Variation in Nursing Home Antipsychotic Prescribing Rates

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Background: Excessive prescribing of antipsychotic therapy is a concern owing to their potential to cause serious adverse events. We explored variation in the use of antipsychotic therapy across nursing homes in Ontario, Canada, and determined if prescribing decisions were based on clinical indications.

Methods: A point-prevalence study of antipsychotic therapy use in 47,322 residents of 485 provincially regulated nursing homes in December 2003. Facilities were classified into quintiles according to their mean antipsychotic prescribing rates. Residents were grouped into those with a potential clinical indication or no identified clinical indication for antipsychotic therapy.

Results: A total of 15,317 residents (32.4%) were dispensed an antipsychotic agent. The mean rate of antipsychotic prescribing by home ranged from 20.9% in the quintile of facilities with the lowest mean prescribing rates (quintile 1) to 44.3% in facilities with the highest mean prescribing rates (quintile 5). Compared with individuals residing in nursing homes with the lowest mean antipsychotic prescribing rates, those residing in facilities with the highest rates were 3 times more likely to be dispensed an antipsychotic agent (adjusted odds ratio [AOR], 3.0; 95% confidence interval [CI], 2.74-3.19). Similar rates were observed among residents with psychoses with or without dementia (AOR, 2.7; 95% CI, 2.35-3.09) and residents without psychoses or dementia (AOR, 2.9; 95% CI, 2.19-3.81) who had no identifiable indication for an antipsychotic therapy.

Conclusion: Residents in facilities with high antipsychotic prescribing rates were about 3 times more likely than those in facilities with low prescribing rates to be dispensed an antipsychotic agent, irrespective of their clinical indication.

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cally, antipsychotic therapy is potentially indicated to manage psychoses and for situations in which the behavioral problems pose a risk to the resident or others.

The province of Ontario, Canada, provides an excellent opportunity to study variations in antipsychotic prescribing rates at the nursing home level. Nursing home residents are a relatively homogeneous group. Admissions are organized through a centralized process, eligibility criteria are standardized, and all facilities are regulated by the province and similarly funded. We used the natural experiment of “assignment” of residents to nursing homes to explore the extent to which variation in the use of antipsychotic therapy across facilities is related to specific clinical indications.

METHODS

Our cohort was drawn from linked administrative databases available from the Institute for Clinical Evaluative Sciences (ICES). We conducted a point-prevalence study using Ontario administrative health care data including demographic data obtained from the Registered Persons Database (defines eligible claimants), diagnostic information from the Ontario Health Insurance Plan (OHIP) (contains physician billing claims including the nursing home location where the medical service was provided), hospital diagnosis from the Canadian Institute for Health Information (CIHI) database (using International Classification of Diseases, Ninth Revision [ICD-9] and International Statistical Classification of Diseases, 10th Revision [ICD-10] codes), and drug information from the Ontario Drug Benefit Plan (ODB) database. These linked provincial databases have been used extensively to explore issues related to drug prescribing in the older population.9,10,16,17 An Ontario Ministry of Health and Long-Term Care list of nursing homes was used to identify active facilities and to obtain their geographic information. This study received approval from the ethics board of Sunnybrook Health Sciences Centre, Toronto, Ontario.

The cohort was drawn from all Ontario nursing home residents 66 years and older on December 31, 2003. We identified all residents residing in a provincially funded nursing home in 2003 with 20 or more residents. We excluded 28 nursing homes because their residents could not be uniquely assigned to 1 facility. We also excluded residents in palliative care because antipsychotic therapy may be used for different purposes in this setting.

ANTIPSYCHOTIC PRESCRIBING

The dispensation of an antipsychotic drug therapy was identified from the ODB. The ODB provides drug therapy basically free of charge to all adults 65 years and older. We identified all oral or intramuscular preparations of conventional (ie, chlorpromazine, fluphenixil, fluphenazine, haloperidol, loxapine, methotrimeprazine, pericyazine, perphenazine, pimozide, thioridazine, thiothixene, trifluoperazine, zuclopenthixol) and atypical (ie, olanzapine, quetiapine fumarate, risperidone) antipsychotic therapies. We measured the percentage of residents who were dispensed conventional vs atypical therapies, since the use of atypical agents is preferred.

QUINTILES BASED ON ANTIPSYCHOTIC PRESCRIBING RATES

We calculated the percentage of residents who were dispensed an antipsychotic therapy at each nursing home. We classified nursing homes, based on their mean facility-level antipsychotic prescribing rates, into quintiles. Quintile 1 (Q1) contained all nursing homes categorized as having the lowest mean facility-level antipsychotic prescribing rates (range, 3.3%-25.5%) and quintile 5 (Q5) contained those with the highest mean facility-level antipsychotic prescribing rates (range, 39.3%-66.7%). When a facility was classified as being in a particular quintile, all residents in that facility were placed in that quintile.

CHARACTERISTICS AND CLINICAL GROUPS

Facility characteristics were identified including number of beds (small, 21-99; medium, 100-199; or large, ≥200) and location (rural vs urban) based on postal codes. We examined age, sex, and comorbidity. The Charlson comorbidity score18 was based on hospitalizations during the previous 5 years. We also measured total drug count using data from the previous year.

We divided all nursing home residents into 3 mutually exclusive clinical groups using an approach similar to that used by Liperoti et al.19 The 2 potential clinical indication groups for antipsychotic therapy use were psychoses with or without dementia and dementia without psychoses. The no potential clinical indication group was identified as residents who were without psychoses or dementia. The use of antipsychotic therapy in this context was considered inappropriate. Table 1 outlines how the diagnostic codes and drug therapies were used to capture potential clinical indications for the use of antipsychotic therapy including psychoses, other conditions for which antipsychotic therapy may be indicated, and dementia. For diagnostic codes, we used data from the previous 3 years, and for drug therapies, we used data from the previous year.

STATISTICAL ANALYSES

Descriptive statistics were used to examine facility and resident characteristics and potential clinical indications across the quintiles. Rate ratios were used to compare facilities with the highest antipsychotic prescribing rates to facilities having the lowest rates to determine whether facility and resident characteristics contributed to this variation.

A logistic regression model assessed the overall effect of quintile of antipsychotic prescribing on the dependent variable of dispensing an antipsychotic therapy to a resident. Bivariate unadjusted and multivariate adjusted regression analyses were conducted. Adjusted analyses used logistic regression to predict resident-level use of antipsychotic therapy controlling for measured facility and resident characteristics. Regression models were examined in the overall population controlling for these clinical groups. To control for potential interactions between prescribing rates and the prevalence of the clinical group, we also used a stratified analysis within each of the 3 groups. Separate logistic regression models were repeated for the subsets of residents within each of the three clinical groups. For all analyses, quintile 1 was the reference group and adjusted and unadjusted odds ratios and 95% confidence intervals (CIs) were reported.

Funnel plots were used to provide a graphical exploration of the variations in antipsychotic prescribing rates across Ontario nursing homes. The standardized prescribing rate for each nursing home was calculated as the ratio of observed to expected numbers of individuals prescribed an antipsychotic therapy. The expected rates were based on 2 different benchmarks consisting of the US nursing home conventional antipsychotic prescribing rates during the periods before (24%) and after (17%) implementation of the OBRA-87 regulations that were designed to restrict inappropriate antipsychotic prescribing20 and in the range found more recently in US nursing homes.21 Standardized prescribing rate was plotted against facility size, superimposing exact Poisson confidence limits to
generate control limits for the rates, while accounting for variability associated with facility size. A standardized prescribing rate of 1 indicates that the observed number of individuals in a nursing home prescribed an antipsychotic agent is equal to that which is expected. Facilities that lie above the 99.8% control limit have unexpectedly high prescribing rates with respect to the benchmark standardized prescribing rate.

RESULTS

We identified 485 nursing homes with 47,322 residents across Ontario. The facility, resident characteristics, and clinical indications are outlined in Table 2. The size of the facilities was similar across quintiles, as was the distribution of rural compared with urban facilities. On average, 24.1% of facilities were classified as small (21-99 beds) and 26.3% as large (≥200 beds).

The mean age of the residents was 84.4 years. A total of 10,247 residents (22%) had psychoses with or without dementia, 29,017 (61%) had dementia without psychoses, and 8,058 (17%) were classified as being without psychoses or dementia.

As outlined in Table 2, the resident-level characteristics were fairly similar across the quintiles. The percentage of residents 85 years and older was lower in Q5 (rate ratio [RR] [Q5/Q1], 0.90; 95% CI, 0.87-0.93) compared with Q1. The distribution of female residents (RR [Q5/Q1], 0.98; 95% CI, 0.96-1.00), those with the highest comorbidity scores (Charlson comorbidity index score ≥2) (RR [Q5/Q1], 0.97; 95% CI, 0.93-1.01), and the mean total drug count (RR [Q5/Q1], 1.02; 95% CI, 1.00-1.03) were consistent across the quintiles. Small and rural facilities were over represented in the lowest and highest prescribing quintiles.

There was some difference in the distributions of the potential clinical indications for antipsychotic therapy across quintiles. Those in facilities with the highest antipsychotic prescribing rates were 30% more likely to have a diagnosis of psychoses with or without dementia (RR [Q5/Q1], 1.31; 95% CI, 1.26-1.35), have a similar percentage of residents with dementia without psychoses (RR [Q5/Q1], 0.98; 95% CI, 0.95-1.00), and were 20% less likely to have residents without psychoses or dementia (RR [Q5/Q1], 0.80; 95% CI, 0.72-0.88) compared with residents in facilities with the lowest antipsychotic prescribing rates.

VARIATION IN USE OF ANTIPSYCHOTIC THERAPY

Table 3 describes the type of antipsychotic therapy dispensed. Overall, 15,317 (32.4%) of residents received at least 1 antipsychotic therapy. Antipsychotic therapy prescribing ranged from a mean of 20.9% in the lowest to a mean of 44.3% in the highest antipsychotic prescribing quintile. Of the residents prescribed an antipsychotic agent, 14,596 (95.3%) received only 1 antipsychotic therapy, most of which were for atypical antipsychotics.
Of those dispensed an atypical antipsychotic agent, risperidone (7238 [53.2%]) was the most common, followed by olanzapine (3822 [28.1%]) and quetiapine (2538 [18.7%]). Overall, 721 of the residents were prescribed multiple antipsychotic agents. The majority (385 [53.4%]) were prescribed both atypical and conventional antipsychotic agents, while 286 (39.7%) were prescribed multiple atypical therapies.

**Antipsychotic Prescribing by Potential Clinical Indication**

Table 4 demonstrates that being in a facility with a high or a low antipsychotic prescribing rate was strongly related to the chance that a resident was prescribed an antipsychotic therapy. Compared with residents residing in Q1 (ie, facilities with lowest mean antipsychotic rates), those residing in Q5 (ie, facilities with the highest mean antipsychotic rates) were 3 times more likely to be dispensed an antipsychotic therapy (odds ratio [OR], 3.0; 95% CI, 2.77-3.16). When we repeated these analyses using a logistic regression model that adjusted for our facility and resident characteristics outlined in Table 2, the model was unchanged (adjusted OR [AOR], 3.0; 95% CI, 2.74-3.19), indicating that these variables did not account for the observed prescribing pattern.

Table 2. Characteristics According to Nursing Home Antipsychotic Drug Therapy Prescribing Rates*

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Overall</th>
<th>Q1 (Lowest)</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5 (Highest)</th>
<th>Rate Ratio (Q5/Q1) (95% CI)</th>
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<tbody>
<tr>
<td><strong>Facility-Level Characteristics</strong></td>
<td></td>
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<tr>
<td>Size</td>
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</tr>
<tr>
<td>Small</td>
<td>11 399 (24.1)</td>
<td>2786 (29.6)</td>
<td>2213 (23.1)</td>
<td>1595 (17.2)</td>
<td>1492 (15.8)</td>
<td>3313 (35.9)</td>
<td>1.22 (1.18-1.25)</td>
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<tr>
<td>Medium</td>
<td>23 454 (49.6)</td>
<td>4445 (47.2)</td>
<td>5382 (56.0)</td>
<td>4629 (50.0)</td>
<td>5049 (53.6)</td>
<td>3969 (43.0)</td>
<td>0.91 (0.88-0.95)</td>
</tr>
<tr>
<td>Large</td>
<td>12 469 (26.3)</td>
<td>2190 (23.2)</td>
<td>1997 (20.9)</td>
<td>3031 (32.7)</td>
<td>3313 (35.2)</td>
<td>1938 (21.0)</td>
<td>0.90 (0.84-0.96)</td>
</tr>
<tr>
<td>Setting</td>
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<tr>
<td>Urban</td>
<td>41 249 (87.2)</td>
<td>7851 (83.3)</td>
<td>8205 (85.7)</td>
<td>8497 (91.8)</td>
<td>8815 (89.5)</td>
<td>7881 (85.5)</td>
<td>1.03 (1.01-1.04)</td>
</tr>
<tr>
<td>Rural</td>
<td>6073 (12.8)</td>
<td>1570 (16.7)</td>
<td>1367 (14.3)</td>
<td>758 (8.2)</td>
<td>1039 (10.5)</td>
<td>9220 (10.5)</td>
<td>0.87 (0.79-0.95)</td>
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<td><strong>Resident-Level Characteristics</strong></td>
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<td>Demographic</td>
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<td>Age, mean, y</td>
<td>84.4</td>
<td>85.0</td>
<td>84.7</td>
<td>84.2</td>
<td>84.0</td>
<td>84.0</td>
<td>0.99 (0.99-0.99)</td>
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<td>65-74</td>
<td>5174 (10.9)</td>
<td>913 (9.7)</td>
<td>987 (10.3)</td>
<td>1063 (11.5)</td>
<td>1135 (11.5)</td>
<td>1076 (11.7)</td>
<td>1.20 (1.19-1.27)</td>
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<tr>
<td>75-84</td>
<td>18 036 (38.1)</td>
<td>3422 (36.3)</td>
<td>3557 (37.0)</td>
<td>3581 (38.7)</td>
<td>3850 (39.1)</td>
<td>3646 (39.5)</td>
<td>1.09 (1.05-1.12)</td>
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<tr>
<td>≥85</td>
<td>24 112 (51.0)</td>
<td>5086 (54.0)</td>
<td>5048 (52.7)</td>
<td>4611 (49.8)</td>
<td>4869 (49.4)</td>
<td>4498 (48.8)</td>
<td>0.90 (0.87-0.93)</td>
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<tr>
<td>Female</td>
<td>34 799 (73.5)</td>
<td>7042 (74.7)</td>
<td>7129 (74.5)</td>
<td>7185 (72.9)</td>
<td>7544 (73.1)</td>
<td>7881 (85.5)</td>
<td>0.98 (0.96-1.00)</td>
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<td>Comorbidity</td>
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<td>Charlson index, mean, score</td>
<td>1.7</td>
<td>1.7</td>
<td>1.7</td>
<td>1.8</td>
<td>1.7</td>
<td>1.7</td>
<td>0.97 (0.94-1.01)</td>
</tr>
<tr>
<td>Missing</td>
<td>13 304 (28.1)</td>
<td>2702 (28.7)</td>
<td>2646 (27.6)</td>
<td>2492 (26.9)</td>
<td>2796 (28.4)</td>
<td>2668 (28.9)</td>
<td>1.01 (0.96-1.05)</td>
</tr>
<tr>
<td>Score 0</td>
<td>8608 (18.2)</td>
<td>1726 (18.3)</td>
<td>1777 (18.6)</td>
<td>1642 (17.7)</td>
<td>1796 (18.2)</td>
<td>1667 (18.1)</td>
<td>0.99 (0.95-1.03)</td>
</tr>
<tr>
<td>Score 1</td>
<td>10 158 (21.5)</td>
<td>1962 (21.0)</td>
<td>2065 (21.6)</td>
<td>2038 (22.0)</td>
<td>2050 (20.8)</td>
<td>2023 (21.9)</td>
<td>1.04 (0.99-1.10)</td>
</tr>
<tr>
<td>Score ≥2</td>
<td>15 252 (32.2)</td>
<td>3011 (32.2)</td>
<td>3084 (33.3)</td>
<td>3212 (33.6)</td>
<td>2862 (31.0)</td>
<td>2862 (31.0)</td>
<td>0.97 (0.93-1.01)</td>
</tr>
<tr>
<td>Drug count, mean, No.</td>
<td>10.7</td>
<td>10.4</td>
<td>10.6</td>
<td>11.0</td>
<td>10.6</td>
<td>10.6</td>
<td>1.02 (1.01-1.03)</td>
</tr>
<tr>
<td>5-9</td>
<td>8662 (18.3)</td>
<td>1849 (19.6)</td>
<td>1721 (18.0)</td>
<td>1736 (18.8)</td>
<td>1644 (16.7)</td>
<td>1712 (18.6)</td>
<td>0.95 (0.88-1.01)</td>
</tr>
<tr>
<td>10-19</td>
<td>14 073 (29.7)</td>
<td>2782 (29.5)</td>
<td>2902 (30.3)</td>
<td>2797 (30.2)</td>
<td>2783 (30.2)</td>
<td>2809 (30.5)</td>
<td>1.03 (0.99-1.07)</td>
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<tr>
<td>20+</td>
<td>20 835 (44.0)</td>
<td>4087 (43.4)</td>
<td>4207 (44.0)</td>
<td>4005 (43.3)</td>
<td>4557 (46.2)</td>
<td>3979 (43.2)</td>
<td>1.00 (0.96-1.03)</td>
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<td>Clinical groups</td>
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<tr>
<td>Potential clinical indication for antipsychotic therapy</td>
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<td></td>
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<tr>
<td>Psychoses, with or without dementia</td>
<td>10 247 (21.7)</td>
<td>1650 (17.5)</td>
<td>2058 (21.5)</td>
<td>2165 (23.4)</td>
<td>2261 (22.9)</td>
<td>2113 (22.9)</td>
<td>1.31 (1.26-1.35)</td>
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<td>Dementia, without psychoses</td>
<td>29 017 (61.3)</td>
<td>5940 (63.1)</td>
<td>5883 (61.5)</td>
<td>5455 (58.9)</td>
<td>6059 (61.5)</td>
<td>5680 (61.6)</td>
<td>0.96 (0.95-1.00)</td>
</tr>
<tr>
<td>No potential clinical indication for antipsychotic therapy: without psychoses or dementia</td>
<td>8058 (17.0)</td>
<td>1831 (19.4)</td>
<td>1631 (17.0)</td>
<td>1635 (17.7)</td>
<td>1534 (15.6)</td>
<td>1427 (15.5)</td>
<td>0.80 (0.72-0.88)</td>
</tr>
</tbody>
</table>

Abbreviations: CI, confidence interval; NA, not applicable.

*Data are given as number (percentage) unless otherwise specified.

(13 599 [93.2%]). Of those dispensed an atypical antipsychotic agent, risperidone (7238 [53.2%]) was the most common, followed by olanzapine (3822 [28.1%]) and quetiapine (2538 [18.7%]). Overall, 721 of the residents were prescribed multiple antipsychotic agents. The majority (385 [53.4%]) were prescribed both atypical and conventional antipsychotic agents, while 286 (39.7%) were prescribed multiple atypical therapies.
the quintiles. Among the 10,247 residents with psychoses with or without dementia, 52.2% were dispensed an antipsychotic therapy, and the rate was 39.5% in the lowest and 64.1% in the highest antipsychotic prescribing quintile. Compared with those residing in facilities in the lowest antipsychotic prescribing quintile, those residing in facilities with the highest antipsychotic prescribing rates were 2.7 times more likely to be dis-

<table>
<thead>
<tr>
<th>Antipsychotic Therapy Use</th>
<th>Overall (N = 47,322)</th>
<th>Q1 (Lowest) (n = 9,421)</th>
<th>Q2 (n = 9,572)</th>
<th>Q3 (n = 9,255)</th>
<th>Q4 (n = 9,854)</th>
<th>Q5 (Highest) (n = 9,220)</th>
</tr>
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<tbody>
<tr>
<td>Prescribed any antipsychotic</td>
<td>15,317 (32.4)</td>
<td>1,965 (20.9)</td>
<td>2,685 (28.1)</td>
<td>3,002 (32.4)</td>
<td>3,581 (36.3)</td>
<td>4,084 (44.3)</td>
</tr>
<tr>
<td>Only 1 antipsychotic prescribed</td>
<td>14,596 (30.3)</td>
<td>1,895 (19.4)</td>
<td>2,575 (26.9)</td>
<td>2,865 (30.4)</td>
<td>3,415 (35.0)</td>
<td>3,846 (42.4)</td>
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<td>Conventional antipsychotic</td>
<td>997 (6.8)</td>
<td>117 (6.2)</td>
<td>177 (6.9)</td>
<td>197 (6.9)</td>
<td>212 (6.2)</td>
<td>294 (7.8)</td>
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<tr>
<td>Atypical antipsychotic</td>
<td>13,599 (93.2)</td>
<td>1,778 (93.8)</td>
<td>2,398 (93.1)</td>
<td>2,668 (93.1)</td>
<td>3,203 (93.8)</td>
<td>3,552 (92.4)</td>
</tr>
<tr>
<td>Olanzapine</td>
<td>382 (28.1)</td>
<td>77 (4.2)</td>
<td>137 (5.7)</td>
<td>166 (6.4)</td>
<td>238 (6.3)</td>
<td>358 (8.0)</td>
</tr>
<tr>
<td>Quetiapine</td>
<td>2,328 (53.2)</td>
<td>427 (18.3)</td>
<td>662 (27.6)</td>
<td>763 (28.6)</td>
<td>922 (28.8)</td>
<td>996 (22.6)</td>
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<td>Risperidone</td>
<td>7,238 (53.2)</td>
<td>973 (54.7)</td>
<td>1,293 (53.9)</td>
<td>1,467 (55.0)</td>
<td>1,677 (52.4)</td>
<td>1,828 (51.5)</td>
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<td>Multiple antipsychotic drugs prescribed</td>
<td>721 (4.7)</td>
<td>70 (3.6)</td>
<td>110 (4.1)</td>
<td>137 (4.6)</td>
<td>166 (4.6)</td>
<td>238 (5.3)</td>
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<tr>
<td>All atypical</td>
<td>286 (39.7)</td>
<td>22 (3.6)</td>
<td>51 (4.1)</td>
<td>45 (3.8)</td>
<td>75 (4.5)</td>
<td>93 (39.1)</td>
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<tr>
<td>All conventional</td>
<td>50 (6.9)</td>
<td>6 (8.6)</td>
<td>7 (8.6)</td>
<td>10 (10.2)</td>
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<tr>
<td>Both atypical and conventional</td>
<td>385 (53.4)</td>
<td>42 (6.0)</td>
<td>52 (6.4)</td>
<td>78 (6.9)</td>
<td>84 (5.6)</td>
<td>129 (54.2)</td>
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*Data are given as number (percentage) of residents.

<table>
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<tr>
<th>Clinical Groups</th>
<th>Residents, No. (%)</th>
<th>Unadjusted Model, OR (95% CI)</th>
<th>Adjusted Model, AOR (95% CI)</th>
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<td>Potential clinical indication for antipsychotic therapy</td>
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<tr>
<td>Psychoses (with or without dementia)</td>
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<tr>
<td>Quintile 1 *</td>
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<td>1 [Reference]</td>
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<tr>
<td>Quintile 2</td>
<td>951 (9.3)</td>
<td>1.4 (1.18-1.57)</td>
<td>1.3 (1.16-1.55)</td>
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<td>Quintile 3</td>
<td>1,117 (10.9)</td>
<td>1.6 (1.42-1.89)</td>
<td>1.6 (1.41-1.88)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>1,277 (12.5)</td>
<td>2.0 (1.75-2.28)</td>
<td>1.9 (1.71-2.22)</td>
</tr>
<tr>
<td>Quintile 5 †</td>
<td>1,355 (13.2)</td>
<td>2.7 (2.36-3.13)</td>
<td>2.7 (2.35-3.09)</td>
</tr>
<tr>
<td>Total</td>
<td>5,352 (52.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dementia (without psychoses)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1 *</td>
<td>1,185 (4.1)</td>
<td>1 [Reference]</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>1,595 (5.5)</td>
<td>1.5 (1.36-1.61)</td>
<td>1.5 (1.36-1.62)</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>1,709 (5.9)</td>
<td>1.8 (1.66-1.98)</td>
<td>1.8 (1.68-2.01)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>2,135 (7.4)</td>
<td>2.2 (1.98-2.36)</td>
<td>2.1 (1.96-2.35)</td>
</tr>
<tr>
<td>Quintile 5 †</td>
<td>2,492 (8.6)</td>
<td>3.1 (2.84-3.41)</td>
<td>3.1 (2.81-3.39)</td>
</tr>
<tr>
<td>Total</td>
<td>9,126 (31.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No potential clinical indication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without psychoses or dementia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1 *</td>
<td>118 (1.5)</td>
<td>1 [Reference]</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>139 (1.7)</td>
<td>1.4 (1.05-1.83)</td>
<td>1.4 (1.07-1.86)</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>176 (2.2)</td>
<td>1.7 (1.27-2.37)</td>
<td>1.8 (1.35-2.49)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>169 (2.1)</td>
<td>1.9 (1.43-2.51)</td>
<td>2.0 (1.51-2.64)</td>
</tr>
<tr>
<td>Quintile 5 †</td>
<td>237 (2.9)</td>
<td>2.9 (2.22-3.84)</td>
<td>2.9 (2.19-3.81)</td>
</tr>
<tr>
<td>Total</td>
<td>839 (10.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All clinical groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quintile 1 *</td>
<td>1,965 (4.2)</td>
<td>1 [Reference]</td>
<td>1 [Reference]</td>
</tr>
<tr>
<td>Quintile 2</td>
<td>2,685 (5.7)</td>
<td>1.5 (1.36-1.54)</td>
<td>1.4 (1.32-1.53)</td>
</tr>
<tr>
<td>Quintile 3</td>
<td>3,002 (6.3)</td>
<td>1.8 (1.70-1.90)</td>
<td>1.8 (1.65-1.91)</td>
</tr>
<tr>
<td>Quintile 4</td>
<td>3,581 (7.6)</td>
<td>2.0 (1.96-2.22)</td>
<td>2.1 (1.92-2.21)</td>
</tr>
<tr>
<td>Quintile 5 †</td>
<td>4,084 (8.6)</td>
<td>3.0 (2.77-3.16)</td>
<td>3.0 (2.74-3.19)</td>
</tr>
<tr>
<td>Total</td>
<td>15,317 (32.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio.

*Lowest antipsychotic prescribing rate.
†Highest antipsychotic prescribing rate.
pensed an antipsychotic therapy (AOR, 2.7; 95% CI, 2.35-3.09).

Among the 29,017 residents who had dementia without psychoses and therefore might have an indication for the use of antipsychotic therapy, 31.5% were dispensed an antipsychotic therapy. The antipsychotic rate in the lowest and highest quintiles was 20.1% and 43.9%, respectively. Compared with those residing in facilities with the lowest prescribing rates, those living in facilities with the highest prescribing rates were 3 times more likely to be dispensed an antipsychotic therapy (AOR, 3.1; 95% CI, 2.81-3.39).

Among the 8,058 residents without psychoses or dementia and therefore no identifiable indication for the use of an antipsychotic therapy, 10.4% were dispensed an antipsychotic therapy, with a rate of 6.4% in the lowest antipsychotic prescribing quintile and 16.6% in the highest antipsychotic prescribing quintile. Compared with residents residing in facilities classified as being in the lowest antipsychotic prescribing quintile, those residing in facilities with the highest prescribing rates were 2.9 times more likely to be dispensed an antipsychotic therapy (AOR, 2.9; 95% CI, 2.19-3.81).

FACILITY VARIATION FROM TARGET ANTIPSYCHOTIC PRESCRIBING RATES

Figure 1 and Figure 2 compare the nursing home–level antipsychotic prescribing rates in Ontario relative to the US rates before OBRA-87 and after OBRA-87. Based on the pre–OBRA-87 prescribing rate of 24%, 48 nursing homes in our sample (9.8%) had antipsychotic prescribing rates beyond the upper 99.8% confidence limits, indicating that they are antipsychotic prescribing outliers (Figure 1). Based on the post–OBRA-87 prescribing rate of 17%, 183 (37.7%) facilities had antipsychotic prescribing rates beyond the upper 99.8% confidence limits, indicating that they are outliers in terms of their prescribing patterns compared with the OBRA-87 target rate in US nursing homes (Figure 2).

COMMENT

We demonstrate that the use of antipsychotic therapy varies greatly across nursing homes and that this variation is not adequately accounted for by measured differences in the characteristics of the residents. Our results demonstrate that residents residing in facilities with the highest antipsychotic prescribing rates were almost 3 times more likely to be prescribed one of these agents compared with similar residents in facilities with the lowest antipsychotic prescribing rates. The 3-fold higher rate was seen overall and within each clinical indication group, whether appropriate or inappropriate. At the same time, we observed only a 30% increase in the number of residents across these same nursing homes with a clinical diagnosis of psychoses. The higher prescribing rates thus cannot be explained by differences in the rates of these conditions across facilities. There is uncertainty about the overall benefit of antipsychotic therapy in the management of behavioral problems of dementia.23,24 Our findings are consistent with data from the surgical literature, indicating that variation in practice is found when there is controversy concerning the appropriateness of the therapy.25

Overall, a third of residents were dispensed an antipsychotic therapy. These data indicate that the magni-
The marked variation in the rate of antipsychotic prescribing between the facilities with high and low antipsychotic prescribing rates remained strong even among the group of residents for whom we identified no clinical indication for the use of an antipsychotic therapy. Specifically, we found that residents residing in facilities with the highest antipsychotic prescribing rates were 3 times more likely to be dispensed an antipsychotic therapy even when there was no diagnosis of psychoses or dementia that might support the need for these agents. Prescribing an antipsychotic therapy to a resident with no clinical indication for the therapy has been identified by the Centers for Medicare and Medicaid Services as a measure of poor quality of care.19

We found that those residents identified as having a diagnosis of psychoses or dementia and thus a potential clinical indication for an antipsychotic therapy were also more likely to be dispensed an antipsychotic therapy if they resided in a facility with the highest antipsychotic prescribing rate. These results suggest that antipsychotic therapy is not being prescribed based on their clinical indication. Rather, the decision to prescribe an antipsychotic therapy appears to be related to the nursing home environment, with some environments being more permissive about antipsychotic use. Given the serious adverse events associated with the use of antipsychotic therapy, it is important to explore nonpharmacologic approaches. Fossey et al26 demonstrate that antipsychotic therapy was reduced by 19% following the introduction of a training and support intervention that focused on alternatives to drug use for the management of agitated behavior. Initiatives such as this provide an important alternative to antipsychotic therapy and should be used more uniformly across nursing homes.

Like all studies, this study has limitations. First, we evaluate only nursing homes in Ontario. Ontario is Canada’s largest province and therefore may provide an indication of practices across the country. Second, we have excluded the smallest nursing homes because the small number of residents in these facilities may create antipsychotic prescribing rates that are misleading. It is likely that variation also exists within this group. Third, our study can evaluate only those measured facility and clinical characteristics that are available from our administrative databases. We do not have detailed facility-level data or clinical information. Accordingly, we cannot identify facilities that have behavioral units and cannot identify residents with specific behavioral problems that may have led to the prescribing of an antipsychotic therapy but who were not diagnosed as having either psychoses or dementia. We expect that the majority of such individuals would have a diagnosis of dementia. Our data provide an opportunity for nursing homes to reflect on their prescribing practices and to determine whether they can be improved.

In conclusion, residents residing in facilities with high mean antipsychotic prescribing rates were about 3 times

Figure 2. Funnel plot of standardized prescribing rates (SPR) for antipsychotic therapy in 485 nursing homes in Ontario based on an expected prescribing rate of 17% used as the benchmark (approximate prescribing rate after implementation of the Omnibus Budget Reconciliation Act of 1987 guidelines). Control limits for the funnel plot are generated using exact Poisson confidence limits for the expected number of individuals receiving an antipsychotic drug. (Note: Any roughness of the control limits is due to interpolation between exact Poisson limits.)
more likely to be dispensed an antipsychotic agent compared with those residing in facilities with low antipsychotic prescribing rates, irrespective of whether a potential clinical indication for use could be identified.

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References


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