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# Prescribing of Psychotropic Medications for Children by Australian Pediatricians and Child Psychiatrists

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**ABSTRACT.** *Objective.* To describe the pattern of prescribing of psychotropic medications for Australian children.

*Design.* Australia-wide cross-sectional postal survey conducted in 2000.

*Participants.* All registered general pediatricians and child and adolescent psychiatrists.

*Results.* The survey was completed by 435 general pediatricians and 187 child and adolescent psychiatrists (response rates 72% and 70%, respectively). Stimulants and clonidine were the most frequently prescribed medications. Seventy-two percent of practitioners reported that they had prescribed a combination of medications. Frequent combinations included a stimulant and clonidine (64% of pediatricians, 51% of child psychiatrists) and a stimulant and a selective serotonin reuptake inhibitor (SSRI; 29% of pediatricians, 36% of child psychiatrists).

Pediatricians were more likely than child psychiatrists to report prescribing clonidine for sleep problems (67% vs 36%). Child psychiatrists were more likely than pediatricians to report prescribing SSRIs (93% vs 75%) and mood stabilizers (45% vs 11%) for depression, and SSRIs (74% vs 50%) and tricyclic antidepressants (37% vs 12%) for obsessive compulsive disorder.

Off-label prescribing (indication or age not included in the product information) was reported by 40%. Over 5% of practitioners in this study had prescribed clonidine, methylphenidate, dexamphetamine, and typical neuroleptics for children under 3 years of age.

*Conclusions.* A broad range of psychotropic medications are being prescribed for Australian children, with some medication groups being prescribed frequently. Combinations of psychotropic medications are used regularly, and there is some prescribing for very young children. The safety and efficacy of several of the agents prescribed have not been adequately researched in children. There is an urgent need for pediatric psychopharmacology research to inform current prescribing practice. *Pediatrics* 2003;111:372–375; *psychotropic medication, stimulant, clonidine, neuroleptic.*

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ABBREVIATIONS. SSRI, selective serotonin reuptake inhibitor; ADHD, attention-deficit/hyperactivity disorder.

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Australian pediatricians and child and adolescent psychiatrists (child psychiatrists) are seeing increasing numbers of children with severe and complex behavior disturbance.<sup>1</sup> Medication is a commonly used treatment modality.

Recent reports from the United States suggest an increase in the prescribing of psychotropic medications for children with behavior and mental health problems, including very young children.<sup>2–5</sup> A population-based analysis of North Carolina Medicaid prescription claims found that between 1992 and 1998, the prescription prevalence in children aged 6 to 14 years increased from 4.4% to 9.5% for stimulants, and from 0.2% to 1.5% for selective serotonin reuptake inhibitors (SSRIs).<sup>5</sup> In another study, 57% of a sample of Medicaid-enrolled children aged 1 to 3 years diagnosed with attention-deficit/hyperactivity disorder (ADHD) were prescribed 22 different psychotropic medications, with one-third receiving 2 or 3 psychotropic medications simultaneously.<sup>3</sup>

These studies have provoked debate about the safety and efficacy of psychotropic medications for children, both in the medical literature<sup>6</sup> and the media. A recent Dutch study has demonstrated that US data cannot be extrapolated to other countries as patterns of psychotropic prescribing vary.<sup>7</sup> Anecdotal evidence in Australia points to an increase in the prescribing of all psychotropic medications, prescribing of combinations of drugs, and prescribing of medications for which the safety and efficacy in children are yet to be established. Thus, concerns raised in the light of US pharmacoepidemiologic data have been echoed in Australia.<sup>8,9</sup> However, apart from a report describing a fourfold rise in the prescription of stimulants from 1988 to 1993<sup>10</sup> and a profile of practice in 1 region in 1992–1994,<sup>11</sup> little is known about the prescription of psychotropic medication for Australian children.

This situation is of concern because for many psychotropic medications it is not clear that the benefits outweigh the potential harms in children. Potential long-term effects are of concern, particularly given the increasing understanding of the susceptibility of the developing brain, biochemically and even microstructurally, to environmental influences.<sup>12</sup> On the other hand, very negative life experiences, which may be ameliorated by medication, can also affect brain development.<sup>13</sup> These patterns of prescribing may reflect the dilemma faced by clinicians as the presentation of young children with severe and com-

plex psychopathology seems to be increasing, yet there is a lack of data to inform optimal management.<sup>8</sup>

The aim of this study, therefore, was to describe the pattern of prescribing of psychotropic medication for Australian children by all registered general pediatricians and child psychiatrists, both to document current practice and also to identify possible areas of concern to inform training, practice, and research.

## METHODS

### Procedure

A postal survey of all 604 general pediatricians and 267 child psychiatrists in Australia was undertaken in November 2000. In Australia, pediatricians and child psychiatrists function as consultant specialists, seeing only patients referred by general practitioners (family doctors). There is considerable overlap in the type of problems seen by these 2 professional groups—35% of pediatric consultations in Australia involve behavioral problems, three-quarters of which relate to ADHD.<sup>1</sup> Although general practitioners can prescribe most medications, only pediatricians and child psychiatrists are permitted to prescribe stimulant medication in Australia.

Contact addresses for practitioners were obtained through the Royal Australasian College of Physicians (Paediatrics and Child Health Division) and the Royal Australian and New Zealand College of Psychiatrists (Faculty of Child and Adolescent Psychiatry), both of whom endorsed the study. These colleges have contact addresses for at least 95% of the doctors practicing in their respective disciplines. A second survey was posted to initial nonresponders after 2 months.

### Measures

Practitioners completed a 15-item questionnaire inquiring about the prescribing of the following medication/medication groups: psychostimulants, clonidine, tricyclic antidepressants, SSRIs, typical neuroleptics, atypical neuroleptics, and mood stabilizers. Specifically, frequency of prescribing, co-prescribing (the prescribing of more than one drug simultaneously), off-label prescribing (use that is disclaimed or not included in the prescribing information), and prescribing for younger ages were addressed. To elicit indications for prescribing, respondents were asked which medication they would prescribe (if any) for 9 named clinical symptoms/indications. They were also asked to cite any concerns about the use of psychotropic medication in children. The recall time period was specified as the preceding 12 months. The prescribing of benzodiazepines was also ascertained. However, these drugs are used extensively for epilepsy in children, and the data with regarding their use as psychotropics is likely to be contaminated. We have therefore not reported them.

The questionnaire was drafted by the authors and then refined through a workshop attended by 25 pediatricians and child psychiatrists, with the aim of developing a survey with high content validity. The revised questionnaire was then piloted with a sample of both professional groups ( $n = 20$ ) before being posted.

### Analysis

Simple frequencies were used to describe the prescription of medication/medication groups.  $\chi^2$  analysis was used to compare prescribing patterns between the 2 professional groups. The 3 most frequently reported medications prescribed for each symptom/condition (eg, sleep problems, depression) were determined, and comparisons were made between pediatricians and child psychiatrists regarding the prescription of each of the 3 medications for that symptom/condition. Only those practitioners who reported prescribing the medication over the preceding 12 months were included in this analysis. Data were analyzed with Stata version 6 (Stata Corp, College Station, TX).

## RESULTS

### Sample Characteristics

Of the 870 surveys posted, 622 (435 pediatricians, 187 child psychiatrists) were returned representing

an overall response rate of 71.5%. The response rate was >50% for each professional group in every state or territory, with the exception of Tasmanian child psychiatrists. The majority of respondents were male, working in private practice, and in a metropolitan setting (Table 1). Nonresponders did not differ from responders in terms of professional group (pediatrician or child psychiatrist) or gender. However, regional/rural pediatricians were over-represented in the sample (31% in sample vs 11% of nonresponders,  $\chi^2 = 24.9$ ,  $P < .001$ ).

### Prescribing Patterns

The frequency of prescribing for each medication/medication group is described in Table 2. Stimulants and clonidine were the most frequently prescribed medications. For each medication/medication group, a substantial proportion of practitioners reported not prescribing at all.

### Indications

Pediatricians were more likely than child psychiatrists to prescribe clonidine for sleep problems (67% vs 36%). Child psychiatrists were more likely than pediatricians to prescribe SSRIs (93% vs 75%) and mood stabilizers (45% vs 11%) for depression, and SSRIs (74% vs 50%) and tricyclic antidepressants (37% vs 12%) for obsessive compulsive disorder (all  $P < .001$ ).

### Co-prescribing

Co-prescribing was common; 72% of practitioners reported that they had prescribed a combination of medications. The most common drug combination reported was a stimulant and clonidine (60.1%), followed by a stimulant and an SSRI (31.2%). Pediatricians were more likely to prescribe a stimulant with clonidine than were child psychiatrists (64% vs 51%,  $\chi^2 = 9.79$ ,  $P = .002$ ), whereas child psychiatrists were more likely to prescribe atypical neuroleptics in combination with each of stimulants, SSRIs, and mood stabilizers (all  $P < .01$ ; Table 3).

### Age

Respondents were asked to report the youngest age for which they had ever prescribed each medication/medication group. The percentage of practi-

TABLE 1. Sample Characteristics

Characteristic	Pediatricians ( $n = 435$ )	Child and Adolescent Psychiatrists ( $n = 187$ )
Male (%)	68	65
Age (%)		
<39 y	29	13
40–49 y	37	40
50–59 y	29	28
≥60 y	6	18
Practice type (%)		
Private	57	58
Public	43	42
Practice location (%)		
Metropolitan	69	89
Rural	31	11

**TABLE 2.** Frequent Prescribers (“Most Weeks” or “Most Months”) Over the Past 12 Months

Medication	Pediatricians ( <i>n</i> = 435) <i>n</i> (%)	Child Psychiatrists ( <i>n</i> = 187) <i>n</i> (%)	$\chi^2$	<i>P</i> Value
Dexamphetamine	280 (65)	90 (49)	14.3	<.001
Methylphenidate	239 (55)	76 (41)	10.7	.001
Clonidine	157 (36)	30 (16)	25.0	<.001
SSRIs	81 (19)	126 (68)	141.1	<.001
Tricyclic antidepressants	62 (14)	28 (15)	0.06	.81
“Typical” neuroleptics	21 (4.9)	52 (28)	66.9	<.001
“Atypical” neuroleptics	27 (6.3)	85 (46.0)	137.0	<.001
Mood stabilizers	5 (1.2)	42 (22.7)	85.2	<.001

**TABLE 3.** Percentage of Practitioners Who Prescribed Each Medication Combination, by Professional Group

Medication Combination	Pediatricians ( <i>n</i> = 431)	Child and Adolescent Psychiatrists ( <i>n</i> = 185)	$\chi^2$	<i>P</i> Value
Stimulant and clonidine (%)	64	51	9.79	.002
Stimulant and SSRI (%)	29	36	3.58	.06
Stimulant and tricyclic (%)	19	13	3.80	.05
Stimulant and atypical neuroleptic (%)	19	29	8.17	.004
SSRI and atypical neuroleptic (%)	5	44	141.89	<.0001
Atypical neuroleptic and mood stabilizer (%)	1	41	180.63	<.0001

tioners who reported that they had prescribed for a child <3 years old was: 10% for clonidine, 8% for methylphenidate, 7% for dexamphetamine, 6% for typical neuroleptics, 3% for tricyclic antidepressants, 2% for SSRIs, 2% for atypical neuroleptics, and 1% for mood stabilizers.

#### Off-Label

Off-label prescribing was reported by 40% of practitioners. The most commonly reported examples of known off-label prescribing were risperidone (36%), SSRIs (12%), olanzapine (5%), and clonidine (4%).

### DISCUSSION

This is the first survey to document the prescribing patterns of psychotropic medication by child psychiatrists and pediatricians in Australia. The survey found that a broad range of psychotropic medications are being prescribed for Australian children, with stimulants, SSRIs, and clonidine being prescribed frequently. Over 70% of practitioners had prescribed a combination of psychotropic medications in the last year, and up to 10% had prescribed for children aged <3 years.

Our findings are consistent with the reported prescription of an expanding array of psychotropic medications for children reported in the United States<sup>2,4,5</sup> and elsewhere.<sup>7</sup> The medications investigated in this survey included some that have been well-researched in children, such as the use of stimulants in ADHD.<sup>14</sup> However, for many of the medications there are scant efficacy and safety data to inform prescribing. Such practice may not be optimal for children and is potentially harmful. For example, although clonidine was the second most frequently prescribed medication, there are only limited high-quality efficacy and safety data regarding the use of

clonidine in children.<sup>15</sup> Furthermore, this medication can cause serious problems in overdose.<sup>16</sup> The SSRIs were reported to be prescribed with almost the same frequency as clonidine, reflecting similar popularity of these agents reported in the United States.<sup>5</sup> Although prescribing of SSRIs was apparently initially based on extrapolation from adult data, several recent studies suggest that certain SSRIs probably have a favorable efficacy and safety profile in children and adolescents with anxiety disorders.<sup>17,18</sup>

As has been reported elsewhere,<sup>3</sup> we found coprescribing was a common practice. We were unable to ascertain how often >2 medications were prescribed simultaneously from this study. It was not surprising to learn that pediatricians were more likely than child psychiatrists to prescribe a stimulant with clonidine, whereas child psychiatrists were more likely to prescribe atypical neuroleptics in combination with other psychotropic medications, as this is consistent with the practice profiles of these clinicians in Australia. Pediatricians see many children with ADHD, whereas child psychiatrists see children with a broader range of psychopathology.

The potential for drug interactions must always be considered when combination therapy is used. Concerns have been raised regarding opposing effects of methylphenidate and clonidine on cardiovascular stability, with potential adverse effects.<sup>19</sup> Prescribers must be aware of the pharmacological effects of these agents on serotonin and other amines, as well as inhibition of various cytochrome P450s. An increase in presentations of potentially fatal serotonin syndrome to pediatric emergency departments has been noted.<sup>20</sup>

Over 5% of practitioners in this study had prescribed clonidine, methylphenidate, dexamphetamine, and typical neuroleptics for children under 3

years of age. Similar patterns of prescribing have been reported in the United States.<sup>3,4</sup> All of this prescribing is off-label, because the manufacturers' product information cautions that the safety and efficacy of these medications in young children have not been established. Although only 40% of respondents reported off-label prescribing, 61% had prescribed the off-label clonidine for children for behavior disturbance. This indicates that many Australian prescribers are unfamiliar with current labeling. In fact, most prescribing of psychotropic medication (as well as many nonpsychotropics) for children is off-label, as pediatric studies of these medications have not been published. We could find no other studies describing practitioners' awareness of pediatric labeling.

Most studies of the prescribing of psychotropics for children have analyzed data sources such as regional Medicaid databases<sup>3-5</sup> or pharmacy dispensing data.<sup>7</sup> Such coordinated data are not collected in Australia. However, we have been able to provide a country-wide profile of prescribing that includes both public and private practice. This enables policy and training responses to be directed toward the whole picture, rather than risk being skewed by reports of potentially idiosyncratic practice in 1 patient subgroup (eg, Medicaid) in 1 or 2 regions.

The main methodologic weakness of this study is that postal survey without empirical validation of the information provided is a limited instrument for assessing history of medication use. There was the potential for recall bias; however, we believe that by limiting the period of recall required to 12 months, the competing aims of detailed data and accurate recall were reasonably reconciled. In addition our findings were broadly similar to those reported in recent papers, making it unlikely that recall bias has significantly threatened the validity of the data. There may have been some selection bias, although responders did not differ from nonresponders in terms of gender or professional group.

### CONCLUSION

This study found that a broad range of psychotropic medications are being prescribed for Australian children, combinations of psychotropic medications are used regularly, and there is some prescribing for very young children, reflecting trends in other countries. Unfortunately, such practice is occurring in the absence of supporting data.<sup>21</sup> These issues are a matter of concern for practicing Australian pediatricians and child psychiatrists, reflected in comments cited in the questionnaire. We must continue to actively pursue controlled clinical trials of safety, efficacy, and effectiveness of psychotropics for children with severe behavioral/mental health disorders. In the meantime, there is a need to develop and disseminate management algorithms, based on available evidence and expert consensus. Given the lack of safety data, ongoing monitoring of

psychotropic prescribing for children is important, with systematic adverse events reporting and surveillance. We need to improve training of prescribers in the optimal use of individual psychotropic medications, appropriate co-prescribing, and adjunctive psychological and educational interventions.

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