Trends in dispensing ADHD medication to New Zealand youth

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Disclaimer

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Attention-deficit/hyperactivity disorder
DSM-5 Diagnostic Criteria

- **16 years or under**: 6+ symptoms
- **17 years plus**: 5+ symptoms

- Behaviour/symptoms are:
  - Present for 6 months
  - Inappropriate for developmental level
  - Disruptive
  - Present before 12 years and in multiple settings

Management

Counselling/therapy

Lifestyle changes

Medication
Prevalences

Worldwide prevalence of ADHD - 3.4%

**Figure 1.** Percent prevalence of ADHD medication use in children and adolescents (0–19 years) in youth cohorts from five countries, 2005/6–2012. Adapted from Bachmann et al. (2017).

**Figure 2.** Overall annual prevalence of attention deficit hyperactivity disorder medication use in children aged 3–18 years. Adapted from Raman et al. (2018).
ADHD medication in NZ

**Data Source:** Statistics New Zealand Integrated Data Infrastructure (IDI), a large database of de-identified administrative and survey data.

**ADHD medication:** Obtained from the community pharmaceutical collection.

- Methylphenidate hydrochloride
- Dexamphetamine sulfate
- Atomoxetine
- Modafinil
- Clonidine
ADHD medication in NZ

**Sample:** All individuals in NZ aged 1 – 24 years from 1\textsuperscript{st} July 2007 – 30\textsuperscript{th} June 2017
- \( N = 2,395,209 \)

**Data analysis:** Dispensing prevalence for each fiscal year

\[
\frac{\text{Number with one or more dispensing}}{\text{Total number in resident youth population}} \times 100,000
\]

Prevalence also calculated for each sex, age group, ethnicity (total response), 2013 NZDep quintile, and DHB.
Total population dispensing prevalence

Period prevalence was 1,182 per 100,000 population
Dispensing prevalence by sex

Fiscal year

Rate per 100,000


Male
Female
Dispensing prevalence by age
Dispensing prevalence by ethnicity

[Diagram showing trends in dispensing prevalence by ethnicity from 2007/08 to 2016/17 for Asian, European, Māori, MELAA, Pacific, and Other groups.]
Dispensing prevalence by deprivation

![Dispensing prevalence by deprivation](image-url)
Dispensing prevalence by DHB

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Rate per 100,000

Fiscal year


Auckland  Hawke’s Bay  Hutt Valley  Northland  Waikato
Bay of Plenty  Canterbury  Lakes  MidCentral
Canterbury  Tairawhiti  Wairarapa  Southern
Hawke’s Bay  West Coast
Hutt Valley  Whanganui
Canterbury  Counties Manukau
Counties Manukau  Nelson Marlborough  Taranaki
Hutt Valley  Tairawhiti
MidCentral  Waikato
Nelson Marlborough  Waitemata
Northland  Wairarapa
Southern  Whanganui
Tairawhiti  Waikato
Taranaki  Waitemata
Waikato  West Coast
Whanganui  Waikato

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Dispensing prevalence by DHB
Prevalence by medication type (per 100,000)

<table>
<thead>
<tr>
<th>Fiscal year</th>
<th>Methylphenidate</th>
<th>Clonidine</th>
<th>Dexamphetamine</th>
<th>Atomoxetine</th>
<th>Modafinil</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007/08</td>
<td>462</td>
<td>50</td>
<td>36</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2008/09</td>
<td>507</td>
<td>51</td>
<td>33</td>
<td>12</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2009/10</td>
<td>555</td>
<td>50</td>
<td>28</td>
<td>28</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2010/11</td>
<td>586</td>
<td>52</td>
<td>26</td>
<td>28</td>
<td>&lt;1</td>
</tr>
<tr>
<td>2011/12</td>
<td>638</td>
<td>57</td>
<td>28</td>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td>2012/13</td>
<td>703</td>
<td>66</td>
<td>29</td>
<td>35</td>
<td>1</td>
</tr>
<tr>
<td>2013/14</td>
<td>744</td>
<td>70</td>
<td>30</td>
<td>37</td>
<td>1</td>
</tr>
<tr>
<td>2014/15</td>
<td>790</td>
<td>79</td>
<td>32</td>
<td>39</td>
<td>1</td>
</tr>
<tr>
<td>2015/16</td>
<td>834</td>
<td>89</td>
<td>31</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>2016/17</td>
<td>899</td>
<td>98</td>
<td>34</td>
<td>46</td>
<td>1</td>
</tr>
</tbody>
</table>
Comparison to other countries

Overall prevalence in ADHD medication dispensing was 1.18% (95% CI 1.17 – 1.20)

<table>
<thead>
<tr>
<th>Region</th>
<th>Prevalence (%)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia and Australia</td>
<td>0.95</td>
<td>0.35–1.56</td>
</tr>
<tr>
<td>North America</td>
<td>4.48</td>
<td>2.86–6.10</td>
</tr>
<tr>
<td>Northern Europe (Nordic countries)</td>
<td>1.95</td>
<td>1.47–2.44</td>
</tr>
<tr>
<td>Western Europe (France, Spain, UK)</td>
<td>0.70</td>
<td>0.31–1.10</td>
</tr>
</tbody>
</table>

Table 1. Prevalence (95% CI) in ADHD medication dispensing. Adapted from Raman et al. (2018)
Comparison with disorder prevalence

Polanczyk and colleagues

- Worldwide-pooled prevalence of ADHD – 3.4%
- Variability in ADHD prevalence estimates explained by methodological factors
- No evidence that ADHD prevalence is increasing
Comparison with disorder prevalence in NZ Health Survey (2016/17)

Comparison with antidepressant dispensing

Bowden et al. (under review) – from 2006/07 to 2015/16

- **Antidepressants**
  - **2015/16**: 2,777 per 100,000
  - 49% relative increase

- **ADHD medication**
  - **2015/16**: 928 per 100,000
  - 79% relative increase
  (92% to 2016/17)
Comparison with antidepressant dispensing

Antidepressants

- NZEO
- Maori
- Asian
- Pasifika

Dispersing Rates (per 100,000 population)

ADHD medication

Rate per 100,000

Fiscal Year

Fiscal Year
Comparison with antidepressant dispensing
Concluding thoughts

- Increase in dispensing prevalence rates from 2007/08 to 2016/17
- Medication dispensing prevalence lower than disorder prevalence
- Differences across DHBs in dispensing prevalence
- Group differences in rates may reflect differences in access to healthcare and medication
  - Ethnicity: cultural variation in the perception of ADHD and treatment
  - Sex and age: genuine differences in prevalence of ADHD in these groups
Limitations

- Dispensings not prescriptions
- Medications may be prescribed for other conditions
- Lack of information on other treatments
- IDI not sufficient in exploring reasons for discrepancies in dispensing prevalence rates
Acknowledgements

- COMPASS team (Barry Milne and Nichola Shackleton)
- Better Start team (Sheree Gibb and Nick Bowden)
- Public Policy Institute
- Stats NZ
Questions
**Attention-deficit/hyperactivity disorder**

<table>
<thead>
<tr>
<th>Inattention symptoms</th>
<th>Hyperactivity/Impulsivity symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fails to give close attention to details or makes careless mistakes.</td>
<td>Fidgets with or taps hands or feet, or squirms in seat.</td>
</tr>
<tr>
<td>Has trouble holding attention.</td>
<td>Leaves seat in situations when remaining seated is expected.</td>
</tr>
<tr>
<td>Does not seem to listen when spoken to directly.</td>
<td>Inappropriately runs about or climbs (adolescents or adults may be limited to feeling restless).</td>
</tr>
<tr>
<td>Does not follow through on instructions and fails to finish tasks.</td>
<td>Unable to play or take part in leisure activities quietly.</td>
</tr>
<tr>
<td>Has trouble organizing tasks and activities.</td>
<td>“On the go” acting as if “driven by a motor”.</td>
</tr>
<tr>
<td>Avoids, dislikes, or is reluctant to do tasks that require mental effort over a long period of time.</td>
<td>Talks excessively.</td>
</tr>
<tr>
<td>Loses things necessary for tasks and activities.</td>
<td>Blurs out an answer before a question has been completed.</td>
</tr>
<tr>
<td>Easily distracted.</td>
<td>Trouble waiting his/her turn.</td>
</tr>
<tr>
<td>Forgetful in daily activities.</td>
<td>Interrupts or intrudes on others.</td>
</tr>
</tbody>
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