**Medication**

**Potential Impact of Benzodiazepine Use on the Rate of Hip Fractures in Five Large European Countries and the United States.**
Authors found that the estimated impact of benzodiazepine use on hip fracture rate varied between 1.8 % and 8.2 % in the six countries studied (Germany, France, United Kingdom, Italy, Spain and United States). These differences are a result of the considerable differences in benzodiazepine use between countries. In all countries, the population attributable risks of short-acting benzodiazepines (SABs) were higher than that of long-acting benzodiazepines (LABs). This suggests that a larger proportion of hip fractures may be associated with the use of SABs than the use of LABs.

**Implementation of a Community Pharmacy-Based Falls Prevention Program.**
In this article, authors evaluated data from a randomized controlled trial examining the effectiveness of a medication review intervention delivered through community pharmacies. A total of 801 (81.7%) participated in an eligibility interview, of whom 342 (42.7%) were eligible. Baseline data collection was completed in 186 of eligible patients (54.4%), who were randomly assigned to the intervention group (n = 93) or the control group (n = 93). Resident pharmacists delivered a medication review to 73 of the patients (78.5%) in the intervention group, with 41 recommendations for changes in medication, of which 10 (24.4%) were implemented. Of the 31 prescribing physicians contacted with resident pharmacists' recommendations, 14 (45.2%) responded, and 10 (32.3%) authorized the changes. Authors conclude that establishing collaborative relationships between prescribers and pharmacists may have improved the communication in this study as well as the rate of acceptance of the recommendations by both prescribers and patients.

**Psychotropic Drugs and Falls in the Elderly People: Updated Literature Review and Meta-Analysis.**
Authors selected 177 out of 3,747 articles of which 71 (published between 1981 and 2007) had data on risk factors associated with psychotropic drugs. The authors’ main finding was the existence of an association between falls in the elderly people and consumption of psychotropic drugs. This was the case when psychotropic drugs were analyzed as a single class and when the meta-analyses were made for different subclasses (antidepressants, benzodiazepines, hypnotics, narcotics, neuroleptics, and tranquilizers). Another finding from this study was that these meta-analyses have little impact on prescribing habits. Even if there is no proven causal link between psychotropic drugs and falls, several historic meta-analyses of different methodology have provided strong evidence to support this association. Authors hope that future prospective studies concerned with the relationship between falls and psychotropic drugs will target older populations and will focus specifically on the new drugs (SSRI class of antidepressants or...
atypical antipsychotic drugs in the class of neuroleptics) that are being prescribed more often.

http://jah.sagepub.com/content/early/2010/10/14/0898264310381277.full.pdf+html

**Vitamin D and Injury Prevention.**


In this nutrition review, authors indicate that Vitamin D, along with calcium, may help decrease the risk of falls and fractures in older adults. Sunlight and other sources of ultraviolet radiation are not recommended because they increase the risk of skin cancers and sun-induced eye disorders. Vitamin D and calcium needs should be met through foods and dietary supplements. As a preventive measure to reduce the risk of falls and fractures, it is recommended that older adults meet the 2005 Dietary Guidelines and consume 1000 IU of vitamin D, preferably as vitamin D(3) and 2,500 mg of calcium.

http://ajl.sagepub.com/cgi/reprint/4/1/21

**Psychotropic drugs and falling accidents among the elderly: a nested case control study in the whole population of Scania, Sweden.**


This study is based on an unselected population of persons 65 years and older registered within medical care after a falling accident (n=10,482). One control was matched to each case based on age, sex, date of the falling accident, living area and propensity score (based on prevalent disease). This study showed that the use of psychotropic drugs, especially opioids and antidepressants, was associated with higher odds for a falling accident among both men and women. This effect seemed to be strongest immediately after initiating therapy. Authors concluded that since psychotropic medication is extensively used among the elderly, the increased risk for falls associated with these kinds of drugs is an important public health problem that could be tackled by a more rational medication use.

http://jech.bmj.com/content/64/5/440.full.pdf

**Vitamin D Treatment for the Prevention of Falls in Older Adults: Systematic Review and Meta-Analysis.**


In this systematic review and meta-analysis, authors included 10 randomized control trials that investigated the effectiveness of vitamin D therapy in the prevention of falls for community dwelling and institutionalized older adults (60+) and used an explicit fall definition. In pooled analysis, vitamin D therapy (200-1,000 IU) resulted in 14% fewer falls than calcium or placebo. The following subgroups had significantly fewer falls: community-dwelling (aged <80), adjunctive calcium supplementation, no history of fractures or falls, duration longer than 6 months, cholecalciferol, and dose of 800 IU or greater; although, no evidence of a linear association between vitamin D dose or duration and treatment effect was found. When seven additional studies without explicit fall definitions were included in the analysis, it yielded a smaller benefit (still significant) and more heterogeneity but found significant intergroup differences favoring adjunctive
calcium over none. Authors conclude that Vitamin D treatment effectively reduces the risk of falls in older adults and that future studies should investigate whether particular populations or treatment regimens may produce greater benefit.

http://www3.interscience.wiley.com/cgi-bin/fulltext/123557291/PDFSTART
Twenty-two healthy middle-aged individuals (59.5+/−4.7 years) participated in this double-blind, placebo-controlled, randomized crossover trial. Three measurements were conducted with a week interval each. A measurement consisted of postural balance as a single task and while concurrently performing a secondary cognitive task and reaction time tasks. For the first measurement indomethacin 75mg (slow-release) or a visually identical placebo was randomly assigned. In total, five capsules were taken orally in the 2.5 days preceding assessment. The second measurement was without intervention, for the final one the first placebo group got indomethacin and vice versa. The present study showed that a high indomethacin dose does not negatively affect postural balance and manual reaction time in this healthy middle-aged population. Although the relatively small and young sample limits the direct ability to generalize the results to a population at risk of falling, the results indicate that indomethacin alone is not likely to increase fall risk.

Annual high-dose oral vitamin D and falls and fractures in older women: a randomized controlled trial
In this double-blind, placebo-controlled trial, 2256 community-dwelling women, aged 70 years or older, considered to be at high risk of fracture were recruited and randomly assigned to receive a single, annual dose of 500 000 IU cholecalciferol or placebo for 3 to 5 years. Falls and fractures were recorded in participant monthly calendars and details were confirmed by telephone interview. Fractures were radiologically confirmed. In a substudy, 137 randomly selected participants underwent serial blood sampling for 25-hydroxycholecalciferol and parathyroid hormone levels and results showed that the levels increased substantially 1 month after dosing and then declined toward baseline but remained on average 41% higher than levels in the placebo group at 12 months. Participants receiving annual, high-dose oral cholecalciferol experienced 15% more falls and 26% more fractures than the placebo group. Participants also experienced more fractures that were not associated with a fall. Authors conclude that the outcome of this study suggests that safety of high-dose vitamin D supplementation warrants further study.

Impact of enhanced pharmacologic care on the prevention of falls: A randomized controlled trial.
This study evaluated the effects of a community pharmacy-based falls prevention program targeting high-risk (reported fall and use of medication associated with falls) older adults (n = 186). Intention-to-treat analyses revealed no significant reduction in the rate of recurrent falls, injurious falls or overall use of high-risk medications; however, individuals in the intervention group were more likely than those in the control group to discontinue use of a high-risk medication or to have the dosage reduced during the 1-year
follow-up period. *As-treated* analyses showed reductions in the rates of falls, injurious falls and filling prescriptions for high-risk medications after the intervention, but the differences were not statistically significant. Authors conclude that more work is needed to evaluate the intervention using a larger sample size to detect clinically meaningful effects.

**Medication interventions for fall prevention in the older adult.**
Using recently published articles from Medline and resources from the Agency for Healthcare Research and Quality website, this article reviews the effects of medications on falls and offers suggestions to minimize fall risk by assessing all medications to reduce fall risk. The article features a basic patient assessment method and tool for pharmacists along with case studies and multiple choice questions to test and apply knowledge presented in the article.

**Inappropriate medication use and risk of falls – A prospective study in a large community-dwelling elderly cohort.**
This multicentre prospective cohort study used community-dwelling men and women aged 65 years or over (n = 6,343) to assess the association between exposure to inappropriate medications and risk of falls. Data on socio-demographic, medical characteristics and medication use (based on self-reports and data from the national healthcare insurance) were collected. Inappropriate medication for elderly was defined from established criteria. Results showed that use of inappropriate psychotropic drugs, and particularly of long-acting benzodiazepines, were associated with an increased risk of falling in persons aged 65 years and over. Authors indicate that short- or intermediate-acting benzodiazepines did not increase the risk of falls and that they should be preferred to long-acting benzodiazepines in elderly patients as recommended. [http://www.biomedcentral.com/content/pdf/1471-2318-9-30.pdf](http://www.biomedcentral.com/content/pdf/1471-2318-9-30.pdf)

**Central nervous system medication changes and falls in nursing home residents.**
Authors investigated the role of changes (a new start, a dose change, an as-needed dose, or a discontinuation) in 6 mutually exclusive medication categories (gastrointestinal, hypoglycemics, antibiotics, central nervous system (CNS) acting, cardiovascular disease agents, and analgesics) on the risk of falling in nursing home residents. Medication records of residents (n = 158) who experienced at least one recorded fall were examined. Authors found that there was a statistically significantly elevated fall risk within 1–3 days of changing a CNS medication (antipsychotic, sedative, antidepressant, or antiseizure) versus 7–9 days after the change. Authors suggest that the risk of falls among nursing home residents is significantly elevated within 3 days of a CNS medication change.
Authors completed a meta-analysis using 22 studies presenting original data of randomized, controlled trial, case control, cohort, or cross-sectional designs assessing the association between medication use and falls in persons aged 60 years or older (n = 79,081) published from 1996 to 2007. Medication classes included antihypertensives, diuretics, β-Blockers, sedatives/hypnotics, neuroleptics/antipsychotics, antidepressants, benzodiazepines, narcotics, and NSAIDs. Results showed that the use of sedatives and hypnotics, antidepressants, and benzodiazepines demonstrated a significant association with falls in older adults.

Fall-related injuries in a nursing home setting: is polypharmacy a risk factor?
A retrospective observational study was carried out in a population of elderly nursing home residents where 695 falls were recorded in 293 residents. Results of the multivariate analysis showed that fall dynamics such as falling from wheelchairs and falling while in own bedrooms resulted in less frequent injuries; whereas falling after standing up and falling randomly were associated with a significantly increased injury rate. Injuries were strongly associated with the use of multiple drugs (7 or more) only when a falls-risk drug (antiarrhythmic or antiparkinson drug) was part of the patient's therapeutic regimen. Authors conclude fall dynamics and falls-risk drugs played a more significant role in falls than polypharmacy alone.
http://www.biomedcentral.com/content/pdf/1472-6963-9-228.pdf

Falls, depression and antidepressants in later life: a large primary care appraisal.
A cross-sectional survey was used to examine medication use associated with falls in 21,900 community-dwelling adults, aged 60 years or over from 383 Australian general practices. Antidepressant use, questionable depression, and clinically significant symptoms of depression were independently associated with multiple falls. Selective serotonin reuptake inhibitors use was associated with the highest risk of multiple falls. Authors recommend that strategies to prevent falls should become a routine part of the management of older people with depression.

Home-based medication review in a high risk elderly population in primary care the POLYMED randomised controlled trial.
A total of 136 patients over 80 years old, living at home, taking 4 or more medications, and having at least one additional medications-related risk factors participated in a randomised control trial comparing home-based medication review with standard care. The patients randomised to the intervention group received two visits by a pharmacist. During the first visit, drug interactions, adverse effects, and storage issues were addressed. The pharmacist consulted with the GP and changes to medications were made
where appropriate. A follow-up meeting was made with patients 6-8 weeks later to reinforce original advice. There was no difference in hospital admissions, deaths, and quality of life between the intervention and control groups. There was a significant reduction in medications prescribed, however. Authors indicated that medication reviews should be done for specific at-risk populations rather than older person in general.

**Randomized Trial to Improve Prescribing Safety in Ambulatory Elderly Patients.**
A specialized pharmacy alert system will alert pharmacists when a patient aged 65 and older are newly prescribed the wrong medication. A US study examined prescription and age information linked to alert pharmacists when a patient 65 plus has been subscribed one of the 11 medications deemed inappropriate for older persons. The research suggests an effectiveness of the alert system coupled with the collaboration between the health care providers will improve the safety of prescribing medication for older persons.

**Medication as a Risk Factor for Falls: Critical Systematic Review**
Medline was searched for articles fitting a defined criteria addressing falls associated with medications among seniors. Results found that the main group of drugs associated with falling is central nervous system drugs – especially psychotropics (benzodiazepines, antidepressants, and antipsychotics). Antiepileptics and drugs that lower blood pressure were weakly associated with falls. Authors indicated that drugs commonly used by seniors are not systematically studied as risk factors.