Benzodiazepine and Zopiclone Prescription Claims by Older Adults in Nova Scotia: Trends and Concordance with the Screening Tool of Older Persons’ potentially inappropriate Prescriptions (STOPP)

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The use of benzodiazepines and zopiclone (BZD-Z), prescribed for anxiety, sleeping disorders, and other conditions, is a concern in older adults. This study evaluates BZD-Z dispensations and concordance with STOPP. Prescription claims data were obtained for beneficiaries of the Nova Scotia Seniors’ Pharmacare program (NSSPP) for the period of April 1, 2006 to March 31, 2011. Trends and descriptive statistics are presented. Annually, BZD-Z use was as prevalent as 25.6% (n=24,464). Beneficiaries claiming for ≥ 30 days or ≥ 90 days of dispensed treatment per year was 23.6% (n=22,519) and 18.8%(n=17,923), respectively. 2010 user rates were lowest in 65-69 (19.8%) and highest in 90-94 (30.3%) year olds. Over 5 years there was little change in rates. A gap in concordance between STOPP and BZD-Z claims by Nova Scotia’s older adults was identified. A strategy to improve the use of BZD-Z is warranted.

Keywords
Drug utilization review, Health Data Management, Hypnotics and sedatives, Older adults, Secondary use of administrative data

1. INTRODUCTION

1.1 OLDER ADULT HEALTHCARE AND MEDICATION MANAGEMENT

The optimization of drug prescribing in older adults has become a priority due to the demographic shift in our population [1,2], and requires the collaboration of patients, caregivers, health care providers, information managers and researchers. Many factors contribute to the challenges inherent in prescribing to older adults, including: i) the biological process of aging (increased sensitivity to drug effects and a reduced ability to eliminate drugs) [3,4], ii) the increased potential for multiple illnesses and multiple drug use [3,4], and iii) the limited access to age-appropriate evidence [3,4,5]. Strategies to improve drug use in older adults has the potential to improve humanistic and clinical outcomes including reducing the potential of drug-related illness, and reducing the economic burden associated with chronic illness [6,7,8].
1.2 BENZODIAZEPINES & ZOPICLONE DRUG USE IN OLDER ADULTS

Benzodiazepines and zopiclone (BZD-Z) are frequently used in older adults to manage illnesses such as anxiety and sleep disorders. However, clinical effectiveness in older adults under certain circumstances is not well established [9]. While these sedatives and hypnotics may offer short-term benefits for some, they are associated with serious risks, especially in frail, older adults [9,10]. BZD-Z have been associated with numerous adverse effects including confusion, memory loss, dizziness, daytime sleepiness, and depression, traffic accidents, falls, and fractures [11,12,13]. Psychomotor and cognitive impairments reduce quality of life and risk serious adverse events [9]. Cumulative effects with repeated use, dependence and tolerance must always be considered when evaluating drug use with these agents [13].

A meta-analysis of 177 studies on psychotropic drug use by older adults found that benzodiazepines have been associated with an increased risk of injury by falls [13]. Such injury is a leading cause of morbidity and mortality in older patients [14,15,16]. In one study, non-fatal fall-related injuries in older community-dwelling patients in the UK accounted for a loss of capacity for independent living in 27.4% of patients aged 75 years and older [17]. Fatal fall-related injuries in the United States increased from 29.4 to 39.2 deaths per 100,000 person years from 1999 to 2004 based on data from the National Center for Injury Prevention and Control [18].

BZD-Z use by older adults is a concern because of its high prevalence. In community-dwelling older Canadians, benzodiazepine use has been documented at 15 to 30.5% [19,20,21,22]. Similarly in other countries, depending on the design, study, time period, population studied, jurisdiction and definitions employed, the prevalence rate of benzodiazepine use by community-dwelling older adults varied from 10% to 43% [23,24]. A study of residential care facilities for older adults in Australia found that 37% of the patients analyzed had been prescribed a benzodiazepine [25]. Long-term benzodiazepine use is common in both community and residential aged-care facilities [25,26].

Concern about BZD-Z prescribing in older adults in Nova Scotia (NS) has been raised by previous studies [27,28]. Smith et al. found that the rate of benzodiazepine use by older adults in NS was more than double that of older adults in Australia and that 8 different benzodiazepines made up 90% of the benzodiazepine and related drug use in NS by contrast to only 4 different benzodiazepines in Australia. Notably, there were 17 types of benzodiazepines and related drugs (including zopiclone) that were used in NS in 2003 compared with 5 in Australia [27]. Of older adults discharged from a tertiary care hospital in Halifax in 2003 to 2004, 58% had been prescribed at least one benzodiazepine during their hospital stay [28].

Clinical practice guidelines for BZD-Z use in the elderly recommend conservative prescribing (minimize duration and dose, intermittent dosing) [9,29-32], and avoiding long-acting benzodiazepines especially in the oldest adults [9]. Given the risks and prevalence of use, strategies that improve prescribing practices of BZD-Z in older adults are valuable.

1.3 STOPP CRITERIA

Explicit criteria have been developed to help health care professionals deal systematically with the complexity of drug use in older adults [33,34]. The Screening Tool of Older Persons’ potentially inappropriate Prescriptions (STOPP) was developed in Ireland in 2008, and consists of 65 evidence-based criteria [35]. STOPP offers several advantages over other explicit criteria (such as Beers) and is being evaluated for use in the European Union [36-41], the United States [42], and Taiwan [43].

We have chosen to use STOPP for this research. In particular, 3 criteria can refer to potentially inappropriate benzodiazepine use:

1. Long-term (i.e. >1 month), long-acting benzodiazepines and benzodiazepines with long-acting metabolites. (risk of prolonged sedation, confusion, impaired balance, falls)
2. Any duplicate drug class prescription, such as two benzodiazepines dispensed on the same day. (optimization of monotherapy within a single drug class should be observed prior to considering a new class of drug)
3. Any benzodiazepines in those prone to falls (≥ 1 fall in past 3 months). (sedative, may cause reduced sensorium, impair balance)

We have applied the first two criteria listed above, as they can be applied using the Nova Scotia Seniors’ Pharmcare Program (NSSPP) claims data. In addition to the benzodiazepines available in NS during the study period, the benzodiazepine-related drug zopiclone was available. While zopiclone
is not classified as a benzodiazepine due to differences in chemical structure, its pharmacological actions and clinical effects are similar to benzodiazepines [26,30]. Although clinicians must always consider individual patient’s clinical characteristics and preferences when prescribing, validated screening criteria such as STOPP could be used to provide an alert mechanism for point of care prescribing, and as a tool for quality improvement initiatives. By identifying potentially inappropriate medication prescribing practices, adverse drug events and cost inefficient practices may be prevented, resulting in improved patient care [3].

2. OBJECTIVE

The purpose of this research was to evaluate trends in BZD-Z use and to determine the concordance of BZD-Z prescribing with the selected subset of STOPP criteria.

3. METHODS

We conducted a pharmacoepidemiological retrospective analysis based on BZD-Z claims data from the NSSPP database. The NSSPP collects data on prescription drugs dispensed by all NS pharmacies to qualifying patients aged 65 years and older. Approximately 8% of NSSPP beneficiaries live in nursing homes, residential care facilities, and community-based options for continuing care. (Personal Communication, Marina Keeping, Manager, Pharmacare Administration, Pharmaceutical Services Branch, April 17, 2013) The NSSPP excludes Nova Scotians receiving benefits from Veterans Affairs Canada; Non-insured Health Benefits for First Nations People and Inuit; Nova Scotia Family Pharmacare; or any other public or private plan that covers most medications and supplies [44]. NSSPP data excludes patients receiving treatment in hospitals and emergency departments. In addition, Nova Scotians may choose to pay for prescriptions themselves and data from these prescriptions would not be included in the NSSPP database.

The twelve benzodiazepines available in NS during the study period and analyzed in this study were: alprazolam, bromazepam, chlordiazepoxide, clonazepam, clorazepate, diazepam, flurazepam, lorazepam, nitrazepam, oxazepam, temazepam, and triazolam. Two benzodiazepines available in NS were excluded: clobazam was excluded because it is used almost exclusively as an anticonvulsant, and midazolam was only available in the injectable form. Zopiclone was added to the twelve benzodiazepines in our study.

The number of unique beneficiaries were determined for each fiscal year (April 1, 2006 to March 31, 2011). We also determined the number of beneficiaries that met any of the following criteria in each fiscal year: i) at least one BZD-Z prescription, ii) more than or equal to 30 days, 90 days, or 181 days of dispensed treatment of BZD-Z, or iii) greater than one BZD-Z prescription on a single day. Data was categorized by age category, sex, and individual drug claimed. Descriptive statistics were performed, and annual trends in claims were analysed using the Cochran-Armitage trend test using SAS version 9.3 (SAS Institute Inc., Cary, North Carolina).

4. RESULTS

Overall, from 2006 to 2011, the rate of NSSPP beneficiaries claiming for at least one BZD-Z prescriptions per year was as prevalent as 25.6%. There was a statistically significant decreasing trend from 25.6% to 24.1% over the five years observed (Table 1).
Table 1 Unique NSSPP Beneficiaries with claims for Benzodiazepine and/or Zopiclone

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Beneficiaries</th>
<th>Beneficiaries with at least 1 claim N(%)</th>
<th>Beneficiaries with &gt;1 claim on a single day N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>95536</td>
<td>24464 (25.6)</td>
<td>1579 (1.7)</td>
</tr>
<tr>
<td>2007</td>
<td>97062</td>
<td>24090 (24.8)</td>
<td>1488 (1.5)</td>
</tr>
<tr>
<td>2008</td>
<td>98624</td>
<td>23933 (24.3)</td>
<td>1449 (1.5)</td>
</tr>
<tr>
<td>2009</td>
<td>100346</td>
<td>24156 (24.1)</td>
<td>1576 (1.6)</td>
</tr>
<tr>
<td>2010</td>
<td>102384</td>
<td>24632 (24.1)</td>
<td>1609 (1.6)</td>
</tr>
</tbody>
</table>

4.1 AGE & SEX

Prevalence of prescription claims increased with age. For example, 21.5% of beneficiaries aged 65-69 years versus 32.4% of those aged 90 years and older made a claim for at least one BZD-Z during 2006 (Table 2).

Table 2 Unique NSSPP Beneficiaries with claims for Benzodiazepine and/or Zopiclone by Age Category

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>65-69 N(%)</th>
<th>70-74 N(%)</th>
<th>75-79 N(%)</th>
<th>80-84 N(%)</th>
<th>85-89 N(%)</th>
<th>90+ N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>5982 (21.5)</td>
<td>5348 (24.6)</td>
<td>4926 (26.2)</td>
<td>3889 (29.1)</td>
<td>2633 (30.5)</td>
<td>1686 (32.4)</td>
</tr>
<tr>
<td>2007</td>
<td>5967 (20.5)</td>
<td>5244 (24.1)</td>
<td>4814 (25.5)</td>
<td>3801 (28.4)</td>
<td>2593 (29.7)</td>
<td>1671 (31.7)</td>
</tr>
<tr>
<td>2008</td>
<td>6048 (20.3)</td>
<td>5196 (23.6)</td>
<td>4718 (24.9)</td>
<td>3795 (27.5)</td>
<td>2493 (28.5)</td>
<td>1683 (31.5)</td>
</tr>
<tr>
<td>2009</td>
<td>6138 (20.1)</td>
<td>5333 (23.8)</td>
<td>4805 (25.3)</td>
<td>3778 (26.6)</td>
<td>2451 (28.0)</td>
<td>1651 (30.6)</td>
</tr>
<tr>
<td>2010</td>
<td>6273 (19.8)</td>
<td>5562 (24.4)</td>
<td>4768 (24.9)</td>
<td>3826 (26.5)</td>
<td>2514 (28.9)</td>
<td>1689 (30.3)</td>
</tr>
</tbody>
</table>

Female beneficiaries had a higher prevalence of BZD-Z claims over the 5 year study period (27.6 to 29% versus their male counterparts 18.5 – 20%) (Table 3).

Table 3 Unique NSSPP Beneficiaries with claims for Benzodiazepine and/or Zopiclone by Sex

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Total Female Beneficiaries</th>
<th>Total Male Beneficiaries</th>
<th>Total Females with Claims N(%)</th>
<th>Total Males with Claims N(%)</th>
<th>Females 65-79 N(%)</th>
<th>Males 65-79 N(%)</th>
<th>Females &gt;79 N(%)</th>
<th>Males &gt;79 N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>59229</td>
<td>36307</td>
<td>17204 (29.0)</td>
<td>7260 (20.0)</td>
<td>10612 (27.5)</td>
<td>5644 (19.0)</td>
<td>6592 (32.0)</td>
<td>1616 (24.4)</td>
</tr>
<tr>
<td>2007</td>
<td>59683</td>
<td>37379</td>
<td>16908 (28.3)</td>
<td>7182 (19.2)</td>
<td>10437 (26.7)</td>
<td>5588 (18.3)</td>
<td>6471 (31.5)</td>
<td>1594 (23.4)</td>
</tr>
<tr>
<td>2008</td>
<td>60262</td>
<td>38362</td>
<td>16827 (27.9)</td>
<td>7106 (18.5)</td>
<td>10446 (26.4)</td>
<td>5516 (17.7)</td>
<td>6381 (30.9)</td>
<td>1590 (22.1)</td>
</tr>
<tr>
<td>2009</td>
<td>60810</td>
<td>39536</td>
<td>16802 (27.6)</td>
<td>7354 (18.6)</td>
<td>10616 (26.5)</td>
<td>5660 (17.8)</td>
<td>6186 (29.9)</td>
<td>1694 (22.1)</td>
</tr>
<tr>
<td>2010</td>
<td>61513</td>
<td>40871</td>
<td>17087 (27.8)</td>
<td>7545 (18.5)</td>
<td>10816 (26.5)</td>
<td>5787 (17.6)</td>
<td>6271 (30.3)</td>
<td>1758 (21.8)</td>
</tr>
</tbody>
</table>

4.2 INDIVIDUAL TYPE OF BZD-Z USED
In 2010, the most frequently claimed drugs in order of prevalence were lorazepam, zopiclone, clonazepam and oxazepam (Figure 1). Overall, 11% of NSSPP beneficiaries claimed for at least one prescription of lorazepam and 5.7% for zopiclone. Over half (54.6%) of all adults aged 90 years and older who claimed a benzodiazepine in 2010 claimed lorazepam, and just under a quarter (24%) claimed zopiclone.

Figure 1 Unique NSSPP Beneficiaries with claims for individual benzodiazepines and zopiclone in 2010: Categorized by age group

4.3 CONCORDANCE WITH STOPP

4.3.1 LONG-TERM, LONG-ACTING BENZODIAZEPINES

On average, 22.6% (n=22,291) of beneficiaries claimed ≥ 30 days dispensed treatment per year. A ≥ 90 day dispensed treatment per year was claimed by an average of 18.2% (n=17,977) of beneficiaries, and > 181 day dispensed treatment per year was claimed by an average of 13.8% (n=13,500). There was a statistically significant (p=0.0133) decreasing trend in the number of beneficiaries receiving ≥ 90 days of dispensed treatment from 2006 to 2010; however, the trend was not statistically significant with the number of beneficiaries receiving ≥ 30 days of dispensed treatment (p=0.1038) (Table 4).

Table 4 Unique NSSPP Beneficiaries with claims for Benzodiazepines and/or Zopiclone by Dispensed Day Supply

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Beneficiaries with ≥30</th>
<th>Beneficiaries with ≥90</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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The four long-acting benzodiazepines available in Canada over the study period were chlordiazepoxide, clorazepate, diazepam, and flurazepam. Flurazepam claims were rare (less than 5 individuals per year) (Table 5).

<table>
<thead>
<tr>
<th>Year</th>
<th>days supply N('%)</th>
<th>days supply N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>22519 (23.6)</td>
<td>17923 (18.8)</td>
</tr>
<tr>
<td>2007</td>
<td>22161 (22.8)</td>
<td>17898 (18.4)</td>
</tr>
<tr>
<td>2008</td>
<td>21999 (22.3)</td>
<td>17801 (18.0)</td>
</tr>
<tr>
<td>2009</td>
<td>22205 (22.1)</td>
<td>17946 (17.9)</td>
</tr>
<tr>
<td>2010</td>
<td>22572 (22.0)</td>
<td>18316 (17.9)</td>
</tr>
</tbody>
</table>

Table 5 Unique NSSPP Beneficiaries with claims for Long-acting Benzodiazepines

4.3.2 DUPLICATE DRUG CLASS PRESCRIPTIONS

Approximately 1500 patients per year (1.5% to 1.7% of beneficiaries) claimed for >1 prescription of BZD-Z on a single day. (Table 1) There was no statistically significant trend in this value over the study period (p=3099).

5. DISCUSSION

Our study documented the type and prevalence of BZD-Z prescribing in older adults in NS, compared prescribing to established criteria (STOPP), and identified a potential provincial system-wide issue related to prescribing of these drugs using readily available administrative prescription claims data. We found the overall prevalence of BZD-Z claims by NSSPP beneficiaries per year was in the higher range of literature-reported rates.[19-26] As the NSSPP includes long-term care facility residents, and given the results of a previous study of BZD-Z use in NS [27], a high prevalence rate was not unexpected.

5.1 AGE & SEX

Across all years of the study, the prevalence of BZD-Z use increased with age and was consistently higher in women than men. Women 90 years of age and older had the highest overall prevalence of use. This pattern of use has been noted by other researchers [10,45,46]. Although beneficiaries were not categorized by sex, the highest prevalence rate of dispensed benzodiazepines in Australia was seen in those individuals aged 85 and older [47]. Similarly, researchers found that BZD-Z use in Norway increased with increasing age [48]. Brownlee et al. found that sex alone did not influence the pharmacological treatment of insomnia. Rather, factors such as age and marital status were associated with sex-based prescribing patterns of hypnotics.[49] Our evaluation was not able to evaluate sociodemographic factors such as income, nor were we able to determine the indication for the BZD-Z use. Both of these factors may explain some of the sex differences in prescribing that we (and others) have found. Nevertheless, as female patients...
and those of older age have been recognized as more vulnerable to BZD-Z adverse effects [10], these findings are concerning.

5.2 ANALYSIS OF INDIVIDUAL TYPE OF BZD-Z USED

The 4 most frequently claimed drugs in 2010 were lorazepam, zopiclone, oxazepam, and clonazepam – cited in order of number of unique beneficiaries making claims. In 2003, a study of NSSPP beneficiaries showed that the most frequently used BZD-Z drugs as a proportion of total defined daily doses were lorazepam (26%), diazepam (18%), alprazolam (10%), zopiclone (9%), temazepam (9%) and oxazepam (8%) [27]. Notable in this comparison with the 2003 study is the increase in zopiclone use, and the reduction in the use of diazepam, alprazolam and temazepam.

Lorazepam, oxazepam and clonazepam, while classified as intermediate-acting benzodiazepines, have a half-life range that may exceed 10 hours especially in older adults leading to potential drug accumulation and risk of adverse events including injury in some patients. Zopiclone has a shorter half-life than lorazepam, oxazepam and clonazepam, but has also been associated with an increased risk in falls and other adverse events [30]. There is some evidence that physicians consider zopiclone to be a safer alternative to benzodiazepines [50].

Drug accumulation may occur depending on the dose and frequency of use. Half-life alone may not be a sufficiently robust indicator of heightened risk of falls, however. Dose and individual benzodiazepine exposure may be tied to any increased risk [11].

5.3 CONCORDANCE WITH STOPP

5.3.1 LONG-TERM LONG-ACTING BENZODIAZEPINES

BZD-Z are generally recommended for short-term use (e.g. for insomnia and anxiety disorders) except for specific circumstances such as for terminally ill patients [29-32]. The product monograph authorized by Health Canada specifies indication, dose and duration for specific BZD-Z. In our study, although we were unable to determine indication, the dispensed treatment per year for some BZD-Z exceeded the duration of recommended regimens. For example, the IMOVANE™ (zopiclone) product monograph (http://products.sanofi.ca/en/imovane.pdf) specifies “Treatment with IMOVANE should usually not exceed 7-10 consecutive days. Use for more than 2-3 consecutive weeks requires complete re-evaluation of the patient. Prescriptions for IMOVANE™ should be written for short-term use (7-10 days) and it should not be prescribed in quantities exceeding a 1-month supply.” We found that many patients used BZD-Z for greater than 30, 90, and even 181 days.

The long-term use of long-acting benzodiazepines is deemed potentially inappropriate according to STOPP. Although we did not determine the duration of use specifically related to the long-acting benzodiazepines, over 1400 individuals per year made a claim for diazepam, and another 500 older adults continue to make claims for chlordiazepoxide or clorazepate.

5.3.2 DUPLICATE DRUG CLASS PRESCRIPTIONS

Duplicate therapy, which was assessed by identifying individuals claiming for >1 BZD-Z prescriptions on a single day, was prevalent in NSSPP beneficiaries - approximately 1500 individuals (1.5 – 1.7% of beneficiaries) per year received duplicate anxiolytic/hypnotic therapy.

5.4 IMPROVING THE PRESCRIBING AND USE OF BZD-Z

This study provides insight into areas for improvement of prescribing BZD-Z for older adults in NS. Further study is needed related to the reasons for the limited concordance of BZD-Z prescribing practice and STOPP, and Health Canada authorized product monographs. Knowledge gaps about recent guidelines and adverse events related to BZD-Z, skills in decreasing the dose or stopping BZD-Z safely, lack of access to drug dependency facilities, and lack of integration of prescribing information
across sectors and practices and other factors may contribute to limited concordance between BZD-Z prescribing and STOPP criteria. Once the causes of potentially inappropriate prescribing are identified, many types of interventions may be used to improve prescribing and drug use [51,52] including the use of decision support systems. Electronic prescribing and decision support systems can be used alone or in combination with other interventions. Decision support systems have been demonstrated in some studies to be effective in improving prescribing behaviour especially in situations when physicians concur with the therapeutic approach in the decision support system [53-58]. They can provide point of care alerts and determine the concordance with STOPP or other validated prescribing criteria. Various public and proprietary decision support tools are available to assist with prescribing, and may be used with administrative databases containing prescription claims data to identify non-concordant prescribing practices. One tool, Clinical Support Information Systems (CSIS http://www.csis.ie/) is specifically linked to the STOPP criteria. In another example, Phansalkar et al. noted that a panel of Clinical Decision Support experts suggested that benzodiazepines, hypnotics and benzodiazepine/hypnotic pairs should generate frequent therapeutic duplication alerts [53]. Our study noted 12 different benzodiazepines and zopiclone varying by drug type (chemical structure, pharmacodynamics and pharmacokinetics), dosage form and strength availability, dosage range, cost, role in clinical practice guidelines and patient care pathways. In NS, the reimbursement for the different benzodiazepines by the three public drug insurance programs (Community Services Pharmacare, Family Pharmacare and Seniors’ Pharmacare (NSSPP)) varies. These drugs also vary by Health Canada approved indications (e.g. anxiety disorder, panic disorder, insomnia, seizure disorder, alcohol withdrawal, skeletal muscle spasticity) and specific dosing/regimens based on patient age. These drug and patient characteristics need to be taken into consideration when implementing a decision support system.

Decision support systems may also be used to provide feedback to physicians as part of structured, ongoing quality improvement processes related to the indication (Is a drug needed?), type (Is the drug first-line?), dose (Is the dose appropriate for the patient related to age, body weight, disease conditions?), and duration (Is the duration in accordance with Health Canada authorized product monograph or clinical practice guidelines?). While we conducted our study at the provincial level, similar approaches could be undertaken at the patient, prescriber, primary care practice, hospital and district health authority levels, or with other criteria. Further work is needed to construct/adopt decision support systems in the Nova Scotian context and to determine their efficacy, as well as monitor for unintended consequences [59].

6. STRENGTHS AND LIMITATIONS

This study, with a 5 year horizon, includes a relatively stable heterogeneous population usually excluded from clinical trials [5]. However, our study was unable to determine specific patient variables which would be useful in determining appropriateness including indications for use, comorbidity and multiple morbidities, off-label drug use, severity of illness, allergies, drug contraindications and interactions, response to therapy and patient preferences. We did not have information on drugs used in hospital or emergency departments or drugs given as samples. We were unable to determine the consequences of drug therapy including effectiveness in disease treatment and patient outcomes such as adverse events including adverse drug reactions and falls.

Our data reflects dispensed prescriptions, rather than those prescribed or actually taken, and as a result, we were unable to quantify prescribed and not dispensed BZD-Z, or BZD-Z prescriptions filled but not taken by the patient.

Although there are factors that may make the use of BZD-Z rational in some instances in older adults, the limited concordance with clinical guidelines and quality prescribing indicators such as STOPP found in our study is significant and concerning.

7. CONCLUSION

A gap in concordance between STOPP criteria and BZD-Z prescription claims data for beneficiaries of the NSSPP has been identified. Long-acting benzodiazepine use, chronic use, and duplicate therapy are prevalent in NS’s older adults, and are considered potentially inappropriate. A strategy to improve the use of BZD-Zs, involving patients, caregivers, healthcare professionals, informaticians and administrators, is warranted based on these findings. The use of STOPP criteria in quality improvement initiatives may prove useful in alerting prescribers to practices that require attention – especially in areas where potentially inappropriate prescribing is prevalent.
ABBREVIATIONS & ACRONYMS

Benzodiazepines and zopiclone (BZD-Z)
Nova Scotia (NS)
Nova Scotia Seniors’ Pharmacare Program (NSSPP)
The Screening Tool of Older persons’Potentially inappropriate Prescriptions (STOPP)

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DISCLAIMER

The opinions expressed are those of the authors and do not necessarily reflect those of the Nova Scotia Department of Health and Wellness.

REFERENCES


