



## Prescribing for teenagers in New Zealand general practice

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### Abstract

**Aim** To describe patterns of prescribing in general practice for New Zealanders aged 13 to 19 years.

**Methods** The computerised records of 225 348 consulting patients from 48 general practices from around New Zealand were examined. A subset of 20 216 consulting patients (53.2% female) aged 13 to 19 years was selected and their prescribed medications analysed. General practice prescribing was described in terms of demographic characteristics and health-card eligibility.

**Results** Patients aged 13 to 19 consult and are prescribed to less than the population as a whole (3.2 consultations versus 5.0, and 2.4 scripts versus 4.9 per annum). Females were prescribed to more frequently than males (2.7 prescriptions per consulting patient per annum versus 2.0). Patients with a community services card were prescribed to more frequently than those without (2.9 prescriptions per consulting patient per annum versus 2.0). Respiratory drugs were most frequently prescribed (primarily anti-asthma medications), followed by medications for the treatment of infections, the genito-urinary system (mainly oral contraceptives), dermatological medications, and medications for treatment of the nervous system (mainly analgesics).

**Conclusions** Patients aged 13 to 19 consult and are prescribed to less frequently than the population as a whole. Asthma appears to be the major source of chronic illness for this population. Prescribing data presented here provide valuable baseline data for further research.

There is a paucity of literature on prescribing for teenagers compared with that of prescribing for other populations. It has been suggested that as teenagers do not conveniently fall into any current medical specialty, their healthcare is particularly relevant to primary care.<sup>1</sup> Although teenagers tend not to have the chronic diseases (asthma aside) that affect adults and older people, there are many challenges in the healthcare of teenagers involving management of the risk of health-damaging behaviours such as smoking, pregnancy, and drug and alcohol use.<sup>2</sup> Emotional health issues are also extremely important. A recent investigation of New Zealand secondary school students found a high prevalence of significant depressive symptoms, eating issues and suicidal behaviours, especially amongst females.<sup>3</sup>

Youth health is seen as an important part of the Government's health policy as reflected in its document 'Youth health: a guide to action'.<sup>4</sup> It is now recognised that teenagers are a distinct demographic group with specific healthcare needs. Despite evidence of reservations amongst young patients about using primary healthcare due to cost of doctors visits and prescriptions, confidentiality issues, and perceptions about their ability to communicate with health providers,<sup>5</sup> general practice continues to be of importance to teenagers. This retrospective descriptive study describes

patterns of prescribing for patients aged 13 to 19 years in New Zealand general practice over a 12-month period.

## Methods

The Dunedin Royal New Zealand College of General Practitioners Research Unit (Dunedin RNZCGP Research Unit) collects anonymous health data voluntarily contributed by New Zealand general practitioners. Extraction programmes query data from practice management systems without including names, addresses and other identifying information. Each patient is allocated a unique code, which is individuating but non-identifiable. Data are imported into a database (Microsoft Access 2000) at the Dunedin RNZCGP Research Unit for further analysis.

The data collection period for this study was from 1 January 2000 to 31 December 2000. Practices were selected on the basis of their recording full electronic clinical records. Data relating to each consulting patient, including demographic details, health-card status, consultation records and prescribed medications, were included in the study data set. Age for each patient was calculated as at 1 January 2000 and patients aged 13 to 19 were identified.

Prescriptions were assigned codes from the Anatomical Therapeutic Chemical (ATC) classification system as used in the New Zealand Pharmaceutical Schedule. A therapeutic group is defined as a set of medicines that are used to treat the same or similar condition(s). The database includes information about some medications that do not receive Ministry of Health subsidies. Over-the-counter medications are included if they are prescribed by the general practitioner. Prescribed medication was calculated as a rate (number of prescriptions or medication items/consulting patient per annum) by age, sex, and community services card status. The proportion of consulting patients who received at least one medication item per annum and those who received five, ten, or twenty and more medication items were identified. The five most frequently prescribed therapeutic groups were identified, as were the five most frequently prescribed therapeutic subgroups.

## Results

The database contains data extracted from 48 general practices (approximately 140 general practitioners) with a total consulting population of 225 348 patients of all ages (54.3% female) for the period 1 January 2000 to 31 December 2000. A Ministry of Health Survey indicates that this would represent approximately 80% of the estimated population base that is serviced by these practices (approximately 7.3% of New Zealand's population as at 31 December 2000).<sup>6</sup> Nineteen per cent of the patients were from the Central region, 25.2% from the Midland, 23.9% from the Northern, and 31.9% from the Southern region. During the study period these patients consulted 1 135 398 times (5.0 per consulting patient per annum), and were prescribed to 1 114 939 times (4.9 per consulting patient per annum). They were prescribed 668 742 repeat medication items (3.0 per consulting patient per annum), giving a total of 1 783 681 medication items (7.9 per consulting patient per annum). Females consulted more frequently than males (5.5 per consulting patient per annum versus 4.6).

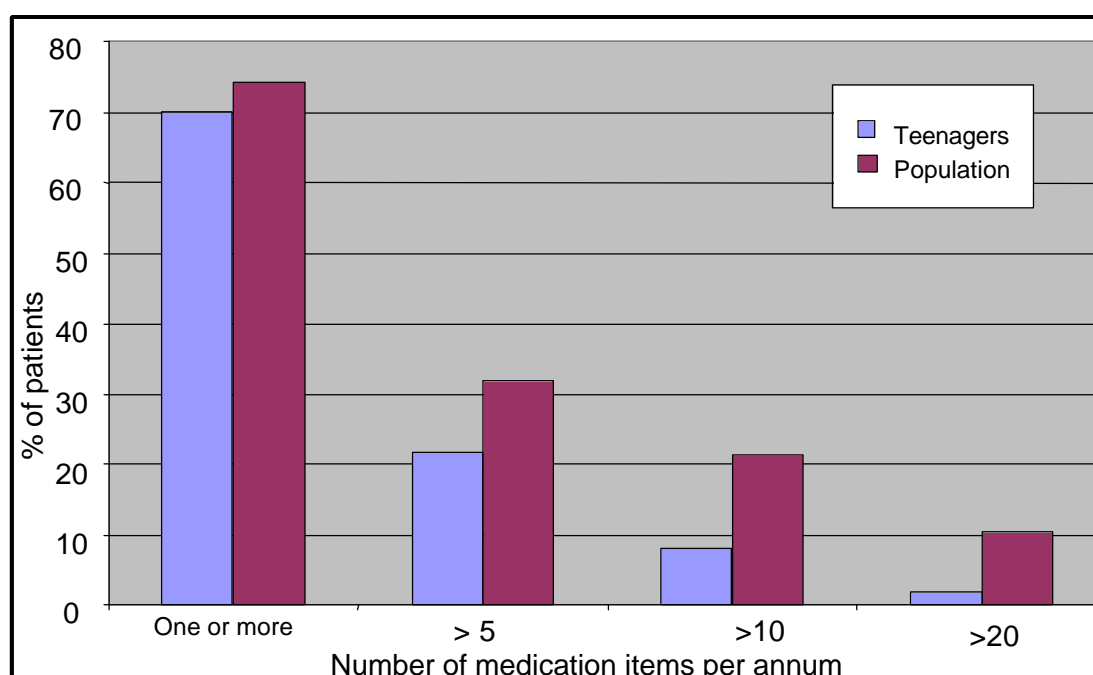
From this larger data set, 20 216 patients aged 13 to 19 were selected (53.2% female). These patients consulted 64 365 times (3.2 per consulting patient per annum), and were prescribed to 47 758 times (2.4 per consulting patient per annum). They were prescribed 17 494 repeat medications (0.9 per consulting patient per annum) giving a total of 65 252 medication items (3.2 per consulting patient per annum). Females consulted more frequently than males (3.5 per consulting patient per annum versus 2.9). Table 1 shows that females were prescribed to more frequently than males (2.7 versus 2.0 scripts per annum and 3.7 versus 2.7 medication items per annum).

**Table 1. Mean number of prescriptions and medication items per consulting patient per annum by age, sex and community services card (CSC) status**

Age (years)	Females	Males	CSC	No CSC	All patients
<b>Mean number of prescriptions</b>					
13	2.2	2.0	2.5	1.9	2.1
14	2.3	2.2	2.7	2.0	2.2
15	2.6	2.2	2.8	2.2	2.4
16	2.9	2.0	3.2	2.2	2.5
17	3.1	2.0	3.4	2.1	2.6
18	2.8	1.9	3.1	1.8	2.4
19	2.6	1.8	2.7	1.9	2.3
<b>Total</b>	<b>2.7</b>	<b>2.0</b>	<b>2.9</b>	<b>2.0</b>	<b>2.4</b>
<b>Mean number of medication items</b>					
13	2.9	2.6	3.3	2.4	2.8
14	3.1	3.0	3.7	2.7	3.0
15	3.5	3.0	3.8	3.0	3.2
16	4.2	2.7	4.4	3.1	3.5
17	4.3	2.7	4.7	3.0	3.6
18	4.0	2.6	4.5	2.4	3.4
19	3.6	2.4	3.7	2.5	3.1
<b>Total</b>	<b>3.7</b>	<b>2.7</b>	<b>4.0</b>	<b>2.7</b>	<b>3.2</b>

Of all consulting patients aged 13 to 19, 70.2% were prescribed to at least once during the year, with 21.7% prescribed five or more medication items per annum, and only 1.9% prescribed 20 or more medication items during the study year (Figure 1).

**Figure 1. Proportion of patients by frequency of prescribed items during the study period. Teenagers compared with the entire population.**



Of all patients aged 13 to 19, 38.0% were recorded as holding a CSC, with the rate of card holding increasing markedly at school-leaving age; 34.9% of 17-year-olds hold a card, increasing to 48.8% of 18-year-olds. Patients with a CSC were prescribed to more frequently than patients without a CSC (2.9 versus 2.0 scripts per annum), and were prescribed more medication items (4.0 versus 2.7 medication items per annum).

**Table 2. The most frequently prescribed medication items. The proportion of therapeutic group by subgroup.**

Therapeutic group (n) Subgroups (% of therapeutic group)	Age (years)							
	13	14	15	16	17	18	19	All
<b>Respiratory system (n)</b>	<b>2525</b>	<b>2737</b>	<b>2647</b>	<b>2925</b>	<b>2526</b>	<b>2610</b>	<b>2190</b>	<b>18 160</b>
Inhaled $\beta$ -adrenoceptor agonists MDI	23.6	23.1	26.0	22.8	28.5	30.3	27.7	25.9
Inhaled corticosteroids MDI	18.3	21.6	18.1	14.9	21.9	19.4	23.3	19.5
Nasal preparations	18.3	14.1	17.9	13.5	16.6	15.1	14.9	15.7
Inhaled $\beta$ -adrenoceptor agonists BA	13.3	11.7	11.5	12.4	10.3	11.4	9.5	11.5
Inhaled corticosteroids BA	10.2	10.9	11.7	10.8	7.2	8.7	7.1	9.6
All others	16.3	18.6	14.8	25.6	15.5	15.1	17.5	17.8
<b>Infections (n)</b>	<b>1872</b>	<b>2106</b>	<b>2204</b>	<b>2331</b>	<b>2681</b>	<b>2101</b>	<b>2037</b>	<b>15 332</b>
Antibacterials	96.3	96.8	95.2	94.5	91.7	91.1	90.9	93.7
Urinary tract infections	0.6	1.2	1.0	2.2	3.4	4.0	3.6	2.3
Antifungals	1.3	0.8	1.4	1.4	2.0	1.5	1.4	1.4
Antitrichomonal agents	0.5	0.6	1.3	1.0	1.7	2.2	2.7	1.4
Antivirals	1.1	0.4	0.8	0.6	1.2	1.0	1.2	0.9
All others	0.2	0.2	0.3	0.3	0.0	0.2	0.2	0.3
<b>Genito-urinary system (n)</b>	<b>79</b>	<b>206</b>	<b>622</b>	<b>1004</b>	<b>1483</b>	<b>1561</b>	<b>1729</b>	<b>6684</b>
Contraceptives hormonal	24.1	36.4	45.2	43.7	52.8	61.2	57.3	53.0
Anti-androgen oral contraceptives	5.1	9.7	16.9	20.9	20.8	14.7	19.1	18.0
Contraceptives hormonal, non-interchangeable	11.4	21.8	18.0	17.0	12.4	10.7	10.6	13.0
Contraceptives non-hormonal	20.3	16.0	12.4	10.0	6.7	4.8	5.7	7.5
Gynaecological anti-infectives	17.7	9.2	5.6	6.8	6.3	6.1	6.1	6.5
All others	21.4	6.9	1.9	1.6	1.0	2.5	1.2	2.0
<b>Dermatologicals (n)</b>	<b>764</b>	<b>773</b>	<b>997</b>	<b>966</b>	<b>1109</b>	<b>1049</b>	<b>984</b>	<b>6642</b>
Corticosteroids topical	44.2	43.2	42.8	45.0	46.5	45.5	50.5	45.5
Antibacterials topical	17.4	15.8	12.3	10.8	10.2	9.6	8.7	11.8
Anti-acne preparations	7.5	13.5	13.1	16.4	11.4	8.3	5.9	10.9
Emollients and barrier creams	6.5	8.4	13.2	9.2	12.0	15.3	8.6	10.7
Antifungals topical	6.7	10.1	5.5	7.1	6.7	9.5	9.7	7.9
All others	17.7	9.0	13.1	11.5	13.2	11.8	16.6	13.2
<b>Nervous system (n)</b>	<b>791</b>	<b>845</b>	<b>775</b>	<b>988</b>	<b>950</b>	<b>1172</b>	<b>953</b>	<b>6474</b>
Analgesics	41.7	43.6	35.5	37.3	41.2	27.2	32.8	36.5
Antidepressants	4.9	12.1	21.4	20.5	20.7	28.2	30.7	20.6
Anti-epilepsy drugs	8.6	13.7	10.8	10.1	12.3	20.0	10.2	12.6
Antinausea and vertigo agents	8.8	5.0	8.9	10.5	8.9	8.4	11.4	8.9
Other CNS agents	21.7	8.8	12.4	4.5	5.7	2.0	1.9	7.4
All others	14.3	16.8	11.0	17.1	11.2	14.2	13.0	14.0
<b>All other medications</b>	<b>1225</b>	<b>1478</b>	<b>1451</b>	<b>1843</b>	<b>2090</b>	<b>1834</b>	<b>2039</b>	<b>11 960</b>
<b>All medications</b>	<b>7256</b>	<b>8145</b>	<b>8696</b>	<b>10 057</b>	<b>10 839</b>	<b>10 327</b>	<b>9932</b>	<b>65 252</b>

MDI = metered-dose inhaler; BA = breath-activated inhaler; CNS = central nervous system

Table 2 shows the most frequently prescribed medication items from the ATC groupings by therapeutic subgroup. Of all prescribed medications, 27.8% were from the respiratory system ATC grouping; 23.5% from infection; 10.2% from the genito-urinary system; 10.2% from dermatological; and 9.9% from the nervous system ATC grouping.

## Discussion

There has been a paucity of published data on prescribing for teenagers in New Zealand general practice. This descriptive study examined the prescribing records of 48 New Zealand general practices for patients aged 13 to 19 years.

The results of this study indicate that teenagers who consult in general practice see their general practitioner less often than the study population as a whole (3.2 versus 5.0 contacts per annum) and are prescribed to less frequently (2.4 versus 4.9 prescriptions per annum).

Prescribing was a frequent outcome of a consultation, with 70.2% of patients prescribed at least one medication during the year. However, polypharmacy was not common, with only 8.1% of patients prescribed ten or more medication items over the year, compared with 21.3% of the entire study population.

Females consult and are prescribed to more frequently than males and this difference increases with age. Some of this difference can be explained by prescriptions for the genito-urinary system, primarily contraceptives. When this therapeutic group is removed from the analysis the mean number of medication items for females is 3.1 per consulting patient per annum, and males 2.7 per consulting patient per annum.

The most frequently prescribed therapeutic groups for patients aged 13 to 19 were for the respiratory system, infections, genito-urinary system, dermatologicals, and medications for the nervous system. These results mirror overseas data for this age group.<sup>7</sup>

Of concern is the relatively large proportion of teenagers prescribed anti-androgen oral contraceptives (presumably in part for their anti-acne properties). Evidence suggests a greater risk of fatal pulmonary embolism with combined oral contraceptives, and especially so for agents containing cyproterone acetate.<sup>8,9</sup> More recent prescribing data are needed to ascertain if this level of prescribing is still occurring in light of recent media attention.

A greater number of medications are prescribed to teenagers with a community services card compared with those without. Higher levels of prescribing to card holders have previously been demonstrated for the population as a whole.<sup>10,11</sup> Some of the highest levels of non-uptake of community services cards have been found amongst young people.<sup>12</sup> If cost is a factor in general practice attendance for teenagers then non-uptake of cards needs to be addressed.

The most frequently prescribed therapeutic group for patients aged 13 to 19 is medication for the respiratory system, principally inhaled beta-adrenoceptor agonists and inhaled corticosteroids (Table 2). This is in accord with evidence of a high prevalence of respiratory-related illness amongst teenagers in New Zealand.<sup>13</sup>

The second most frequently prescribed therapeutic group is for infections, predominantly antibacterials, which make up 22.0% of all medication items

prescribed to young people. Antibiotic resistance has been identified as an emerging threat for public health<sup>14</sup> and there has been a call for an exploration of patient expectations in the consultation to help decrease prescribing rates.<sup>15</sup> One consideration with the data presented is that some of these medications may be prescribed as needed and never dispensed.

Dermatological medications were the next most frequently prescribed therapeutic group, with topical corticosteroids making up 45.5% of all medications prescribed from this group. Other frequently prescribed medications include topical antibacterials and anti-acne preparations. Skin care is important for young people, with teenagers in particular quite stigmatised by skin problems such as acne, even in mild cases.<sup>16</sup>

Most medications prescribed from the nervous system ATC grouping are analgesics. However, the number of antidepressants prescribed increased with age. This is in accord with a reported increase of mental illness as young people move through adolescence.<sup>17</sup> Closer examination of the data reveals that 72.4% of all antidepressants were selective serotonin reuptake inhibitors (SSRIs), which is in line with evidence that tricyclic antidepressants are less effective for teenagers than for adults.<sup>18</sup> However, this may just be a reflection of a widespread increase in the prescribing of SSRIs in New Zealand.

The limitations of using the Dunedin RNZCGP database for research include potential bias in data collections (the magnitude and direction of this bias was the subject of a previous investigation, which found the database provided data that reflected similar morbidity and services to those of practices not contributing data to the network<sup>19</sup>); the lack of a defined population, as some patients consult with different practices or clinics over the study year; the cross-sectional study design; the fact that data recorded for prescribed medications do not take into account the difference between prescribed and dispensed medications; and that data are missing from non-prescribed, over-the-counter medications.

The study data set does not contain any data from family planning or sexual health clinics, which provide clinical services including sexual health checkups, contraception, pregnancy testing and counselling, and also run clinics in or near schools. There is some evidence that New Zealand teenagers would prefer to receive contraceptive services away from their general practice.<sup>20</sup> The data presented are a reflection of general practice prescribing only, and reflect only one aspect of sexual health prescribing for young New Zealanders. However, the Dunedin RNZCGP database is a valuable tool in describing general practice prescribing for defined demographic groups without influencing or altering practice.

This study provides valuable baseline data of the medications prescribed for patients aged 13 to 19 years in an environment of very limited research either in New Zealand or the rest of the world. The most frequently prescribed medications for patients aged 13 to 19 were for treatment of the respiratory system, infections, the genito-urinary system, skin conditions, and the nervous system, and it is assumed this is a reflection of the morbidity of this population.

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