

Defining inappropriate practices in prescribing for elderly people: a national consensus panel

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Abstract

Objective: To develop a consensus-based list of inappropriate practices in prescribing for elderly people.

Design: Mail survey of a 32-member national panel.

Setting: Academic medical centres across Canada.

Participants: Thirty-two specialists selected arbitrarily, including 7 clinical pharmacologists, 9 geriatricians, 8 family practitioners and 8 pharmacists.

Outcome measures: Consensus that the practice would introduce a substantial and significant increase in the risk of a serious adverse effect and is common enough that its curtailment would decrease morbidity among elderly people, ranking of clinical importance of the risk, and availability of equally or more effective and less risky alternative therapy.

Results: The 32-member national panel developed a list of 71 practices in prescribing for elderly people and rated the clinical significance of each on a scale of 1 (not significant) to 4 (highly significant). The practices in prescribing identified fell into 3 categories: drugs generally contraindicated for elderly people, drug-disease interactions and drug-drug interactions. The mean significance rating was greater than 3 for 39 practices. For each practice, alternative therapies were recommended. There was surprising congruence among the specialists on the significance rating and the suggested alternative therapies.

Conclusion: The authors have developed a valid, relevant list of inappropriate practices in prescribing for elderly people, to be used in a practice-based intervention study.

Résumé

Objectif : Établir une liste consensuelle de pratiques indues d'établissement d'ordonnances à l'intention des personnes âgées.

Conception : Sondage postal auprès d'un panel national de 32 membres.

Contexte : Centres médicaux d'enseignement du Canada.

Participants : Trente-deux spécialistes choisis arbitrairement, dont 7 pharmacologues cliniques, 9 gériatres, 8 médecins de famille et 8 pharmaciens.

Mesures des résultats : Consensus selon lequel la pratique entraînerait une augmentation importante et significative du risque d'effets indésirables graves et est assez répandue pour que son confinement réduise la morbidité chez les personnes âgées, classement de l'importance clinique du risque et disponibilité d'un traitement de substitution aussi ou plus efficace et moins risqué.

Résultats : Le panel régional de 32 membres a dressé une liste de 71 pratiques d'établissement d'ordonnances pour les personnes âgées et coté l'importance clinique de chacune sur une échelle de 1 (aucune importance) à 4 (grande importance). Les pratiques d'établissement d'ordonnances ont été réparties en 3 catégories : médicaments en général contre-indiqués pour les personnes âgées, interactions entre médicaments et maladies et entre médicaments. La cote de signification moyenne a été supérieure à 3 dans le cas de 39 pratiques. Dans chaque cas, on a recommandé des thérapies de substitution. La cote d'importance et les thérapies de substitution recommandées ont fait



Education

Éducation

Dr. McLeod is Professor in the Departments of Medicine and Pharmacology, Dr. Huang is Assistant Professor in the Department of Medicine, Dr. Tamblyn is Associate Professor in the Departments of Medicine and of Epidemiology and Biostatistics, and Dr. Gayton is Associate Professor in the Departments of Medicine and of Epidemiology and Biostatistics, McGill University, Montreal, Que.

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l'objet d'un consensus étonnant chez les spécialistes.

Conclusion : Les auteurs ont établi une liste valide et pertinente de pratiques incluses d'établissement d'ordonnances pour les personnes âgées. Cette liste servira dans le contexte d'une étude d'intervention fondée sur la pratique.

Elderly people suffer from more illness and disability than younger people; as a result, they account for a disproportionate amount of prescription-drug use in Canada and elsewhere.¹⁻³ There is no question that many prescribed drugs reduce illness and the risk of death in this age group. But the balance between benefits and risks is precarious, and, as people age, there is a greater likelihood of adverse effects.⁴ This risk results from age-related factors such as changes in drug distribution in the body, in metabolism, in excretion and in receptor sensitivity^{5,6} as well as from prescription of multiple drugs.^{7,8} Because some physicians are unaware of these factors, their prescribing is sometimes suboptimal, questionable or even inappropriate.^{9,10} In an earlier study, we and our associates¹¹ found that the prevalence of questionable high-risk prescribing among elderly people in Quebec was substantial. Overall, 52.6% of the patients in our study were given high-risk prescriptions.

We believe that inappropriate prescribing is a preventable cause of morbidity and mortality. We have therefore started a study to determine whether a computer-based intervention that allows practitioners to conduct surveillance of patient prescriptions, coupled with expert assistance with prescribing decisions, will reduce inappropriate and questionable prescribing. The intervention project will be based on a credible, validated list of high-risk practices in prescribing for elderly people. The most widely used set of explicit criteria for inappropriate prescribing for elderly people was developed by Beers and collaborators.¹² These criteria have been used in other studies,¹³⁻¹⁶ but we found them unacceptable for our purposes. Specifically, we disagreed with the authors' designation of some of the drugs as inappropriate for prescription for elderly people. Among these drugs were reserpine and chlorthalidone, both valuable antihypertensive agents,^{17,18} chlorpropamide, a useful orally administered hypoglycemic agent,¹⁹ and amitriptyline, a useful agent for a broad range of pain syndromes.²⁰ Some of the drugs listed by Beers and collaborators, such as isoxsuprine, cyclandelate and propoxyphene, have fallen into disuse and therefore do not merit inclusion.

Our clinical experience suggests that drug-drug and drug-disease interactions should be significantly emphasized in any discussion of inappropriate prescribing for elderly people. We therefore developed a new list of inappropriate practices for our intervention project. This

article describes the development of the list. We used a modified Delphi approach to arrive at consensus recommendations of a national expert panel.

Methods

Development of a preliminary list

We initially categorized inappropriate practices in prescription of drugs for elderly people into 3 types: (1) prescription of drugs generally contraindicated for elderly people because of an unacceptable risk-benefit ratio, (2) prescription of drugs that can cause drug-drug interactions and (3) prescription of drugs that can cause drug-disease interactions. For the first category we used the list developed by Beers and collaborators¹² as a model, and we excluded drugs not available in Canada and drugs for which we were unable to find supporting evidence of significant risk. A preliminary list of drug-drug interactions was developed from a quarterly expert review of drug interactions²¹ and the *Medical Letter Handbook of Adverse Drug Interactions*.²² From these references, a review panel of 6 specialists with academic affiliations independently selected the drug-drug interactions to be included in the preliminary list sent to the national consensus panel. The list of inappropriate practices involving drug-disease interactions was developed by one of us (A.R.H.), an experienced academic geriatrician, from standard textbooks on therapy provided to elderly people. All of the authors reviewed the drugs in all 3 categories before mailing the list to the members of the national consensus panel.

Criteria for judgements by members of the national consensus panel

Having developed the 3 categories of inappropriate prescribing, we elaborated on the criteria to be used by the national consensus panel to define important inappropriate prescribing practices. We decided to include only practices that met 3 criteria: (1) the prescription introduces a substantial and clinically significant increase in the risk of a serious adverse effect, (2) equally effective or more effective and less risky alternative therapy is available for most patients, and (3) the practice is likely to occur often enough that a change in practice could decrease morbidity in elderly people.



Selection of an expert panel

In selecting the national consensus panel, we aimed for a reasonable balance among geographic regions of Canada and among relevant specialties. We arbitrarily chose a panel of 32 specialists representing clinical pharmacology, geriatrics, family medicine and pharmacy. We identified experts in each discipline and contacted them by telephone to solicit their participation. All of the specialists selected were sent a letter in early August 1995 outlining the purpose of the study, the criteria for making judgements about prescribing practices and the process we planned to follow in developing the list.

Evaluation of the preliminary list

In late August 1995 we sent the panel members the preliminary list of 38 important, inappropriate practices,

which included 16 practices involving generally contraindicated drugs, 11 involving drug–drug interactions and 11 involving drug–disease interactions. To facilitate evaluation, each practice was depicted in a brief clinical situation. We asked the experts to assess the preliminary list, to suggest additions in each of the 3 categories and to recommend relevant lower-risk alternative therapies. The responses from the consensus panel members were used to supplement and revise the preliminary list, creating the final list.

Rating of the clinical importance of each practice on the final list

The final, revised list of practices was mailed to panel members, who were asked to rate the clinical importance of the potential adverse effects of each practice on a 4-point scale from 1 (not significant) to 4 (highly signifi-

Table 1: Inappropriate practices in prescribing drugs to treat cardiovascular diseases for elderly people, according to 32 members of a national consensus panel

Practice	Mean clinical significance rating*	Risk to patient	Alternative therapy	% of panel members who agreed with alternative
Prescription of β -adrenergic blocking agent to treat hypertension for patients with a history of asthma or COPD†	3.83	May exacerbate respiratory disease	Another class of antihypertensive drugs	94
Prescription of β -adrenergic blocking agent to treat angina for patients with a history of asthma, COPD or heart failure	3.63	May exacerbate respiratory disease or heart failure	Nitrate or calcium-channel blocker	94
Prescription of reserpine to treat hypertension	3.14	May cause depression and extrapyramidal effects in high dosages	Another antihypertensive drug	76
Prescription of disopyramide to treat atrial fibrillation	3.09	May cause anticholinergic side effects and sudden cardiac death	Digoxin Quinidine Procainamide	59 31 25
Prescription of thiazide diuretic to treat hypertension for patients with a history of gout	3.07	May precipitate or worsen gout	Another antihypertensive drug	74
Prescription of calcium-channel blocker to treat hypertension for patients with a history of heart failure	3.06	May worsen heart failure	Diuretic or ACE‡ inhibitor or both	94
Prescription of β -adrenergic blocking agent to treat hypertension for patients with a history of heart failure	3.00	May worsen heart failure	Diuretic or ACE inhibitor Lower dosage of β -adrenergic blocking agent and monitor effects	78 44
Long-term prescription of β -adrenergic blocking agent to treat angina or hypertension for patients with a history of Raynaud disease	3.00	May worsen Raynaud disease	Calcium-channel blocker	91

*Rating scale from 1 (not significant) to 4 (highly significant).

†COPD = chronic obstructive pulmonary disease.

‡ACE = angiotensin-converting-enzyme.



cant). Panel members were also asked to indicate their agreement or disagreement with the alternative therapy suggested for each practice.

Overall mean clinical significance ratings were calculated for each practice from the ratings by all of the panel members. Mean ratings by specialty were calculated by combining the ratings by the panel members in

each of the 4 specialties represented. We performed an analysis of variance of these mean significance ratings to compare the ratings among specialties.

Results

The national consensus panel consisted of 32 special-

Table 2: Inappropriate practices in prescribing psychotropic drugs for elderly people

Practice	Mean clinical significance rating	Risk to patient	Alternative therapy	% of panel members who agreed with alternative
Long-term prescription of long-half-life benzodiazepine to treat insomnia	3.72	May cause falls, fractures, confusion, dependence and withdrawal	Nondrug therapy or short-half-life benzodiazepine	97
Prescription of tricyclic antidepressant to treat depression for patients with a history of glaucoma, BPH* or heart block	3.63	May aggravate glaucoma, cause urinary retention in patients with BPH or worsen heart block	SSRI	94
Long-term prescription of barbiturate to treat insomnia	3.59	May cause falls, fractures, confusion, dependence and withdrawal	Nondrug therapy or low dosage of short-half-life benzodiazepine	94
Prescription of SSRI† for patients already receiving an MAO‡ inhibitor to treat depression	3.56	May extend adverse effects of SSRI	Avoid combining; ensure a wash-out period of at least 7 days if switching from an MAO inhibitor to an SSRI	81
Long-term prescription of long-half-life benzodiazepine to treat anxiety	3.55	May cause falls, fractures, confusion, dependence and withdrawal	Nondrug therapy or short-half-life benzodiazepine	88
Long-term prescription of long-half-life benzodiazepine to treat agitation in dementia	3.52	May cause falls, fractures, confusion, dependence and withdrawal	Loxapine or haloperidol Short-half-life benzodiazepine	88 56
Prescription of tricyclic antidepressant to treat depression for patients with a history of postural hypotension	3.26	May worsen postural hypotension and cause falls	SSRI, with monitoring of blood pressure	94
Long-term prescription of triazolam to treat insomnia	3.23	May cause cognitive and behavioural abnormalities	Nondrug therapy or low dosage of short-half-life benzodiazepine	91
Prescription of chlorpromazine to treat psychosis for patients with a history of postural hypotension	3.22	May worsen postural hypotension and cause falls	High-potency neuroleptic such as haloperidol, with blood-pressure monitoring	94
Prescription of nylidrin, niacin or pentoxifylline to treat dementia	3.16	Ineffective treatment for dementia and moderate risk of side effects	Discontinue	81
Prescription of tricyclic antidepressant with active metabolites (e.g., imipramine or amitriptyline) to treat depression	3.12	May cause anticholinergic side effects	Tricyclic antidepressant without active metabolites or SSRI	91
Prescription of methylphenidate to treat depression	3.11	May cause agitation, stimulation of central nervous system and seizures	SSRI or short-half-life tricyclic antidepressant without active metabolites	81

*BPH = benign prostatic hyperplasia.

†SSRI = selective serotonin reuptake inhibitor.

‡MAO = monamine oxidase.



ists: 7 clinical pharmacologists, 9 geriatricians, 8 family practitioners and 8 pharmacists. All responded promptly to the first mailing of the preliminary list of 38 inappropriate practices in prescribing, and the respondents suggested a total of 51 additions to the list. There was modest overlap in the suggestions. Most panel members contributed recommendations for alternative therapy.

The final list mailed to panel members consisted of 71 practices in prescribing for elderly people. Each was depicted in a clinical situation, and each situation was accompanied by a recommendation for alternative therapy. All of the panel members returned the final lists, giving

their clinical significance ratings and indicating their agreement or disagreement with the alternative therapy suggested.

The mean clinical significance rating varied from a low of 2.53, for adding cholestyramine to the regimen of a patient who was already taking digoxin to treat atrial fibrillation, to a high of 3.83, for prescribing a β -adrenergic blocking agent to treat hypertension for patients with a history of asthma or chronic obstructive pulmonary disease. The proportion of panel members who agreed with recommendations for alternative therapies in the high-risk prescribing practices varied modestly. The lowest

Table 3: Inappropriate practices in prescribing NSAIDs and other analgesics for elderly people

Practice	Mean clinical significance rating	Risk to patient	Alternative therapy	% of panel members who agreed with alternative
Long-term prescription of NSAIDs to treat osteoarthritis for patients with a history of peptic ulcer	3.78	May cause recurrence of peptic ulcer	Nondrug therapy or acetaminophen or NSAID with gastroprotective agent	97
Prescription of phenylbutazone to treat chronic osteoarthritis	3.69	May cause bone-marrow depression	Acetaminophen or intermittent dosage of an NSAID of another class	100
Prescription of ASA to treat pain for patients already receiving warfarin	3.61	May cause increased bleeding	Acetaminophen	91
Long-term prescription of meperidine or pentazocine for pain	3.58	May cause falls, fractures, confusion, dependency and withdrawal	Stepped approach involving nondrug therapy, then acetaminophen, then codeine, morphine or hydromorphone if needed	91
Long-term prescription of NSAIDs to treat osteoarthritis for patients with chronic renal failure	3.56	May worsen renal failure, may cause salt and water retention	Nondrug therapy, then acetaminophen	97
Prescription of NSAIDs to treat osteoarthritis for patients already receiving warfarin	3.56	May cause increased bleeding	Nondrug therapy or acetaminophen or NSAID with gastroprotective agent	81
Long-term prescription of NSAIDs to treat osteoarthritis for patients with a history of heart failure	3.38	May cause salt and water retention, may worsen heart failure	Nondrug therapy or acetaminophen or close monitoring of heart failure	97
Long-term prescription of piroxicam, ketorolac or mefenamic acid to treat pain	3.35	Greater risk of upper gastrointestinal-tract bleeding than that associated with other NSAIDs	Nondrug therapy or acetaminophen; switch to a different NSAID or to codeine	81
Long-term prescription of NSAIDs for patients with a history of hypertension	3.34	May cause salt and water retention and exacerbation of hypertension	Nondrug therapy, acetaminophen or ASA, or close monitoring of blood pressure	91
Long-term prescription of indomethacin to treat gout	3.32	May cause gastropathy, neurologic side effects and salt and water retention	Allopurinol or intermittent dosage of NSAID as needed	50
Long-term prescription of NSAIDs to treat osteoarthritis	3.22	May cause gastropathy, bleeding and salt and water retention	Acetaminophen	100



level of agreement (25% of members) was for the use of procainamide as an alternative to disopyramide in the treatment of atrial fibrillation. For many practices, such as substitution of acetaminophen for a nonsteroidal anti-inflammatory drug (NSAID) to treat osteoarthritis, there was 100% agreement.

Analysis of the responses by specialty showed no significant differences in the mean clinical significance ratings of the 71 practices, although there was a higher mean significance rating (3.16) by geriatricians and a lower mean significance rating (2.96) by clinical pharmacologists. Family practitioners' and pharmacists' mean ratings fell between those of geriatricians and clinical pharmacologists.

Tables 1 to 4 rank the 38 prescribing practices that received a mean clinical significance rating of 3.0 or greater from panel members. The inappropriate prescribing practices have been grouped into 4 categories: prescription of drugs to treat cardiovascular diseases, prescription of psychotropic drugs, prescription of NSAIDs and other analgesics and prescription of miscellaneous drugs. Eighteen of the 38 practices involve drugs generally contraindicated for elderly people because of an unacceptable risk-benefit ratio. Sixteen involve a drug-disease interaction, and only 4 involve drug-drug interactions. Three of these 4 concern interactions with the orally administered anticoagulant warfarin.

Almost all of the panel members wrote unsolicited comments about the overall list and about the high-risk practices. Most of the comments were aimed at enhancing the specificity of the criteria. Examples include: "Resist any push to put chlorpropamide and reserpine on the list"; "There are data indicating benefit of β -blockers in heart failure"; "Thiazides are OK in non-insulin-dependent diabetes [mellitus] if used in low doses"; "All H_2 blockers can interact with warfarin"; and "Recommendations for alternatives are semi-controversial. Perhaps brevity is the problem."

Discussion

We have described a relatively new approach to defining inappropriate practices in prescribing for elderly people. Our approach takes into account the clinical relevance of the prescribing practice and the opportunities to have a beneficial effect on the problem it creates. We assured that the recommendations would be generalizable by involving specialists in clinical pharmacology, geriatrics, family medicine and pharmacy, the 4 types of specialists most commonly involved in the management of drugs given to elderly people. The broad geographic representation of panel members assured that local or regional prescribing practices¹³ did not overly influence the development of the

Table 4: Inappropriate practices in prescribing miscellaneous drugs for elderly people

Practice	Mean clinical significance rating	Risk to patient	Alternative therapy	% of panel members who agreed with alternative
Prescription of cimetidine to treat peptic ulcer for patients already receiving warfarin	3.47	May inhibit warfarin metabolism and increase the risk of bleeding	Other histamine (H_2)-receptor antagonist	84
Prescription of anticholinergic or antispasmodic drugs to treat irritable bowel syndrome for patients with dementia	3.41	May worsen cognitive and behavioural function	Nondrug and diet therapy, calcium-channel blocker to treat diarrhea	69
Prescription of dipyridamole to prevent stroke	3.30	Ineffective	ASA Ticlopidine	94 69
Long-term prescription of orally administered steroids to treat COPD for patients with a history of NIDDM*	3.25	May worsen NIDDM	Inhaled steroids and bronchodilators with monitoring of blood glucose levels	97
Prescription of anticholinergic drugs to prevent extrapyramidal effects of antipsychotic drugs	3.16	May cause agitation, delirium and impaired cognition	Decreased dosage of antipsychotic drugs or reassessment of need for these drugs	97
Long-term prescription of diphenoxylate to treat diarrhea	3.13	Drowsiness, cognitive impairment and dependence	Nondrug and diet therapy or loperamide	84
Prescription of cyclobenzaprine or methocarbamol to treat muscle spasms	3.06	Drowsiness, agitation and disorientation	Nondrug therapy (physiotherapy, application of heat and cold or TENSt)	94

*NIDDM = non-insulin-dependent diabetes mellitus.

†TENS = transcutaneous electrical nerve stimulation.



list. There was surprising congruence among the specialists in the 4 disciplines on the clinical importance of each of the practices listed. Therefore, even if our list has missed some important inappropriate practices, we are confident that those listed are regarded as important by a large, diverse group of disinterested specialists.

The high-risk prescribing situations in our final list represent mainly drugs generally contraindicated for elderly people plus risky drug-disease interactions. Drug-drug interactions are less prominent. In this way, our list differs significantly from one recently proposed by Willcox, Himmelstein and Woolhandler.¹³ Their list included mainly contraindicated drugs. Our list takes into account the fact that diseases that alter drug metabolism or elimination or tissue sensitivity to therapeutic agents must be accounted for when weighing prescribing risk. Furthermore, our consensus panel did not identify methyldopa, propranolol or chlorpropamide as contraindicated drugs for elderly people, as did Willcox, Himmelstein and Woolhandler. Centrally acting drugs such as benzodiazepines, tricyclic antidepressants and selective serotonin reuptake inhibitors are prominent in our final list. These drugs are especially relevant to prescribing for elderly people, who are often intolerant of centrally acting drugs but who continue to account for a disproportionately large share of their use.²³

This list of inappropriate practices in prescribing is now undergoing final modifications before it is used in a double-blind, controlled trial of a computer-based intervention aimed at improving prescribing for elderly people. We anticipate that we will have to revise the list regularly if it is to be helpful to practising physicians. For many drugs prescribed for elderly people there is a dearth of evidence-based guidelines, so we will rely on a consensus panel for revisions. We hope that the criteria developed in this study will be considered for use by clinicians caring for older people, researchers in geriatric pharmacotherapy and teachers of undergraduate and postgraduate students.

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References

1. Quinn K, Baker MJ, Evans B. A population-wide profile of prescription drug use in Saskatchewan, 1989. *Can Med Assoc J* 1992;146:2177-86.
2. Gordon M. Principles in prescribing for the older patient. *Drug Protocol* 1987;2:15-24.
3. Baum C, Kennedy DL, Forbes MB, Jones JK. Drug use in the United States in 1981. *JAMA* 1984;251:1293-7.
4. Montamat SC, Cusack BJ, Vestal RE. Management of drug therapy in the elderly. *N Engl J Med* 1989;321:303-9.
5. Lipton HL, Bero LA, Bird JA, McPhee SJ. The impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing. *Med Care* 1992;30:646-58.
6. Katzung BG. Special aspects of geriatric pharmacology. In: Katzung B, editor. *Basic and clinical pharmacology*. 6th ed. Norwalk (CT): Appleton & Lange, 1995:923-31.
7. Gurwitz JH, Avorn J. The ambiguous relation between aging and adverse drug reactions. *Ann Intern Med* 1991;114:956-66.
8. Larmour I, Dolphin RG, Baxter H, Morrison S, Hooke DH, McGrath BP. A prospective study of hospital admissions due to drug reactions. *Aust J Hosp Pharm* 1991;21:90-5.
9. Brook RH, Kamberg CJ, Mayer-Oakes A, Beers MH, Raube K, Steiner A. Appropriateness of acute medical care for the elderly. *Health Policy* 1990;14:225-42.
10. Grymonpre RE, Mitenko PA, Sitar DS, Aoki FY, Montgomery PR, et al. Drug-associated hospital admissions in older medical patients. *J Am Geriatr Soc* 1988;36:1092-8.
11. Tamblyn RM, McLeod PJ, Abrahamowicz M, Monette J, Gayton DC, Berkson L, et al. Questionable prescribing for elderly patients in Quebec. *Can Med Assoc J* 1994;150:1801-9.
12. Beers MH, Ouslander JG, Rollinger I, Reuben DB, Brooks J, Beck JC, et al. Explicit criteria for determining inappropriate medication use in nursing home residents. *Arch Intern Med* 1991;151:1825-32.
13. Willcox SM, Himmelstein DU, Woolhandler S. Inappropriate drug prescribing for the community-dwelling elderly. *JAMA* 1994;272:292-6.
14. Beers MH, Fingold SF, Ouslander JG, Reuben DB, Morgenstern H, Beck JC, et al. Characteristics and quality of prescribing by doctors practising in nursing homes. *J Am Geriatr Soc* 1993;41:802-7.
15. Stuck AE, Beers MH, Steiner A, Aronow HU, Rubenstein LZ, Beck JC, et al. Inappropriate medication use in community-residing older persons. *Arch Intern Med* 1994;154:2195-200.
16. Williams B, Betley C. Inappropriate use of non-psychotropic medications in nursing homes. *J Am Geriatr Soc* 1995;43:513-9.
17. Materson BJ, Cushman WC, Goldstein G, Reda DJ, Freis ED, Ramirez EA, et al. Treatment of hypertension in the elderly: blood pressure and clinical changes: results of a Department of Veterans Affairs Cooperative Study. *Hypertension* 1990;15:348-60.
18. SHEP Cooperative Research Group. Prevention of stroke by antihypertensive drug treatment in older patients with isolated systolic hypertension. *JAMA* 1991;265:3255-64.
19. United Kingdom Prospective Diabetes Study. Relative efficacy of randomly allocated diet, sulfonylurea, insulin or metformin in patients with newly diagnosed non-insulin dependent diabetes followed for three years. *BMJ* 1995;310:83-8.
20. Baldessarini RJ. Drugs and the treatment of psychiatric disorders. In: Gillman AG, Rall TW, Nies AS, Taylor P, editors. *Goodman and Gilman's the pharmacological basis of therapeutics*. 8th ed. New York: Pergamon Press, 1990:383-435.
21. Tatro DS, editor. *Drug interactions facts*. St. Louis (MO): Facts and Comparisons Inc., 1992.
22. *The medical letter handbook of adverse drug interactions*. New Rochelle (NY): The Medical Letter, 1993.
23. Thomsom M, Smith W. Prescribing benzodiazepines for non-institutionalized elderly. *Can Fam Physician* 1995;41:792-8.

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