringah
Demographic rating	Outer metropolitan	Rural	Inner metropolitan
Number of prescriptions	3129	2564	348
Prop. children aged 5–14 years	18.3%	16.4%	10.5%
Proportion persons attending school*	20.5%	18.8%	12.5%
Proportion couple families with dependent children	46.3%	37.2%	35.9%
Prop. one parent families with dependent children	15.1%	13.0%	6.8%
Prop. families weekly income below $500	31.9%	51.2%	16.8%
Prop. families weekly income $1500 and above	9.1%	3.9%	34.8%
Unemployment rate (Census 1996)	10.5%	17.9%	3.8%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Appendix 3: Victoria

Variable	Corio	McMillan	Higgins
Demographic rating	Provincial	Rural	Inner Metropolitan
Number of prescriptions	2747	2717	271
Prop. children aged 5–14 years	14.2%	17.0%	9.6%
Proportion persons attending school*	17.0%	19.4%	11.7%
Proportion couple families with dependent children	38.8%	43.7%	36.3%
Prop. one parent families with dependent children	11.0%	10.7%	7.8%
Prop. families weekly income below $500	37.5%	38.1%	20.6%
Prop. families weekly income $1500 and above	8.0%	7.8%	33.3%
Unemployment rate (Census 1996)	12.9%	12.6%	6.8%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Appendix 4: Queensland

Variable	Oxley	Rankin	Kennedy
Demographic rating	Outer metropolitan	Outer metropolitan	Rural
Number of prescriptions	3078	1930	439
Prop. children aged 5–14 years	16.3%	17.6%	15.7%
Proportion persons attending school*	17.5%	19.0%	16.4%
Proportion couple families with dependent children	42.1%	46.1%	41.7%
Prop. one parent families with dependent children	13.5%	13.5%	9.8%
Prop. families weekly income below $500	34.1%	31.8%	34.8%
Prop. families weekly income $1500 and above	6.6%	8.1%	10.3%
Unemployment rate (Census 1996)	10.7%	11.5%	7.6%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Appendix 5: South Australia

Variable	Bonython	Kingston	Hindmarsh
Demographic rating	Outer metropolitan	Outer metropolitan	Inner metropolitan
Number of prescriptions	4054	3041	859
Prop. children aged 5–14 years	17.1%	16.7%	9.4%
Proportion persons attending school*	19.2%	19.4%	11.4%
Proportion couple families with dependent children	41.3%	42.9%	28.8%
Prop. one parent families with dependent children	14.4%	11.4%	9.1%
Prop. families weekly income below $500	42.8%	34.6%	37.3%
Prop. families weekly income $1500 and above	3.5%	6.0%	9.2%
Unemployment rate (Census 1996)	16.2%	11.3%	10.3%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Appendix 6: Tasmania

Variable	Bass	Franklin	Braddon
Demographic rating	Provincial	Outer metropolitan	Rural
Number of prescriptions	2270	1554	789
Prop. children aged 5–14 years	14.4%	17.4%	16.1%
Proportion persons attending school*	16.6%	19.4%	18.0%
Proportion couple families with dependent children	38.6%	42.0%	39.8%
Prop. one parent families with dependent children	11.0%	11.8%	10.0%
Prop. families weekly income below $500	38.7%	35.2%	42.5%
Prop. families weekly income $1500 and above	7.2%	8.9%	5.6%
Unemployment rate (Census 1996)	10.9%	10.1%	12.5%

*infants, primary and secondary school

Sources: A Kopras, Electorate Rankings: Census 1996; Department of Health and Aged Care, *Electorate Profiles*, June 2000.

Endnotes

1. G. Fritz, 'The time is right to dispel myths about ADHD', *Brown University Child and Adolescent Behavior Letter*, vol. 16, issue 9, September 2000, p. 8.
2. Dexamphetamine sulfate is listed on the PBS for the treatment of ADHD and narcolepsy. More than 95 per cent of prescriptions are dispensed for the treatment of ADHD.
3. American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition, 1994.
4. M. Sawyer et al., *Mental Health of Young People in Australia*, Department of Health and Aged Care, Canberra, 2000.
5. ibid., p. 19.
6. National Health and Medical Research Council, *Attention Deficit Hyperactivity Disorder*, NH&MRC, Canberra, 1997, p. xi.
7. National Health and Medical Research Council, op. cit., p. 17.
8. US Surgeon General, *Mental Health: a Report of the Surgeon General*, 1999.
9. National Health and Medical Research Council, op. cit., p. xi.
10. Sawyer, op. cit., p. 20.
11. Sawyer, op. cit., p. 26.
12. National Health and Medical Research Council, op. cit., p. 99.
13. U.S. National Institute of Mental Health, *Long term effects of stimulant medications on the brain: possible relevance to the treatment of ADHD: notes of a NIMH workshop*, December 1999, at www.nimh.nih.gov/events/adhdworkshop.cfm
14. P. Hazell, 'ADHD: Diagnosis and treatment', in *Psychological Medicine: a companion to management of mental disorders*, edited by P. Beumont, G. Andrews, P. Boyce, V. Carr, WHO Collaborating Centre for Mental Health and Substance Abuse, Sydney 1997.
15. National Health and Medical Research Council, op. cit., p. 41.
16. Commonwealth Department of Health and Aged Care, *Australian Statistics on Medicine*, various years.
17. L. Diller, *Running on Ritalin: a physician reflects on children, society and performance in a pill*, quoted in B. Prosser and R. Reid, 'Psychostimulant use for children with Attention Deficit hyperactivity Disorder in Australia', *Journal of Emotional and Behavioral Disorders*, vol. 7, 1999, p. 110–117.
18. National Health and Medical Research Council, op. cit., p. 69.
19. See for example, M. Riley, 'Kiddie cocaine: it's the drug of the new generation', *Sydney Morning Herald*, 21 February 2001, p. 1, 10.
20. US National Institute of Mental Health, *Attention Deficit Hyperactivity Disorder (ADHD)–Questions and Answers*, at www.nimh.nih.gov/publicat/adhdqa.cfm

21. US Surgeon General, *Mental Health: a report of the Surgeon General*, 1999.

22. C. Sparke, 'The ADHD epidemic', *Australian Doctor*, 26 April 2000, p. 31–33.

23. Dr N. Swan, *The Health Report*, 23 October 2000.

24. K. Gadow and J. Loney eds, *Psychosocial aspects of drug treatment for hyperactivity*, quoted in B. Prosser and R. Reid, 'Psychostimulant use for children with Attention Deficit Hyperactivity Disorder in Australia', *Journal of Emotional and Behavioral Disorders*, vol. 7, 1999, p. 110–117.

25. B. Prosser and R. Reid, 'Psychostimulant use for children with Attention Deficit hyperactivity Disorder in Australia', *Journal of Emotional and Behavioral Disorders*, vol. 7, 1999.

26. Rankings of electorates against a wide range of census data can be found in: A Kopras, 'Electorate Rankings: Census 1996', *Background paper No. 14*, 1997–98, Department of the Parliamentary Library, Canberra, 1998.

27. Electorates are classified by the Australian Electoral Commission into four socio-demographic categories: inner metropolitan (comprising well established built-up suburbs); outer metropolitan (containing areas of more recent suburban expansion); provincial (majority of enrolment in major provincial cities, or in non-metropolitan urban conglomerates); and rural (without a majority of enrolment in major provincial cities). Australian Electoral Commission, *National Electoral Division Profiles*, Australian Electoral Commission, Canberra December 1998, p. v.

28. B. Prosser and R. Reid, 'Psychostimulant use for children with Attention Deficit hyperactivity Disorder in Australia', *Journal of Emotional and Behavioral Disorders*, vol. 7, 1999.

29. Dr D. Efron, Paediatrician, Royal Children's Hospital, Melbourne, interviewed on *The Health Report*, ABC Radio, 23 October 2000.