Chapter 2 - Alcohol

Alcohol abuse and misuse is the major substance abuse problem among older adults. "In the United States, it is estimated that 2.5 million older adults have problems related to alcohol, and 21 percent of hospitalized adults over age 40... have a diagnosis of alcoholism with related hospital costs as high as $60 billion per year" (Schonfeld and Dupree, 1995, p. 1819). In 1990, those over the age of 65 comprised 13 percent of the U.S. population; by the year 2030, older adults will account for 21 percent of the population (U.S. Bureau of the Census, 1996). This projected population explosion has serious implications for both the number of alcohol-related problems likely to occur among older adults and the subsequent costs involved in responding to them. Currently, rates for alcohol-related hospitalizations among older patients are similar to those for heart attacks (Adams et al., 1993). Those rates vary greatly by geographic location, from 19 per 10,000 admissions in Arkansas to 77 per 10,000 in Alaska.

As disturbing as these figures are, they probably represent a gross underestimation of the true problem. Studies consistently find that older adults are less likely to receive a primary diagnosis of alcoholism than are younger adults (Booth et al., 1992; Stinson et al., 1989; Beresford et al., 1988). A study of 417 patients found that house officers accurately diagnosed the disease in only 37 percent of older alcoholic patients compared with 60 percent of the younger alcoholic patients (Geller et al., 1989).

Alcohol and Aging

Despite a certain heterogeneity in drinking practices, there are substantial differences between an older and a younger adult's response to alcohol, the majority of which stem from the physiological changes wrought by the aging process.

Adults over the age of 65 are more likely to be affected by at least one chronic illness, many of which can make them more vulnerable to the negative effects of alcohol consumption (Bucholz et al., 1995).

In addition, three age-related changes significantly affect the way an older person responds to alcohol:

- Decrease in body water
- Increased sensitivity and decreased tolerance to alcohol
- Decrease in the metabolism of alcohol in the gastrointestinal tract.

As lean body mass decreases with age, total body water also decreases while fat increases. Because alcohol is water-soluble and not fat-soluble, this change in body water means that, for a given dose of alcohol, the concentration of alcohol in the blood system is greater in an older person than in a younger person. For this reason, the same amount of alcohol that previously had little effect can now cause intoxication (Smith, 1995; Vestal et al., 1977). This often results in increased sensitivity and decreased tolerance to alcohol as people age (Rosin and Glatt, 1971). Researchers speculate that the change in relative alcohol content combined with the slower reaction times frequently observed in older adults may be responsible for some of the accidents and injuries that plague this age group (Bucholz et al., 1995; Salthouse, 1985; Ray, 1992).

The decrease in gastric alcohol dehydrogenase enzyme that occurs with age is another factor that exacerbates problems with alcohol. This enzyme plays a key role in the metabolism of alcohol that occurs in the gastric mucosa. With decreased alcohol dehydrogenase, alcohol is metabolized more slowly, so the blood alcohol level remains raised for a longer time. With the stomach less actively involved in metabolism, an increased strain is also placed on the liver (Smith, 1995).

Comorbidities

Although alcohol can negatively affect a person of any age, the interaction of age-related physiological changes and the consumption of alcohol can trigger or exacerbate additional serious problems among older adults, including

- Increased risk of hypertension, cardiac arrhythmia, myocardial infarction, and cardiomyopathy
Increased risk of hemorrhagic stroke
Impaired immune system and capability to combat infection and cancer
Cirrhosis and other liver diseases
Decreased bone density
Gastrointestinal bleeding
Depression, anxiety, and other mental health problems
Malnutrition.

Other biomedical changes of aging are cognitive impairments, which are both confused with and exacerbated by alcohol use. Chronic alcoholism can cause serious, irreversible changes in brain function, although this is more likely to be seen in older adults who have a long history of alcoholism. Alcohol use may have direct neurotoxic effects leading to a characteristic syndrome called alcohol-related dementia (ARD) or may be associated with the development of other dementing illnesses such as Alzheimer's disease or Wernicke-Korsakoff syndrome, an illness characterized by anterograde memory deficits, gait ataxia, and nystagmus. Indeed several researchers have cast doubt on the existence of ARD as a neuropathological disease and suggest that the majority of cases of ARD are in fact Wernicke-Korsakoff syndrome (Victor et al., 1989).

Sleep patterns typically change as people age (Haponik, 1992). Increased episodes of sleep with rapid eye movement (REM), decreased REM length, decreased stage III and IV sleep, and increased awakenings are common patterns, all of which can be worsened by alcohol use. Moeller and colleagues demonstrated in younger subjects that alcohol and depression had additive effects on sleep disturbances when occurring together (Moeller et al., 1993). One study concluded that sleep disturbances, especially insomnia, may be a potential etiologic factor in the development of late-life alcohol problems or in precipitating relapse (Oslin and Liberto, 1995). This hypothesis is supported by a study demonstrating that abstinent alcoholics experienced insomnia, frequent awakenings, and REM fragmentation (Wagman et al., 1977). However, when these subjects ingested alcohol, sleep periodicity normalized and REM sleep was temporarily suppressed, suggesting that alcohol can be used to self-medicate sleep disturbances.

Positive Effects of Alcohol Consumption

Small amounts of alcohol have been shown to provide some health benefits, although abstinence is still recommended for anyone who has a history of alcoholism or drug abuse, who is taking certain medications (see Chapter 3), or who is diagnosed with certain chronic diseases such as diabetes and congestive heart failure. Some studies, largely conducted on male samples, show that low levels of alcohol consumption (one standard drink per day or less) reduce the risks of coronary heart disease (Shaper et al., 1988). However, this cardiovascular benefit may not apply to adults already diagnosed with heart disease. Older adults in this category should not drink unless their physician says otherwise.

"An intriguing epidemiologic finding is the association of regular, but moderate, alcohol use (up to two drinks per day) with lower morbidity and mortality from coronary artery disease," especially in men, who compared with heavy alcohol users and abstainers (Atkinson and Ganzini, 1994, p. 302). "This U or J shaped relationship appears to be quite robust," occurring in diverse cultural and national cohorts (Atkinson and Ganzini, 1994, p. 302). That heavy drinkers have more coronary disease is to be expected, but why should abstainers have higher morbidity and mortality than moderate drinkers? One explanation may be that the abstainer group was heterogeneous in composition and may have included former alcoholics as well as others predisposed to cardiac disease (Atkinson et al., 1992). A number of other studies, including the only one reported to date that consisted of exclusively older adult subjects, likewise failed to account for this possibility in their study designs (Scherr et al., 1992).

Other analyses of abstainer groups report conflicting findings (Shaper et al., 1988; Klatsky et al., 1990). Further study is needed to determine the contributions of alcohol-induced rise in high-density lipoproteins (HDLs) (Srivastava et al., 1994; Davidson, 1989) and antioxidant effects of beverage alcohol (Artaud-Wild et al., 1993) to the association between abstinence and coronary artery disease.

Although moderate alcohol consumption has been shown to improve HDL levels in women (Fuchs et al., 1995), it also has been linked to breast cancer in postmenopausal women (Buchoz et al., 1995). More studies on the risks and benefits of alcohol consumption for older women are needed to clarify this issue.

Low levels of alcohol consumption also appear to promote and facilitate socialization among older adults, suggesting that alcohol plays an important role in community life for older adults (Gomberg, 1990). However, the
health of some older adults (e.g., those with chronic conditions, those using certain medications) may be compromised by any alcohol consumption. Again, recommendations for use of alcohol should always be individualized.

**Classifying Drinking Practices and Problems Among Older Adults**

Physiological changes, as well as changes in the kinds of responsibilities and activities pursued by older adults, make established criteria for classifying alcohol problems largely irrelevant for this population.

Two classic models for understanding alcohol problems - the medical diagnostic model and the at-risk, heavy, and problem drinking classification - include criteria that may not adequately apply to many older adults and may lead to underidentification of drinking problems (Atkinson, 1990).

**DSM-IV**

Most clinicians rely on the conventional medical model defined in the American Psychiatric Association's *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)* (American Psychiatric Association, 1994) for classifying the signs and symptoms of alcohol-related problems. The DSM-IV uses specific criteria to distinguish between those drinkers who abuse alcohol and those who are dependent on alcohol. Figures 2-1 and 2-2 present the DSM-IV criteria, which subsume alcohol abuse indicators within the general categories of substance abuse and dependence.

Although widely used, the DSM-IV criteria may not apply to many older adults who experience neither the legal, social, nor psychological consequences specified. For example, "a failure to fulfill major role obligations at work, school, or home" is less applicable to a retired person with minimal familial responsibilities. Nor does the criterion "continued use of the substance(s) despite persistent or recurrent problems" always apply. Many older alcoholics do not realize that their persistent or recurrent problems are in fact related to their drinking, a view likely to be reinforced by health care clinicians who may attribute these problems, in whole or in part, to the aging process or age-related comorbidities.

Although tolerance is one of the DSM-IV criteria for a diagnosis of substance dependence - and one weighted heavily by clinicians performing an assessment for substance dependence - the thresholds of consumption often considered by clinicians as indicative of tolerance may be set too high for older adults because of their altered sensitivity to and body distribution of alcohol (Atkinson, 1990). The lack of tolerance to alcohol does not necessarily mean that an older adult does not have a drinking problem or is not experiencing serious negative effects as a result of his or her drinking. Furthermore, many late onset alcoholics have not developed physiological dependence, and they do not exhibit signs of withdrawal. Figure 2-3 presents the DSM-IV criteria for substance dependence as they apply to older adults with alcohol problems.

The drinking practices of many older adults who do not meet the diagnostic criteria for abuse or dependence place them at risk of complicating an existing medical or psychiatric disorder. Consuming one or two drinks per day, for example, may lead to increased cognitive impairment in patients who already have Alzheimer's disease, may lead to worsening of sleep problems in patients with sleep apnea, or may interact with medications rendering them less effective or causing adverse side effects. A barrier to good clinical management in these cases may be the lack of understanding of the risks of so-called "moderate drinking." Limiting access to treatment because symptoms do not meet the rigorous diagnostic criteria of the DSM-IV may preclude an older patient from making significant improvements in his or her life.

**At-Risk, Heavy, and Problem Drinking**

Some experts use the model of at-risk, heavy, and problem-drinking in place of the DSM-IV model of alcohol abuse and dependence because it allows for more flexibility in characterizing drinking patterns. In this classification scheme, an at-risk drinker is one whose patterns of alcohol use, although not yet causing problems, may bring about adverse consequences, either to the drinker or to others. Occasional moderate drinking at social gatherings and then driving home is an example of at-risk drinking. Although an accident may not have occurred, all the elements for disaster are present.

As their names imply, the terms heavy and problem drinking signify more hazardous levels of consumption than at-risk drinking. Although the distinction between the terms heavy and problem is meaningful to alcohol treatment specialists interested in differentiating severity of problems among younger alcohol abusers, it may have less relevance for older adults (Atkinson and Ganzini, 1994), who may experience pervasive consequences with less consumption due to their heightened sensitivity to alcohol or the presence of such coexisting diseases as diabetes mellitus, hypertension, cirrhosis, or dementia.
In general, the threshold for at-risk alcohol use decreases with advancing age. Although an individual's health and functional status determine the degree of impact, the pharmacokinetic and pharmacodynamic effects of alcohol on aging organ systems result in higher peak blood alcohol levels (BALs) and increased responsiveness to doses that caused little impairment at a younger age. For example, body sway increases and the capacity to think clearly decreases with age after a standard alcohol load, even when controlling for BALs (Beresford and Lucey, 1995; Vogel-Sprott and Barret, 1984; Vestal et al., 1977).

Certain medical conditions, for example, hypertension and diabetes mellitus, can be made worse by regular drinking of relatively small amounts of alcohol. In addition, the tendency "to take the edge off" with alcohol during times of stress, and its subsequent impact on cognition and problem-solving skills, may provoke inadequate or destructive responses, even in those older adults whose overall consumption over 6 months is lower than that for some younger, problem-free, social drinkers. Furthermore, older drinkers who do not meet the substance abuse criteria for "recurrent use" behavior or consequences may, nonetheless, pose potential risk to themselves or others.

For many adults, the phenomenon of aging, with its accompanying physical vulnerabilities and distinctive psychosocial demands, may be the key risk factor for alcohol problems. To differentiate older drinkers, the Consensus Panel recommends using the terms at-risk and problem drinkers only. As discussed above, not only do the concepts of quantity/frequency implicit in the term heavy drinking have less application to older populations, but the "distinction between heavy and problem drinking narrows with age" (Atkinson and Ganzini, 1994, p. 300). In the two-stage conceptualization recommended by the Panel, the problem drinker category includes those who would otherwise fall into the heavy and problem classifications in the more traditional model as well as those who meet the DSM-IV criteria for abuse and dependence.

Age-Appropriate Levels of Consumption

In its Physician's Guide to Helping Patients With Alcohol Problems, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) offers recommendations for low-risk drinking. For individuals over the age of 65, NIAAA recommends "no more than one drink per day" (National Institute on Alcohol Abuse and Alcoholism, 1995). The Consensus Panel endorses that recommendation and the accompanying refinements presented below (Dufour et al., 1992):

- No more than one drink per day
- Maximum of two drinks on any drinking occasion (New Year's Eve, weddings)
- Somewhat lower limits for women.

A standard drink is one can (12 oz.) of beer or ale; a single shot (1.5 oz.) of hard liquor; a glass (5 oz.) of wine; or a small glass (4 oz.) of sherry, liqueur, or aperitif. The Panel's purpose in promoting these limits is to establish a "safety zone" for healthy older adults who drink. Older men and women who do not have serious or unstable medical problems and are not taking psychoactive medications are unlikely to incur problems with alcohol if they adhere to these guidelines. The goal is to foster sensible drinking that avoids health risks, while allowing older adults to obtain the beneficial effects that may accrue from alcohol. Older adults' alcohol use should be considered as spanning a spectrum from abstinence to dependence rather than falling into rigid categories.

Drinking Patterns Among Older Adults

Although more research on substance abuse among older adults is needed, studies to date suggest three ways of categorizing older adults' problem-drinking - early versus late onset drinking, continuous versus intermittent drinking, and binge drinking.

Early Onset Versus Late Onset Problem Drinking

One of the most striking and potentially useful findings in contemporary geriatric research is the new understanding about the age at which individuals begin experiencing alcohol-related problems. Although it appears that alcohol use declines with increasing age for most adults (Temple and Leino, 1989; Fillmore, 1987), some begin to experience alcohol-related problems at or after age 55 or 60.

Early onset drinkers tend to have longstanding alcohol-related problems that generally begin before age 40, most often in the 20s and 30s. In contrast, late onset drinkers generally experience their first alcohol-related problems after age 40 or 50 (Atkinson, 1984; Liberto and Oslin, 1995; Atkinson et al., 1990).

Early onset drinkers
Early onset drinkers comprise the majority of older patients receiving treatment for alcohol abuse, and they tend to resemble younger alcohol abusers in their reasons for use. Throughout their lives, early onset alcohol abusers have turned to alcohol to cope with a range of psychosocial or medical problems. Psychiatric comorbidity is common among this group, particularly major affective disorders (e.g., major depression, bipolar disorder) and thought disorders. For the most part, they continue their established abusive drinking patterns as they age (Schonfeld and Dupree, 1991; Atkinson, 1984; Atkinson et al., 1985, 1990; Stall, 1986).

**Late onset drinkers**

In comparison, late onset drinkers appear psychologically and physically healthier. Some studies have found that late onset drinkers are more likely to have begun or to have increased drinking in response to recent losses such as death of a spouse or divorce, to a change in health status, or to such life changes as retirement (Hurt et al., 1988; Finlayson et al., 1988; Rosin and Glatt, 1971). Because late onset problem drinkers have a shorter history of problem drinking and therefore fewer health problems than early onset drinkers do, health care providers tend to overlook their drinking. Panelists report that, in addition, this group's psychological and social pathology, family relationships, past work history, and lack of involvement with the criminal justice system contradict the familiar clinical picture of alcoholism. Late onset drinkers frequently appear too healthy, too "normal," to raise suspicions about problem drinking.

The literature suggests that about one-third of older adults with drinking problems are late onset abusers (Liberto and Oslin, 1995). Late onset alcoholism is often milder and more amenable to treatment than early onset drinking problems (Atkinson and Ganzini, 1994), and it sometimes resolves spontaneously. When appraising their situation, late onset drinkers often view themselves as affected by developmental stages and circumstances related to growing older. Early onset drinkers are more likely to have exacerbated their adverse circumstances through their history of problem alcohol use (Atkinson, 1994).

Data from the Epidemiologic Catchment Area Project (ECA), a large-scale, community-based survey of psychiatric disorders including alcohol abuse and dependence, provide relevant information on the occurrence of late onset alcoholism, which has been defined by various researchers as occurring after ages 40, 45, 50, or 60 (Bucholtz et al., 1995). From the ECA study, 3 percent of male alcoholics between 50 and 59 reported first having a symptom of alcoholism after 49, compared with 15 percent of those between 60 and 69 and 14 percent of those between 70 and 79. For women, 16 percent between 50 and 59 reported a first symptom of alcoholism after the age of 50, with 24 percent of women between 60 and 69 and 28 percent of women between 70 and 79. These percentages suggest that late onset alcoholism is a significant problem, especially among women. (Gender differences are discussed further below.)

Both early and late onset problem drinkers appear to use alcohol almost daily, outside social settings, and at home alone. Both are more likely to use alcohol as a palliative, self-medicating measure in response to hurts, losses, and affective changes rather than as a socializing agent.

Although there is controversy over the issue of whether early and late onset distinctions influence treatment outcomes (Atkinson, 1994), the Panel believes that problem onset affects the choice of intervention. Panelists believe, for example, that late onset problem drinkers may respond better than early onset drinkers to brief intervention because late onset problems tend to be milder and are more sensitive to informal social pressure (Atkinson, 1994; Moos et al., 1991). Figure 2-4 outlines the essential similarities and differences between early and late onset drinkers. The most consistent findings concern medical and psychiatric comorbidity; demographic and psychosocial factors are less consistent. Little is known about the impact of early versus late onset on the complications and treatment outcomes of concomitant medication and alcohol use.

**Continuous Versus Intermittent Drinking**

Another way of understanding the patterns of drinking over a life span is to look at the time frames in which people drink and the frequency of their drinking. In contrast to ongoing, continuous drinking, intermittent drinking refers to regular, perhaps daily, heavy drinking that has resumed after a stable period of abstinence of 3 to 5 years or more (National Institute on Alcohol Abuse and Alcoholism, 1995).

Intermittent drinking problems are easy to overlook, but crucial to identify. Even those problem drinkers who have been sober for many years are at risk for relapse as they age. For this reason, during routine health screenings, it is important for clinicians to take a history that includes both current and lifetime use of alcohol in order to identify prior episodes of alcoholism. When armed with this information, caregivers can help their older patients anticipate situations that tend to provoke relapse and plan strategies for addressing them when they occur.

**Binge Drinking**
Binge drinking is generally defined as short periods of loss of control over drinking alternating with periods of abstinence or much lighter alcohol use. A binge itself is usually defined as any drinking occasion in which an individual consumes five or more standard drinks. For older adults, the Consensus Panel defines a binge as four or more drinks per occasion. People who are alcohol-free throughout the work week and celebrate with Friday night or holiday "benders" would be considered binge drinkers.

Identifying older binge drinkers can be difficult because many of the usual clues, including disciplinary job actions or arrests for driving while intoxicated, are infrequently seen among aging adults who no longer work or drive. Although research is needed on the natural history of binge drinkers as they age, anecdotal observations indicate that younger binge drinkers who survive to their later years often become continuous or near-daily drinkers.

Risk Factors for Alcohol Abuse

Gender

Studies indicate that older men are much more likely than older women to have alcohol-related problems (Myers et al., 1984; Atkinson, 1990; Bucholz et al., 1995). Since the issue was first studied, most adults with alcohol problems in old age have been found to have a long history of problem drinking, and most of them have been men (D'Archangelo, 1993; Helzer et al., 1991b). About 10 percent of men report a history of heavy drinking at some point in their lives. Being a member of this group predicts that one will have widespread physical, psychological, and social dysfunction in later life (Colsher and Wallace, 1990) and confers a greater than fivefold risk of late-life psychiatric illness despite cessation of heavy drinking (Saunders et al., 1991). Forty-three percent of veterans (who can be assumed to be mostly male and mostly alcohol - as opposed to drug-abusers) receiving long-term care were found to have a history of substance abuse problems (Joseph et al., 1995; D'Archangelo, 1993). Men who drink have been found to be two to six times more likely to have medical problems than women who drink (Adams et al., 1993), even though women are more vulnerable to the development of cirrhosis.

Older women are less likely to drink and less likely to drink heavily than are older men (Bucholz et al., 1995). The ratio of male-to-female alcohol abusers, however, is an open question. Bucholz and colleagues noted a "substantial excess of men over women," larger than the gap observed in younger age groups (Bucholz et al., 1995, p. 30). Another study, however, found "a higher than expected number of females," (Beresford, 1995b, p. 11), whereas a study of older patients in treatment facilities found a ratio of 2:1 (83 men to 42 women) (Gomberg, 1995).

Both epidemiological research, including the findings of the ECA studies of the National Institute of Mental Health (Holzer et al., 1984), and clinical research consistently report later onset of problem drinking among women (Gomberg, 1995; Hurt et al., 1988; Moos et al., 1991). In one study by Gomberg, for example, women reported a mean age at onset of 46.2 years, whereas men reported 27.0 years. Furthermore, 38 percent of older female patients but only 4 percent of older male patients reported onset within the last 10 years (Gomberg, 1995).

A number of other differences between older male and female alcohol abusers have been reported: In contrast to men, women are more likely to be widowed or divorced, to have had a problem drinking spouse, and to have experienced depression (Gomberg, 1993). Women also report more negative effects of alcohol than men (Gomberg, 1994), greater use of prescribed psychoactive medication (Brennan et al., 1993; Gomberg, 1994; Graham et al., 1995), and more drinking with their spouses.

Although research has not identified any definite risk factors for drinking among older women, Wilsnack and colleagues suggest that increased amounts of free time and lessening of role responsibilities may serve as an etiological factor (Wilsnack et al., 1995). It should also be noted that women generally are more vulnerable than men to social pressure, so their move into retirement communities where drinking is common probably has an impact.

Differences between men and women have implications for treatment. Women of all ages are less likely than men to appear at treatment facilities. Among older women who may be socially isolated or homebound, outreach is particularly important. Families, physicians, senior centers and senior housing staff, and the police play important roles in helping to identify women who abuse alcohol (see Chapter 5 for more on community outreach). To be effective, however, all of these potential outreach agents must be sensitive to women's feelings of stigma, shame, and social censure.

Loss of Spouse

Alcohol abuse is more prevalent among older adults who have been separated or divorced and among men who have been widowed (Bucholz et al., 1995). Some researchers have hypothesized that a significant triad of
disorders may be triggered in older men when their wives die - depression, development of alcohol problems, and suicide. The highest rate of completed suicide among all population groups is in older white men who become excessively depressed and drink heavily following the death of their spouses (National Institute on Alcohol Abuse and Alcoholism, 1988; Brennan and Moos, 1996).

Other Losses
As individuals age, they not only lose their spouse but also other family members and friends to death and separation. Retirement may mean loss of income as well as job-related social support systems and the structure and self-esteem that work provides. Other losses include diminished mobility (e.g., greater difficulty using public transportation where available, inability to drive or driving limited to the daylight hours, problems walking); impaired sensory capabilities, which may be isolating even when the elder is in physical proximity to others; and declining health due to chronic illnesses.

Health Care Settings
High rates of alcoholism are consistently reported in medical settings, indicating the need for screening and assessment of patients seen for problems other than substance abuse (Douglass, 1984; Liberto et al., 1992; Adams et al., 1996). Among community-dwelling older adults, investigators have found a prevalence of alcoholism between 2 and 15 percent (Gomberg, 1992b; Adams et al., 1996) and between 18 and 44 percent among general medical and psychiatric inpatients (Colsher and Wallace, 1990; Saunders et al., 1991).

Substance Abuse Earlier in Life
A strong relationship exists between developing a substance use disorder earlier in life and experiencing a recurrence in later life. Some recovering alcoholics with long periods of sobriety undergo a recurrence of alcoholic drinking as a result of major losses or an excess of discretionary time (Atkinson and Ganzini, 1994). Among the 10 percent of older men who reported a history of heavy drinking at some point in their lives, widespread physical and social problems occurred in later life (Colsher and Wallace, 1990). Drinking problems early in life confer a greater than fivefold risk of late-life psychiatric illness despite cessation of heavy drinking. Indeed, some research suggests that a previous drinking problem is the strongest indicator of a problem in later life (Welte and Mirand, 1992) and that "studying older alcoholics today may help to anticipate the demands that these younger alcoholics will eventually place on our resources and society" (Bucholz et al., 1995, p. 19).

Comorbid Psychiatric Disorders
Estimates of primary mood disorder occurring in older alcohol abusers vary from 12 to 30 percent or more (Finlayson et al., 1988; Koenig and Blazer, 1996). Although research does not support the notion that mood disorders precede alcoholism in older adults, there is evidence that they may be either precipitating or maintenance factors in late onset drinking. Depression, for example, appears to precipitate drinking, particularly among women. Some problem drinkers of both sexes who do not meet the clinical criteria for depression often report feeling depressed prior to the first drink on a drinking day (Dupree et al., 1984; Schonfeld and Dupree, 1991).

Patients with severe cognitive impairment generally drink less than nonimpaired alcohol users. Panelists report that, among individuals who are only mildly impaired, however, alcohol use may increase as a reaction to lower self-esteem and perceived loss of memory. Axis II disorders are more likely to be associated with early onset interpersonal and alcohol-related problems and less likely to affect the individual for the first time at age 60 or older. Late onset alcohol abuse is less associated with psychological or psychiatric problems and more likely linked to age-associated losses. The exception might be the intermittent drinker who has been in control and whose alcohol or psychiatric problems surface again later in life. See Chapter 4 for more on psychiatric comorbidity.

Family History of Alcohol Problems
There is substantial cumulative evidence that genetic factors are important in alcohol-related behaviors (Cotton, 1979). Some studies have suggested that there may be a greater genetic etiology of problem drinking in early onset than in late onset male alcohol abusers (Atkinson et al., 1990). Researchers studying the genetic tendency of a group of male alcohol abusers assert that these men often have an early history of drinking that worsens over time (Goodwin and Warmack, 1991; Schuckit, 1989).

Although most human genetic studies of alcohol use have been conducted on relatively young subjects, several studies using a twin registry of U.S. veterans have focused on significantly older individuals (Carmelli et al., 1993;
Swan et al., 1990). The results of these studies provide strong evidence that drinking behaviors are greatly influenced by genetics throughout the lifespan (Heller and McClearn, 1995; Atkinson, 1984).

Concomitant Substance Use

The substances most commonly abused by older adults besides alcohol are nicotine and psychoactive prescription medications. (See Chapter 3 for further discussion of psychoactive drug abuse and of drug interactions.) Both nicotine and prescription drug abuse are far more prevalent among older adults who also abuse alcohol than among the general population of this age group (Gronbaek et al., 1994; Goldberg et al., 1994; Colsher et al., 1990; Finlayson et al., 1988). The Panel recognizes that the concomitant use of prescribed benzodiazepines and alcohol is also common among older adults, especially older women. This includes nonabusive use of both substances, which may be harmful even at modest doses, for example, consuming one or two drinks plus a small dose of a sedative at night. A similar concern is raised with the concomitant use of alcohol and opiates prescribed for pain relief. Although there is little empirical evidence in this area, clinical practice suggests that dual addiction decreases the effectiveness of specific interventions and increases the individual’s severity of symptoms.

Although there is little research on the abuse of other illicit substances (e.g., heroin, cocaine, marijuana) by older adults, therapists and health care personnel are seeing more older adults who present with symptoms of illicit drug abuse. Panel members believe that many of these older illicit drug abusers receive drugs from a younger relative or partner who uses or sells drugs.

Tobacco

Smoking is the major preventable cause of premature death in the United States, accounting for an estimated five million years of potential life lost (U. S. Preventive Services Task Force, 1996). Every year, tobacco smoking is responsible for one out of every five American deaths (U. S. Preventive Services Task Force, 1996). Despite these compelling statistics, however, 25.5 percent or 48 million adults are current smokers (National Center for Health Statistics, 1996).

Surveys show that cigarette smoking, although fairly widespread among older adults, declines sharply after age 65. In 1994, approximately 28 percent of men ages 45 to 64 reported current use of cigarettes; among those age 65 and older, however, this figure was only about 13 percent. In the younger age group (ages 45 to 64), women have lower smoking rates than men, but after age 65, the levels are similar. Approximately 23 percent of women ages 45 to 64 reported smoking cigarettes in 1994, whereas about 11 percent of those age 65 and older currently smoked (National Center for Health Statistics, 1996). Although the trend in use declines with age, the problem remains significant with over 4 million older adults smoking regularly (Salive et al., 1992).

Smoking is a "major risk factor for at least 6 of the 14 leading causes of death among individuals 60 years and older (i.e., heart disease, cerebrovascular disease, chronic obstructive pulmonary disease, pneumonia/influenza, lung cancer, colorectal cancer) and a complicating factor of at least three others" (Cox, 1993, p. 424). Current cigarette smoking is also "associated with an increased risk of losing mobility in both men and women" (LaCroix et al., 1993). Not surprisingly, older adult smokers have a "70 percent overall risk of dying prematurely" (Carethers, 1992, p. 2257), and fewer smokers "make it to the ranks of older adults as compared with non-smokers and quitters" (Cox, 1993, p. 423). In addition to increasing the risk of disease, smoking may also affect the performance of prescription drugs. For example, smokers tend to require higher doses of benzodiazepines to achieve efficacy than do nonsmokers (Ciraulo et al., 1995).

Smoking in older problem drinkers is far more prevalent than in the general older adult population, making tobacco use the most common substance use disorder among older adults. Some researchers estimate that 60 to 70 percent of older male alcohol users smoke a pack a day (Finlayson et al., 1988), an assessment consistent with studies indicating that the prevalence of smoking among alcoholics generally is above 80 percent (Jarvik and Schneider, 1992).

Although there have been few studies on interventions that are especially useful to older adults regarding smoking cessation, the advantages of quitting at any age are clear (Fiore et al., 1990; Orleans et al., 1994a; Rimer and Orleans, 1994; Orleans et al., 1994b). Two years after stopping, for example, the risk of stroke begins to decrease. Mortality rates for chronic obstructive pulmonary disease decline; bronchitis, pneumonia, and other infections decrease; and respiratory symptoms such as cough, wheezing, and sputum production lessen (U. S. Preventive Services Task Force, 1996). As another example, a 60-year-old male smoker who quits can expect to reduce his risk of smoking-related illness by about 10 percent over the next 15 years (Cox, 1993).

As with alcohol and drug abuse, studies suggest that many clinicians fail to counsel patients about the health
effects of smoking, despite the fact that "older smokers are more likely to quit than younger smokers" (Salive et al., 1992, p. 1268). However, tailoring smoking cessation strategies to older adults so that their unique concerns and barriers to quitting are addressed improves success rates. Brief intervention, for example (see Chapter 5), can more than double 1-year quit rates for older adults (Rimer and Orleans, 1994). In one study of older smokers using transdermal nicotine patches, 29 percent of the subjects quit smoking for 6 months (Orleans et al., 1994). Because there is little evidence that adults in recovery from alcohol problems relapse when they stop smoking, the Panel recommends that efforts to reduce substance abuse among older adults also include tobacco smoking (Hurt et al., 1993).

Psychoactive Drugs

Older adults' use of psychoactive drugs combined with alcohol is a growing concern (see Chapter 3). In a study of inpatients age 65 and older in a chemical dependency program, 12 percent had combined dependence on alcohol and one or more prescription drugs (Finlayson et al., 1988). In addition, an early report by Schuckit and Morrissey found that two-thirds of women in an alcohol treatment center had received prescriptions for abusable drugs, usually hypnotic and antianxiety drugs, and one-third reported abusing them (Schuckit and Morrissey, 1979). The drug-abusing women in this study reported more suicide attempts and early antisocial problems and had received more psychiatric care than the alcoholic women who did not abuse their prescriptions. These findings are of particular concern because anxiolytics, hypnotics, and stimulants may be used to treat alcohol and other drug abusers.

An additional concern is that psychoactive drugs may combine with alcohol to create adverse drug reactions. A recent study found that the combination of alcohol and over-the-counter pain medications was the most common source of adverse drug reactions among older patients (Forster et al., 1993). Such drug interactions result from a lack of understanding among physicians, pharmacists, and older adults themselves about the potential dangers of consuming alcohol when taking certain medications.
Table 2-1: DSM-IV Diagnostic Criteria for Substance Abuse

<table>
<thead>
<tr>
<th>DSM-IV Diagnostic Criteria for Substance Abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>The DSM-IV defines the diagnostic criteria for substance abuse as a maladaptive pattern of substance use leading to clinically significant impairment or distress, as manifested by one or more of the following, occurring within a 12-month period:</td>
</tr>
<tr>
<td>1. Recurrent substance use resulting in a failure to fulfill major role obligations at work, school, or home (e.g., repeated absences or poor work performance related to substance use; substance-related absences, suspensions, or expulsions from school; neglect of children or household).</td>
</tr>
<tr>
<td>2. Recurrent substance use in situations in which it is physically hazardous (e.g., driving an automobile or operating a machine when impaired by substance use).</td>
</tr>
<tr>
<td>3. Recurrent substance-related legal problems (e.g., arrests for substance-related disorderly conduct).</td>
</tr>
<tr>
<td>4. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of the substance (e.g., arguments with spouse about consequences of intoxication, physical fights).</td>
</tr>
</tbody>
</table>

### Figure 2-4: Clinical Characteristics of Early and Late Onset Problem Drinkers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Early Onset</th>
<th>Late Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age at onset</td>
<td>Various, e.g., &lt; 25, 40, 45</td>
<td>Various, e.g., &gt; 55, 60, 65</td>
</tr>
<tr>
<td>Gender</td>
<td>Higher proportion of men than women</td>
<td>Higher proportion of women than men</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td>Tends to be lower</td>
<td>Tends to be higher</td>
</tr>
<tr>
<td>Drinking in response to stressors</td>
<td>Common</td>
<td>Common</td>
</tr>
<tr>
<td>Family history of alcoholism</td>
<td>More prevalent</td>
<td>Less prevalent</td>
</tr>
<tr>
<td>Extent and severity of alcohol problems</td>
<td>More psychosocial, legal problems, greater severity</td>
<td>Fewer psychosocial, legal problems, lesser severity</td>
</tr>
<tr>
<td>Alcohol-related chronic illness (e.g., cirrhosis, pancreatitis, cancers)</td>
<td>More common</td>
<td>Less common</td>
</tr>
<tr>
<td>Psychiatric comorbidities</td>
<td>Cognitive loss more severe, less reversible</td>
<td>Cognitive loss less severe, more reversible</td>
</tr>
<tr>
<td>Age-associated medical problems aggravated by alcohol (e.g., hypertension, diabetes mellitus, drug-alcohol interactions)</td>
<td>Common</td>
<td>Common</td>
</tr>
<tr>
<td>Treatment compliance and outcome</td>
<td>Possibly less compliant; Relapse rates do not vary by age of onset (Atkinson et al., 1990; Blow et al., 1997; Schonfeld and Dupree, 1991)</td>
<td>Possibly more compliant; Relapse rates do not vary by age of onset (Atkinson et al., 1990; Blow et al., 1997; Schonfeld and Dupree, 1991)</td>
</tr>
</tbody>
</table>

Chapter 3 - Use and Abuse of Psychoactive Prescription Drugs and Over-the-Counter Medications

Adults age 65 and older consume more prescribed and over-the-counter medications than any other age group in the United States. Although older adults constituted less than 13 percent of the population in 1991, they received 25 to 30 percent of all prescriptions (Woods and Winger, 1995; Ray et al., 1993; Sheahan et al., 1989) and experienced more than half of all reported adverse drug reactions leading to hospitalization (Chastain, 1992). Some 80 to 86 percent of older adults over age 65 reportedly suffer from one or more chronic diseases or conditions (Administration on Aging and Staff of the U. S. Senate Special Committee on Aging, 1991; U. S. Bureau of the Census, 1996), and an estimated 83 percent of adults over 65 take at least one prescription drug (Hazelden Foundation, 1991; Ray et al., 1993). In fact, 30 percent of those over 65 take eight or more prescription drugs daily (Sheahan et al., 1989).

A large share of prescriptions for older adults are for psychoactive, mood-changing drugs that carry the potential for misuse, abuse, or dependency. In 1983, one-fourth of community-dwelling older adults used psychotherapeutic drugs on a regular basis for sleep disorders or chronic pain as well as for anxiety and labile mood (Finlayson, 1995b). Approximately 25 to 28 percent of older adults reported use of a psychoactive drug within the last year, and 20 percent used a tranquilizer daily. Indeed, 27 percent of all tranquilizer prescriptions and 38 percent of hypnotic prescriptions in 1991 were written for older adults. Moreover, older adults are apparently more likely to continue use of psychoactive drugs for longer periods than their younger counterparts (Sheahan et al., 1995; Woods and Winger, 1995).

This chapter focuses on the most commonly prescribed abusable psychoactive medications for older adults - benzodiazepines, antidepressants, and opioid/opioid analgesics. Also covered are risk factors that make older adults more vulnerable to misuse and abuse of these substances; adverse effects associated with consumption of psychoactive medications; and uses for, effects of, and alternatives to different categories of prescription drugs.

Evolution of Psychoactive Prescribing

Since their introduction in the late 1950s, benzodiazepines have become the most widely prescribed anxiolytics and hypnotics in medical practice. Their growing use throughout the 1960s prompted many to ask whether the United States was becoming an overmedicated society in which people would take a pill for any physical or emotional pain rather than exert some simple self-control. Some researchers feared that use of prescribed psychoactive drugs for a vast array of conditions would inexorably lead to irresponsible recreational use or physiological dependence on licit or illicit substances. Others thought that prevalence of associated psychosocial problems would rise along with the prescription drug use (Balter, 1973; Manheimer et al., 1973; Cooperstock and Parnell, 1982).

Yet studies of older populations conducted over the past 20 years have generally found that most adults who take psychoactive medications do not intend to abuse them. The drugs usually are obtained with an appropriate prescription from a primary care physician for a specific health-related purpose and are primarily used in conjunction with a physical condition or to alleviate symptoms of emotional stress (Piland, 1979; Guttmann, 1977; Cooperstock and Parnell, 1982). In fact, there has been a steady improvement in prescribing practices and safe and appropriate medication use in the last 25 years.

Misuse and abuse of prescriptions have dwindled over that time for several reasons: (1) safer drugs with fewer undesirable side effects are constantly being developed by pharmaceutical companies, especially for common health and mental health problems; (2) ever-changing Federal and State regulations seek to protect consumers from hazardous substances and to restrict undesirable provider practices; (3) guidelines and protocols recommending best practices are being developed and disseminated to health care providers; (4) more physicians are receiving training relevant to the care of older patients (from geriatric research, education, and clinical centers); and (5) consumers are being educated by their physicians and other health care providers, pharmacists, and various media sources regarding the dangers of drug interactions and the importance of medication compliance for positive therapeutic outcomes.
More specifically, benzodiazepines with a lower addiction potential and fewer adverse interactions with other medications have replaced many of the older barbiturates, bromides, meprobamate, and neuroleptics for management of anxiety, especially acute situational anxiety, generalized anxiety disorder, and associated transient insomnia. Similarly, in the 1960s, the benzodiazepine flurazepam (Dalmane) replaced many of the barbiturates and nonbarbiturates routinely used for sleep disorders and insomnia complaints. Displaced drugs included such barbiturates as pentobarbital (Nembutal), secobarbital (Seconal), and the combination aprobarbital and secobarbital (Tuinal), as well as the nonbarbiturates chloral hydrate, ethchlorvynol (Placidyl), and glutethimide (Doriden) (Fouts and Rachow, 1994; Finlayson, 1995b; Rickels and Schweizer, 1993). Sales reports and pharmacy prescription audits reflect the overall decline in the numbers of stimulant and barbiturate prescriptions, with minor tranquilizers and/or sedatives exceeding other classes since the 1980s (Cooperstock and Parnell, 1982). Prescriptions for the popular anxiolytic benzodiazepines have more recently shifted from diazepam (Valium) to the shorter acting compounds, particularly alprazolam (Xanax) and lorazepam (Ativan), and from the earlier long-acting benzodiazepine hypnotic, flurazepam, to the shorter acting triazolam (Halcion) and temazepam (Restoril). Overall, sales of benzodiazepine anxiolytics have decreased, whereas use of benzodiazepines as sleep-inducing hypnotics has increased or remained stable (Winger, 1993; Woods and Winger, 1995).

In 1996, the top 10 drugs prescribed in nursing homes included two selective serotonin reuptake inhibitors (SSRIs), sertraline (Zoloft) and fluoxetine (Prozac), as well as the nonbenzodiazepine anxiolytic, buspirone (BuSpar). This represents a decrease from 1970, when 8 of the top 10 nursing home prescriptions were for psychoactive drugs (Prentice, 1979). Furthermore, chronic pain from such conditions as arthritis is more frequently treated now with nonsteroidal anti-inflammatory agents rather than with opiate-containing drugs such as acetaminophen with codeine (Finlayson, 1995b). Yet even though fewer prescriptions for psychoactive drugs are being written for older adults, many patients prescribed these drugs still misuse and abuse them, and some health care providers continue to exhibit poor judgment in their prescribing and monitoring practices.

Patterns of Use

The drug-taking patterns of psychoactive prescription drug users can be described as a continuum that ranges from appropriate use for medical or psychiatric indications through misuse by the patient or the prescribing health care practitioner to persistent abuse and dependence as defined by the American Psychiatric Association’s criteria in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) (American Psychiatric Association, 1994) (see Figure 3-1). Because older adults are less likely to use psychoactive medications nontherapeutically, problems with drugs generally fall into the misuse category and are unintentional. For example, older patients are more likely to misunderstand directions for appropriate use - a problem that is compounded by the multiple prescriptions they receive, often from multiple physicians unaware of a colleague’s treatments. In these circumstances, overdose, additive effects, and adverse reactions from combining drugs are more likely to occur. Unintentional misuse can, however, progress into abuse if an older adult continues to use a medication nontherapeutically for the desirable effects it provides, much as an abuser of any drug does.

Adults can become physiologically dependent on psychoactive medications without meeting dependence criteria. Tolerance and physical dependence can develop when some psychoactive medications (e.g., benzodiazepines, opioids) are taken regularly at the therapeutically appropriate dose for relatively brief periods. An abstinence syndrome or withdrawal effects may occur if the drug is stopped precipitously. This type of iatrogenically induced physiological dependence is not usually accompanied by any tendency on the part of the patient to escalate dosage during or after medically supervised withdrawal, to experience cravings after discontinuation, or to subsequently continue use or addictive behavior (Woods and Winger, 1995; Portenoy, 1993). In other words, adults can become dependent on psychoactive medications without realizing it.

Risk Factors for Misuse And Abuse of Psychoactive Drugs

A variety of factors influence the use and potential for misuse or abuse of psychoactive prescription drugs and over-the-counter medications by older adults. The aging process, with its physiological changes, accumulating physical health problems, and other psychosocial stressors, makes prescription drug use both more likely and more risky. The most consistently documented correlates of psychoactive prescription drug use are old age, poor physical health, and female gender (Cooperstock and Parnell, 1982; Sheahan et al., 1989; Finlayson, 1995b).

Among older women, use of psychoactive drugs is correlated with middle- and late-life divorce, widowhood, less education, poorer health and chronic somatic problems, higher stress, lower income, and more depression and anxiety (Gomberg, 1995; Closser and Blow, 1993). Major losses of economic and social supports, factors related to the provider and health care system, and previous or coexisting drug, alcohol, or mental health problems also seem to increase vulnerability for misusing or abusing prescribed medications.
Chapter 3 - Use and Abuse of Psychoactive Prescription Drugs and Over...

Data from the 1984 Epidemiological Catchment Area (ECA) survey (Regier et al., 1988) confirm that anxiety disorders are relatively prevalent in the general population of adults older than 65, with 7.3 percent of older respondents reporting an incidence within the past month. Older women are nearly twice as likely as older men to develop a diagnosable anxiety disorder. Bereavement precipitates anxiety in nearly one-fourth of survivors during the first 6 months following the death of a loved one and in nearly two-fifths of those left behind during the second 6-month period. Anxiety is also common after a severe traumatic event (Salzman, 1993a).

System and Environmental Influences

A variety of health care system-related and environmental factors also place older adult users of psychoactive prescription drugs at risk for misuse of these substances, serious adverse effects, or abuse and dependence. Potentially dangerous prescribing practices include ordering medications without adequate diagnoses or other documented indicators of symptoms, prescribing them for too long a time without appropriate medical monitoring of drug reactions and patient compliance with the prescribed regimen, selecting drugs known to have a high potential for side effects in older adults at the doses given, ordering drugs without knowing or reviewing whether they interact adversely with other medications the patient is taking, and failing to provide adequate and comprehensible instructions for patients regarding how and when to take medications and what side effects to expect and report. Drug misuse also includes failure to consider the influence of aging on the effects of drugs in the body (see Figure 3-2).

Previous History of Substance Abuse or Psychiatric Disorder

Although most experts agree that nonmedical use or abuse of benzodiazepines is rare at any age and household surveys indicate that nonmedical use is declining (Salzman, 1993b; Barnas et al., 1992), some liability for abuse of the benzodiazepines does seem to exist in the following cohorts: (1) light-to-moderate alcohol drinkers who have been demonstrated to prefer diazepam over placebo and may be vulnerable to the reinforcing properties of these drugs; (2) adults with histories of sedative abuse, abuse of multiple drugs, and methadone-maintained clients; and (3) patients who have developed physiological dependence on benzodiazepines after long-term use and are experiencing acute withdrawal effects following abrupt discontinuation (Salzman, 1993b; Barnas et al., 1992).

However, continued craving for the medication does not seem to persist among adults who fit none of the categories above and who have successfully been withdrawn from benzodiazepines. By contrast, adults with histories of substance abuse prefer benzodiazepines to placebo. They also prefer, however, older anxiolytics and hypnotics such as methaqualone (Quaalude) or meprobamate (Miltown) to benzodiazepines (Winger, 1993; Woods and Winger, 1995). The benzodiazepines preferred by sedative abusers and methadone maintenance clients seem to be diazepam, lorazepam, and alprazolam (Woods and Winger, 1995). Unfortunately, little is known about the risk potential for these individuals in late life.

Data from the Mayo Clinic further suggest that psychiatric diagnoses may be a risk factor among older adults for abuse of and dependence on prescription drugs (Finlayson, 1995a). In this study, rates of mental disorder diagnosis in 100 older adults hospitalized for prescription drug dependence included the following disorders: mood (32 percent), organic mental (28 percent), personality (27 percent), somatoform (16 percent), and anxiety (12 percent). The patient group was predominantly female, and some patients had more than one mental disorder diagnosis. The patient group was identified as having considerable psychopathology by several other measures as well (Finlayson, 1995a). Although research on older drug addicts is rare, at least one study indicates that older patients with substance dependence disorders are more likely than younger drug addicts to have a dual diagnosis. In this investigation, only 15 percent of older drug-dependent patients had a substance abuse diagnosis without a coexisting psychiatric disorder compared with 64 percent of younger counterparts. These researchers concluded that older adults with a preexisting psychiatric disorder may be more at risk for concurrent prescription drug dependence (Solomon et al., 1993).

Adverse Effects

The chronic administration of psychoactive substances to older adults, even at therapeutic doses, has been associated with a variety of adverse central nervous system effects, including diminished psychomotor performance, impaired reaction time, loss of coordination, ataxia, falls, excessive daytime drowsiness, confusion, aggravation of emotional state, rage, and amnesia as well as the development of physiological dependence manifested by withdrawal effects when the drugs are suddenly discontinued (Fouts and Rachow, 1994). Psychoactive medications have been implicated in 23 percent of adverse drug reactions among nursing home residents (Joseph, 1995). Side effects from these drugs range from constipation, dry mouth, or urinary difficulty to such severe reactions as hip fractures from falls, withdrawal seizures or delirium, and worsened depression.
leading to suicide attempts (American Psychiatric Association, 1994). However, all undesirable reactions may be more serious in frail older adults and in those with multiple chronic diseases and cannot be ignored (Lapane et al., 1995; Solomon et al., 1993).

**Anxiolytics**

Figure 3-3 summarizes information about some of the anxiolytics most frequently prescribed for acute or chronic anxiety in older adults. The figure depicts the generic and most usual brand name for these medications as well as the elimination half-life or duration of action in the body. Note that Figures 3-3 and 3-4 both contain the names of benzodiazepines, their designations as anxiolytics or sedative/hypnotics are based on properties that drive marketing decisions. Some physicians may choose, for example, to use lorazepam as either an anxiolytic or sedative depending on the circumstances.

An estimated 95 percent of benzodiazepine prescriptions for older adults in this country are ordered for anxiety and insomnia, with only 5 percent used as adjuncts for general anesthesia, as muscle relaxants, or as anticonvulsants (Ray et al., 1993). Numerous studies, including the 1990 American Psychiatric Association Task Force report, have concluded that the vast majority of use of these agents is appropriate, with only occasional overprescribing by physicians for some patient subgroups or misuse by patients (Salzman, 1990, 1993b; Winger, 1993; Woods and Winger, 1995). Even among the small group of respondents to household surveys who have acknowledged taking benzodiazepines that were not prescribed for them (less than 6 percent), the vast majority borrowed pills from significant others and used them for symptom relief, not recreational purposes. Moreover, worldwide experience with the short-term use of benzodiazepines to relieve acute anxiety, situational stress, and transient insomnia indicates that these medications are unusually safe and efficacious, with very little liability for dose increases, prolonged use, or addictive dependence (Salzman, 1993b).

Although most people use benzodiazepines for short periods of time without developing problems, others take them past the point where they are effective and thus are at risk for adverse effects including tolerance and abuse. By 1990, as many as a fourth of anxiolytic users had taken these medications for a year or more (Winger, 1993). Several studies in the United States and Britain confirm that long-term users (for a year or more) of benzodiazepines are likely to be older than age 45 and female with substantial psychological stress, dysphoric or depressive symptoms, and multiple chronic physical illnesses or somatic problems (Salzman, 1993b; Winger, 1993). Benzodiazepine use for longer than 4 months is of particular concern among older adults. The physiological aging process decreases the body's ability to absorb and metabolize drugs, allowing the drug to accumulate more rapidly than in younger people and increase the likelihood of toxicity and adverse effects. Benzodiazepines have variable rates of absorption, with metabolism occurring primarily in the liver. Because the longer acting benzodiazepines have active metabolites, some of which have very long half-lives - up to 200 hours in the case of flurazepam - the duration of action is often longer than expected. They are also more likely to produce residual sedation and other adverse effects such as decreased attention, memory, cognitive function, and motor coordination and increased injurious falls or motor vehicle crashes (Weiss, 1994; Solomon et al., 1993; Fouts and Rachow, 1994; Ray et al., 1993; Winger, 1993). By contrast, some shorter acting benzodiazepines are not as likely to produce toxic or dependence-inducing effects with chronic dosing. One reason is that these drugs have no active metabolites. Furthermore, because the oxidative pathway is often impaired in older adults and in those with liver disease, it is best to choose drugs that are not metabolized by this pathway. Such drugs include oxazepam (Serax) and lorazepam. Because of these unpleasant and potentially hazardous side effects of many benzodiazepines, the Panel recommends caution in selecting the most appropriate benzodiazepine for elderly patients.

Unfortunately, both long- and short-acting benzodiazepines tend to result in physiological dependence, even when these medications are taken at therapeutic doses and for as short a period as 2 months (Woods and Winger, 1995). Many of the most unpleasant withdrawal effects can be alleviated by gradually tapering the dose rather than stopping it abruptly. Even if the dose is tapered, however, withdrawal symptoms are experienced by 40 to 80 percent of people who discontinue benzodiazepines after 4 to 6 months of regular use (Miller et al., 1985; Speirs et al., 1986). Such symptoms as anxiety, agitation, lethargy, nausea, loss of appetite, insomnia, dizziness, tremor, poor coordination, difficulty concentrating, depersonalization, or confusion may occur after stopping either long or short half-life benzodiazepines. Symptoms usually peak toward the end of the tapered discontinuation and disappear altogether within 3 to 5 weeks (Winger, 1993; Rickels and Schweizer, 1993). In a few psychiatric patients, the withdrawal syndrome has been known to persist for several months (Solomon et al., 1993).

The rebound effects experienced in withdrawal usually mimic the original symptoms for which the benzodiazepine was prescribed (e.g., anxiety, insomnia, panic). Those effects occur in as many as one-third to one half of patients after even 1 or 2 months of benzodiazepine therapy, may be more intense than before treatment began, and are frequently misperceived by frightened patients as a return of the initial problem (Rickels and Schweizer, 1993; ...
Salzman, 1993b). Rebound effects, however, are sudden and transient, whereas a relapse entails a gradual but persistent return of the original symptoms that may continue unabated unless treated again with benzodiazepines or other appropriate medications (Rickels and Schweizer, 1993).

Unfortunately, misperceived rebound effects may lead some patients to self-medicate by supplementing doses during withdrawal unless the tapering is sufficiently gradual to ameliorate symptoms and the patient is counseled that these rebound effects are transient and to be expected (Rickels and Schweizer, 1993). Unlike withdrawing from alcohol, however, the difficulty in abstaining during the acute phase of benzodiazepine withdrawal is not followed by any further craving once the patient is drug-free (Winger, 1993). It appears that most patients withdrawn from benzodiazepines can maintain abstinence.

The question of whether the benefits outweigh the disadvantages of chronic benzodiazepine therapy is far from settled. Followup studies have found that more than half of patients (50 to 66 percent) treated with benzodiazepine anxiolytics or hypnotics experience a relapse of the original symptoms within a year of discontinuing benzodiazepine use (Atkinson et al., 1992). Half of these patients resume use of benzodiazepines. Longer followup studies indicate that a majority eventually resume use, whether intermittently or chronically (Finlayson, 1984). The reasons for discontinuation have to be examined in an individually calculated risk-benefit model by weighing the linkage between untreated anxiety or insomnia and alcoholism, depression, and suicide (Woods and Winger, 1995). Many researchers, moreover, argue that anxiety is undermedicated with benzodiazepines and that as many as 60 percent of patients who have legitimate medical or psychological reasons for high levels of stress and anxiety do not seek or obtain relief for these conditions (Salzman, 1993a).

Salzman (1993b) makes a compelling case that chronic benzodiazepine use may be appropriate for patients he characterizes as older (but not necessarily elderly), with a number of chronic illnesses and compromised physical and/or psychosocial functioning. This group includes patients who are often in pain, dysphoric, or depressed as well as anxious, suffering from insomnia, or willing to visit their physicians. Chronic users of this type may experience side effects from benzodiazepines or incur mild interactions with other drugs they are taking, but they are not purposefully abusing psychoactive drugs or mixing them with alcohol. Benzodiazepine prescriptions seem to be clearly indicated for patients with overwhelming stress or anxiety that compromises functioning for short periods of time and for chronically medically ill, usually older, patients (Salzman, 1993b).

One new drug, the serotonin agonist buspirone, is a promising alternative to benzodiazepines for the treatment of chronic anxiety with associated depressive symptoms. It apparently produces minimal sedative effects and little or no impairment of cognitive or psychomotor functioning, is not synergistic with most other psychoactive drugs or alcohol, and has little observed potential for causing tolerance or dependence, withdrawal, or overdose. Buspirone does not have the muscle relaxant or anticonvulsant properties of benzodiazepines. However, it does have some side effects at higher doses, and it is not immediately or invariably effective in ameliorating anxiety. The efficacy of buspirone for older patients is still being examined; it may precipitate some manic effects. Also, dosages should be reduced for those with decreased renal or hepatic functioning (Winger, 1993; Weiss, 1994; Ray et al., 1993; Bezchlibnyk-Butler and Jeffries, 1995).

**Sedative/Hypnotics**

Sleep disturbances are a common complaint among older adults, occurring in approximately half of Americans over age 65 who live at home and in two-thirds of those in long-term care facilities. Complaints about insomnia, which increase with advancing age, occur in conjunction with a variety of psychiatric, medical, or pharmacological problems as well as the changing circadian rhythms that accompany the aging process (National Institutes of Health, 1990; Fouts and Rachow, 1994; Mullan et al., 1994).

As previously noted, benzodiazepines have replaced older and more toxic hypnotics (e.g., secobarbital, ethchlorvynol, glutethimide), which have a high addiction liability and difficult-to-treat overdose potential and which also tend to accumulate in older adults with chronic dosing as their capabilities for drug absorption and elimination diminish (Solomon et al., 1993; Bezchlibnyk-Butler and Jeffries, 1995). Nearly two out of five prescriptions for benzodiazepines (38 percent) in 1991 were written for older patients (National Institutes of Health, 1990; Fouts and Rachow, 1994). As with anxiolytics, the shorter acting hypnotic benzodiazepines are generally favored over longer acting ones that tend to accumulate in older adults and produce undesirable effects in the central nervous system. Today, the most commonly prescribed hypnotic benzodiazepines are oxazepam, temazepam, triazolam, and lorazepam (Fouts and Rachow, 1994).

Unfortunately, hypnotic benzodiazepines, like the anxiolytics, also tend to be prescribed for longer than needed for efficacy, a situation that leads to the well-known drawbacks of withdrawal and rebound insomnia (Fouts and Rachow, 1994). In 1990, for example, 23 percent of adults who used benzodiazepine hypnotics (mostly the short-acting triazolam) had used them nightly for at least 4 months (Woods and Winger, 1995).
Figure 3-4 displays information about some sedative/hypnotics frequently prescribed for insomnia, listing the generic name, the common trade name, and the elimination half-life or expected duration of action in the body. The commonly prescribed oxazepam and lorazepam are listed with the benzodiazepine anxiolytics.

Although aging changes sleep architecture, decreasing the amount of time spent in the deeper levels of sleep (stages three and four) and increasing the number and duration of awakenings during the night, these new sleep patterns do not appear to bother most medically healthy older adults who recognize and accept that their sleep will not be as sound or as regular as when they were younger (National Institutes of Health, 1990; Mullan et al., 1994). Rather, insomnia complaints among older adults are usually associated with a secondary medical or psychiatric disorder, psychosocial changes and stressors, or the use of medications that interfere with sleep (National Institutes of Health, 1990; Mullan et al., 1994).

Among the drugs causing poor sleep patterns are the antidepressant monoamine oxidase (MAO) inhibitors and SSRIs; anti-Parkinson medications; appetite suppressors; the beta-blocker for hypertension, propranolol (Inderal); and alcohol. Sleep apnea, in particular, may be aggravated by the use of a benzodiazepine (Culebras, 1992). Insomnia has also been related to depression and anxiety, Alzheimer's disease, Parkinson's disease, cardiovascular disease, arthritis, pain, urinary problems, prostate disease, pulmonary disease, hyperthyroidism, and endocrinopathies. Sleep disruption as well as anxiety commonly accompany other psychosocial adjustments such as retirement, bereavement, dislocation, or traumatic situations (National Institutes of Health, 1990; Mullan et al., 1994). Sleep complaints are also associated with female gender, living alone or in a nursing facility, activity limitations, and sleep habits such as excessive daytime napping (Mullan et al., 1994).

With respect to treatment of insomnia, a 1990 National Institutes of Health consensus development conference statement pertaining to sleep disorders of older adults specifically cautioned against relying on hypnotic benzodiazepines as the mainstay for managing insomnia (National Institutes of Health, 1990). Although these medications can be useful for short-term amelioration of temporary sleep problems, no studies demonstrate their long-term effectiveness beyond 30 continuous nights, and tolerance and dependence develop rapidly (Mullan et al., 1994; National Institutes of Health, 1990; Salzman, 1993b). In fact, symptomatic treatment of insomnia with medications should be limited to 7 to 10 days with frequent monitoring and reevaluation if the prescribed drug will be used for more than 2 to 3 weeks. Intermittent dosing at the smallest possible dose is preferred, and no more than a 30-day supply of hypnotics should be prescribed. Given the changes associated with drug metabolism among older patients, all hypnotic medications should be used with caution, especially those with long half-lives (National Institutes of Health, 1990; Fouts and Rachow, 1994; Mullan et al., 1994). As with the anxiolytic benzodiazepines, withdrawal effects signifying physiological dependence are common concomitants of precipitous medication discontinuation, especially of the short-acting compounds. The REM sleep rebound effects from abruptly stopping a chronically administered benzodiazepine hypnotic can last 1 to 3 weeks or longer (Mullan et al., 1994; Fouts and Rachow, 1994).

Furthermore, sedative/hypnotics, as well as benzodiazepines, used for sleep induction may cause confusion and equilibrium problems in older users who get up frequently during the night (e.g., to go to the bathroom). When treating older adults, situations likely to increase the incidence of falls with subsequent injury should be avoided at all costs. In addition, drugs taken at night for sleep induction will be potentiated by any alcohol the individual has used during the evening.

Instead of relying on drugs as a first line of approach, treatment should initially be directed toward any underlying disorder (e.g., depression, alcoholism, panic states, anxiety) (Mullan et al., 1994). Having the patient keep a sleep diary may be useful for obtaining a more objective clarification of sleep patterns because insomnia is notoriously subjective. Also, the importance of good sleep hygiene cannot be underestimated (Mullan et al., 1994; National Institutes of Health, 1990; Fouts and Rachow, 1994). Patients may need to be educated about regularizing bedtime, restricting daytime naps, using the bedroom only for sleep and sexual activity, avoiding alcohol and caffeine, reducing evening fluid intake and heavy meals, taking some medications in the morning, limiting exercise immediately before retiring, and substituting behavioral relaxation techniques (National Institutes of Health, 1990; Fouts and Rachow, 1994).

Withdrawal from sedative/hypnotic medications (as well as anxiolytics) should be carefully monitored. Withdrawal is characterized by increased pulse rate, hand tremor, insomnia, nausea or vomiting, and anxiety. A grand mal seizure may occur in as many as 20 to 30 percent of dependent persons if withdrawal symptoms are untreated. Hallucinations similar to those associated with alcoholic delirium tremens (DTs) may also be present.

Several precautions about particular drugs should be noted. Specifically, triazolam rapidly achieved notoriety and was banned in the United Kingdom and other European countries after its 1979 introduction with accompanying...
reports of bizarre, idiosyncratic panic and delusional reactions as well as adverse side effects of confusion, agitation, and anxiety (Woods and Winger, 1995; Winger, 1993). More serious side effects are still more consistently and more frequently reported with triazolam than with temazepam, a similar short-acting hypnotic benzodiazepine (Woods and Winger, 1995). It appears that older patients are more likely than younger ones to experience increased sedation and psychomotor impairment with this medication and to report an increased incidence of adverse behavioral reactions if the dose is greater than 0.125 mg (Fouts and Rachow, 1994).

Another recently introduced but popular hypnotic, zolpidem (Ambien), does not have the anxiolytic, muscle relaxant, or anticonvulsant properties of benzodiazepines. It has been touted as a safer sleep medication because it does not disrupt physiological sleep patterns at low doses and appears to have relatively mild, dose-related adverse effects. However, zolpidem is much more costly than the benzodiazepines, an important consideration for low-income older patients. Also, lower doses (beginning at 5 mg) must be used in older patients to avoid hazardous confusion and falls (Winger, 1993; Fouts and Rachow, 1994; Ray et al., 1993; Bezchlibnyk-Butler and Jeffries, 1995). Because of its recent introduction, there is limited information available on the possible undesirable effects of zolpidem for the older patient.

Several antihistamines, usually used for relief of allergies and available as over-the-counter medications, are also taken as sleeping aids because of their sedating properties (e.g., Benadryl). Antihistamines are also combined with over-the-counter analgesics and marketed as nighttime pain medications (e.g., Tylenol PM). However, older adults appear to be more susceptible to adverse anticholinergic effects from these substances and are at increased risk for orthostatic hypotension and central nervous system depression or confusion. In addition, antihistamines and alcohol potentiate one another, further exacerbating the above conditions as well as any problems with balance. Because tolerance develops within days or weeks, these antihistamines have questionable efficacy and are not recommended for older adults who are living alone (Ray et al., 1993; Fouts and Rachow, 1994; National Institutes of Health, 1990; Bezchlibnyk-Butler and Jeffries, 1995).

### Opiate/Opioid Analgesics

An estimated 2 to 3 percent of noninstitutionalized older adults receive prescriptions for opioid analgesics (Ray et al., 1993). Opioids are undeniably effective for management of severe pain such as that occurring after surgery and serious trauma and periodically in some medical illnesses (e.g., gout, inflammatory bowel disease). This acute pain is usually short-lived and resolves within days to weeks at most. Opioid analgesics are also used to treat cancer-related pain, which is experienced by nearly all patients with advanced disease and by one-third to one-half of patients in earlier stages. The use of opioid medications for these purposes is widely acceptable in medical practice (Portenoy, 1993).

In addition to the rapid development of tolerance and physiological dependence, other problems are associated with opioid prescriptions for older patients. Opioid dose requirements decrease with age: The onset of action is slowed by the decreased rate of gastrointestinal absorption of orally ingested narcotics, and the duration of action is longer because of older patients' decreased metabolism and liver functioning. Older adults also have more adverse side effects because of changes in receptor sensitivity with age. The less potent opioids, codeine and propoxyphene (Darvon), cause sedation and mild, dose-related impairment of psychomotor performance, whereas the more potent opioids, oxycodone (Percodan) and intramuscular meperidine (Demerol), induce substantial impairment of vision, attention, and motor coordination. No apparent relation between age and sedation is observed in patients treated with morphine and pentazocine (Talwin) (Solomon et al., 1993; Ray et al., 1993).

The prescribing of opioid analgesics for chronic nonmalignant pain (not associated with cancer) is a controversial issue. Although long-term treatment of chronic pain with opiates or opioids has not traditionally been accepted by either patients or physicians, a growing body of evidence suggests that prolonged opioid therapy may be both effective and feasible. Convincing and persuasive testimony has also been given by a number of clinicians and medical associations regarding the successful management of lengthy opioid treatment in patients with chronic nonmalignant pain (Portenoy, 1993).

These advocates note that both acute and chronic pain in the United States is more usually under- than overmedicated for a variety of patient- and provider-related reasons, not the least of which is fear of addiction. In addition, patients may believe that stoicism is virtuous, that pain is an inevitable and intractable part of the illness or disease, or that prescribed medications are too costly, too complex to manage, or likely to have numerous and undesirable side effects. Clinicians also may underprescribe because of fear of sanctions (Portenoy, 1993).

The disagreements among clinicians regarding management of long-term opioid therapy reflect different perspectives regarding the dangers and persistence of psychological dependence following physical addiction and the potential for psychosocial disintegration into an addictive, drug-abusing lifestyle. Many researchers point
out that clinical populations can be successfully withdrawn from opiates and opioids without dire consequences. One study, for example, found that only 4 of nearly 12,000 patients who were prescribed morphine for self-administration became addicted (Chapman and Hill, 1989). Other practitioners argue that patients’ quality of life improves (e.g., less medical care utilization) if they are kept on opioids and manage pain without addiction (Finlayson et al., 1986a, 1986b). Also, opioid analgesics are usually contraindicated if the patient has a history of alcoholism or another substance abuse or dependence disorder.

Opioid withdrawal is accompanied by restlessness, dysphoric mood, nausea or vomiting, muscle aches, tearing and yawning, diarrhea, fever, and insomnia. Although opioid withdrawal is uncomfortable, it is not life-threatening or particularly dangerous compared with untreated withdrawal from benzodiazepines.

Figure 3-5 displays information about some of the more commonly prescribed opiate/opioid analgesics, listing the generic and brand names with comments about indications and effects.

Interactions With Other Drugs and With Alcohol

Drug-drug and drug-alcohol interactions are of increased importance in older adults for several reasons. Because older adults take more prescription and over-the-counter drugs than younger adults and many continue to drink, the potential for interactions is enhanced. An interaction is likely to be more problematic in an older adult because of slowed metabolic and clearance mechanisms, resulting in a delay in the resolution of the unfavorable reaction. The aging body is also more susceptible to adverse interactions. The presence of chronic diseases tends to increase the number of medications used by older adults. Thus the risk for drug interactions is increased in those for whom an adverse reaction would be most dangerous. Further research is needed on specific drug-drug interactions and on drug-alcohol combinations that can be deadly, such as alcohol and diazepam.


Any use of drugs and alcohol carries risk, abuse of these substances raises the risk, and multiple drug abuse (polypharmacy) further increases the risk. A recent study documented the many possible unfavorable reactions between prescription drugs and alcohol (Korrapati and Vestal, 1995) (see Figure 3-6). For example, chronic alcoholics who use even therapeutic doses of acetaminophen may experience severe hepatotoxicity. Alcohol can increase lithium toxicity and enhance central nervous system depression in persons taking tricyclic antidepressants. High doses of benzodiazepines used in conjunction with alcohol or barbiturates can be lethal (American Psychiatric Association, 1994).

Drug-drug interactions can be extremely dangerous and dramatic - the combination of meperidine with an MAO inhibitor can cause marked blood pressure fluctuations, excitability, rigidity, hyperreflexia, hyperthermia, coma, and even death. More often, however, such interactions produce subtle or mild quantitative effects. A change in sleep, appetite, or an increase in anxiety may be the only sign and could lead a clinician to increase the dose of a medication that is already contributing to the adverse reaction. To use psychoactive prescription and over-the-counter drugs wisely, both physicians and consumers need to understand how the aging process influences responses to medication and to recognize how vulnerable older adults are both to their misuse and abuse.
## Tables

**Figure 3-2: Effect of Aging on Response to Drug Effect**

<table>
<thead>
<tr>
<th>Drug</th>
<th>Action</th>
<th>Effects of Aging</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analgesics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspirin</td>
<td>Acute gastroduodenal mucosal damage</td>
<td>No change</td>
</tr>
<tr>
<td>Morphine</td>
<td>Acute analgesic effect</td>
<td>Increased</td>
</tr>
<tr>
<td>Pentazocine</td>
<td>Analgesic effect</td>
<td>Increased</td>
</tr>
<tr>
<td><strong>Anticoagulants</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heparin</td>
<td>Activated partial thromboplastin time</td>
<td>No change</td>
</tr>
<tr>
<td>Warfarin</td>
<td>Prothrombin time</td>
<td>Increased</td>
</tr>
<tr>
<td><strong>Bronchodilators</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Albuterol</td>
<td>Bronchodilation</td>
<td>No change</td>
</tr>
<tr>
<td>Ipratropium</td>
<td>Bronchodilation</td>
<td>No change</td>
</tr>
<tr>
<td><strong>Cardiovascular Drugs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adenosine</td>
<td>Minute ventilation and heart rate</td>
<td>No change</td>
</tr>
<tr>
<td>Diltiazem</td>
<td>Acute antihypertensive effect</td>
<td>Increased</td>
</tr>
<tr>
<td>Enalapril</td>
<td>Acute antihypertensive effect</td>
<td>Increased</td>
</tr>
<tr>
<td>Isoproterenol</td>
<td>Chronotropic effect</td>
<td>Decreased</td>
</tr>
<tr>
<td>Phenylephrine</td>
<td>Acute vasoconstriction</td>
<td>No change</td>
</tr>
<tr>
<td>Prazocin</td>
<td>Acute antihypertensive effect</td>
<td>No change</td>
</tr>
<tr>
<td>Timolol</td>
<td>Chronotropic effect</td>
<td>Decreased</td>
</tr>
<tr>
<td>Verapamil</td>
<td>Acute antihypertensive effect</td>
<td>Increased</td>
</tr>
<tr>
<td><strong>Diuretics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Furosemide</td>
<td>Latency and size of peak diuretic response</td>
<td>Decreased</td>
</tr>
<tr>
<td><strong>Psychotropics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diazepam</td>
<td>Acute sedation</td>
<td>Increased</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>Psychomotor function</td>
<td>No change</td>
</tr>
<tr>
<td>Haloperidol</td>
<td>Acute sedation</td>
<td>Decreased</td>
</tr>
<tr>
<td>Midazolam</td>
<td>Electroencephalographic activity</td>
<td>Increased</td>
</tr>
<tr>
<td>Temazepam</td>
<td>Postural sway, psychomotor effect, and sedation</td>
<td>Increased</td>
</tr>
<tr>
<td>Triazolam</td>
<td>Psychomotor activity</td>
<td>Increased</td>
</tr>
<tr>
<td><strong>Others</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Levodopa</td>
<td>Dose elimination due to side effects</td>
<td>Increased</td>
</tr>
<tr>
<td>Tolbutamide</td>
<td>Acute hypoglycemic effect</td>
<td>Decreased</td>
</tr>
</tbody>
</table>

*Source: Adapted from Cusack and Vestal, 1986.*
### Figure 3-3: Commonly Prescribed Anxiolytics

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th>Brand Name</th>
<th>Elimination Half-Life for Older Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzodiazepines</td>
<td>Alprazolam</td>
<td>Xanax</td>
<td>9-20 hours</td>
</tr>
<tr>
<td></td>
<td>Chlordiazepoxide</td>
<td>Librium</td>
<td>5-30 hours, with short- and long-acting active metabolites</td>
</tr>
<tr>
<td></td>
<td>Diazepam</td>
<td>Valium</td>
<td>20-50 hours, with short- and long-acting active metabolites effective up to 200 hours</td>
</tr>
<tr>
<td></td>
<td>Lorazepam</td>
<td>Ativan</td>
<td>18-24 hours; clearance may be reduced in older adults</td>
</tr>
<tr>
<td></td>
<td>Oxazepam</td>
<td>Serax</td>
<td>3-25 hours</td>
</tr>
<tr>
<td>Serotonin agonist</td>
<td>Buspirone</td>
<td>BuSpar</td>
<td>1-11 hours</td>
</tr>
</tbody>
</table>

Refer to product information insert for each drug as to its suitability for use in older adults.
### Figure 3-4: Commonly Prescribed Sedative/Hypnotics

<table>
<thead>
<tr>
<th>Class</th>
<th>Drug</th>
<th>Brand Name</th>
<th>Elimination Half-Life for Older Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzodiazepines</td>
<td>Flurazepam</td>
<td>Dalmane</td>
<td>72 hours, with short- and long-acting active metabolites</td>
</tr>
<tr>
<td></td>
<td>Prazepam</td>
<td>Centrax</td>
<td>Less than 3 hours, with long-acting active metabolites</td>
</tr>
<tr>
<td></td>
<td>Quazepam</td>
<td>Doral</td>
<td>25-41 hours, with long-acting active metabolites</td>
</tr>
<tr>
<td></td>
<td>Temazepam</td>
<td>Restoril</td>
<td>10-20 hours</td>
</tr>
<tr>
<td></td>
<td>Triazolam</td>
<td>Halcion</td>
<td>2-6 hours, with reports of clinical effects up to 16 hours following a single dose</td>
</tr>
<tr>
<td>Imidazopyridine</td>
<td>Zolpidem</td>
<td>Ambien</td>
<td>1.5-4.5 hours (longer in older adults)</td>
</tr>
<tr>
<td>Chloral derivatives</td>
<td>Chloral hydrate</td>
<td>Noctec</td>
<td>4-8 hours (loses effect in 2 weeks)</td>
</tr>
<tr>
<td>Antihistamines</td>
<td>Hydroxyzine</td>
<td>Atarax</td>
<td>1-3 hours</td>
</tr>
<tr>
<td></td>
<td>Diphenhydramine</td>
<td>Benadryl (over-the-counter)</td>
<td>8-10 hours</td>
</tr>
<tr>
<td></td>
<td>Doxylamine</td>
<td>Unisom (over-the-counter)</td>
<td>8-10 hours</td>
</tr>
</tbody>
</table>

^ Refer to product information insert for each drug as to its suitability for use in older adults.
### Figure 3-5: Commonly Prescribed Opiate/Opioid Analgesics

<table>
<thead>
<tr>
<th>Opiates</th>
<th>Methylmorphine/Morphine</th>
<th>Common ingredient of analgesics.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codeine</td>
<td>e.g., Tylenol III, Robitussin A-C</td>
<td>Common ingredient of analgesics and antitussives. Can cause sedation and mild, dose-related impairment of psychomotor coordination.</td>
</tr>
<tr>
<td>Opioids (synthetic)</td>
<td>Hydrocodone Lortab</td>
<td>Can produce dose-related respiratory depression and irregular breathing if taken in large amounts.</td>
</tr>
<tr>
<td>Meperidine</td>
<td>Demerol</td>
<td>Contraindicated if patient is taking MAO inhibitors. Can produce psychomimetic effects and impair vision, attention, and motor coordination.</td>
</tr>
<tr>
<td>Oxycodone</td>
<td>Percodan/Percocet</td>
<td>Can produce substantial impairment of vision, attention, and motor coordination.</td>
</tr>
<tr>
<td>Propoxyphene</td>
<td>Darvon</td>
<td>Can produce sedation and mild, dose-related impairment of psychomotor coordination.</td>
</tr>
<tr>
<td>Pentazocine</td>
<td>Talwin</td>
<td>Age does not appear to increase sedative effects.</td>
</tr>
</tbody>
</table>

*Refer to product information insert for each drug as to its suitability for use in older adults.*