Preventive Health Care for the Elderly

BARRY M. STULTS, MD, *Salt Lake City*

Demographic, economic and humanitarian considerations dictate that effective preventive health care be provided to the elderly. A disease-specific approach to geriatric preventive health care will not suffice; measures to enhance or maintain physical, mental and social function must also be emphasized. Unfortunately, the effectiveness of many preventive care procedures has not been adequately investigated in the elderly. Research is urgently needed to determine the efficacy of and appropriate target population for various geriatric preventive health care measures.

(Stults BM: Preventive health care for the elderly, *In* Personal health maintenance [Special Issue]. West J Med 1984 Dec; 141:832-845)

Elderly persons aged 65 years and older are the fastest growing segment of the population in the United States. Between 1960 and 1980 there was a 24% increase in the population younger than 65, but there was a 55% increase in the population 65 and older.[1] More important, there was a 100% increase in those aged 75 to 84 years and a 140% increase in the population older than 85.[1] These "old-old" persons 75 years and older are more likely to suffer from chronic illnesses and to require costly medical care than are younger persons. Although persons aged 65 and older compose only 11% of the US population, they consume 30% of the national health funds and 50% of the federal health budget.[2] By the year 2040, the elderly may consume 50% of the total health care dollars.[1] A small segment of the elderly population, perhaps a fourth of the total, is responsible for much of this expense. This segment is comprised of those elderly, most often the "old-old" (75 and older), who are either confined to an institution or are at high risk of being so placed because of chronic illness and disabilities.[2,3] Elderly persons now occupy 90% of nursing home beds,[2] and the elderly nursing home population is expected to double in size between 1980 and 1990.[4]

Currently, 30% of the practice of internists and medical subspecialists is devoted to the elderly,[4] and this may increase to 50% within the next 20 years.[5] Physicians should be aware that the life expectancy of elderly persons is surprisingly long. The average person aged 65 can expect to live another 15 years[5(pp17-34)] and remain functionally independent for ten of those years.[6] Persons aged 75 and 85 have average life expectancies of ten years and six years, respectively, and will remain functionally independent for about half that time.[5(pp17-34),6]

In view of the above considerations, providing preventive health care to the elderly must be a major concern of both primary care physicians and the health care system. Unfortunately, inadequate data are available to define what constitutes effective preventive health care for this segment of the population.[7-14] The preventive care measures that are useful and the frequency with which they should be applied have generally not been determined in scientifically adequate studies. Moreover, what constitutes necessary and effective preventive care procedures may vary considerably for relatively healthy elderly persons in a community compared with the "frail" elderly (those with serious functional disabilities) in a community, or compared with those elderly residing in institutions; future research must distinguish among these different subgroups. Controlled studies are needed to determine whether preventive health care programs can improve or maintain elderly patients' health, functional abilities, independence and life satisfaction and hopefully prevent, or at least prolong, the time before they require placement in an institution. The few preliminary studies of preventive care for geriatric outpatients have not shown definite benefit with respect to medical conditions and functional state, but they have noted that considerable expense and physician time would be required to initiate a preventive program for the elderly in both ambulatory and nursing home settings.[15-18]

Other obstacles may also hinder providing preventive health care to the elderly. Many elderly persons—nearly 90% by some estimates[7]—do not regularly visit a personal physician. This appears to be due to several factors: lack of finances or transportation, geographic and cultural barriers, apathy or a sense of futility concerning their own health, or a combination of all of these. Additionally, many elderly persons fail to report their illnesses and health needs until they reach an advanced stage of disease and disability when thera-

From the Department of Internal Medicine, Division of General Internal Medicine, University of Utah School of Medicine, and Veterans Administration Medical Center, Salt Lake City.

Reprint requests to Barry M. Stults, MD, Division of General Internal Medicine, Room 4E525, University of Utah School of Medicine, 50 N Medical Drive, Salt Lake City, UT 84132.

ABBREVIATIONS USED IN TEXT

T_4 = thyroxine
Td = tetanus-diphtheria [toxoid]
TIG = tetanus immune globulin
TSH = thyrotropin [thyroid-stimulating hormone]

peutic interventions may be less effective.[2,9] The financing of health care for the elderly through medicare, medicaid and most third-party insurance carriers is geared to acute hospital and nursing home care rather than to preventive care. Preventive measures such as periodic health examinations, dental care, foot care, mental health services, eyeglasses, hearing aids, immunizations and many community health services are often inadequately funded.[2,19] How effectively elderly persons would participate in preventive health care programs is also not known. Of special concern is the apparent attitude or approach of physicians toward elderly patients. Although elderly patients have more health problems (medical and psychosocial), take more medication and are more likely to have significant communication difficulties than younger patients, physician-patient encounters are actually *shorter* for patients aged 65 and older than for those aged 45 to 64 years, especially for comprehensive and consultative visits.[20] Similarly, elderly patients average only one more physician visit per year than younger patients.[5] The causes of this physician-patient behavior and its relationship to the provision of preventive health care to the elderly have not been determined.

On the basis of the limited data now available, recommendations for potentially useful preventive care measures for the elderly have been made by several sources (Table 1).[7,11,12,21-23] Of particular importance is the recommendation that persons aged 65 through 74 be seen regularly every two years and those aged 75 and older be seen annually to assess the "progressive incapacity of aging"[12] that may occur with respect to physical, social and psychological functions.[12,23] The Canadian Task Force on the Periodic Health Examination recommends that this intervention be accomplished via a home visit by a physician.[12] It is important for primary care physicians to understand the patterns of health, disease and disability in elderly persons that have generated this recommendation for routine biennial or annual visits by (or to) their elderly patients.

TABLE 1.—*Potential Geriatric Preventive Health Measures*

Primary Prevention
- Immunization
  - Influenza
  - Pneumococcus
  - Tetanus
- Health promotion
  - Accident prevention
  - Physical fitness
  - Nutrition

Secondary Prevention—Early Detection and Treatment
- Hypertension
  - Diastolic
  - Systolic (isolated)
- Cancer
  - Breast
  - Colon
  - Cervix
- Sensory deficits
  - Vision
  - Hearing
- Mental health
  - Dementia
  - Depression
  - Alcoholism
- Social support system
- Iatrogenic disease: Drug therapy
- Miscellaneous
  - Urinary incontinence
  - Podiatric disorders
  - Hypothyroidism

Tertiary Prevention—Rehabilitation
- Comprehensive assessment of function: physical, psychological, social
  - Every 2 years for ages 65-74
  - Yearly for age 75 and older

Health Problems of the Elderly

Progressive decrements in physical, mental and social function may occur with advancing age. Multiple factors contribute to this decline (Figure 1). First, there is a physiologic age-related decline in organ function from the fourth through the ninth decades,[24-26] the magnitude of which varies considerably among different persons.[24] While these physiologic losses do not significantly compromise the overall function of an elderly person, in the event of a superimposed illness or injury they may result in more profound dysfunction and a longer recuperation time than in younger persons.[26,27] Physical and mental inactivity (disuse) may also compromise organ function with advancing age.[28,29] Some of the decline in organ function that has been attributed to physiologic aging may instead be due to disuse and therefore be preventable or reversible with appropriate therapy.[28] The prevalence of chronic physical and mental illness increases dramatically with age, particularly in persons 75 and older.[2,5] The rates for chronic illnesses in the elderly such as arthritis, hypertension, organic heart disease, sensory impairments and urinary incontinence are about twice the rates in persons younger than 65.[5] Nearly 25% of community-dwelling elderly have symptomatic mental illness, including 10% with significant depression and 5% with dementia.[2] Potentially serious psychosocial stresses are common and include undesired retirement, inadequate finances, death of a spouse or the necessity of moving away from the family home. Many elderly persons will simultaneously suffer from several of these chronic physical or mental conditions.[2,9,13]

The magnitude of the decrements in physical, mental and social function varies tremendously among elderly persons. The vast majority of the elderly are able to tolerate and adjust to their functional impairments or disabilities and remain independent within the community.[2] However, a significant minority have major functional disability. Nearly 20% of the elderly aged 75 through 84 and 30% aged 85 and older are unable to carry on major activities such as leaving home, doing housework or cooking, compared with 7% with similar disability who are younger than 65.[2] Nearly 10% to 20% of persons aged 80 and older are unable to carry on even basic activities of daily living (bathing, dressing, eating, toileting) versus 4% younger than 65.[2] Because of this dependency many of these elderly persons will require placement in a nursing home unless adequate social support can be obtained from family, friends or the community. Whereas only 5% of

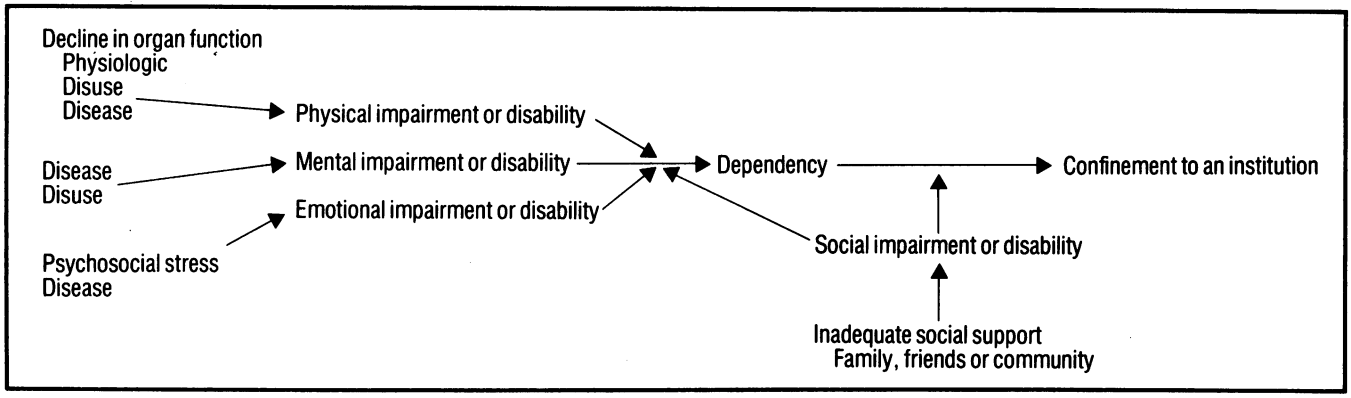

Figure 1. Loss of function and independence with age.

persons older than 65 years are in nursing homes, 20% older than 85 reside in them; the elderly have a 20% chance of requiring at least temporary nursing home placement at some time in their life.[2]

Unfortunately, much chronic illness and disability in elderly persons are unreported or undetected. A number of studies suggest that 40% to 50% of elderly patients' health problems are unknown to their personal physicians.[2,9,15,22,30] While cardiac, pulmonary and major central nervous system disorders were both reported and detected in most studies, disabilities such as urinary incontinence, locomotor dysfunction, defective hearing and vision, podiatric problems, depression, alcoholism and nonmedical social needs were not. Nearly half of these disorders were amenable to treatment. Left untreated, some of these problems may progress in severity and result in significant limitation of function and even dependency and confinement to an institution. The reasons these health problems are unreported or undetected are not known with certainty. Elderly persons may fail to report some medical conditions because they believe disease and disability are natural accompaniments of aging or that no effective therapy is available. They may fear placement in an institution if they bring up such problems. Others may be depressed and lack the desire to regain their health. Some may feel the health care system is unresponsive to their needs.[2,13,26,30] Physicians may fail to detect these problems due to inadequate training and a lack of awareness of the problems' existence or importance. Physician bias against preventive care for the elderly may also play a role.[20]

This high prevalence of physical, psychological and social dysfunction in elderly persons and its frequent failure to be reported or detected have led to the recommendation for routine comprehensive functional assessment of elderly patients either biennially or annually according to their age.[12,23] Because many illnesses of the elderly are chronic and incurable, a disease-specific approach to preventive health care that emphasizes only the primary prevention or early detection and treatment of disease will not, by itself, suffice.[31] Primary care physicians must also assess physical, psychological and social function. If deficits are found the physician must initiate treatment and rehabilitation to improve or maintain a person's condition or at least slow deterioration in function. In this way dependency and subsequent admission to an institution may be prevented or forestalled. When functional abilities cannot be restored, a physician should attempt to marshal an adequate social support system using family or community resources, or both, to maintain an elderly person in the community. Unfortunately, practical and clinically validated instruments by which a physician can assess physical and especially psychological and social function in the office or home are not yet available.[9] Ongoing research in the field will hopefully remedy this deficiency in the near future.[32] In the meantime, to comprehensively assess the elderly, physicians must rely on their own clinical judgment and the assistance of allied health personnel including social workers, psychologists and physical and occupational therapists. Whether such a comprehensive approach to elderly persons will improve their health status over a prolonged period of time must be determined in future research.

Preventive Health Measures for the Elderly

Preventive health measures of potential utility for the elderly are listed in Table 1. The list is derived from several sources,* and it omits some maneuvers such as routine screening for anemia and diabetes mellitus suggested by others.[33] The available scientific data and pertinent medical literature regarding each maneuver are reviewed briefly below. In many instances the data are either inadequate or contradictory and strong recommendations to include or exclude a maneuver are not possible.

Primary Prevention: Immunizations

Influenza vaccination. During epidemics of influenza A and B, the elderly population frequently shows excess mortality and admissions to hospital from primary influenza pneumonia, secondary bacterial pneumonia and exacerbations of chronic cardiopulmonary disease.[34] As many as 80% of influenza-related deaths and 30% of admissions to hospital occur in persons older than 65 years despite a lower incidence of infection than is found in younger age groups.[35] Those elderly persons with coexisting chronic cardiopulmonary or metabolic diseases are at greatest risk, particularly if they are in an institution.[34] Influenza outbreaks in nursing homes have attack rates as high as 60%, with case fatality ratios of 30% or more.[34] Healthy persons older than 65 are also at increased risk of admission to hospital during influenza epidemics, but the rate is threefold to fourfold lower than in those elderly with chronic disease.[36] There are widely divergent estimates of influenza vaccine efficacy in the elderly varying from 5% to 85% protection rates.[35] The vaccine is probably 60% to

*References 5(pp 299-302), 11, 12, 21-23.

70% effective in reducing mortality and admission to hospital in elderly persons when it is adequately matched to the epidemic virus strains of a given season.[37,38] Some studies, however, suggest the benefits are limited to those elderly with coexisting high-risk chronic diseases.[38] The Centers for Disease Control have therefore further subclassified the high-risk population according to greatest need for annual influenza vaccination as follows: (1) persons with significant chronic cardiopulmonary disease and those residing in nursing homes or other chronic care facilities, (2) medical personnel and (3) otherwise healthy persons older than 65 years and those with chronic metabolic diseases.[34]

Unfortunately, there are serious problems in carrying out annual influenza vaccination in the elderly. Physicians are currently vaccinating only 54% of their elderly patients who have serious chronic disease and only 33% of their otherwise healthy elderly patients.[39] Medicare at this time does not finance the cost of annual influenza vaccination. Some studies even suggest that elderly persons frequently refuse influenza vaccination when it is offered.[40] Further research is needed to improve the delivery of influenza vaccination to the elderly in office, institution and hospital settings (perhaps using allied health personnel) and to increase acceptance of the vaccine.[41] In the meantime, physicians should try to develop an organized program in their clinic to improve the vaccination rate. The use of amantadine hydrochloride for treatment and prophylaxis of influenza A in the elderly has recently been reviewed.[34]

Pneumococcal vaccination. Influenza and bacterial pneumonia are the fourth leading cause of death in persons aged 65 and older[42]; 25% of all cases of pneumonia are caused by *Streptococcus pneumoniae* (pneumococcus).[43] The incidence of pneumococcal pneumonia increases with age and is twofold greater in persons older than 60 years than in younger persons.[43] Mortality from pneumococcal disease (pneumonia, bacteremia and meningitis) also increases severalfold with age, but this appears to be due more to the presence of coexisting chronic diseases than to advanced age alone.[42,44] The degree of morbidity and mortality in otherwise healthy elderly persons has not been well quantified.

A 14-valent vaccine against the pneumococcus has been available since 1977; this was replaced by a more comprehensive vaccine containing 23 serotypes in 1983. The efficacy of the vaccine is well established in young, healthy populations at high risk of pneumococcal disease. However, randomized controlled trials of the vaccine in older outpatients and in persons in institutions did not show definite benefit, perhaps due to an inadequate sample size.[43,45] As a result, until recently most authorities suggested use of the pneumococcal vaccine in persons who had chronic cardiopulmonary, metabolic or immunosuppressive diseases, but noted a definitive recommendation could not be made with respect to the otherwise healthy elderly.[37,44,46,47] However, two studies using the case-control method have now suggested that the pneumococcal vaccine may have 60% to 70% efficacy in preventing systemic pneumococcal infections in both chronically ill and relatively healthy persons older than 60 years.[48,49] The Centers for Disease Control now recommend pneumococcal vaccination for all persons older than age 65.[43] Medicare will partially reimburse the cost of pneumococcal vaccination in both inpatients and outpatients. Only a single vaccination with the 23-valent vaccine is recommended at this time. It may be given simultaneously with the influenza vaccine. Unfortunately, as with influenza vaccine, only 45% of physicians are currently administering pneumococcal vaccine to their elderly patients.[50] Organized hospital and office-based programs are needed to improve this rate.

Tetanus vaccination. Although tetanus is an uncommon disease in the United States, it carries a 35% to 50% mortality and is preventable with appropriate immunization.[51] The highest incidence of tetanus is in the elderly in whom mortality reaches 80%.[42] In recent studies 50% to 70% of persons aged 60 years and older lacked protective serum levels of tetanus antitoxin compared with only 15% of persons younger than 40 years.[52-54] The likelihood of having protective antitoxin levels decreases progressively with advancing age.[54] This appears to be due to inadequate vaccination coverage because two doses of tetanus-diphtheria (Td) toxoid confer adequate antitoxin levels to almost all elderly persons.[53] More than a third of elderly persons have never received a tetanus immunization, as formal immunization programs were not available during their childhood.[54] However, even in settings in which there is regular access to medical care including free immunizations, such as with health maintenance organizations, persons older than 70 years are vaccinated against tetanus only 50% as frequently as younger patients aged 20 to 39.[55] Again, primary care physicians need to provide organized programs of immunization for their elderly patients. Additionally, because they are less likely to have been adequately immunized, older persons are more likely than younger to require tetanus immune globulin (TIG) for tetanus-prone wounds.[37] Recommendations for administering Td toxoid and TIG have been recently summarized.[56]

Accident Prevention

Injuries are the fifth leading cause of death in persons older than 65.[57] While the elderly have lower rates of injury than younger persons, they suffer greater mortality and morbidity; they have twice the death rate from injury and three times as many days of restricted activity and bed confinement as any other age group.[58] Of the deaths, 50% are due to falls, 25% are due to motor vehicle accidents (a third of which are pedestrian deaths) and 10% result from burns.[58]

The frequency of falls increases dramatically with age, being particularly prevalent in persons aged 75 and older.[58] A third of community-dwelling elderly persons and 10% to 25% of the elderly in institutions fall each year; two thirds of those who fall once will fall again.[59] The mortality and morbidity from these falls is considerable; 70% of deaths from falls occur in persons older than 65 years.[57] In all, 200,000 elderly Americans break a femur or hip each year; of these, 15% die from complications and many others suffer prolonged or permanent disability. Multiple falls may impair the mobility of an elderly person due to fear alone and are a risk factor for placement in an institution.[5(pp137-152)]

Strategies to prevent falls require identifying the specific pathogenetic factors that cause them.[59] The causes of falls in the elderly are often multiple and complex, however, and may be difficult to identify in an individual patient. Host factors, such as abnormalities of gait, strength, coordination, vision, cardiovascular function and the like, may interact in a complicated fashion with adverse environmental conditions—stairs,

TABLE 2.—*Potential Strategies to Prevent Falls**

Encourage physical activity within limits of function of patient
Reduce environmental hazards
Eliminate obstacles, such as loose rugs, from floor
Advise handrails and good lighting for bathroom and stairs
Identify and correct contributing medical factors
Sensory deficits (vision, hearing)
Musculoskeletal impairment or disability
Orthostatic hypotension
Teach adaptive behavior
Canes or walkers
Gait training
Slow rising
Low, broad heels on shoes
Identify cause of previous falls and correct

*Adapted from Kane et al,[5(pp137-152)] Rubenstein[57] and Hogue.[58]

TABLE 3.—*Physical Fitness Prescription Recommendations for the Elderly**

Patient education
Importance of exercise for older adults of both sexes
Regularly scheduled activity program as a lifetime commitment
Obtain history and do physical examination; use exercise performance tests as indicated
Prescribe exercise regimen within limits of function of a patient
Follow-up with an active interest in the patient's exercise practices
Qualified supervision of exercise when indicated

*Adapted from the American Medical Association's Council on Scientific Affairs[63] and Fuller.[64]

obstacles, poor lighting, loose rugs and so forth—to produce falls.[57,59] The efficacy of various interventions to prevent falls in elderly persons has not yet been validated in controlled trials. Several potentially useful preventive strategies are listed in Table 2.

Elderly persons have a higher rate of motor vehicle accidents than any age group except those aged 25 and younger.[58] Whether this is due primarily to errors in judgment and perception or is also related to underlying medical conditions is controversial[58]; further research is clearly needed. Elderly persons with impaired vision, mental illness, epilepsy or major impairment of neuromuscular function should be counseled about limiting their driving or repeating an actual driving test to document adequate skills. Of all pedestrian deaths, 20% occur in persons aged 65 and older, generally at intersections; these accidents are likely related to the slow rate of walking of the elderly.[58] Elderly persons should be counseled about this potential danger.

Elderly persons experience a disproportionate number of burn injuries, including scalds from tap water, contact burns and flame injuries.[58] Scalds from tap water in the bathing area are both common and preventable in the elderly. They should be encouraged to set their hot-water heaters at a maximum 50°C (120°F) (most are set at greater than 55°C [130°F]), which will also save them money in energy costs.[58]

Physical Fitness in the Elderly

Cross-sectional studies suggest that with advancing age there is a progressive decrease in maximal oxygen consumption (a measure of the cardiovascular response to the stress of exercise), muscle strength, endurance and coordination.[29,60] Along with these changes, there is a progressive increase in the incidence and prevalence of physical disability.[29,61] While most elderly persons maintain substantial physical ability, nearly 25% of those aged 75 to 84 are unable to climb stairs or walk half a mile.[61] Among clinically healthy 80-year-olds, almost no women and only 20% of men are able to walk fast enough to cross a street with a traffic light.[62] After 80 years of age, 10% to 20% of persons are unable to carry out the basic activities of daily living.[2] What portion of these decrements in physical function is due to true physiologic aging and what portion to physical inactivity or disease (or both) is not known. Longitudinal studies in progress may provide answers to these questions. There is evidence, however, that physical deconditioning may play some role in this decline of physical function with age. Many biologic changes attributed to aging are quite similar to the functional losses induced by prolonged inactivity.[28] Habitually active older persons show less of a decline in maximal oxygen consumption than their sedentary counterparts.[60] If loss of physical function with age is due to physical deconditioning, exercise programs for the elderly may prevent or restore some of the loss of function. This is of great importance because even a modest improvement in muscle strength, endurance and coordination may have a pronounced effect on the ability of an elderly person to leave home, complete housework or even carry on the basic activities of daily living.[62]

As summarized in recent reviews, a number of studies have shown improvements in physical and even mental function in the elderly through exercise programs.[29,63,64] Many of these studies, however, have considerable limitations including small sample size, study populations not representative of the general elderly population and inadequate randomization and control groups.[29] Given these limitations, the studies still show improvements in aerobic capacity, muscle strength, flexibility, range of motion and coordination in these elderly persons. Although not well quantitated, psychological benefits have also been reported including improved psychomotor reaction time, better relaxation and general elevation of mood and self-image.[29] Comprehensive rehabilitation programs in nursing home patients have even improved the performance of activities of daily living, though the specific contribution of physical exercise is difficult to quantitate.[65]

Specific recommendations for physical fitness prescriptions for the elderly have recently been published (Table 3).[29,63,64] Primary care physicians must carefully design and tailor the appropriate exercise program for each of their elderly patients.

Nutrition in the Elderly

This is a topic of controversy in geriatric medicine, in large part due to the limited availability of adequate scientific data. The major controversy concerns the prevalence of undernutrition in the elderly. Some reviews emphasize that calorie, vitamin and mineral deficiencies are widespread among the elderly, therefore justifying a detailed nutritional evaluation as part of the routine assessment of most or all elderly patients.[66] Other clinicians dispute this claim and state that there is, instead, a very low prevalence of nutritional deficiency in the elderly in industrialized Western societies, largely limited to the 10% to 15% of the elderly with chronic illness severe

enough to have them confined to an institution or to cause them to be housebound.[5(pp199-222),67] They note that there is little or no evidence that unrecognized dietary deficiency causes disease or disability in the elderly, or that better nutrition for the average elderly person reduces or prevents morbidity.[5(pp199-222),67] They suggest that detailed nutritional assessment and preventive programs be concentrated on the minority of elderly persons at high risk of serious nutritional deficiency: those elderly persons with severe, chronic illness, especially if rendered housebound or confined to an institution; those with depression or social isolation (or both); those with severe dental and periodontal disease, and those of low socioeconomic status.[5(pp199-222),67] Historical evaluation of these high-risk patients should include information about access to food (transportation and finances), motivation and ability to prepare adequate meals and ability to consume them (dentition, appetite, dysphagia). Consultation with a dietitian may be invaluable. Physical examination provides only a gross estimate of nutritional status, and anthropometric measurements are not well standardized in the elderly population.[66] Measurements of serum albumin level, total lymphocyte count and skin test reactivity may provide useful information. For those elderly persons found to be undernourished, there are practical recommendations that may improve their nutrition.[66]

Obesity is more common in the elderly than is undernutrition, particularly among women; 20% to 25% of women aged 75 to 85 are obese.[5(pp199-222)] The importance of obesity as an independent risk factor for both total mortalityand cardiovascular mortality[69] tends to decrease with age. It is not clear how aggressively physicians should pursue a weight loss program for their obese patients, particularly those less than 20% to 30% above ideal body weight.[70] Certainly a weight loss program is indicated for those elderly patients who are grossly obese (40% or more above ideal body weight) or who are suffering complications from their obesity.

Secondary Prevention—Early Detection and Treatment

Hypertension, diastolic. About 15% of whites and 30% of blacks aged 65 years and older have diastolic hypertension as defined by a diastolic pressure of 95 mm of mercury or greater.[71] Most of these patients had the onset of their hypertension before age 65. Diastolic hypertension in the elderly carries the same relative risk and a greater absolute risk of cardiovascular morbidity and mortality than in younger persons.[72] Effective antihypertensive therapy appears to reduce the cardiovascular sequelae of diastolic hypertension in patients up to age 69,[73,74] but adequate studies are not yet available for patients aged 70 years and older.[75] There is an ongoing, randomized, double-blind multicenter study in Europe designed to answer this specific question (European Working Party on Hypertension in the Elderly) and results should be available in the near future.[76] Most authorities recommend treatment of elderly persons who have persistent elevations of diastolic pressure above 90 to 95 mm of mercury.[75,77] Because the lability of blood pressure increases with age, it is especially important in the elderly to confirm the diagnosis of diastolic hypertension with multiple blood pressure measurements over time.[72,76] Nonpharmacologic therapy (salt restriction, weight reduction and exercise) should be used initially, although its efficacy has not been determined. Low doses of diuretics and adrenergic inhibitor medications (methyldopa, clonidine hydrocholoride) have been shown to be effective and well-tolerated antihypertensive agents in the elderly[76] when nonpharmacologic maneuvers fail. Elderly persons should be monitored for adverse effects of the medications, particularly postural hypotension.

Isolated systolic hypertension. In economically developed societies systolic blood pressure increases linearly with age.[72] This is primarily due to decreased elasticity of the great arterial vessels from arteriosclerosis.[72] As a result, isolated systolic hypertension (usually defined as a systolic blood pressure above 160 mm of mercury with a diastolic pressure of less than 90 to 95 mm of mercury) is common in the elderly and more prevalent than diastolic hypertension in persons older than 70 years.[78] In all, 10% to 15% of persons aged 65 and older and 25% to 30% aged 75 and older have isolated systolic hypertension.[79-81] Even in the absence of other risk factors, systolic hypertension increases cardiovascular morbidity and mortality (stroke, congestive heart failure) twofold to threefold, the magnitude of the risk increasing progressively with the systolic pressure.[72,81] Evidence is not currently available as to whether treatment of isolated systolic hypertension in the elderly will reduce these cardiovascular complications. However, a randomized trial to answer this question is currently under way, sponsored by the National Institutes of Health.[77] In the meantime, several authorities suggest cautious treatment when the systolic pressure is persistently greater than 180 mm of mercury on multiple measurements, or greater than 160 mm of mercury in the setting of significant end-organ disease.[75,77,78,82] Maintenance of a systolic pressure in the range of 140 to 160 mm of mercury is a reasonable therapeutic goal. Nonpharmacologic therapy should be used initially. If ineffective, pharmacologic therapy with low doses of diuretics and adrenergic inhibitors appears to be both effective and well-tolerated, though patients should be monitored carefully for side effects, especially postural hypotension.[76,77,83]

Cancer Screening

Recent monographs are available that thoroughly review the current status of cancer screening in the elderly.[84-86] The elderly are at an exceptionally high risk for the development of cancer. While the risk of cancer developing is 2% between ages 20 and 50, it is 20% between ages 65 and 85[87]; 50% of all cancers and 60% of all cancer deaths occur in the 11% of the population that is older than age 65.[84(pp5-15)] The major sources of cancer deaths in men older than 65 are lung, prostate and colorectum, and, in elderly women, colorectum, breast and lung.[84(pp5-15)]

Despite this dramatic increase in incidence with age, very little is currently known about cancer in the elderly.[84(pp5-15)] What benefits can be expected in the elderly from primary prevention activities like cessation of smoking? How much benefit can be expected from early detection and screening programs in the elderly? While early detection and treatment through screening have been suggested to provide potential survival benefit for cancers of the cervix, breast and colorectum,[88] the elderly population has been generally omitted or underrepresented in most of the pertinent studies.[84(pp5-15)] Will the "young-old," aged 65 to 74, and the "old-old,"

aged 75 and older, both benefit in terms of survival or quality of life from cancer detection programs? How much toxicity might each of these groups suffer from the necessary diagnostic procedures? What about the elderly who are in institutions? There are also grossly inadequate data concerning the behavior of both elderly persons and their physicians with respect to the use of both primary and secondary cancer prevention activities. Some studies suggest that elderly persons receive less cancer screening than their younger counterparts.[86,89] In one investigation, 50% of women aged 75 and older reported that they had never been screened for cancer as compared with figures of 33% of women aged 65 and older and 20% of women younger than 65.[89] In the same study age was inversely related to the receipt of annual breast examinations and instruction in breast self-examination. There is also evidence that older age correlates with nonparticipation of women in a variety of cancer screening activities.[86] Finally, the elderly appear to be undereducated as to cancer risk, as 70% are unaware that the risk of cancer increases with age.[86] This is of great concern, especially in view of the previously described tendency of the elderly to fail to report their symptoms.

Breast cancer. Of all breast cancers, 50% occur in women older than age 65, with both the incidence and mortality increasing progressively with age.[90] There is no difference in the extent of tumor at the time of diagnosis in the elderly as compared with younger patients.[91] As a result, 5- and 10-year absolute postoperative survival rates following mastectomy are as good in patients older than 70 years as in younger patients.[92] The frequency of estrogen-receptor-positive breast cancers increases with age, so that elderly women are more likely than younger women to respond to hormonal manipulation.[90] Elderly women also respond to and tolerate chemotherapy for breast cancer as well as younger women, providing appropriate alterations in dose are made.[91] With respect to early diagnosis, the breast of an elderly patient may be easier to evaluate both by physical examination and by mammography.[93] Recent studies have indeed suggested that the benefits from regular breast cancer screening are greater with increasing age, although very elderly women were not examined in large numbers.[94]

All of these considerations argue for a vigorous approach to breast cancer screening in most elderly women. However, a recent study found that only 40% of women aged 75 and older were receiving annual breast examination by their physicians compared with 75% younger than 65.[89] Two thirds of women younger than 65 years but only a third older than 65 were instructed in breast self-examination. In a large radiology practice only 16% of mammograms done were in women older than 65 years and, of these, only a third were done as a routine screening procedure.[95]

The available evidence suggests that primary care physicians should place greater emphasis on instructing elderly women to do monthly breast self-examination and to undergo examination by their physician every year and mammography every one[88] or two[95] years.

Colorectal cancer. The incidence of colorectal cancer rises with age, peaking at about age 80; overall, 60% of colorectal cancers occur in persons older than age 65.[96] Once diagnosed and treated, the five-year survival rates for colon cancer are the same for patients aged 65 and 75 and older as for younger patients.[96] When patients older than 40 are considered, there is suggestive, though not definitive, evidence that annual fecal occult blood testing and proctosigmoidoscopy every three years (after two negative examinations one year apart) result in the detection of colorectal cancer at an earlier and more curable stage.[97] Together these considerations suggest that screening for colorectal cancer may be a useful preventive measure in elderly persons. However, only limited data are available to answer this question.[98,99]

In studies of fecal occult blood testing at the Memorial Sloan-Kettering Cancer Center (New York), only 8% of the study population (1,700 persons) was older than 70 years.[98] The incidence of heme-positive fecal smears increased progressively with age from 1.7% in the 40- to 49-year age group to 4.4% in the over-70 age group. Among the patients older than 70 who had positive smears, 23% proved to have colorectal cancer and 37% had adenomas. The compliance of the elderly patients with the necessary screening and diagnostic procedures was excellent, the Dukes's staging of their cancers was more favorable than in younger patients and there did not appear to be excess morbidity from the diagnostic procedures.[98] This was a highly select elderly population, however, who had voluntarily sought preventive medical care, and these results may not be generalizable to the entire elderly population. For example, in a recent study of the use of fecal occult blood testing in a nursing home, less than 10% of positive smears were caused by either colorectal cancer or adenomas; most lesions emanated from a duodenal ulcer or a cause could not be determined.[99]

Despite the promising preliminary studies noted above, at this time many questions remain unanswered concerning the final use of annual fecal occult blood testing and frequent proctosigmoidoscopy in the elderly population.[98] It is not known whether such testing will improve survival or quality of life, or both, whether all elderly persons should be screened or whether there will be too many false-positive tests and excessive morbidity from the necessary diagnostic procedures. Pending further information, primary care physicians will have to individualize their approach to each elderly patient.

Cervical cancer. Because the incidence of carcinoma in situ of the uterine cervix is extremely low after age 65, it is currently recommended that women older than 65 who have had repeated normal Papanicolaou smears without significant atypia be dropped from routine screening programs for squamous cell carcinoma of the cervix.[88,100] However, primary care physicians should be aware that 15% of women aged 65 to 74 years and 38% of women 75 years and older report never having had a Pap smear.[89] Because 25% of the cervical cancer incidence (excluding carcinoma in situ) and 41% of cervical cancer deaths occur in the population older than 65 years,[89] women older than age 65 without previous Pap smears should probably have periodic smears every one to three years for an indefinite period of time.

Early Detection of Sensory Deficits in the Elderly

Vision. The incidence and prevalence of defective vision and blindness increase sharply with age.[101] In all, 5% of persons aged 65 and older have severe visual impairments (inability to read normal newspaper print with conventional glasses), 1% are legally blind (corrected acuity less than 20/

200) and many more have less severe but still significant visual impairment.[102] In nursing homes, 50% of the residents have trouble seeing and 15% are severely disabled or are unable to see.[102] These numbers likely underestimate the true prevalence of severe visual impairment in the elderly, which is expected to double over the next 20 years.[102,103] Defective vision significantly decreases the mobility, safety and life satisfaction of elderly persons and ultimately can result in a loss of independence.[107] The disorders most often responsible for serious visual deficits in the elderly—cataracts, senile macular degeneration, glaucoma and diabetes mellitus—are each at least partly remediable with early detection and treatment, with the possible exception of senile macular degeneration.[101] Glasses and other optical aids will benefit many of the patients, as will rehabilitation programs that include environmental structuring and navigational skills.[102]

Unfortunately, it is estimated that only a few percent of the visually impaired elderly people in this country receive adequate vision services.[102] This may relate, in part, to the tendency of many elderly patients or their physicians to attribute visual loss to normal aging with a resultant low rate of referral to specialists and a large residual pool of preventable dysfunction. Primary care physicians should do routine screening for visual deficits in their elderly patients every one to two years. Visual acuity should be tested with a Snellen acuity chart and by asking a patient to read newsprint. An ophthalmoscopic examination should be done, but with a clear understanding of the low sensitivity and specificity of the examination as done by internists for detecting both glaucoma and diabetic retinopathy.[104] The utility of handheld tonometry to measure intraocular tension as a screening maneuver for glaucoma is controversial.[12,105] The Canadian Task Force on the Periodic Health Examination does not recommend it, believing there are too many false-positive results for it to be useful.[12] An alternative approach would be a regular referral (every one to three years) to community screening programs that use the more accurate applanation equipment.[5(pp223-233)]

The discovery of significant visual dysfunction is an indication for ophthalmologic consultation. When severe visual deficits cannot be adequately corrected, it may be useful to refer an elderly patient to community services for the visually handicapped. Finally, primary care physicians must consider the functional consequences of an elderly patient's visual deficits—that is, safety in the home, driving and avocational activities. This assessment may require a home visit by the physician or by an allied health worker.[102]

Hearing. The prevalence of hearing impairment in the elderly varies from 30% to 60% in different investigations according to the particular criteria used, the type of testing done and the characteristics of the elderly population being studied.[106] Hearing loss severe enough to produce disability may be present in 25% of persons aged 65 and older and 50% of persons older than 85 years.[107] Of patients in nursing homes, 30% to 50% have moderate to profound hearing loss.[106,108] Considerable morbidity may be associated with significant hearing loss.[106] Anger and frustration in these patients may result in withdrawal and social isolation. The incidence of depression may be twofold greater in elderly persons with hearing disability than in those with normal hearing.[109] Hearing disability may exacerbate confusion and paranoia in persons with dementia or psychiatric disease.[110]

Medical and surgical therapy is rarely able to correct hearing disability in the elderly. However, aural rehabilitation using hearing aids, education of the patients and family in communication techniques and structuring of the environment may significantly benefit many of these elderly persons.[106] Even in nursing homes where the high prevalence of mental incapacity may limit the therapeutic response, 15% of the hearing impaired may benefit from a rehabilitation program.[108]

The prevalence of hearing disability in the elderly, the associated morbidity and the potential response to rehabilitation programs all argue for the screening and detection of hearing impairment in the elderly.[12] In studies from both the community and nursing homes, however, self-reporting of hearing impairment by the elderly and detection by their primary care physicians were both found to underestimate the prevalence of hearing impairment by 50% or more, when compared with formal audiometric testing.[108,109,111] This discrepancy may be due to a variety of factors: a refusal to admit to hearing loss, failure to recognize hearing loss due to its gradual onset and slow progression or to coexisting cognitive deficits (such as dementia) and the belief of elderly patients or their physicians that beneficial therapy for hearing impairment is not available.[108] As a result, many elderly persons with potentially remediable hearing disorders may go without appropriate diagnosis and rehabilitation.

Primary care physicians should carefully screen their elderly patients annually or biennially for hearing deficits, using history and physical examination. The limitations of these maneuvers should be recognized, however, and audiologic or otolaryngologic consultation should be promptly requested for all suggestive cases. Additionally, consideration should be given to the recent proposal that all nursing home patients undergo routine audiometry.[108]

Preventive Aspects of Mental Health Care in the Elderly

Dementia. The prevalence of dementia in those older than 65 years is estimated at 5% to 20%.[112] Dementia is the most common reason for admission of elderly persons to nursing homes and is therefore a major expense to the health care system.[113] More important, dementia is a source of enormous personal suffering both to the patient and to the patient's family and friends.[114] Unfortunately, more than 70% of dementia cases in the elderly are due to Alzheimer's disease.[112] Primary prevention of this disorder is not possible, nor is beneficial treatment available following early detection (secondary prevention). Physicians frequently attempt to diagnose a cause of "reversible" dementia that may be present in 15% of demented elderly patients (usually drug toxicity or hypothyroidism).[112] Unfortunately, once the diagnostic evaluation is completed, many physicians abandon patients who have chronic dementia as untreatable.[115] This ignores the concept of tertiary prevention, whereby a physician attempts to maximize function and minimize disability and thereby slow the progression toward dependency and confinement in an institution. Such tertiary prevention can be of tremendous benefit both to demented patients and their care-givers. In a recent study of elderly outpatients referred for evaluation of chronic dementia, nearly half of these patients had previously unrecognized but treatable medical and psychiatric disease including depression, urinary tract infections, congestive

heart failure, Parkinson's disease, drug toxicity and a number of others.[112] Therapy for these disorders resulted in objective improvement in 25% of the patients. Careful assessment of a demented elderly patient's family and environment may also disclose unreported social and psychological needs amenable to intervention by other members of the health care team, such as social workers, home health aids and so forth.[112] These interventions may improve the function of both patient and care-givers enough to prevent or delay placement in an institution.

Depression. It is estimated that 13% of persons aged 65 and older have clinically significant depression warranting intervention, including 5% to 10% of community-dwelling elderly and 30% of elderly in nursing homes.[5(pp83-106),116] In men older than 80 years, the prevalence of depression may be as high as 24%.[116] The rate of suicide increases sharply with age in men: elderly men have a suicide rate threefold to fourfold greater than the rest of the population.[5(pp83-106)] Effective therapy (pharmacologic, electroconvulsive and psychotherapy) is available for elderly patients who have depression.[117,118] Despite the high prevalence of depression and the availability of effective therapy, however, elderly depressed patients are both underdiagnosed and underserved. It is common for physicians to miss a diagnosis of depression in the elderly[119] and, in one series, nearly 75% of cases of depression in elderly outpatients were unknown to the primary care physician.[111] Less than 5% of the clients of community health centers are aged 65 and older and less than 3% of the visits to office-based psychiatrists are by patients older than 65.[116] Only 30% of nursing homes offer mental health counseling as a routine service.[116]

Physicians may fail to make a diagnosis of depression in elderly patients for several reasons.[119] Physical illness is an important contributing cause of depression in the elderly,[116] and physicians may be too involved with a patient's physical disease processes to notice coexisting depression. Depression may also present in an atypical fashion in elderly patients—so-called masked depression, with pronounced somatic symptoms and an absence of classic psychiatric symptoms.[119] Finally, some psychiatrists and primary care physicians may be less interested in the mental health of their elderly patients as compared with their younger patients.[120]

Primary care physicians should carefully screen their elderly patients for signs and symptoms of depression, so that referral and therapeutic interventions can be initiated early. Risk factors include coexisting physical illness, recent bereavement, alcohol abuse and, perhaps, social isolation.[116] Elderly patients who have multiple somatic symptoms that remain unexplained after a thorough medical examination may be suffering from depression and need further investigation.

Alcoholism. The definition of alcoholism in the elderly is difficult but essentially includes excessive, persistent drinking that interferes with a persons's health and interpersonal relations.[121] There are no adequate large-scale studies of the incidence and prevalence of alcoholism in community-dwelling elderly persons.[122] Estimates of prevalence from available studies range from 1% to 23%, with an average of about 10% in persons older than 65.[121,122] Due to the greater difficulty in diagnosing alcoholism in elderly persons, this figure may be an underestimate.[122] Although the prevalence of alcoholism in the elderly is less than in younger persons,[121] it constitutes a serious public health problem. Alcoholism in the elderly may be a major etiologic factor in 15% to 20% of nursing home admissions, 10% of hospital admissions for acute conditions and 5% to 15% of medical outpatient visits.[121] There is evidence from studies in animals that an elderly person's brain may be more sensitive to both the acute and chronic effects of alcohol.[123] As a result, alcohol in amounts tolerated by younger persons may acutely impair the coordination and equilibrium of elderly persons and may be an important etiologic factor in falls and motor vehicle accidents, though this has not yet been confirmed. Chronic alcohol consumption may increase vulnerability to Alzheimer's dementia and reversibly exacerbate confusion in demented elderly persons. Alcoholism may interact with depression in the elderly in a vicious cycle and contribute to the high suicide rate in this age group.[124]

A disproportionately small number of elderly persons with alcoholism receive therapy for it, despite the fact that treatment may be nearly twice as effective as in younger patients.[122] This may in part reflect underdiagnosis of alcoholism in the elderly by primary care physicians. Two types of elderly persons with alcoholism have been identified.[122] Two thirds have had alcoholism all their lives but have survived into old age; diagnosis in this group usually is not difficult. The other third have the onset of the disorder in old age, perhaps partly in response to the psychosocial stresses of old age. These elderly patients are often not identified as having alcoholism as they do not manifest the classic social problems seen in younger persons with the disorder.[121,124] Elderly persons are more often widowed and retired and drive less frequently than younger persons, and so their alcoholism presents less frequently with marital stress, poor job performance or encounters with law enforcement agencies. Because many physicians are unaware of the relatively high prevalence of alcoholism among the elderly, they are unlikely to attribute nonspecific symptoms and signs or other health problems to alcohol abuse.

In view of the prevalence and morbidity of alcoholism in the elderly and considering its difficult diagnosis and relatively favorable response to therapy, primary care physicians should carefully screen the drinking habits of their elderly patients. High-risk elderly patients who are socially isolated, depressed or apparently demented, or who have recently suffered a fall or motor vehicle accident, should be evaluated carefully for alcoholism.

Social Support System

To live independently within a community, a person or couple must be able to adequately carry out certain social tasks such as housekeeping, transportation, food preparation, grocery shopping and social interaction with other people.[125] Failure to accomplish these tasks increases dependency and may result in being admitted to an institution.[5] Although the prevalence of social disability does increase with age, more than 90% of community-dwelling persons older than age 65 have minimal social disability and do not require extensive support.[125] Even in the "old-old" older than 75, only about 10% to 15% have major unmet social needs.[125] Social isolation among community-dwelling elderly persons does not increase much with age, and these elderly persons have as many

social contacts among relatives and friends as younger persons.[126]

Primary care physicians must attempt to identify the small subgroup of elderly with unmet social needs that place them at serious risk of institutional placement. Practical tools to effectively accomplish this are not yet available, though it appears that those elderly with significant physical and mental disability are at greatest risk, particularly if they are poor and without close family or friends.[5,7,126] Once identified, it is the responsibility of a primary care physician to marshal the appropriate family and community resources to provide for these unmet social needs. Families currently provide 80% or more of the home health care of the elderly in the United States, and nearly a third of nursing home referrals are the result of a breakdown of the family support system. Physicians may have to provide temporary or part-time relief for some families in the form of community services such as home nurses, home health aides and Meals-on-Wheels.[5] They must provide these services at the correct time. If they are given too early, scarce community finances are wasted. If the services are given too late, the patient may need to be permanently confined to an institution. Ideally, physicians should be aware of the variety of support services available in their community, which of their patients qualify for these services and how to arrange for them. In practice this is a complicated maze in which it is difficult to match the specific needs of individual elderly patients with the services for which they qualify.[5(pp303-320)] The assistance of a knowledgeable social worker may be of great value. Preliminary studies suggest that with appropriate use of family and community resources, most elderly patients referred for skilled and unskilled nursing home placement may remain in the community.[7] Maintaining an elderly patient's social support system may therefore be a most important preventive health maneuver.

Iatrogenic Disease: Drug Therapy

Elderly persons receive more drugs, including a greater number of potentially toxic drugs with a narrow therapeutic ratio, than do younger persons.[127-129] In all, 80% to 90% of elderly persons living in the community take some medication regularly, and 15% receive four or more drugs a day; two thirds of these medications are by prescription and a third are obtained over the counter.[127,129] The most common prescription medication in outpatients includes diuretics, digoxin, antihypertensives, antiarthritis medications and anxiolytics.[127,128,130] Drug use is even more extensive in nursing homes with the average patient receiving three to four prescription drugs per day, primarily psychotropic drugs, digoxin and antihypertensives.[127,128]

Adverse drug reactions and their associated morbidity and mortality also increase with age and are twice as frequent in persons older than 65 years as in the younger population.[129,131] The drugs most often at fault are those most frequently prescribed and include cardiovascular medications, hypnotics, anxiolytics, antidepressants and anti-Parkinsonian drugs.[128,129,131] Unfortunately, elderly persons are only half as likely as younger persons to report adverse symptoms from drugs to their physicians[132]—another manifestation of their tendency not to report illness. Multiple factors may contribute to the increased rate of adverse drug reactions in the elderly and include an increased number of drugs per patient, some of which may be unnecessary; an increased intrinsic sensitivity to the drugs due to altered pharmacokinetics and pharmacodynamics; the frequent presence of multiple chronic illnesses that may adversely interact with the drugs, and poor compliance.[128,129]

TABLE 4.—*Prescribing Recommendations for the Elderly**

Identify medical illnesses that will affect drug disposition and adjust dose accordingly
Start with low drug doses and gradually increase
Monitor serum concentrations when available
Explain to patient and family the reason for a medication
Expected benefits
Possible side effects
Possible interactions with drugs or foods
Provide a patient with a written list of all medication
Identify each drug by name, list its purpose and describe its appearance
Develop a dosage schedule to match a patient's activity schedule
May use drug calendars to reinforce instructions
Be sure a patient can read instructions and can open container
Use large labeling and easy-open containers when necessary
Be sure patient has access to a pharmacy and can afford prescription
Monitor compliance
Use relatives and other health professionals in home
Request patients bring all drugs to office visits
Maintain complete chart roster of prescription and nonprescription drugs
Periodic review of need for continued drug therapy
Reduce medication to the minimum necessary

*Adapted from Lamy[128] and Royal College of Physicians.[129]

Elderly persons may also fail to use prescribed medication effectively: 25% to 50% of elderly outpatients may not comply properly with their drug therapy, failing to take prescribed medication, taking drugs that were not prescribed or taking medication at incorrect time intervals.[133,134] Causes of poor drug compliance in the elderly include large numbers of drugs; misunderstanding of verbal instructions, often due to cognitive or hearing deficits; poor vision and inability to read prescription labels; an inability to open child-proof containers (found in 25% to 50% of elderly patients), and an inability to afford medication or lack of adequate transportation to reach a pharmacy.[128,133,135]

A number of studies have identified a subset of elderly patients who may be at greater risk for adverse drug reactions or poor compliance or both.[128] These high-risk groups include the "old-old" elderly (aged 75 years or older), women, those elderly living alone, elderly persons who take more than three drugs per day, elderly persons with multiple chronic illnesses, elderly persons with impaired vision or hearing and those with severe physical or mental disability. Although there has been little validation in controlled studies, a number of preventive measures have been suggested to decrease the frequency of adverse drug reactions and to improve patient compliance in the elderly (Table 4).

Urinary Incontinence

The prevalence of significant urinary incontinence increases with age and is estimated at 5% to 20% in community-dwelling elderly persons and 40% to 50% in the elderly in institutions.[5(pp107-135),136] Many of these patients are otherwise ambulatory and have good mental function.[5(pp107-135)] The medical, psychological and social consequences of urinary

incontinence may be disabling to an elderly person. Urinary incontinence may result in skin breakdown, decubitus ulcers, sepsis and even death. It is a source of great personal humiliation and may result in social withdrawal and confinement to the home and may aggravate existing depression. Urinary incontinence may place stress on family and friends. It is a known risk factor predisposing elderly persons in the community to dependency and confinement to an institution. However, with early diagnosis and treatment (pharmacologic, behavioral), most elderly persons with urinary incontinence can be cured or their condition significantly improved, especially the ambulatory elderly.[136]

Despite its high prevalence, tremendous morbidity and relatively good response to treatment programs, urinary incontinence in community-dwelling elderly is frequently not diagnosed. Of the elderly in the community who have incontinence, 20% to 50% are unknown to the health care system.[111,137] This may relate both to the reticence of elderly persons to admit to and discuss urinary incontinence and to the failure of physicians to pursue diagnostic questioning with enough vigor.[138]

Podiatric Care

Common foot problems of the elderly include nail abnormalities, cornifying processes of the foot (calluses, bunions and the like), biomechanical problems—such as arch problems and flat feet—and ulcerations.[139] One study of elderly persons in the community noted a 43% prevalence of foot disorders of mild to moderate severity, some of which had the potential to limit the mobility and independence of the elderly person; two thirds of these disorders were unknown to the patients' primary care physicians.[111] There are no formal studies that confirm the preventive value of podiatric care for the maintenance and improvement of ambulation in the elderly. However, the clinical impression of some geriatricians is that podiatric care may indeed provide such preventive benefits.[5(pp289-302)] It may be beneficial to regularly screen elderly persons for the presence of foot discomfort and examine their feet carefully for the lesions listed above, with referral to a podiatrist as needed. Preventive foot care and education is especially important for elderly persons with occlusive peripheral arterial disease or diabetes mellitus.

Hypothyroidism

Hypothyroidism is a relatively common disorder in the elderly, especially in women. The reported prevalence from community studies varies from 0.5% to 3.8%, depending on the definition of hypothyroidism.[140] The prevalence of overt, symptomatic hypothyroidism in the community is 1.4% in elderly women but less than 1% in elderly men.[141] Subclinical hypothroidism is characterized by an increase in serum thyrotropin (thyroid-stimulating hormone [TSH]) levels with normal or low-normal levels of serum thyroxine (T_4) in the setting of few or absent clinical signs or symptoms.[140] Mild hypothyroidism manifests with minor nonspecific symptoms, elevated TSH and low or low-normal serum T_4 levels.[140] The prevalence of subclinical and mild hypothyroidism in persons older than 60 years may be as high as 7.1% in women and 2.3% in men,[141,142] though other studies have noted lower prevalences.[143,144]

Because of the considerable prevalence of hypothyroidism in the elderly, the Canadian Task Force on the Periodic Health Examination recommended that persons aged 65 and older be screened every two years for hypothyroidism using clinical examination.[12] Others have suggested the routine screening measurement of serum TSH and T_4 levels in view of the difficulties in clinically diagnosing subclinical and mild hypothyroidism in the elderly.[140,142] The critical question is whether thyroid hormone replacement is clinically beneficial to a patient with mild, or especially subclinical, hypothyroidism. If few or no benefits are to be derived from therapy, there is little indication to pursue a vigorous screening program. Recent evidence suggests that thyroxine therapy may be of value to many of these patients, correcting abnormal myocardial function that may be present in up to 50% of patients with subclinical hypothyroidism and relieving subtle hypothyroid symptoms that may be elicited only with intensive questioning.[145,146] Additionally, many patients with subclinical and mild hypothyroidism will progress to overt hypothyroidism, which will be poorly tolerated by some.[140,147-149] Thyroxine replacement therapy in these patients may prevent the development of overt hypothyroidism.[149] However, further studies of the prevalence of hypothyroidism and of the benefit-toxicity ratio of thyroxine treatment of elderly patients with subclinical and mild hypothyroidism are needed before a definite statement can be made about the utility of regular screening.

Comprehensive Assessment and Tertiary Prevention

A comprehensive assessment of an elderly patient includes not only identifying and treating specific medical conditions but also quantifying a patient's physical, mental and social function. The discovery of functional impairment or disabilities guides subsequent rehabilitation efforts. If function cannot be adequately restored, the physician may enlist family or community resources (or both) to help prevent or forestall increasing dependency and possible placement in an institution.[150,151]

The Canadian Task Force on the Periodic Health Examination recommends that primary care physicians comprehensively assess their elderly patients every other year from age 65 to 74 and annually thereafter.[12] However, a comprehensive assessment of disease and function in elderly patients may be complex and time-consuming and require the multidisciplinary skills of allied health personnel; it will therefore be expensive in terms of finances and resources. Is there evidence that such an assessment will improve patient outcome for the elderly?

There is only one controlled trial of comprehensive assessment of elderly outpatients. Tulloch and Moore randomly selected 295 general practice patients aged 70 years and older for a control group that received conventional patient-initiated care and an experimental group that underwent comprehensive assessment of disease and function; these patients were observed for two years.[15] In the experimental group they discovered a large number of previously undiagnosed but treatable medical conditions and many social problems. However, at the end of the two-year study period there was no difference between the groups with respect to medical conditions or functional status. The experimental group did consume more social and health services.

A number of studies have examined the effectiveness of

comprehensive assessment of the elderly in an inpatient setting of geriatric assessment or evaluation units. These elderly inpatients constitute a select group and the results of these studies may not be generalizable to the elderly population at large. These studies have been recently reviewed.[151-153] Most of the studies are descriptive and did not use an experimental design with a control group. Most of these uncontrolled data do suggest that comprehensively assessing elderly inpatients improves patient outcome with respect to diagnosis and treatment of previously unrecognized medical conditions, more appropriate and decreased use of medication, improved physical and mental function, improved emotional state and sense of well-being and lower rates of nursing home placement after hospital discharge.[151,152] Two controlled studies of geriatric assessment units are available,[154,155] along with preliminary results from a third study.[151] One of the studies noted some improvement in function with comprehensive assessment but no change in mortality or in rates of nursing home placement.[154] The other two studies found an improved functional state and lower rates of institutional placement following comprehensive assessment[151,155]; preliminary results from one of these studies also suggest decreased one-year mortality, lower rates of readmission to hospital, and reduced costs in the experimental group.[151]

The disparate results of these studies may relate to patient selection, in that perhaps only certain subgroups of the elderly benefit from comprehensive assessment.[151] Most elderly persons who are relatively healthy and the subgroup with the most severe functional compromise perhaps derive less benefit than those elderly patients who fall in between these two groups.[151,153]

More research is urgently needed to determine the effectiveness of comprehensive assessment of both elderly outpatients and inpatients. Validated preevaluation selection criteria are needed to target those subgroups of elderly patients most likely to benefit from comprehensive assessment.

REFERENCES

1. Rice DP, Feldman JJ: Living longer in the United States: Demographic changes and health needs of the elderly. Milbank Mem Fund Q 1983; 61:362-396

2. Ouslander JG, Beck JC: Defining the health problems of the elderly. Annu Rev Public Health 1982; 3:55-83

3. Kallenberg GA, Beck JC: Care of the geriatric patient, chap 23, *In* Rakel RE (Ed): Textbook of Family Practice, 3rd Ed. Philadelphia, WB Saunders, 1984, pp 244-282

4. Health and Public Policy Committee, American College of Physicians: Long-term care of the elderly. Ann Intern Med 1984; 100:760-763

5. Kane RL, Ouslander JG, Abrass IB: Essentials of Clinical Geriatrics. New York, McGraw-Hill, 1984.

6. Katz S, Branch LG, Branson MH, et al: Active life expectancy. N Engl J Med 1983; 309:1218-1223

7. Kennie DC: Health maintenance of the elderly. J Am Geriatr Soc 1984; 32:316-323

8. Kennie DC: Good health care for the aged. JAMA 1983; 249:770-773

9. Williamson J: Screening, surveillance, and case-finding, chap 12, *In* Arie T (Ed): Health Care of the Elderly: Essays in Old Age Medicine, Psychiatry, and Services. Baltimore, Johns Hopkins University Press, 1981, pp 194-213

10. Sackett DL: Preventive geriatric medicine. Primary Care 1982; 9:3-6

11. Carnes M: Preventive health care for the elderly. Wis Med J 1983; 82:15-18

12. Spitzer WO, Bayne RD, Charron KC, et al: Task Force Report: The periodic health examination. Can Med Assoc J 1979; 121:1193-1254

13. Grimley-Evans J: Prevention of the age-associated loss of autonomy: Epidemiologic approaches. J Chronic Dis 1984; 37:353-363

14. Barber JH: Screening and surveillance of the elderly at risk. Practitioner 1984; 228:269-273

15. Tulloch AJ, Moore V: A randomized controlled trial of geriatric screening and surveillance in general practice. J R Coll Gen Pract 1979; 29:733-742

16. Barber JH, Wallis JB: The effect of a system of geriatric screening and assessment on general practice workload. Health Bull (Edinb) 1982; 40:125-132

17. Irvine PW, Carlson K, Adcock M, et al: The value of annual medical examinations in the nursing home. J Am Geriatr Soc 1984; 32:540-545

18. Gambert SR, Duthie EH, Wiltzius F Sr: The value of yearly medical evaluation in a nursing home. J Chronic Dis 1982; 35:65-68

19. Stettner M: Medigap: Are we cheating the elderly? (Health Care Delivery). West J Med 1983 Nov; 139:742-745

20. Keeler EB, Solomon DH, Beck JC, et al: Effect of patient age on duration of medical encounters with physicians. Med Care 1982; 20:1101-1108

21. Medical Practice Committee, American College of Physicians: Periodic health examination: A guide for designing individualized preventive health care in the asymptomatic patient. Ann Intern Med 1981; 95:729-732

22. Anderson FA, Williams B: The preventive approach, chap 2, Practical Management of the Elderly, 4th Ed. Oxford, Blackwell, 1983, pp 7-30

23. Breslow L, Somers AR: The lifetime health-monitoring program. N Engl J Med 1977; 296:601-608

24. Shock NW: Aging of physiological systems. J Chronic Dis 1983; 36:137-142

25. Gilchrest BA, Rowe JW: The biology of aging, chap 2, *In* Rowe JW, Besdine RW (Eds): Health and Disease in Old Age. Boston, Little, Brown, 1982, pp 15-24

26. Williams ME: Clinical implications of aging physiology. Am J Med 1984; 76:1049-1054

27. Cape RDT: The geriatric patient, chap 2, *In* Cape RDT, Coe RM, Rossman I (Eds): Fundamentals of Geriatric Medicine. New York, Raven Press, 1983, pp 9-15

28. Bortz WM: Disuse and aging (Special Communication). JAMA 1982; 248:1203-1208

29. Vallbona C, Baker SB: Physical fitness prospects in the elderly. Arch Phys Med Rehabil 1984; 65:194-200

30. Besdine RW: Geriatric medicine: An overview. Annu Rev Gerontol Geriatr 1980; 1:135-153

31. Williams ME, Hadler NM: The illness as the focus of geriatric medicine. N Engl J Med 1983; 308:1357-1360

32. National Institute on Aging: NIA Technology Assessment Conference, Evaluating the Elderly Patient: The case for assessment technology. J Am Geriatr Soc 1983; 31:636-664, 721-765

33. Fielding JE: Preventive services for the well population, *In* Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention—Background Papers, publication (PHS) 79-55071A. US Dept of Health, Education, and Welfare. Government Printing Office, 1979, pp 277-304

34. Immunization Practices Advisory Committee, Centers for Disease Control: Prevention and control of influenza. Ann Intern Med 1984; 101:218-222

35. Couch RB, Cate TR: Managing influenza in older patients. Geriatrics 1983; 38:61-74

36. Barker WH, Mullooly JP: Impact of epidemic type A influenza in a defined adult population. Am J Epidemiol 1980 Dec; 112:798-811

37. Schoenbaum SC: Immunization, chap 4 *In* Gleckman RA, Gantz NM (Eds): Infections in the Elderly. Boston, Little, Brown, 1983, pp 63-71

38. Barker WH, Mullooly JP: Influenza vaccination of elderly persons—Reduction in pneumonia and influenza hospitalization and deaths. JAMA 1980; 244:2547-2549

39. Riddiough MA, Sisk JE, Bell JC: Influenza vaccinations: Cost-effectiveness and public policy. JAMA 1983; 249:3189-3195

40. Rundall TG, Wheeler JRC: Factors associated with the utilization of the swine flu vaccination program among senior citizens in Tompkins County. Med Care 1979; 17:191-200

41. Schoenbaum SC: Influenza vaccine: Delivering the goods. Am J Public Health 1983; 73:365-366

42. Schneider EL: Infectious diseases in the elderly. Ann Intern Med 1983; 98:395-400

43. Immunization Practices Advisory Committee, Center for Disease Control: Update: Pneumococcal polysaccharide vaccine usage—United States. Ann Intern Med 1984; 101:348-350

44. Gruer LD, McKendrick MW, Geddes AM: Pneumococcal bacteremia—A continuing challenge. Q J Med 1984; 53:259-270

45. Austrian R: A reassessment of pneumococcal vaccine. N Engl J Med 1984; 310:651-653

46. American College of Physicians: Pneumococcal vaccine recommendation. Ann Intern Med 1982; 96:206-207

47. Schwartz JS: Pneumococcal vaccine: Clinical efficacy and effectiveness. Ann Intern Med 1982; 96:208-220

48. Shapiro ED, Clemens JD: A controlled evaluation of the protective efficacy of pneumococcal vaccine for patients at high risk for serious pneumococcal infections. Ann Intern Med 1984; 101:325-330

49. Broome CV, Facklam RR, Fraser DW: Pneumococcal disease after pneumococcal vaccination: An alternative method to estimate the efficacy of pneumococcal vaccine. N Engl J Med 1980; 303:549-552

50. Patriarca PA, Schleck WF, Hinman AR, et al: Pneumococcal vaccination practices among private physicians. Public Health Rep 1982; 97:406-408

51. Rothstein RJ, Baker FJ II: Tetanus: Prevention and treatment. JAMA 1978; 240:675-676

52. Crossley K, Irvine P, Warren JB, et al: Tetanus and diphtheria immunity in urban Minnesota adults. JAMA 1979; 242:2298-2300

53. Ruben FL, Nagel J, Fireman P: Antitoxin responses in the elderly to tetanus-diphtheria (Td) immunization. Am J Epidemiol 1978; 108:145-149

54. Weiss BP, Strassburg MA, Feeley JC: Tetanus and diphtheria immunity in an elderly population in Los Angeles County. Am J Public Health 1983; 73:802-804

55. Mullooly JP: Tetanus immunization of adult members of an HMO. Am J Public Health 1984; 74:841-842

56. Immunization Practices Advisory Committee, Centers for Disease Control: Diphtheria, tetanus, and pertussis: Guidelines for vaccine prophylaxis and other preventive measures. Ann Intern Med 1981; 95:723-728

57. Rubenstein LZ: Falls in the elderly: A clinical approach (Topics in Primary Care Medicine). West J Med 1983 Feb; 138:273-275

58. Hogue CC: Injury in late life: Epidemiology and prevention. J Am Geriatr Soc 1982; 30:183-190, 276-280

59. Perry BC: Falls among the elderly: A review of the methods and conclusions of epidemiologic studies. J Am Geriatr Soc 1982; 30:367-371

60. Greenland P: Cardiac fitness and rehabilitation in the elderly. J Am Geriatr Soc 1982; 30:607-611

61. Jette AM, Branch LG: Framingham Disability Study: II. Physical disability among the aged. Am J Public Health 1981; 71:1211-1216

62. Svanborg A. Bergstrom G, Mellstrom D: Epidemiological studies on social and medical conditions of the elderly: Report on a survey (EURO Reports and Studies No. 62). Copenhagen, WHO Regional Office for Europe, 1982

63. Council on Scientific Affairs, American Medical Association: Exercise programs for the elderly. JAMA 1984; 252:544-546

64. Fuller E: Exercise: Getting the elderly going. Patient Care 1982; 16:67-114

65. Schuman JE, Beattie EJ, Steed DA, et al: Geriatric patients with and without intellectual dysfunction: Effectiveness of a standard rehabilitation program. Arch Phys Med Rehabil 1981 Dec; 62:612-618

66. Crapo PA: Nutrition and the elderly, chap 10, *In* Schrier RW (Ed): Clinical Internal Medicine in the Aged. Philadelphia, WB Saunders, 1982, pp 167-181

67. Cape RDT: Nutrition and the elderly, chap 30, *In* Cape RDT, Coe RM, Rossman I (Eds): Fundamentals of Geriatric Medicine. New York, Raven Press, 1983, pp 295-308

68. Lew EA, Garfinkel L: Variations in mortality by weight among 750,000 men and women. J Chronic Dis 1979; 32:563-576

69. Hubert HH, Feinleib M, McNamara PM, et al: Obesity as an independent risk factor for cardiovascular disease: A 26-year followup of participants in the Framingham study. Circulation 1983; 67:968-977

70. Andres R: Aging, diabetes, and obesity: Standards of normality. Mt Sinai J Med (NY) 1981; 48:489-495

71. Stamler J, Stamler R, Riedlinger WF, et al: Hypertension screening of 1 million Americans. JAMA 1976; 235:2299-2306

72. Kannel WB, Brand F, McGee D: Hypertension in the elderly, chap 28, *In* Cape RDT, Coe RM, Rossman I (Eds): Fundamentals of Geriatric Medicine. New York, Raven Press, 1983, pp 275-285

73. Hypertension Detection and Followup Program Cooperative Group: Five-year findings of the Hypertension Detection and Follow-up Program II—Mortality by race, sex, and age. JAMA 1979; 242:2572-2577

74. National Heart Foundation of Australia: Treatment for mild hypertension in the elderly. Med J Aust 1981; 2:398-402

75. Applegate WB, Dismuke SE, Runyon JW: Treatment of hypertension in the elderly: A time for caution? J Am Geriatr Soc 1984; 32:21-23

76. Forette F, Henry JF, Henry MP, et al: Hypertension in the elderly, chap 22, *In* Amery A (Ed): Hypertensive Cardiovascular Disease: Pathophysiology and Treatment. The Hague, Martinus Nijhoff, 1982, pp 347-364

77. The 1984 report of the Joint National Committee on Detection, Evaluation, and Treatment of High Blood Pressure. Arch Intern Med 1984; 144:1045-1057

78. Rowe JW: Systolic hypertension in the elderly. N Engl J Med 1983; 309:1246-1247

79. Kannel WB, Dawber TR, McGee DL: Perspectives on systolic hypertension: The Framingham Study. Circulation 1980; 61:1179-1182

80. Gifford RW: Isolated systolic hypertension in the elderly: Some controversial issues. JAMA 1982; 247:781-785

81. Franklin SF: Geriatric hypertension. Med Clin North Am 1983; 67:395-417

82. Chobanian AV: Pathophysiologic considerations in the treatment of the elderly hypertensive patient. Am J Cardiol 1983; 52:49D-53D

83. Gray DR, Weber MA, Drayer JIM: Effects of low dose antihypertensive therapy in elderly patients with predominant systolic hypertension. J Gerontol 1983; 38:302-306

84. Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983

85. Kane-Williams E, White JE: Community-based cancer education for the elderly, *In* Mettlin C, Murphy GP (Eds): Progress in Cancer Control: IV. Research in the Cancer Center. New York, Alan R Liss, 1983, pp 113-122

86. Reimer B, Jones WL, Wilson C, et al: Cancer and the elderly: A cancer control challenge, *In* Mettlin C, Murphy GP (Eds): Progress in Cancer Control IV: Research in the Cancer Center. New York, Alan R. Liss, 1983, pp 123-134

87. Riley MW: Cancer and the life course, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 25-32

88. American Cancer Society: ACS Report on the Cancer-Related Health Checkup. CA 1980; 30:194-240

89. Celentano DD, Shapiro S, Weisman CS: Cancer preventive screening behavior among elderly women. Prev Med 1982; 11:454-463

90. Kennedy BJ: Clinical oncology: Focus on the elderly, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 43-50

91. Carbone PP, Begg CB, Jensen L, et al: Oncology perspective on breast cancer in the elderly, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 63-72

92. Herbsman H, Feldman J, Selderna J, et al: Survival following breast cancer surgery in the elderly. Cancer 1981; 47:2358-2363

93. Carlile T, Kopecky, KJ, Hadaway EN: Breast cancer screening in the elderly, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983

94. Breast screening: New evidence (Editorial). Lancet 1984; 1:1217-1218

95. Snyder RE: Detection of breast cancer in the elderly woman, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 73-82

96. Patterson WB: Oncology perspective on colorectal cancer in the geriatric patient, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 105-112

97. Third International Symposium on Colorectal Cancer. CA 1984; 34:130-176

98. Winawer SJ, Baldwin M, Herbert E, et al: Screening experience with fecal occult blood testing as a function of age, *In* Yancik R, Carbone PP, Patterson WB, et al (Eds): Perspectives on Prevention and Treatment of Cancer in the Elderly. New York, Raven Press, 1983, pp 265-274

99. Mangla JC, Pereira M, Murphy J: Diagnosis of occult gastrointestinal lesions by stool guaiac testing in a geriatric hospital. J Am Geriatr Soc 1981; 29:473-475

100. Canadian Task Force on Cervical Cancer Screening Programs: Cervical cancer screening programs: Summary of the 1982 Canadian Task Force Report. Can Med Assoc J 1982; 127:581-588

101. Kleinstein R: Vision disorders in public health. Annu Rev Public Health 1984; 5:369-384

102. Padula WV: Low vision related to fundamental service delivery for the elderly, *In* Sekuler R, Kline D, Dismukes K (Eds): Aging and Human Visual Function. New York, Alan R. Liss, 1982, pp 315-323

103. Greenberg DA, Branch LG: A review of methodologic issues concerning incidence and prevalence data of visual deterioration in elders, *In* Sekuler R, Kline D, Dismukes K (Eds): Aging and Human Visual Function. New York, Alan R. Liss, 1982, pp 279-296

104. Sussman EJ, Tsiaras WG, Soper KA: Diagnosis of diabetic eye disease. JAMA 1982; 247:3231-3234

105. Robertson D: Tonometry screening on the medical service. Arch Intern Med 1977; 137:443-445

106. Mader S: Hearing impairment in elderly persons. J Am Geriatr Soc 1984; 32:548-553

107. Fisch L: Special senses: The aging auditory system, chap 8, *In* Brocklehurst JC (Ed): Textbook of Geriatric Medicine and Gerontology, 2nd Ed. Edinburgh, Churchill Livingstone, 1978, pp 276-290

108. Corbin S, Reed M, Nobbs H, et al: Hearing assessment in homes for the aged: A comparison of audiometric and self-report methods. J Am Geriatr Soc 1984; 32:396-400

109. Gillhome-Herbst K, Humphrey C: Hearing impairment and mental state in the elderly living at home. Br Med J 1980; 281:903-906

110. Eastwood MR, Corbin S, Reed M: Hearing impairment and paraphrenia. J Otolaryngol 1981; 10:306-308

111. Williamson J, Stokoe IH, Gray S, et al: Older people at home: Their unreported needs. Lancet 1964; 1:1117-1120

112. Larson EB, Reifler BV, Featherstone HJ, et al: Dementia in elderly outpatients: A prospective study. Ann Intern Med 1984; 100:417-423

113. Arie T: Prevention of mental disorders of old age. J Am Geriatr Soc 1984; 32:460-465

114. Mace NL, Rabin PV: The 36-Hour Day: A Family Guide to Caring for Persons With Alzheimer's Disease, Related Dementing Illnesses, and Memory Loss in Later Life. Baltimore, Johns Hopkins University Press, 1981

115. Cassel CK, Jameton AL: Dementia in the elderly: An analysis of medical responsibility. Ann Intern Med 1981; 94:802-807

116. Gurland BJ, Cross PS: Epidemiology of psychopathology in old age: Some implications for clinical services. Psychiatr Clin North Am 1982; 5:11-25

117. Jarvik LF, Mintz J, Steiner J, et al: Treating geriatric depression—A 26-week interim analysis. J Am Geriatr Soc 1982; 30:713-717

118. Salzman C: Electroconvulsive therapy in the elderly patient. Psychiatr Clin North Am 1982; 5:191-198

119. Ouslander JG: Physical illness and depression in the elderly. J Am Geriatr Soc 1982;30:593-599

120. Small GW, Jarvik LF: Depression in the aged: A commentary. Psychiatr Clin North Am 1982; 5:45-48

121. West LJ, Maxwell DS, Noble EP, et al: Alcoholism. Ann Intern Med 1984; 100:405-416

122. Blazer DG, Pennybacker MR: Epidemiology of alcoholism in the elderly, *In* Hartford JT, Samorajski T (Eds): Alcoholism in the Elderly. New York, Raven Press, 1984, pp 25-33

123. Crook T, Cohen G: Future directions for alcohol research in the elderly, *In* Hartford JT, Samorajski T (Eds): Alcoholism in the Elderly. New York, Raven Press, 1984, pp 277-282

124. Hartford JT, Thienhaus OJ: Psychiatric aspects of alcoholism in geriatric patients, *In* Hartford JT, Samorajski T (Eds): Alcoholism in the Elderly. New York, Raven Press, 1984, pp 253-262

125. Branch LG, Jette AM: The Framingham Disability Study: I. Social disability among the aging. Am J Public Health 1981; 71:1202-1208

126. Berkman LF: The assessment of social networks and social support in the elderly. J Am Geriatr Soc 1983; 31:743-749

127. Vestal RF: Pharmacology and aging. J Am Geriatr Soc 1982; 30:191-200

128. Lamy PP: Drug prescribing for the elderly, chap 3, *In* Reichel W (Ed): Clinical Aspects of Aging, 2nd Ed. Baltimore, Williams & Wilkins, 1983, pp 21-71

129. Royal College of Physicians: Medication for the elderly. J R Coll Phys 1984; 18:7-17

130. Knapp DA, Knapp DA, Wiser TH, et al: Drug prescribing for ambulatory patients 85 years of age and older. J Am Geriatr Soc 1984; 32:138-143

131. Klein LE, German PS, Levine DM: Adverse drug reactions among the elderly: A reassessment. J Am Geriatr Soc 1981; 29:525-530

132. Klein LE, German PS, Levine DM, et al: Medication problems among outpatients: A study with emphasis on the elderly. Arch Intern Med 1984; 144:1185-1188

133. Kendrick R, Bayne JRD: Compliance with prescribed medication by elderly patients. Can Med Assoc J 1982; 127:961-962

134. Parkin DM, Henney CR, Quirk J, et al: Deviation from prescribed drug treatment after discharge from the hospital. Br Med J 1976; 2:686-688

135. Robbins LJ, Jahnigen DW: Child-resistant packaging and the geriatric patient. J Am Geriatr Soc 1984; 32:450-453

136. Williams ME, Pannill FC: Urinary incontinence in the elderly. Ann Intern Med 1982; 97:895-907

137. Yarnell JWG, St Leger AS: The prevalence, severity, and factors associated with urinary incontinence in a random sample of the elderly. Age Ageing 1979; 8:81-85

138. Williams ME: A critical evaluation of the assessment technology for urinary incontinence in older persons. J Am Geriatr Soc 1983; 31:657-664

139. Albert SF, Jahnigen DW: Treating common foot disorders in older patients. Geriatrics 1983; 38:42-55

140. Hurley JR: Thyroid disease in the elderly. Med Clin North Am 1983; 67:497-516

141. Turnbridge WMG: The epidemiology of hypothyroidism. Clin Endocrinol Metab 1979; 8:21-28

142. Sawin CT, Chopra D, Azizi F, et al: The aging thyroid: Increased prevalence of elevated serum thyrotropin levels in the elderly. JAMA 1979; 242:247-250

143. Campbell AJ, Reinken J, Atlan BC: Thyroid disease in the elderly in the community. Age Ageing 1981; 10:47-52

144. Heikoff LE, Luxenberg J, Feigenbaum LZ: Low yield of screening for hypothyroidism in healthy elderly. J Am Geriatr Soc 1984; 32:616-617

145. Cooper DS, Halpern R, Wood LC, et al: L-thyroxine therapy in subclinical hypothyroidism: A double-blind, placebo-controlled trial. Ann Intern Med 1984; 101:18-24

146. Ridgeway EC, Cooper DS, Walker H, et al: Peripheral response to thyroid hormone before and after L-thyroxine therapy in patients with subclinical hypothyroidism. J Clin Endocrinol Metab 1981; 53:1238-1242

147. Gordin A, Lamberg BA: Spontaneous hypothyroidism in symptomless autoimmune thyroiditis: A long-term follow-up study. Clin Endocrinol (Oxf) 1981; 15:537-543

148. Turnbridge WMG, Brewis M, French JM, et al: Natural history of autoimmune thyroiditis. Br Med J [Clin Res] 1981; 282:258-262

149. Tibaldi JM, Barzel US: Clinical hypothyroidism is a preventable disorder. J Am Geriatr Soc 1984 Apr; 32(Suppl):18

150. Williams TF: Comprehensive functional assessment: An overview. J Am Geriatr Soc 1983; 31:637-641

151. Rubenstein LZ: The clinical effectiveness of multidimensional geriatric assessment. J Am Geriatr Soc 1983; 31:758-762

152. Rubenstein LZ, Ree L, Kane RL: The role of geriatric assessment units in caring for the elderly: An analytic review. J Gerontol 1982; 37:513-521

153. Rubenstein LZ, Wieland D, English P: The Sepulveda VA Geriatric Evaluation Unit: Data on four-year outcome and predictors of improved patient outcomes. J Am Geriatr Soc 1984; 32:503-512

154. Teasdale TA, Shuman L, Snow E, et al: A comparison of placement outcomes of geriatric cohorts receiving care in a geriatric assessment unit and on general medicine floors. J Am Geriatr Soc 1983; 31:529-534

155. Lefton E, Bonstelle S, Frensley JD: Success with an inpatient geriatric unit: A controlled study of outcome and follow-up. J Am Geriatr Soc 1983; 31:149-155