

Prescribing benzodiazepines for noninstitutionalized elderly

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OBJECTIVE To describe benzodiazepine prescribing for elderly people living in the community in British Columbia, and to compare such prescribing with an indicator of current guidelines

DESIGN Descriptive analysis of pharmacy billing data

SETTING Province of British Columbia

PARTICIPANTS All elderly persons (age 65 and older) dispensed benzodiazepines by community pharmacies in British Columbia during 1990

MAIN OUTCOME MEASURE Potentially inappropriate prescriptions were defined by a maximum 2-month limit of 20 diazepam equivalents daily, as determined by the BC Drug Usage Review Program in consultation with experts in the field. Physicians' rates of potentially inappropriate prescribing were determined per 100 benzodiazepine prescriptions written.

RESULTS Almost 24% of elderly people in British Columbia were prescribed benzodiazepines at least once during 1990. Of these, 17.1% were given potentially inappropriate prescriptions. Physicians who prescribed benzodiazepines most frequently had the highest rates of potentially inappropriate prescriptions.

CONCLUSION Prescribing practice does not correspond with our indicator of current guidelines.

OBJECTIF Décrire le profil des prescriptions de benzodiazépines aux personnes âgées vivant dans la communauté et comparer ce profil de pratique à un indicateur des lignes directrices actuelles.

CONCEPTION Analyse descriptive des données de facturation des pharmaciens.

CONTEXTE Province de Colombie-Britannique.

PARTICIPANTS Toutes les personnes âgées (plus de 65 ans) à qui les pharmacies communautaires de la Colombie-Britannique ont fourni des benzodiazépines en 1990.

PRINCIPALE MESURE DES RÉSULTATS Pour définir une ordonnance potentiellement inappropriée, on a utilisé une limite maximale de deux mois de prise quotidienne de 20 équivalents chimiques de diazépam, tel que fixé par le BC Drug Usage Review Program en consultation avec les experts du domaine. Les taux d'ordonnances inappropriées de la part des médecins furent calculés en pourcentage des ordonnances de benzodiazépines rédigées.

RÉSULTATS Presque 24% des personnes âgées de la Colombie-Britannique ont reçu des ordonnances de benzodiazépines au moins une fois au cours de 1990. De ce groupe, 17,1% ont reçu des ordonnances potentiellement inappropriées. Les médecins ayant rédigé le plus d'ordonnances de benzodiazépines ont connu les taux les plus élevés d'ordonnances potentiellement inappropriées.

CONCLUSION Les profils de prescription ne correspondent pas à notre indicateur des lignes directrices actuelles.

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ALTHOUGH BENZODIAZEPINES WERE welcomed in the 1960s as safer than barbiturates, the extent of their use is now viewed with some reservation. While short-term use might be effective for relieving anxiety and insomnia, continuous use, especially by the elderly, is questioned.¹⁻⁴ An American Psychiatric Association task force examining benzodiazepine use concluded:

[C]linicians should endeavor to use the lowest benzodiazepine doses that are therapeutic and treat for the briefest period of time as indicated by the patient's own clinical condition.... Special caution should be taken when benzodiazepines are prescribed to the elderly....⁵

An editorial in the *New England Journal of Medicine* on sleeping pill use concludes, "Current guidelines suggest that they be prescribed for relatively short periods at the lowest possible doses... usually for no more

than 2 to 4 weeks of continuous use."⁶ Concerns about side effects, such as memory loss, decreased coordination, impaired judgment, loss of autonomy, and drug dependency, prompt more cautious use of benzodiazepines for the elderly.^{2,7,8}

We reviewed benzodiazepine prescribing in British Columbia. The BC Ministry of Health's Pharmacare "Plan A" pays the ingredient costs and a portion of the dispensing fee for all prescriptions dispensed to the noninstitutionalized elderly (age 65 and older). Pharmacare billing data, therefore, contain a fairly complete record of drugs dispensed to this population. We used the data to determine the pattern of benzodiazepine prescribing to the elderly. Then we estimated how many elderly users received potentially inappropriate prescriptions. Finally, in order to determine whether educational programs should be aimed at certain

groups of physicians, we examined whether any particular group of physicians had high rates of potentially inappropriate prescriptions.

METHODS

The term "potentially inappropriate prescriptions" was used by the Committee for the Study of Prescription Drug Use by the Elderly in the Province of Quebec to evaluate drug prescribing in that province.⁹ The term is meant to reflect the uncertainty inherent in categorizing prescribing from available billing data. We defined potentially inappropriate benzodiazepine prescriptions as a maximum 2-month limit of 20 diazepam equivalents per day.

A maximum daily dose of 20 mg of diazepam was recommended by the BC Drug Usage Review Program (DUR)¹⁰ in 1986. Maximum daily

Table 1. Recommended geriatric doses of benzodiazepines

DRUG	COMPENDIUM OF PHARMACEUTICALS AND SPECIALTIES ¹¹	HANDBOOK OF DRUG THERAPY IN PSYCHIATRY ¹²	BC DRUG USAGE REVIEW PROGRAM ¹⁰
	INITIAL (MAXIMUM) MG/D	RANGE MG/D	MAXIMUM MG/D
Lorazepam	0.5-(2.0)	0.5-1.5	3
Triazolam	0.125-(0.5)	0.125	0.75
Oxazepam	10	10-30	60
Diazepam	4	1-10	20
Temazepam	15	—	15
Alprazolam	0.375	0.125-0.5	1
Flurazepam	15	—	30
Chlordiazepoxide	20	5-30	50
Bromazepam	3	—	9
Nitrazepam	2.5-(5.0)	—	5
Clorazepate	3.75	—	30
Zopiclone*	—	—	15
Ketazolam	7.5	—	15

* Zopiclone is not a benzodiazepine, but was grouped with benzodiazepines by Pharmacare.

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doses of the other benzodiazepines were also approved by the DUR's Professional Advisory Committee, after consultation with experts in the fields of geriatrics and clinical pharmacology and review of medical and pharmacologic literature. *Table 1*¹⁰⁻¹² shows recommended dosages.

Maximum daily doses set by the DUR for the elderly appear lenient in light of the recommendations of other experts several years later: the *Canadian Compendium of Pharmaceuticals and Specialties* (1990)¹¹ recommended maximum geriatric doses for the two most frequently used benzodiazepines (lorazepam and triazolam) that are one third lower than DUR maximums; the *Handbook of Drug Therapy in Psychiatry*¹² recommended doses 33% to 80% lower than the DUR maximums; and for triazolam, Health and Welfare

Canada recently recommended an 80% lower dose for the elderly.¹³

Diazepam equivalents for other benzodiazepines were estimated relative to the DUR maximum recommended daily doses, eg, 3 mg of lorazepam was comparable to 20 diazepam equivalents. Benzodiazepine equivalents did not necessarily have comparable therapeutic potency.

We looked at prescriptions dispensed to individuals in 2-month windows from January through October 1990, following a method previously developed by the DUR. Potentially inappropriate prescriptions were defined as those that added up to more than 2 months' worth of maximum recommended daily doses, eg, in the January-February window, prescriptions that exceeded 1180 diazepam equivalents (20 equivalents x 59 days) were termed potentially inappropriate. These included individual prescriptions in excess of 1180 equivalents and prescriptions that exceeded 1180 equivalents when added to other prescriptions in the same time window.

A 2-month limit for appropriate prescribing of the maximum daily dose reflects less than complete consensus by the experts. Long-term use of anxiolytics is thought appropriate for some cases of anxiety,⁵ but British experts suggest the general use of anxiolytics should be discontinued after 3 to 4 weeks.^{2,4,14} An American expert recommended only 2 to 4 weeks of continuous nightly use by

Table 2. Estimated doses of benzodiazepines in prescriptions dispensed January 1 to October 31, 1990

ESTIMATED DOSES (MG DIAZEPAM EQUIVALENTS)	PRESCRIPTIONS (%)
Up to 4 wk of initial doses ($\leq 112^*$)	20 797 (6.7)
4-8 wk of initial doses (113-224)	69 870 (22.5)
8 wk of initial doses to 4 wk of maximum doses [†] (225-560)	120 928 (39)
4-8 wk of maximum doses (561-1120)	71 869 (23.2)
More than 8 wk of maximum doses (> 1120)	26 476 (8.5)
TOTAL	309 940

* Initial dose of 4 mg is recommended for elderly¹¹ ($4 \text{ mg} \times 28 \text{ d} = 112$).

† Maximum dose of 20 mg is recommended for elderly ($20 \text{ mg} \times 28 \text{ d} = 560$).

Table 3. Physician specialty and benzodiazepine prescribing based on prescriptions filed January 1 to October 31, 1990: Three hundred nine physicians were excluded because their sex was not recorded on the records.

SPECIALTY	NO. OF PHYSICIANS	BENZODIAZEPINE PRESCRIPTIONS PER PHYSICIAN	POTENTIALLY INAPPROPRIATE PRESCRIPTIONS PER PHYSICIAN	POTENTIALLY INAPPROPRIATE PRESCRIPTIONS PER 100 BENZODIAZEPINE PRESCRIPTIONS
General practice	3528	82.4	12	14.6
Psychiatry	256	20	5.5	27.6
Other specialties	1417	8	1	12.6

the elderly for insomnia.⁶ Although arbitrary, we thought the 2-month limit was reasonable.

Pharmacare data

We used Pharmacare Plan A data on benzodiazepines dispensed to noninstitutionalized elderly people in 1990. Data contained an individual identifier, sex, birth date, date prescription was filled, physician number, and drug name and quantity. Entry error in the drug quantity field was estimated by Pharmacare as 1/10000.

Prescriptions for the benzodiazepine clonazepam were excluded from the benzodiazepine file by Pharmacare, because it was classified as an anticonvulsant; zopiclone, a nonbenzodiazepine, was included because it has sedative and anxiolytic effects similar to benzodiazepines. Zopiclone was approved for use in British Columbia late in 1990.

From January to December 1990, 377 496 benzodiazepine prescriptions were dispensed to noninstitutionalized elderly people in British Columbia. Benzodiazepines comprised 8% of all prescriptions and 69.3% of central nervous system prescriptions (excluding anticonvulsants, analgesics, and anti-inflammatories). Ingredient costs were \$2 370 546.

Populations for each age and sex group were estimated by adding the number of persons in long-term care facilities to the estimated number in acute care hospitals and subtracting the sum from total populations extrapolated for 1990.¹⁵ Resulting values were used as denominators in calculating rates of drug use.

Physician characteristics

A file of physician characteristics (age, sex, specialty) was linked with the prescription database to determine whether some categories of physicians wrote potentially inappropriate prescriptions at unusual rates. Rates were calculated as potentially inappropriate prescriptions per 100 benzodiazepine prescriptions.

RESULTS

Patterns of benzodiazepine use

Figure 1 shows rates of benzodiazepine use in 1990 by age and sex. Benzodiazepines were more frequently dispensed to the older old than to the younger old, and to women than to men. Overall, one or more benzodiazepines were dispensed to 23.4% of the noninstitutionalized elderly (26.6% of women and 18.5% of men).

The median number of prescriptions dispensed to an individual during the year was three. A single prescription was dispensed to 31.1% of benzodiazepine recipients; four or more prescriptions to 41.3%.

Table 2¹¹ gives the size of individual prescriptions in terms of diazepam equivalents. Some prescriptions were large: 23.2% provided 4 to 8 weeks' worth of maximum recommended daily doses and 8.5% provided more than 8 weeks' worth.

Kinds of benzodiazepines used

Figure 2 shows the kinds of benzodiazepine prescriptions dispensed. Lorazepam, triazolam, and oxazepam were the most frequently dispensed. Most prescriptions were for short-acting drugs. A single kind of benzodiazepine (eg, lorazepam) was dispensed to 80% of patients; two kinds to 16.7%; and three or more kinds to 3.3%. Prescriptions for benzodiazepines classed as anxiolytics (lorazepam, oxazepam, diazepam, alprazolam, chlordiazepoxide, bromazepam, chlorthalidopate) were dispensed to 58.3% of all recipients; hypnotics (triazolam, temazepam, flurazepam, nitrazepam) were dispensed to 28.1%; and both anxiolytics and hypnotics were dispensed to 12.4%.

Potentially inappropriate prescriptions

In the first 10 months of 1990, 17.1% of patients (14 323 persons, 3.7% of all elderly persons in the province) were dispensed potentially inappropriate prescriptions. More than half of

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them (55%) received such prescriptions in more than one 2-month period; 10% received such prescriptions in all five periods.

Of those dispensed potentially inappropriate prescriptions, 68% received them from a single physician,

23.6% from two physicians, and only 8.4% from three or more physicians. Also, 79.5% were dispensed all their prescriptions at a single pharmacy, 16.3% at two pharmacies, and only 4.4% at three or more pharmacies.

Of the 6162 physicians actively billing the Medical Services Plan in 1990, 89.4% prescribed benzodiazepines to one or more elderly persons and 50.7% wrote potentially inappropriate prescriptions. Some differences were found between categories of physicians in how many of their benzodiazepine prescriptions were potentially inappropriate. Male physicians wrote on average 65.2 benzodiazepine prescriptions, of which 9.8 were potentially inappropriate; female physicians wrote on average 32.3 benzodiazepine prescriptions, of which 4.0 were potentially inappropriate. The relative risk of potentially inappropriate prescriptions per 100 benzodiazepine prescriptions written was 20% higher for male than female physicians (relative risk = 1.20, 95% confidence interval = 1.17 to 1.24). No trends were seen by age or years since graduation. Potentially inappropriate prescription rates were higher for psychiatrists than for other specialists (Table 3).

Physicians who prescribed benzodiazepines most frequently had the highest rates of potentially inappropriate prescriptions. The most frequent benzodiazepine prescribers (200 or more prescriptions in 10 months) were 83% more likely than the least frequent (1 to 4 prescriptions in 10 months) to give potentially inappropriate prescriptions (relative risk = 1.83, 95% confidence interval = 1.63 to 2.05).

DISCUSSION

Studies show that women take more psychotropic drugs than men (Figure 1).¹⁶ Even for the same diagnosis, according to some studies, women are prescribed tranquilizers more frequently than men.^{17,18} Higher use by

Figure 1. Rates of benzodiazepine prescribing for the noninstitutionalized elderly

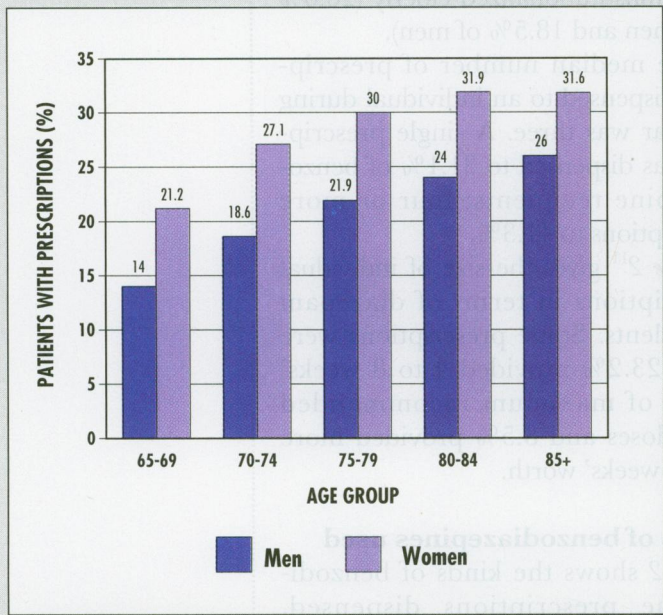
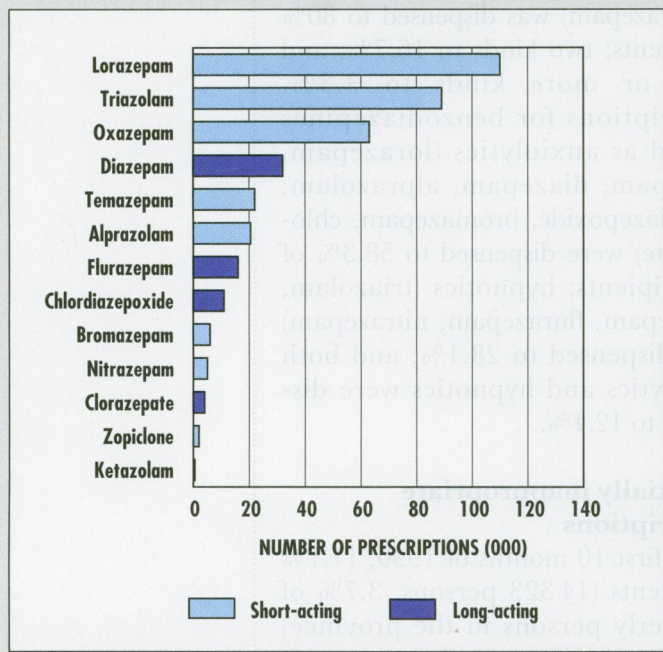


Figure 2. Kinds of benzodiazepines prescribed for the noninstitutionalized elderly



older than by younger elderly is not frequently noted. The more frequent benzodiazepine use by older elderly seen here might be associated with more frequent visits to physicians by aging patients.¹⁸

More than the maximum recommended 2-month limit of benzodiazepines was prescribed to 17.1% of patients. This represents a gap between our indicator of current guidelines and prescribing practice.

Limitations of the method

We recognize our definition of potentially inappropriate prescriptions was inexact and somewhat arbitrary. Using a 2-month window meant that prescriptions dispensed near the end of the period would be attributed to that period instead of to the subsequent period for which they were mainly intended. We expected, however, that results would not be greatly affected because, in any case, prescriptions would be attributed to one period only. Neither daily doses nor intended duration of use were available in the administrative data. Also, we had no diagnostic information.

Although the data pertain only to prescriptions dispensed, not to consumption (which would be expected to be lower), physicians probably meant their prescriptions to be used. Also, some potentially inappropriate prescriptions could have resulted from physicians discontinuing one benzodiazepine in favour of another.

Prescribing practices

Studies evaluating prescribing show little consistency in delineating appropriate prescribers. Hemminki¹⁹ found psychotropic drug prescribing frequencies differed greatly from doctor to doctor, but the variation could not be explained by the variables chosen. Stolley et al²⁰ found that younger primary care physicians, who had graduated more recently and had busier practices, prescribed more appropriately. We found no differences

in benzodiazepine prescribing between age groups or years since graduation.

Our analysis by physician groups did raise some questions. Female physicians were more conservative prescribers than male physicians. Did they differ in clinical judgment as to the appropriateness of benzodiazepines, or did their patient populations differ? Physicians who prescribed benzodiazepines most frequently also prescribed them in the largest amounts. Did frequent prescribers have patient populations who required these larger amounts?

Conclusion

Benzodiazepines were dispensed to about 24% of the noninstitutionalized elderly in British Columbia during 1990. Amounts prescribed to almost 4% of the population appeared to be in excess of guidelines. Physicians need to know how their prescribing practices relate to guidelines. Individuals who are made aware of discrepancies often adopt more appropriate prescribing practices.^{21,22} ■

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A LOGICAL FIRST CHOICE

ACTIONS:

Acetaminophen is an analgesic and antipyretic.

INDICATIONS:

TYLENOL* acetaminophen is indicated for the relief of pain and fever. Also as an analgesic/antipyretic in the symptomatic treatment of colds.

CONTRAINDICATION:

Hypersensitivity to acetaminophen.

ADVERSE EFFECTS:

In contrast to salicylates, gastrointestinal irritation rarely occurs with acetaminophen. If a rare hypersensitivity reaction occurs, discontinue the drug. Hypersensitivity is manifested by rash or urticaria. Regular use of acetaminophen has shown to produce a slight increase in prothrombin time in patients receiving oral anti-coagulants, but the clinical significance of this effect is not clear.

PRECAUTIONS AND TREATMENT OF OVERDOSE:

Resuscitation and supportive care must proceed as for any other potentially serious overdose. In acute overdose, serum levels of acetaminophen are meaningful in predicting those patients likely to develop serious hepatic toxicity. They must be drawn between 4 and 24 hours post overdose and the values plotted on the Matthew-Rumack Nomogram. N-acetylcysteine (N.A.C.) is a highly effective antidote for acetaminophen poisoning. Do not delay administration of N.A.C. either by parenteral or oral routes if the ingested dose is likely to be toxic (> 150 mg/kg ingested) or if serum levels are in the toxic range on the Nomogram. N.A.C. must be administered prior to the 24th hour post overdose to be protective. Further details on therapy of acetaminophen overdose are available by calling your regional Poison Control Centre.

DOSAGE:

Adults: 650 to 1000 mg every 4 to 6 hours, not to exceed 4000 mg in 24 hours.

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TYLENOL* Tablets 325 mg: Each round, white tablet, scored on one side and engraved "TYLENOL" other side, contains 325 mg acetaminophen. Available in bottles of 24†, 50†, 100 and 500 tablets. Also available in vials of 12 tablets.

TYLENOL* Caplets 500 mg: Each white caplet, engraved "TYLENOL" on one side and "500" other side, contains 500 mg acetaminophen. Available in bottles of 24†, 50† and 150†† caplets. Also available in vials of 10 caplets.

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†Package is child-resistant. ††Easy to open.

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