OLDER AMERICANS
Substance Abuse & Mental Health
Technical Assistance Center

Evidence-Based Practices for Preventing Substance Abuse and Mental Health Problems in Older Adults

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS (continued)

List of Tables

EXECUTIVE SUMMARY

The prevention of substance abuse and mental health problems within the aging population has been recognized as a national priority. The Substance Abuse and Mental Health Services Administration's *Older Americans Substance Abuse and Mental Health Technical Assistance Center* (TAC) is committed to serving as a leading resource for the prevention and early intervention of late-life substance use and mental health problems. Despite the substantial prevalence and adverse consequences of substance use and mental health problems in older persons and the considerable knowledge related to preventing these problems, evidence-based prevention and early intervention services are not widely available nor promoted for this at-risk population. Given financial restrictions facing many health care systems, guidance is needed to direct limited available resources toward the provision of programs that have proven effectiveness. To support this effort, the TAC has reviewed the best available evidence supporting programs that target the prevention and early intervention of substance abuse and mental health problems in older adults.

The purpose of this review is to highlight prevention and early intervention programs that have proven effectiveness. This report identifies the demographic imperative for addressing late-life substance use and mental health problems, describes the current terminology of prevention programs and practices, provides a comprehensive review of the published evidence base for the prevention and early intervention of geriatric substance abuse and mental health problems based on the empirical evidence, and describes dissemination and implementation issues that align with state needs and priorities.

Five specific areas are addressed. These include the prevention and early intervention of alcohol misuse, medication misuse, depression and anxiety, suicide, and co-occurring substance abuse and mental health problems among older adults. This review provides a comprehensive examination of prevention programs in these areas that have been published through September 2005.

Alcohol Misuse

- Brief interventions can reduce alcohol misuse and hazardous drinking among older adults. Specifically, structured brief interventions and brief advice in health care settings have shown to be effective at reducing alcohol consumption in this population.

- Little evidence is available regarding universal prevention programs targeted at the prevention or reduction of alcohol misuse among older adults. Some health education programs have demonstrated increased knowledge among older adults about hazardous alcohol use.

- Recently developed screening and assessment instruments show promise as useful tools to improve identification of older at-risk drinkers and enhance clinician interactions to prevent or reduce alcohol misuse.

Medication Misuse

- Computer-based health education tools designed for older adults have shown gains in knowledge and self-efficacy regarding potential drug interactions, as well as improvements in self-medication behaviors.

- Clinical trials on early interventions with older adults who are at increased risk for medication misuse have had mixed results. Nonetheless, interventions with patients prior to hospital discharge, interventions targeted at changing provider prescription patterns, and home-based medication reviews show some promise to prevent medication misuse.

Depression and Anxiety

- A moderate amount of evidence supports the effectiveness of problem solving therapy (PST) and exercise in preventing the onset or worsening of depression. In addition, targeted outreach is effective in engaging isolated and vulnerable older adults in mental health care.

- More research is needed to determine whether other potentially effective strategies are effective in preventing depression, including: life review, reminiscence therapy, educational classes for older adults and providers, and mind-body wellness.

- Minimal evidence supports prevention programs focused on late-life anxiety.

Suicide

- Supportive interventions that include screening for depression, psychoeducation, and group-based activities have been associated with reduced rates of completed suicide among older adults.

- Telephone-based supportive interventions have also been associated with a reduction in the rate of completed suicide.

- Protocol-driven treatment of depression delivered by a care manager has been associated with reduced suicidal ideation.

Co-occurring Disorders

- Concurrent treatment of substance abuse and depression may be effective in reducing alcohol use and improving depressive symptoms.
- The evaluation and treatment of co-occurring substance use and mental health problems among older adults is an under-studied area.

This report highlights the evidence base for the prevention and early intervention of substance use disorders and mental illness in older adults. Of note, the field of prevention is far less developed than our understanding of the diagnosis and treatment of substance abuse and mental disorders in late-life. In particular, comparatively few scientific efforts have focused on preventive measures, the early identification of and intervention with high-risk individuals, and the promotion of optimal health regarding substance abuse and mental health concerns in late adulthood. However, this summary of the current evidence base provides direction for both providers and consumers regarding substance abuse and mental health prevention and early intervention services. This information can be useful in planning and implementing effective programs and practices, while also underscoring future directions for research and evaluation.

INTRODUCTION

Substance Abuse and Mental Health Problems: The Growing Need for Prevention and Early Intervention Among Older Adults

Substance abuse and mental health problems are serious and increasing threats to the health and well-being of many older adults. Community surveys indicate hazardous and harmful alcohol consumption patterns are prevalent among older adults;[1-3] rates of alcohol misuse and abuse are even higher among clinical populations because problem drinkers are more likely to present in health care settings.[4-6] Combined alcohol and medication misuse is estimated to affect up to 19 percent of older Americans.[7-10] In addition, one in four older adults has a significant mental disorder.[11] Among the most common mental health problems in older persons are depression, anxiety disorders, and dementia.[12] Finally, older adults have the highest suicide rate of any age group, with greater risk associated with men,[13] and with the presence of alcohol use and depressive symptoms.[14, 15]

Demographic projections indicate that the aging of the "baby boom" generation will increase the proportion of persons over age 65 from 13 percent currently, to 20 percent by the year 2030.[16] By the year 2030, the number of older adults with substance abuse or mental illness is expected to more than double to an estimated 15 million individuals.[11,16] As the "baby boom" cohort ages, the extent of alcohol and medication misuse is predicted to significantly increase due to the combined effect of the growing population of older adults and cohort-related differences in lifestyle and attitudes.[16,17] Based on these projections, the associated need for treatment services of substance use disorders in older persons is estimated to increase by 70 percent.[18] Increases in the need and the demand for mental health services are expected as well. The demand for mental health services is likely to increase as the baby boom cohort has tended to utilize mental health services more frequently than the current older adult cohort and has tended to be less stigmatized by seeking mental health care.[11,19,20] Population growth and cohort-specific characteristics indicate a future of increasing pressure on all health care resources and treatment systems but particularly for substance abuse and mental health services.[21]

Substance abuse and mental health problems among older adults are associated with poor health outcomes including increased disability and impairment, compromised quality of life, reduced independence and community-based functioning, increased caregiver stress, increased mortality, and higher risk of suicide.[21] Alcohol and medication misuse in older persons has negative effects on health and is associated with increased morbidity, disability, and mortality from disease-specific disorders, as well as increasing risks for diseases and trauma.[22,23] Psychiatric disorders such as depression are

associated with worse health outcomes, more compromised health status, and risk of suicide.[24-27] Mental health and substance abuse problems are also associated with significant health care expenditures. Combined, these costs accounted for 7.6 percent of all U.S. health care expenditures in 2001, including $85 billion for mental health care and $18 billion for substance abuse services.[28] Prevention and early intervention represent some of the most promising and appropriate ways to maximize health outcomes and minimize health care costs among older adults.[29,30] Research has identified a number of factors that place older adults at risk for developing substance abuse and mental health problems. Prevention programs that address these risk factors, promote resiliency, and strengthen protective factors can help older adults weather the unique circumstances that contribute to the development and/or deterioration of substance abuse and mental health problems.

Limited information is available to providers and consumers on the most efficacious approaches to adequately prevent and/or intervene with late-life substance abuse and mental health problems. Many strategies are neither age-specific nor sensitive to what is most clinically effective in accommodating the unique biological and social conditions of older persons. Important differences exist between age cohorts (e.g., baby boomers compared to Depression-era older adults), residence status (e.g., living independently in home or apartment compared to nursing home or other institutional setting), health and disability status, and socio-economic status, among other factors. Furthermore, there is considerable variation and diversity within the older adult population that magnifies the critical importance of cultural sensitivity and competence for this group of Americans. The population of older adults is also expected to become more ethnically and racially diverse in the coming decades. Minority older adults are among the fastest growing segment of the population and present new challenges and opportunities for designing effective prevention services. This increasing diversity in the U.S. aging population has implications for access and barriers to mental health and substance abuse services, cultural competency of providers and consumer-practitioner dynamics, and the need for research-based knowledge regarding differences in the perception and experience of mental illness and substance use among older adults. The current challenges and increasing pressure of demographic trends make the dissemination and implementation of science-based prevention knowledge of critical importance.

Science to Service: Evidence-Based Practices

Evidence-based medicine (EBM) is the provision of health care that systematically integrates the best available research evidence with clinical expertise and the patient's unique values, preferences, and circumstances.[31] EBM has been defined as "the conscientious and judicious use of current best evidence from clinical care research in the management of individual patients."[32] Identifying evidence-

based practices relies on a systematic approach to identifying and critically appraising the *best available evidence.*

There is a growing and substantial evidence base supporting the effectiveness of a variety of treatments for late-life substance abuse and other mental disorders.[21,33,34] However, considerably less research has focused on prevention of and early intervention for late-life substance abuse and mental health problems. In this respect, identifying the best available evidence is particularly relevant, where both the quality and quantity of evidence varies widely. A systematic evaluation of the literature is critical when the research literature is not well described or when there are only a small number of studies to inform clinical decisionmaking. The research evidence is conceptualized along a hierarchy of evidence from the highest to lowest levels. Further, the identification of the evidence base is a dynamic process that must take into account priority areas that lack extensive research.[35] In these instances, the best available evidence may be limited to extrapolation from related populations or early findings that are promising, but do not meet the standards of a large randomized controlled trial. For instance, despite a paucity of rigorously controlled studies that evaluate the effectiveness of interventions for the prevention of suicide in older adults, current practice should use principles from the best available evidence from a limited geriatric literature, while adapting findings from younger populations and continuously evolving to incorporate new findings.

Lack of awareness, lack of expertise, and organizational barriers often lead to continued use of unproven strategies rather than implementation of effective practices based on state-of-the-art prevention research. In general, scientific knowledge is typically far advanced beyond common practice, with the time lag between empirically identifying evidence-based approaches and implementing them into practice often taking many years. Utilizing evidence-based practices requires an integration of clinical skills, knowledge of the unique circumstances of the specific person with the identified problem, and an application of the best research evidence. Clinical skills and past experience are crucial to identifying the specific health status, risks, benefits, and unique circumstances for each individual person's health care need. This is especially important in the field of geriatrics where the risk and potential benefits of an evidence-based approach may vary substantially when the intervention is provided to a young adult with few medical problems, compared to a frail older person with multiple medical problems, concurrent treatments, and functional challenges.

The Substance Abuse and Mental Health Services Administration (SAMHSA) is committed to promoting the practical implementation of evidence-based practices to address substance abuse and mental health problems among older adults. The National Registry of Evidence-based Programs and Practices (NREPP) is an example of a developing resource supported by SAMHSA that serves as a

clearinghouse for pre-screened information on effective and practical interventions to prevent and/or treat mental and addictive disorders. As part of that effort, NREPP is currently expanding its database in the still-nascent field of prevention among geriatric populations. For example, the Gatekeeper program is listed in NREPP as a promising practice that trains public service providers and employees of local businesses (e.g., letter carriers, police officers, bank tellers, landlords) to identify and refer older adults who are at-risk for serious substance abuse and mental health problems.[36-38] In addition, the Suicide Prevention Resource Center's registry of evidence-based suicide prevention programs identifies the Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) model of depression care management as an "effective" selective and indicated prevention program.[39] In an effort to advance knowledge of evidence-based practices for older adults, the Older Americans Substance Abuse and Mental Health TAC developed this review to provide practitioners, organizations, policy makers, and concerned others with the current best available evidence regarding the prevention and early intervention of late-life substance abuse and mental health problems.

METHODS

The expected growth in the number of older adults with substance abuse and mental health disorders, the significant impact of these disorders on the health and functioning of older people, their families, and their communities, and the associated increases in health care use and costs demonstrate a critical need for the identification, organization, dissemination, and implementation of evidence-based prevention and intervention programs. Prevention of both the onset of these conditions and the potential relapse, disability, comorbidity, and continued health and functional burden among persons with substance abuse and mental health problems is a necessary focus of attention.[40-43] This report attempts to address these issues.

The Institute of Medicine's Prevention Framework

Prevention is different from intervention and treatment in that it is aimed at general population groups with various levels of risk for problems associated with substance abuse and mental illness. The Institute of Medicine's (IOM) prevention framework offers a useful model for understanding the differing objectives of various interventions. The framework can be used to match interventions to the needs of a targeted population. The goal of prevention programs is to reduce risk factors and to enhance

protective factors. Table 1 provides an overview of the IOM's framework 44, as it applies to the prevention of substance abuse, mental illness, and suicide among older adults.

Table 1. Prevention framework for substance misuse, mental illness, and suicide

Intervention Terminology	Approach	Target	Objectives
Universal Prevention	Population	Entire population, not identified based on individual risk.	Implement broadly directed initiatives to prevent substance misuse, mental illness and suicide-related morbidity and mortality through reducing risk and enhancing protective factors.
Selective Prevention	Population; High Risk	Asymptomatic or pre-symptomatic individuals or subgroups with risk factors for substance misuse, mental illness, or suicide; or individuals who have a higher-than-average risk of developing substance use or mental disorders.	Prevent morbidity and mortality through addressing specific characteristics that place older adults at risk.
Indicated Prevention	High Risk	Individuals with detectable symptoms and/or other primary risk factors for substance abuse, mental illness, or suicide.	Treat/intervene with older individuals with precursor signs and symptoms to prevent development of disorders or the expression of suicidal behavior.

Universal prevention programs target the general population of older adults with or without specific risk factors for developing substance misuse or mental health problems. For instance, a universal prevention program may provide community-wide support or education to older adults. Universal prevention may include the implementation of broad, directed initiatives to prevent substance misuse, mental illness, and suicide-related morbidity and mortality by reducing risk factors and enhancing protective factors. Examples of universal prevention programs that will be described in this report include health education around issues of substance use and engagement in exercise programming.

Selective prevention programs target older persons who are at high risk for developing problems with substance use or mental well-being. Targeted individuals are identified on the basis of the nature and number of risk factors to which they may be exposed. Selective prevention programs focus on persons who do not yet display signs of substance abuse or mental illness. However, they may have a higher than average risk for developing these problems. For instance, selective prevention programs may target older adults who have recently lost a spouse, retired, or experienced other significant lifestyle changes that may be associated with medical problems such as a stroke, vision loss, or cognitive impairment. Although these individuals may not currently have mental health or substance use problems, these conditions may predispose them to developing these issues in the future. Selective prevention programs are often designed to prevent the development of problems by specifically addressing the issues or characteristics that place older persons at increased risk. Selective prevention programs described in

this report include brief alcohol interventions and psychoeducation around the management of medical health conditions.

Indicated prevention programs target older persons who have a high risk for developing substance use disorders or mental illness. Indicated prevention programs typically focus on persons with detectable symptoms and/or other proximal risk factors for substance abuse, mental illness, or suicide in an effort to prevent chronic and severe problems. For instance, an indicated prevention program may target older adults with depression and/or substance abuse, in an effort to prevent the development of greater impairment or the expression of suicidal behavior. Finally, indicated prevention programs include depression care management and guideline-based depression treatment as an approach to reducing suicidal ideation among older adults.

Search Strategy Overview

Several strategies have been developed to aid health care providers, administrators, and policy makers in identifying the level of evidence supporting specific prevention programs and practices.[45] For the purposes of this review, multiple strategies were used to identify programs that target the prevention and early intervention of substance abuse and mental heath problems among older adults.

Our primary approach to identifying prevention programs involved systematic reviews of multiple literature databases. These databases included: Medline, PsychInfo, Ageline, Social Work Abstracts, Social Services Abstracts, CINAHL (Cumulative Index to Nursing and Allied Health Literature), and ERIC (Educational Resources Information Center). General search terms are described below. Each asterisk (*) represents a wild card. For instance, *elder** would include search terms as *elder, elderly,* and *elders*.

- Elder* or Geri* or Late-life or Senil* or Gero*, or "older" in the title
- Substance abuse or Alcohol or Medication Misuse
- Mental or depress* or psych*
- Suicid* or suicidal ideation or death ideation
- Prevent*

To supplement this strategy, we reviewed several other search engines. First, the Web-of-Science search engine was used to identify articles that were related to those identified in our initial

search strategy. This process was supplemented by reviewing the references at the end of each relevant article. Finally, other online resources were used to identify unpublished prevention programs. Federal agencies and foundations supporting research in substance abuse and mental health were evaluated in each area. The www.clinicaltrials.gov database was particularly useful in identifying ongoing research efforts. More details of the search strategy are provided in the review of each of the five prevention areas: alcohol misuse, medication misuse, depression and anxiety, co-occurring substance abuse and mental health problems, and suicide.

Evaluation Process and Criteria

The following review evaluates the scientific evidence that supports programs that target the prevention and early intervention of substance abuse and mental health problems in older adults. The aim of our review was to (a) identify studies that are published in the scientific literature or that are currently being evaluated, and to (b) critically evaluate the effectiveness of these programs. This review includes programs with established effectiveness, as well as those programs that, while promising, do not have sufficient evidence indicating their effectiveness. This comprehensive evaluation strategy provides the reader with a synopsis of "what works" and "what may not work" and is designed to serve as a guide to understanding the state of the science in prevention services for older adults.

This review contains five modules that address the prevention and early intervention of substance abuse and mental health problems (alcohol misuse, medication misuse, depression and anxiety, late-life suicide, and co-occurring substance abuse and mental health problems). Each module identifies programs that reflect universal prevention, as well as programs that reflect the selective and indicated prevention. For each of these areas, we describe the unique search methodology, a description of universal prevention programs, a description of indicated and selective intervention strategies (early intervention), and future research directions. Detailed descriptions of each program are provided in tables at the end of each module. Please note that a few prevention programs could have been appropriately located in more than one module, as they address related issues (e.g., education programs that address hazardous alcohol use in combination with medications or targeted outreach programs to identify older adults at risk for both substance abuse and mental health problems).

The tables provide (a) a description of the scientific design of the study, (b) the model or conditions that were evaluated, (c) the age of the study sample, (d) other general characteristics of the study sample, (e) the duration of the study and the percent of the sample who remained in the program during the followup period, (f) the effectiveness of the program, and (g) limitations or other comments

that should be considered in evaluating the program. Each of these areas represents important criteria for evaluating a program. For example, these criteria allow the reader to evaluate the rigor of the study (e.g., scientific design), generalizability (e.g., sample size, age, and demographics), feasibility (e.g., study drop-outs), and the likelihood of success in preventing the development of substance use disorders or mental illness or the success in preventing downstream health impairment (e.g., effectiveness).

PREVENTION OF SUBSTANCE MISUSE PROBLEMS

The following two sections highlight the current best evidence supporting prevention and early intervention programs targeting the reduction and elimination of two primary areas of substance use disorders among older adults: alcohol misuse and medication misuse. The misuse of alcohol, prescription drugs, and other substances among older adults is a sizeable and growing concern. Problem drinking among older adults in the community is estimated to range from 1-15 percent.[1-3] At-risk or problem drinking, as well as alcohol abuse or dependence, is notably higher among older adults seen in health care settings and residents of nursing homes.[4-6, 46-49] An estimated one in five older Americans (19%) may be affected by combined difficulties with alcohol and medication misuse.[7-10] Problems related to alcohol use are currently the largest class of substance use problems seen in older adults. The substances most commonly abused by older adults besides alcohol are nicotine and psychoactive prescription drugs. Co-occurring problems are frequent, as both nicotine and prescription drug abuse are much more prevalent among older adults who misuse alcohol than among the general older population.[50-53]

Older adults are uniquely vulnerable to substance use disorders due to a variety of biological, psychological, and social changes associated with aging. Older adults have an increased risk for misuse and abuse of medications, as they use a higher number of prescription and over-the-counter medications compared to younger adults. In contrast to younger persons with substance abuse problems who most often abuse illicit drugs, substance abuse problems among older individuals more typically occur from misuse of over-the-counter and prescription drugs. The rates of illegal drug abuse in the current older adult cohort are very low.[29,54] The interactions between alcohol and medications are of notable concern for older populations. Negative interactions between alcohol and psychoactive medications, such as benzodiazepines, barbiturates, and antidepressants, are of particular importance. Alcohol use can interfere with the metabolism of many medications and is a leading risk factor for the development of adverse drug reactions.[55-57] Despite the risks, physical and mental health care practitioners fail to identify most older adults who consume alcohol at risky levels, including any consumption in hazardous combinations with medications, as at-risk or problem drinkers.[4]

The use of nicotine is a significant health problem for older adults. Although tobacco use declines with age, nearly 4 million older adults continue to smoke regularly.[58] In 1999, nearly 23 percent of adults ages 50 to 64 reported past month use of cigarettes. Among those age 65 and older, this figure was about 11 percent.[58] Consistent with younger populations, older women have lower smoking rates than older men.[59] Nicotine addiction often co-occurs with other substance use disorders, and can be a marker for other substance abuse. For example, smoking in older problem drinkers is more prevalent than in the general older adult population. Some studies indicate that the prevalence of smoking among alcohol dependent individuals generally is above 80 percent;[60] an estimated 60 percent to 70 percent of older male alcohol users smoke a pack or more of cigarettes each day.[61] Smoking is a major risk factor for many of the leading causes of death among individuals age 60 and older,[62,63] and is associated with increased risk of losing mobility [64] and premature death.[65] Smoking also affects the performance of some prescription drugs. For example, smokers tend to require higher doses of benzodiazepines to achieve efficacy than nonsmokers.[66]

As with other substance misuse among older adults, evidence of effective prevention strategies for smoking cessation with older populations is more limited than with younger populations. Many clinicians fail to counsel older patients about the health effects of smoking even though older adults are more likely to quit than younger smokers.[67] Selected strategies that have shown effectiveness in older adult populations include brief interventions. One study found a tailored brief intervention more than doubled 1-year "quit rates" for older adults.[68] A study of older smokers using transdermal nicotine patches found that 29 percent of the subjects quit smoking for 6 months.[69] In addition, there is little evidence that adults in recovery from alcohol problems relapse when they stop smoking. In summary, efforts to prevent substance abuse among older adults should include tobacco consumption as a key health behavior that often co-occurs with substance abuse and with other mental health problems.[70]

Alcohol Misuse

Alcohol misuse, such as drinking above age-recommended limits, binge drinking, or combining alcohol with some medications, is a problem that can be reduced or eliminated among many older adults through prevention and early intervention strategies. Health care settings and organizations providing social or supportive services for older adults, such as the aging services network, represent essential venues for the prevention of and early intervention with alcohol misuse among older adults. Education, resource development, and technical assistance for health and human services organizations, providers, and policymakers around this issue are promising directions for broad-based prevention efforts. Universal prevention strategies such as broad education programs have been able to increase knowledge

among seniors about risky drinking practices and ways to limit hazardous alcohol use. A number of screening and assessment tools have been developed and shown to be reliable and feasible for use with this population. Early intervention or targeted prevention strategies such as brief advice by primary care physicians and other brief interventions in health care settings have reduced alcohol consumption among older adults.

Several search engines were used to identify programs addressing the prevention of and early intervention with alcohol misuse among older adults. A number of EBM databases were searched, including the Cochrane Central Register of Controlled Trials (CCTR), Cochrane Database of Systematic Reviews, ACP Journal club, and Database of Abstracts of Review of Effects (DARE). PubMed, PsychInfo, CINAHL, Ageline, Social Services Abstracts, Social Work Abstracts, and ERIC databases were used to identify published literature and other resources using a combination of age-related terms (older, geriatric, elder, late-life, etc.) with the following search terms: alcohol, prevention, early, intervention, brief intervention, screening. Search techniques were also employed to follow promising search directions, such as the "Related Articles" feature in PubMed. Additional searches were performed using the Google search engine and federal agency and grant databases, such as the federal CRISP (Computer Retrieval of Information on Scientific Projects) and National Institutes of Health (NIH) Clinical Trials database.

Universal Prevention

The evidence-base supporting effective universal prevention programs for alcohol misuse among older adults is very limited. To summarize, few population-based prevention programs targeted at the prevention or reduction of hazardous or harmful drinking among older adults have been evaluated rigorously. The best available studies are reviewed below. Please see Table 2 for further details regarding each study.

Health Education

Two recent studies have demonstrated improvements in knowledge of alcohol misuse among older adults using a pretest/posttest evaluation of health education interventions to prevent alcohol misuse. Fink and colleagues describe the development and evaluation of health promotion materials specifically designed to educate older adults about non-hazardous, hazardous, and harmful alcohol use.[71] This project brought together patient focus groups, physicians, educators, and alcohol researchers in

developing materials and measures. Participants were patients of UCLA physicians who were community-dwelling adults age 60 or older (n=101). The materials consisted of a written booklet and pamphlet. Knowledge and self-efficacy scores increased among participants from a pretest assessment to an immediate posttest. Process evaluation results also indicated high levels of feasibility and patient satisfaction. The authors concluded that older adults were motivated and able to learn about age-appropriate and recommended alcohol use. In a different pilot study among women aged 54-90 (n=32), Eliason and Skinstad [72] found that older women, particularly moderate to heavy drinkers, demonstrated improved knowledge regarding alcohol and medication misuse and other health behaviors immediately after a 60-minute educational presentation. These programs did not assess longer-term knowledge retention, so it is unclear whether the immediate knowledge and self-efficacy gains are sustainable over time.

Preventive Physician Visits

There has been very limited research regarding the effectiveness of general preventive health counseling among older adults. In a randomized trial, Medicare beneficiaries (age 65 and older) were assigned either to an intervention group (n=1573) that offered yearly preventive visits for 2 years and optional counseling visits to their primary care provider or to a control group (n=1524) that received usual care.[73] Information was collected at baseline and at 2 years. The intervention visit included history and physical exam, screening and immunization, and review of lifestyle health behaviors. Differences were observed between the intervention and control groups in the extent to which changes occurred in smoking and problem alcohol use, but none of the differences were statistically significant. There was virtually no difference between the groups in changes to sedentary lifestyle. Problem alcohol use was defined as any positive response to the Cut down, Annoyed, Guilty, Eye-opener (CAGE) Questionnaire; the CAGE was repeated at 2-year followup. The authors concluded that the study demonstrated the difficulty of bringing about health behavior change in older patients during the course of a yearly preventive visit for 2 years with their primary care physician when the visit encompasses screening and immunizations, as well as physician-directed health behavior counseling. The study implied that more targeted preventive measures are needed than a general preventive visit to effect changes in specific health behaviors.

A series of health promotion demonstration programs (the Rural Health Promotion Program) offered health screening and disease risk factor interventions, including alcohol counseling, at no cost to rural Medicare beneficiaries (aged 65 and older).[74,75] The evaluation indicated that older rural Americans modestly increased their use of a range of prevention/health promotion services if covered by Medicare. However, the study did not analyze the participation in the alcohol counseling because few people were

eligible to receive those services after assessment (~2%). Inclusion into the program was determined by a Health Risk Appraisal (HRA) interview, but the authors did not report the specific criteria used to determine eligibility for preventive alcohol counseling among these Medicare beneficiaries.

Screening and Assessment

Accurate identification of alcohol misuse and risky drinking behaviors is important in the prevention and early intervention of geriatric alcohol misuse.[76] In particular, despite the common occurrence of alcohol problems, health care personnel often fail to recognize problem drinking among older patients.[4,77] A number of screening tools are often used with older adults, but only a few have been developed and evaluated specifically for use with this population. The Michigan Alcoholism Screening Instrument-Geriatric Version (MAST-G) and its shorter version (SMAST-G) were developed as screening instruments to detect alcohol abuse and dependence among older adults.[78-80] Quantity and frequency measures have also been identified as essential screening tools among older adults, as recommended alcohol consumption levels for older adults are lower than those for adults under age 65.[4,81,82]

Several recent studies have evaluated the Alcohol-Related Problems Survey (ARPS) and a shorter version (Short ARPS or shARPS). The ARPS was developed and has tested reliably as a screening measure designed for older adults, intended to identify risks of alcohol consumption due to age-related physiological changes, declining health and functional status, and medication use.[83] It classifies drinking as non-hazardous, hazardous, or harmful. Non-hazardous drinking is defined as consumption with no known risks for adverse physical or psychological health events, hazardous drinking is consumption with such risks, and harmful drinking results in adverse events. Fink and colleagues [84] compared the ARPS to three validated alcohol screens: the Cut down, Annoyed, Guilty, Eye-opener (CAGE), Short-Michigan Alcohol Screening Test (SMAST), and Alcohol-Use Identification Test (AUDIT). Current drinkers 65 years and older (n=574) completed the ARPS and AUDIT in primary care clinics; after random assignment, half of the group completed the CAGE and half completed the SMAST. The ARPS identified nearly all drinkers detected by the CAGE, SMAST, and AUDIT and detected hazardous and harmful drinkers not identified by these measures. These drinkers used medications or had medical conditions that placed them at risk for adverse health events. Moore and colleagues evaluated the validity and reliability of the ARPS and the shorter shARPS.[85] The two measures were compared against a "LEAD" standard ("longitudinal evaluation done by experts employing all available data": a medical record review, a clinical interview, and a telephone interview with a collateral informant) among a sample of 166 drinkers aged 60 years and older in 10 internal medicine clinics. The ARPS and shARPS proved to be sensitive in identifying older drinkers with a spectrum of alcohol use disorders. They were also more sensitive than

the AUDIT and the SMAST-G in identifying older persons who may be at risk or experiencing harm due to alcohol use. The authors suggest that these instruments provide information on specific risks associated with alcohol use not obtained by other screening measures and may therefore better facilitate clinician-provided interventions.

Combined Screening and Health Education

Nguyen, Fink, and colleagues evaluated the feasibility of a combined alcohol-screening and health education system for older patients: the Computerized Alcohol-Related Problems Survey (CARPS) system.[86] The CARPS system is a screening and health education device that processes and produces individual drinking risk reports based on an individual's survey responses. The study was conducted among primary care patients age 60 and older (n=106), examining completion rates, participant drinking characteristics, and patient attitudes. Nearly all participants were able to complete the program while waiting for a scheduled physician appointment (median time 15 minutes). Sixty-seven percent of participants reported learning new information, 78 percent had never discussed alcohol with a physician, and 31 percent intended to do so. The authors concluded that combined screening and health education were feasible in health care settings such as primary care practices. Please note in the Indicated and Selective Prevention Strategies section below that a randomized trial is underway to evaluate the effectiveness of the CARPS system.

Indicated and Selective Prevention Strategies (Early Intervention)

Clinical trials for brief intervention with at-risk older drinkers have shown effectiveness with this population. There is a substantial evidence base indicating that brief interventions in a variety of clinical settings are effective at reducing alcohol consumption among adults of younger ages.[1,87-90] To date, three randomized clinical trials have examined brief interventions to reduce hazardous drinking among older adults in primary care settings. Please see Table 3 for more information regarding each study.

Brief Interventions in Primary Care Settings

A controlled clinical trial, Project GOAL (Guiding Older Adult Lifestyles), examined the efficacy of brief physician advice in reducing the alcohol use and use of health care services of older adult

problem drinkers.[2] The study involved 43 family physicians and internists in 24 community-based primary care practices in Wisconsin. Subjects age 65 or older were randomized into a control group (n = 71) or an intervention group (n = 87). Intervention group patients received two 10- to 15-minute physician-delivered counseling sessions scheduled 1 month apart. Sessions included advice, education, and contracting using a scripted workbook, as well as a followup telephone call by a nurse 2 weeks after each session. Control group patients received a general health booklet. At total of 146 patients (92.4%) participated in the 12-month followup procedure. No significant differences were found between the control and intervention groups at baseline in alcohol use, age, socioeconomic status, depression, onset of alcohol use, smoking status, activity level, or use of mood-altering drugs. Intervention group patients demonstrated a significant reduction in 7-day alcohol use, episodes of binge drinking, and frequency of excessive drinking ($p < .005$) compared with the control group at 3, 6, and 12 months after the intervention. Specifically, among the older adults who received the physician-delivered brief intervention, there was a 34 percent reduction in 7-day alcohol use, 74 percent reduction in mean number of binge-drinking episodes, and 62 percent reduction in the percentage of older adults drinking more than 21 drinks per week compared with the control group. Due to the small number of events, patterns of health care utilization were not extensively analyzed. This study provided the first direct evidence that brief physician advice can decrease alcohol use by older adults in community-based primary care practices. The methods were replicable and reasonably transferable to comparable health care settings.

Gordon and colleagues [91] compared the effects of three types of early interventions in a randomized clinical trial among older patients (age 65 and older) with hazardous drinking and examined whether older patients responded similarly to younger populations. Forty-five older enrollees met criteria for hazardous drinking and were randomized to receive Motivational Enhancement (ME, n = 18), Brief Advice (BA, n = 12), and Standard Care (SC, n = 12). At baseline, older adults drank more alcohol and abstained fewer days than the younger cohort ($p < 0.05$). During the 1-year study, older adults in all three conditions increased the number of days abstained, decreased the number of drinks per day, and reduced the number of total days per month drinking. There were trends toward decreases in the alcohol consumption measures in the ME and BA treatment arms compared to SC. The older groups' response to all interventions was similar to that of the younger cohort in the larger study. Despite extremely low sample sizes, the authors suggest that brief interventions reduce alcohol consumption in older adults similarly to younger populations.

The Health Profiles Project was a randomized clinical trial that examined the effectiveness of an age-specific brief alcohol intervention for older adults in primary care settings who report drinking above recommended limits.[92] Health screening, including specific questions regarding alcohol use and misuse, was conducted with more than 14,000 older patients (age 55 and over) seeking health care in 46

primary care clinics located in southeast Michigan and northwest Ohio. A total of 446 older patients who screened positive for hazardous drinking were randomized either to a brief (20-25 minute) alcohol intervention or control condition. Intervention group patients received an intervention appointment during which the clinician and patient would review together a Brief Alcohol Intervention booklet that included the patient's self-reported drinking data and develop a contract to reduce at-risk drinking. Control group patients received an intervention appointment and were given a general health advice booklet (addressing a range of health behaviors including alcohol use as well as nutrition, exercise, smoking, etc.). Participants were re-assessed at 3, 6, 12, and 18 months post-intervention. Preliminary results show significantly more reduction in frequency and quantity of alcohol consumption for the brief intervention compared to the control condition. These results suggest that an easy-to-administer, elder-specific brief alcohol intervention is effective in reducing at-risk drinking among older adults and shows promise in improving long-term alcohol-related health outcomes for this population.

A substudy of the Health Profile Project examined male veterans in the sample and estimated the effects of the brief intervention on health care use in that population.[93] Male veterans exposed to the intervention (n=100) used more outpatient medical services in the short term compared to the control group. Long-term effects on inpatient/outpatient use were not observed. These findings suggest that brief interventions aimed at reducing drinking may be associated with increased efforts to seek health care. The authors concluded that early detection and management of alcohol-related or other illnesses might be expected to accrue savings in later years due to positive health behavior changes.

Ongoing Selective Prevention Programs Under Evaluation

A search of current federally funded research identified three ongoing projects that are specifically designed to prevent alcohol misuse among older adults. All three focus on the identification of and brief intervention with at-risk older drinkers in health care settings. The CARPS system, described above, is the focus of a current research project funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA).[94] The project is a randomized trial of the effectiveness and cost-effectiveness of an integrated patient provider intervention to prevent harmful, hazardous alcohol use (risks for problems) in older adults. The patient intervention uses the CARPS, which results in printed Patient and Physician Reports with classification of the patient as a harmful, hazardous or non-hazardous drinker and reasons for the classification. The Patient Report references a companion educational booklet developed for older adults. The provider component is based on a physician intervention with proven effectiveness. The proposed research design involves randomization of 28 primary care physicians in four clinics and their eligible patients age 65+ to the intervention vs. "usual care." Outcomes include the comparative

effectiveness of a patient and physician educational intervention to prevent geriatric alcohol hazardous and harmful use, the comparative costs of the intervention, and the post-effectiveness of the intervention, all relative to usual care. Effectiveness measures include alcohol consumption behaviors, health-related quality of life; proximal outcomes examined include knowledge and self-efficacy.

A NIAAA-funded study is underway identifying at-risk drinkers using the shARPS. [95] The investigators proposed a 12-month, randomized, controlled trial involving 880 individuals attending primary care clinics at two non-academic sites. The intervention consists of advice given to both at-risk drinkers and their physicians personalized to address the particular reasons an individual is identified as an at-risk drinker. At-risk drinkers will be randomized to receive either brief advice about at-risk drinking (intervention) or a booklet on healthy behaviors (control). Assessments are planned at baseline, 3 months and 12 months. Planned analyses will assess the effect of the intervention on the prevalence of at-risk drinking, the amount of drinking, and the numbers of risks identifying those subjects still considered at-risk drinkers. This study will be the first to assess a preventive intervention to reduce risks of alcohol use, alone or in conjunction with comorbidity and medication use among older adults in primary care.

Funded by NIAAA, the stated aim of Project SHARE (Senior Health and Alcohol Risk Education) is to examine whether patient and provider education can decrease risky alcohol use and reduce health care costs in persons 65 years of age and older.[96] The proposed research design involves randomization of 28 primary care physicians in four clinics and their eligible patients age 65+ to an intervention or "usual care" condition. The intervention will include a "tested computerized screening and education system that was developed especially for older adults and their providers, supplemented by a well-established intervention for physicians." Expected total study enrollment is 1,229; the study timeline is May 2005-August 2010. Outcome measures include hazardous and harmful drinking, health-related quality of life, utilization and costs, as well as alcohol knowledge, alcohol-related self-efficacy, and functional status.

In addition to ongoing clinical trials, a recent collaborative publication from the National Council on the Aging and SAMHSA, entitled "Promoting Older Adult Health," describes several promising programs and partnerships that have been developed to address alcohol misuse, as well as medication and mental health problems in older persons.

Conclusions

Alcohol problems among older adults are associated with increased health care utilization and significant health care expenditures. Studies have indicated that targeted prevention and early intervention with this population can impact subsequent health care utilization. Prevention and early intervention programs, including those focused on risk and protective factors associated with this age group, are some of the most promising approaches to maximizing health outcomes and minimize health care costs among older adults. These programs represent the future of age-appropriate care for the growing number of older Americans. A range of prevention/intervention strategies available to older adults including prevention and education for persons who are at risk but nondependent drinkers, accurate identification and screening tools, brief advice during medical visits by primary care providers, and structured brief intervention protocols. These approaches offer providers and consumers options that meet different needs and preferences of older adults across the spectrum of drinking patterns. While progress has been made in understanding the effectiveness of preventive alcohol screening and brief interventions with older adults, there are challenges to matching these models to different service settings and different subgroups of older adults.

The scarcity of prevention programs addressing geriatric alcohol misuse in the published literature is notable. This review of the existing evidence base indicated that a number of the evaluated prevention programs that have included alcohol may have failed to identify alcohol misuse among older adults accurately (i.e., see Wallace and colleagues[97] discussion in the Depression & Anxiety section). For example, using the CAGE as the only measurement instrument will likely identify only those with alcohol abuse or dependence issues.[1,86,98] Further, CAGE scores are a lifetime measure ("Have you ever felt the need to Cut-down?"), so are less sensitive to measuring change. As the CAGE does not have high validity with older adults,[1] if used, it should ideally be part of a larger questionnaire or interview that includes quantity/frequency questions, and questions about consequences. Other health promotion programs directed at older adults, such as the one examined by Huang and colleagues,[99] did not address alcohol misuse. Although study authors identified the importance of mental health promotion among older adults, the study did not indicate specific information provided on alcohol misuse or measure changes in knowledge in this area.

Table 2. Prevention and screening of late-life alcohol misuse

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Fink et al., 2001[71]	Pretest/Posttest Evaluation; Feasibility Evaluation	Patients were contacted by telephone and asked to come early/stay late next dr. appt: 40 min for pre- and post test plus read health educ booklet and pamphlet	60+ Range: 60-89 Mean: 72	101 male and female patients with variety of MDs	Immediate posttest	Increased knowledge and self-efficacy after intervention. High levels of satisfaction and interest with materials.	No measure of behavior. Feasible to replicate easily.
Burton et al., 1995 [73]	RCT Johns Hopkins Medicare Preventive Services Demo	Interv: Yearly preventive visits for 2 years + optional counseling visits w/PCP Control: Usual care	65+ Interv: Age 65-74: 60.9% Age 75-84: 33.4% Control: Age 65-74: 62.0% Age 75-84: 32.5%	Medicare beneficiaries (male and female). Problem alcohol use identified with any + CAGE score. Interv: n=2105 Control: n=2090	Followup 2 years: 3097 of 4195 (73.8%)	No statistical differences between interv and controls in changes in problem alcohol use.	Use of 1 or more + CAGE score as only measure for problem alcohol use in this population is a limitation. Supports idea that targeted preventive strategies are needed.
Lave et al., 1995; 1996 [74, 75]	RCT Rural Health Promotion Program	Three arm study Interv 1: free hospital-based health promotion services Interv 2: free physician-based health prom services Control: Offered no health prom services	65+ Range: 65-79 Age 65-69: 41.4% Age 70-74: 38.1% Age 75-79: 20.4%	Medicare beneficiaries (male and female). Participants offered "alcohol counseling" health promotion services after Health Risk Appraisal interview but no info re: HRA criteria. Interv 1: n=1312 Interv 2: n=1347 Control: n=1225	Ongoing tracking of use of health promotion services	2 % eligible for alcohol counseling; authors did not model participation due to low #'s. General outcomes included participants' use of free health promotion/prevention services.	Screening criteria unknown. Likely inaccurate measure of those older adults appropriate for alcohol misuse prevention services.

Table 2. Prevention and screening of late-life alcohol misuse (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Eliason & Skinstad, 2001 [72]	Pretest/Posttest Evaluation (Pilot test)	Two 60 min educational programs presented at local senior center	Range: 54-90 Mean: 75	32 female participants	26 of 32 participants completed immediate posttest (81% response rate).	16-item knowledge test plus demographics and alc/med consumption info. Participants, particularly moderate to heavy drinkers, improved knowledge significantly.	Small sample size. No measure of behavior, although some participants did indicate behavioral intentions to reduce alcohol.
Nguyen et al., 2001 [86]	Feasibility Evaluation CARPS	Patients completed computerized (CARPS) survey, received printed report of his/her data and related education to reduce risks. Patients also completed survey re: usefulness and feasibility of CARPS	60+ Age 60-74: 60% Age 75+: 40%	Male and female patients in community group practice and community health center; current drinkers (defined as 1 drink in 12 mos) Participants: n=106	One-time evaluation, no followup	Nearly all pts were able to complete while waiting for a scheduled appt (median time 15 min). 67% participants reported learning new information; 78% had never discussed alcohol with MD, 31% intended to do so. MDs in clinics found useful.	Replicable. No measure of behavior. Presence of CARPS data encouraged alcohol use discussions between MD and patient.
Fink et al., 2002 [84]	Instrument Comparison ARPS	All patients completed ARPS and AUDIT; one half of total group also completed CAGE, other half completed SMAST	65+ Range: 65-100 Mean: 75	Male and female patients in two primary care clinics; current drinkers (defined as 1 drink in 12 mos) ARPS: n=574 AUDIT: n=553 CAGE: n=277 SMAST: n=273	One-time evaluation, no followup	ARPS identified nearly all drinkers detected by the CAGE, SMAST, and AUDIT; detected hazardous and harmful drinkers not identified by these measures. These drinkers used medications or had medical conditions that placed them at risk for adverse health events.	ARPS is sensitive and identifies unique subset of at-risk drinking older adults often missed in other commonly used screens. Reliance on computer scoring/complicated algorithms to determine drinking category is limits replicability.
Moore et al., 2002 [85]	Instrument Evaluation ARPS and shARPS	Compared ARPS, shARPS, AUDIT, and SMAST-G against "LEAD" standard: medical record review, clinical interview, interview with collateral informant	60+ Mean Age: 74.3 Range: 60-93	Male and female drinking patients in 10 internal medicine clinics Participants: n=166	One-time evaluation, no followup	Compared to LEAD: Sensitivity ARPS: 93% Specificity ARPS: 63% Sensitivity shARPS: 92% Specificity shARPS: 51% Sensitivity AUDIT: 28% Specificity AUDIT: 100% Sensitivity SMAST-G: 52% Specificity SMAST-G: 96%	See above. May be more sensitive than AUDIT and SMAST-G due to ability to assess comorbidities.

Table 3. Alcohol misuse early interventions

Reference	Study Design	Model/ Conditions	Age	Sample	Followup	Outcome measures and Results	Limitations/ Comments
Fleming et al., 1999 [2]	RCT Project GOAL	Interv: Booklet and 2 10-15 minute MD-delivered counseling sessions 1 month apart, plus 1 nurse call 2 weeks after each visit Control: General Health Booklet	65+ Range: 65-85	Male and female patients with problem drinking in 24 primary care clinics. Problem drinking defined as >11 drks/wk for men, >8 for women; 2 or more + CAGE; or 4 or more drks/occ for men, 3 for women in past 3 mos Interv: n=87 Control: n=71	Followup 3,6, and 12 mos 92.4% patients completed 12-month followup	Interv group compared to control: 34% reduction in 7-day alcohol use; 74% reduction mean # of binge-drinking episodes; 62% reduction in % of older adults consuming greater than 21 drinks/wk No significant changes in health status. Health care util not analyzed due to small # of events.	Strong evidence of efficacy; consistent with literature for younger adults. Costs involved in physician time/visits plus nurse followup call. B.I. workbook and procedures feasible to replicate.
Gordon et al., 2003 [91]	RCT Posthoc analysis by age of ELM study	Three arm study ME: Motivational enhancement 45-60 min sessions with research interventionist, + 2 10-15 min booster sessions 2 & 6 wks after initial BA: Brief Advice 1 10-15 min session SC: Standard Care	65+	Male and female patients with hazardous drinking in 12 primary care clinics. Haz drinking defined as 8 or > AUDIT score or 16 or more drks/wk for men, 12 or more for women. ME: n = 18 BA: n = 12 SC: n = 12	Followup 1, 3, 6, 9, and 12 mos (1, 3, 9 by telephone; 6 and 12 in person).	Over the year, all three groups increased days abstained, decreased # of drks/day and # of total drinking days in month. Trend toward decreases in alc consumption for ME and BA compared to SC, but not stat significant. Similar response to younger cohort.	Interventions conducted by research interventionists, not patient's physician. Sample size is small. May provide evidence of effects of screening: 5 followups plus baseline in 1 year.
Blow et al., in progress [92]	RCT Health Profiles Project	Interv: 1 20-25 min interv appt with clinician to review pt drinking data and make contract to reduce drinking Control: 1 interv appt + general health advice booklet	55+ Mean: 66±6.4	452 subjects (26 % African-American) Male and female patients with at-risk drinking in primary care clinics. At-risk drinking defined as >12 drks/wk for men, >9 for women; or 4 or more drks/occ for men, 3 for women 2x or more in past 3 mos	Followup 3, 6, 12, 18 mos. 92% patients completed 12-month followup	Preliminary results show significantly more reduction in frequency and quantity	Study analysis still being completed. Includes broader age group and diverse sample. Adds to evidence base for B.I. among older adults.

Table 3. Alcohol misuse early interventions (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Copeland et al., 2003 [93]	RCT Substudy Health Profile Project	Same as above	55+ Range: 55-81 Interv: 65.7±6.3 Control: 66.1±6.5	Male veterans in VA primary care settings with at-risk drinking (defined above) Interv: n=100 Control: n=105	Same as above	Interv patients used more outpatient medical services in short term (9 mos post-interv). Effects on long-term util of inpat/outpt services not observed (19 mos post-interv).	Cost-effective B.I. may increase health care-seeking and appropriate treatment early.

Medication Misuse

Medication misuse is an important arena for prevention and early intervention among older adults. In contrast to drug abuse in young adults who often abuse illicit or illegally obtained prescription drugs, drug abuse problems among older adults more typically occur from misuse or abuse of prescription and/or over-the-counter medications, as well as herbal remedies. Relative to younger individuals, older adults use a high number of prescription and over-the-counter medications, which increases their risk for inappropriate use of medications. Studies report that older persons regularly consume on average between two and six prescription medications and between one to three over-the-counter medications.[100] Late-life medication misuse includes the overuse, underuse, and irregular use of both prescribed and over-the-counter (OTC) medications.

Medication misuse that involves particular types of medications or patterns of use may develop into drug abuse.[101,102] For example, a subset of older adults is at risk of developing problems with physical dependence when prescribed narcotics, barbiturates, or benzodiazepines over long periods of time. Of particular concern is the combined use of specific prescription medications or OTC medications with alcohol that are known to result in serious health problems. For example, concurrent use of alcohol with benzodiazepines or barbiturates can result in sedation, confusion, falls, delirium, and withdrawal seizures. Typically, abuse of psychoactive substances among older adults does not involve the use of these substances specifically to "get high" nor are they usually obtained illegally.[81] Instead, unsafe combinations or amounts of medications may be obtained by seeking prescriptions from multiple physicians ("doctor shopping"), by obtaining medications from family members or peers, or by stockpiling medications over time. Thus, medication abuse among individuals in late life is qualitatively and quantitatively different than it is for younger adults.

Several search engines were used to identify programs addressing the prevention of and early intervention with medication misuse among older adults. A number of EBM databases were searched, including the Cochrane Central Register of Controlled Trials (CCTR), Cochrane Database of Systematic Reviews, ACP Journal club, and Database of Abstracts of Review of Effects (DARE). PubMed, PsychInfo, CINAHL, Ageline, Social Services Abstracts, Social Work Abstracts, and ERIC databases were used to identify published literature and other resources using a combination of age-related terms (older, geriatric, elder, late-life, etc.) with the following search terms: medication, prescription, benzodiazepine, misuse, abuse, prevention, screening, assessment. Search techniques were also employed to follow promising search directions, such as the "Related Articles" feature in PubMed. Additional searches were performed using the Google search engine and federal agency and grant

databases, such as the federal Computer Retrieval of Information on Scientific Projects (CRISP) and the NIH Clinical Trials database.

Universal Prevention

The evidence base for prevention of medication misuse/abuse among older adults indicates some promising advances. For example, prevention programs for late-life medication misuse have developed and tested computer-based health education tools as well as more traditional group-based health education programs with an individualized component. However, the development of assessment and screening tools for this problem area is limited. Please see Table 4 for further details regarding each study.

Health Education

Several programs have addressed medication misuse through the use of computer technology. Neafsey and colleagues have conducted two studies evaluating the use of touch-screen notebook computers that employ an interactive multimedia software program designed for the learning styles and psychomotor skills of older adults called the Personal Education Program (PEP). A randomized clinical trial found that older adults (age 60 and older) using the PEP software increased knowledge and improved self-efficacy regarding the potential drug interactions that can result from self-medication with OTC medications and alcohol, compared to controls and those receiving a conventional information booklet.[103] PEP users also reported fewer adverse self-medication behaviors over time. Another study involving PEP consisted of a randomized pilot study with more limited content (drug interactions with OTC antacids, calcium supplements, and acid reducers).[104] The group using PEP in this study also demonstrated increased gains in knowledge and self-efficacy compared to controls. These programs did not assess long-term knowledge retention, so it is unclear whether the immediate knowledge and self-efficacy gains were sustained over time. Alemagno and colleagues [105] conducted a pretest/posttest pilot evaluation of an interactive computer intervention to reduce risk of medication misuse, showing some promising results at the 2-month followup among older adults recruited from senior centers (mean age 76): 55 percent of participants used the computer-generated medication reminder checklist, 32 percent used the checklist to discuss problems with a physician, and 24 percent reported “real change” in the way they took medications.

Group health education in church settings combined with individual sessions with a pharmacist has been evaluated as an alternative approach to preventing medication misuse. Although this evaluation was not targeted specifically at geriatric populations, the mean age of the volunteer participants was 69.7. In this pretest/posttest evaluation study, Schommer and colleagues.[106] found that participants reported taking fewer medications on a daily basis and had fewer medication-related problems 6 months after the intervention.

Assessment

The evidence base regarding comprehensive screening and assessment for geriatric medication misuse is narrow. DeBrew and colleagues [107] tested a standardized instrument to assess medical knowledge and practices among a small group (n=20) of older adults age 65 and older newly admitted to a home health care agency. This instrument showed promise as a useful tool for health care practitioners in home health care settings, but data were limited.

Medication Non-adherence

One aspect of medication misuse that has received extensive attention in the literature is medication non-adherence. Schlenk and colleagues [108] provide a review from a nursing perspective of factors associated with medication non-adherence among older adults (defined as age 50 and older), as well as a number of strategies and interventions that have potential for the prevention of medication misuse. In addition to the studies reviewed elsewhere in this section, other strategies include effective instruction formats for older adults (i.e., drug-taking instructions organized in lists rather than paragraphs, use of pictorial icons, etc.) [109-112] and use of calendar blister packs compared to standard bottles or packets among older patients.[113] Schlenk and colleagues [108] also review a variety of methods for assessment of medication non-adherence among older adults, including self-reports, pill counts, pharmacy records, biochemical measures, clinical judgment, therapeutic response, and electronic monitoring.

Indicated and Selective Prevention Strategies (Early Intervention)

Clinical trials for early intervention with older adults at risk for medication misuse have shown mixed results. To date, a number of randomized clinical trials have examined several types of early interventions, including interventions with older patients prior to hospital discharge, interventions

targeted at provider prescription patterns, home-based medication review, and patient education. Please see Table 5 for more information regarding each study.

There is a growing evidence base regarding early interventions focused on pharmacy services to prevent or minimize drug-related problems in geriatric populations. Hanlon and colleagues [114] recently reviewed the evidence from randomized controlled studies to determine whether drug-related problems and associated health outcomes can be modified by providing clinical pharmacy services for older adults in community-based settings. They found 14 randomized controlled studies assessing drug-related problems and health outcomes in individuals age 65 and older after pharmacist interventions in various settings, including home health settings (five studies), hospitals prior to discharge with home-based followup (three studies), clinics (three studies), a community pharmacy (one study), and long-term care facilities (two studies). The authors concluded that there was considerable evidence that clinical pharmacy interventions reduced the occurrence of drug-related problems but showed limited evidence that the interventions reduced morbidity, mortality, or health care costs. The study by Al-Rashed and colleagues [115] described below is an example of a pharmacist intervention study.

Hospital Discharge-based Programs

Several studies have explored strategies to improve medication compliance and reduce medication misuse among older adults upon hospital discharge. Al-Rashed and colleagues [115] found that patient knowledge and compliance to medication regimen was significantly better among patients (age 65 and older) receiving a 30-minute consultation with a pharmacist prior to hospital discharge compared to those receiving standard discharge procedures. Those patients receiving the pharmacist consultation also had significantly fewer unplanned trips to the doctor, hospital admissions, and personally altered their medications less than controls. Pereles and colleagues [116] evaluated the Self-Medication Program (SMP), a three-stage program in which geriatric patients (mean age 80) were given increasing responsibility for administering their own medications while still in the hospital. Compared to controls, the SMP patients had fewer medication errors, showed significant improvement in compliance, and had fewer serious medication errors at approximately 1 month after hospital discharge. A study by Lowe and colleagues [117] found comparable results in a study in which older patients (age range 57-96) who completed a three-stage self-medication program before discharge had significantly higher compliance scores and greater knowledge of purpose of medications 10 days after discharge compared to a control group receiving standard care. Rich and colleagues [118] found that patients (age 70 and older) who received a multidisciplinary intervention prior to discharge had significantly higher medication adherence compared to controls receiving standard care. The intervention included comprehensive patient education, dietary

and social service consultations, medication review with a cardiologist, and intensive post-discharge followup. Esposito [119] evaluated the effects of four different types of medication education prior to discharge for patients aged 65 and older. Although those results should be interpreted cautiously due to small sample size, the groups with medication dosage schedules had decreased incidence of medication errors compared to groups without schedules.

Prescribing Guidelines for Providers

Decision support systems for prescribing have been proposed as one promising avenue to decrease inappropriate or excessive medication use and to prevent related adverse drug events among geriatric populations. In a quasi-experimental study, Peterson and colleagues [120] evaluated a computer-based system of guided dosing of psychotropic medications and selection guidelines for clinicians treating older inpatients (aged 65 and older). The intervention targeted three medication classes: benzodiazepines, opiates, and neuroleptics. The intervention increased the prescription of the recommended daily dose, reduced the incidence of 10-fold dosing, and reduced the prescription of nonrecommended drugs. Patients in the intervention cohort had lower fall rates (in the hospital). No effects on length of stay or days of altered mental status were found.

A study among 41 general practitioners (GPs) in Queensland, Australia, found that "therapeutic flags" may improve appropriate prescribing behaviors.[121] The practitioners used a series of statements (therapeutic flags) applied to the medication lists of 727 older patients. These targeted instructional statements on quality prescribing resulted in changes in 14.5 percent of prescribed medications and the discontinuation of 6 percent of the medications. The process led to increased monitoring as well.

Medication Review: Home and Nursing Home Settings

A number of studies have examined the effectiveness of home-based medication review as an early intervention strategy to prevent medication misuse among older adults. The HOMER program was a large British clinical trial (n=872) in which a pharmacist reviewed medications, provided education, and addressed barriers to compliance (such as inability to open pill bottle tops) with adults age 80 and older in their homes 2 and 8 weeks after hospital discharge.[122] Surprisingly, the intervention group had significantly more emergency hospital readmissions and physician home visits than controls. The authors referenced three additional recent studies in the United Kingdom of community-based medication review

among older adults in which two showed non-significant decreases in admissions [123,124] and one showed a non-significant increase in admissions.[125] Finally, they conclude that the evidence remains mixed regarding community-based medication review, particularly in regards to outcomes such as hospital admissions.

In a randomized clinical trial involving a series of three home visits by pharmacists for all study participants, Lowe and colleagues [126] demonstrated increased compliance and understanding of purpose of medications among the group (aged 65 and older) that received additional pharmacist services during the first two home visits (an assessment of ability to use medications and appropriateness of prescribed medications during visit one; discussion and reminder chart during visit two). In a different three-arm clinical trial, a group (aged 60 and older) that received a home visit that included a 20-minute teaching session, provision of pill cassettes, and a followup telephone call 1-2 weeks after the home visit indicated significantly greater improvement in medication-taking behaviors than the group without the followup telephone call.[127] Both groups receiving the home visit teaching sessions had significantly higher medication-taking behavior scores compared to controls. In a study of older adults aged 65 and older receiving community nursing visits, Griffiths and colleagues [128] demonstrated knowledge increases after a home-based medication review and individualized consultation by a nurse among a group identified with deficits in medication knowledge and/or self-management ability.

In a small study in an inner-city setting, two general practitioners made one comprehensive visit each to four randomly selected nursing homes to review the prescribing record of each patient and alter prescriptions if needed.[129] Among the 107 patients (aged 57-99, mean age 82.1) with "repeat" prescriptions reviewed, 65 percent had their prescriptions altered. Fifty-one percent had at least one item stopped, 26 percent had at least one item changed, and 7 percent had a new medication prescribed. One person had the medication dose increased. Benzodiazepines, antipsychotic drugs, antidepressant drugs, non-opioid analgesics, and laxatives were the medications most often stopped after review. Although the study is not generalizable, the authors concluded a single visit to a nursing home and a comprehensive review of prescriptions can greatly reduce the consumption of inappropriate medications.

Patient Education

A number of studies of variable quality have evaluated nursing-based education interventions. These studies have indicated mixed results in increasing knowledge and/or medication compliance among adults age 65 and older, particularly over time (studies are summarized here, but not included in Table 5). Fielo and Warren [130] found that a group with a teaching session and medication

instruction sheet made fewer medication errors after 1 week compared to controls, but no differences between groups were sustained after 4 weeks. Harper [131] found that a group receiving oral instruction during four home visits demonstrated increased knowledge and compliance after 4 days compared to a control group receiving four home visits but no oral instruction, but again no differences were sustained after 4 weeks. Kim and Grier [132] found that among groups given taped medication instructions, the group receiving taped instructions at a slow pace demonstrated improved knowledge after 1 day compared to the groups receiving either no instruction or taped instructions at a normal pace. Taira [133] found that clients demonstrated improved knowledge regarding medications 1 week after a teaching session (no control group). Finally, Wolfe and Schirm [134] found that a group receiving medication counseling and a fact sheet demonstrated increased knowledge compared to controls after 3 weeks, but these differences were not sustained at 6 weeks. No differences in medication compliance were found between the two groups at 3 or 6 weeks.

Ongoing Prevention Programs Undergoing Evaluation and Research Directions

A search of the federal web sites did not identify any studies currently underway that address prevention of or early intervention with medication misuse among older adults. It is of note that many of the studies regarding medication misuse have originated internationally. A current NIAAA-funded study (described above in the Alcohol Misuse: Ongoing Prevention Program section) assessing a prevention intervention to reduce risks of alcohol use does include medication use among the risk factors addressed in the intervention.[95] However, a variety of guidelines and recommendations have been developed to assist providers and consumers in taking steps to minimize risks associated with medication misuse. An example of a set of basic recommendations aimed at prevention of medication misuse is provided by an interdisciplinary panel assembled by the nonprofit Alliance for Aging Research. This group issued recommendations for researchers, health care organizations, and public policymakers to address the issue of geriatric medication misuse in its 1998 publication, "When Medicine Hurts Instead of Helps: Preventing Medication Problems in Older Persons."[135] The recommendations were as follows:

- Recommendation #1: Compile and disseminate a list of medications considered potentially inappropriate for use in older persons and mandate that the list be used as a screening tool.
- Recommendation #2: Provide geriatrics-relevant labeling information for over-the-counter medications.
- Recommendation #3: Fund and encourage research on medication-related problems in older persons to determine which medications are most troublesome and which patients are most at risk.

- Recommendation #4: Provide incentives to pharmaceutical manufacturers to better study medication effects in the frail elderly and oldest old in pre- and post-marketing clinical trials.
- Recommendation #5: Establish mechanisms for data collection, monitoring, and analysis of medication-related problems by age group.
- Recommendation #6: Encourage health care professionals' competency in geriatric pharmacotherapy.
- Recommendation #7: Direct Medicare Graduate Medical Education dollars to training in geriatric pharmacotherapy.
- Recommendation #8: Fund and provide education and resources for caregivers providing medication assistance to older people.

Conclusions

Medication misuse is a serious and growing problem among older adults. Older adults can be particularly vulnerable to dangerous medication interactions and other problems related to medication misuse given age-related physical changes, cognitive changes, health problems with related numerous medications, and social isolation. Older adults with limited English language skills or low literacy skills can be at particular risk for not comprehending complex medication regimes and failure to recognize risky medication-taking behaviors. There is a growing body of research indicating that most medication-related problems are predictable and thus potentially preventable.[135] The evidence base for prevention programs to address medication misuse among older adults is limited and in its early stages. The studies described above have a variety of methodological limitations, such as selection of primary outcome measures (e.g., actual medication-taking behavior and health outcomes are not measured), lack of control groups, short followup time periods, and poor followup rates. As mentioned above in the section on Alcohol Misuse, the scarcity of research regarding prevention programs addressing late-life medication misuse is notable.

The evidence base for early interventions to address this problem is more substantial, but many questions remain unanswered. The exact mechanisms at work are unclear in the complex issue of medication misuse among older adults. For example, findings such as increased hospital admissions among older persons receiving home-based medication reviews point to the need for further research to illuminate the most effective types of interventions. In particular, new technologies are needed that are matched to the needs of specific groups of consumers in specific settings. Finally, risk and protective factors need to be identified that correspond to older adults with a range of health conditions, cognitive skills, assistance in the home, and complex medical regimens.

Table 4. Prevention and assessment of late-life medication misuse

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
DeBrew et al., 1998 [107]	Instrument Evaluation. Home Health Medication Assessment	Convenience sample of older adults administered instrument to assess medication knowledge and practices	65+ Mean: 72	20 older adults newly admitted to a home health agency	Same tool administered 1 week later (70% followup rate)	Interpreter reliability 82% Test-retest reliability 92%	Small sample size. Standardized instrument to assess med knowledge and practices shows promise for directed education with older adults.
Neafsey et al., 2001 [104]	Randomized Posttest only Pilot Test. Personal Education Program (PEP)	Participants recruited from local senior centers and divided randomly: Experimental: use pilot PEP (see below) Control: wait-list	60+ Mean Exp: 68.8 ± 11.9 Mean Controls: 73 ± 7	60 recruited community-living senior center participants currently taking OTC calcium supplements, antacids, or acid reducers. Exp: 30 Controls: 30	Exp group tested for knowledge and self-efficacy immediately post-PEP use; controls tested before PEP use	PEP users had significantly greater knowledge of potential drug and alcohol/med interactions and significantly greater self-efficacy for avoiding interactions, compared to controls. No differences between groups in mean satisfaction scores and stated behavioral intentions.	Pilot test shows promise of computer-assisted education programs to increase knowledge and self-efficacy; no behavioral measures. This version of PEP limited to specific content of antacids, calcium supplements, and acid reducers.
Neafsey et al., 2002 [103]	RCT. Personal Education Program (PEP)	Three arm study Interv 1: PEP info book Interv 2: Info book only Controls: No intervention Participants recruited from local senior centers to use interactive computer program designed to teach older adults about potential drug interactions from OTC meds and alcohol.	60+ Mean: 73.8 ± 6.5	85 recruited community-living senior center participants currently taking prescription antihypertensive or anticoagulants in conjunction with OTC calcium supplements, antacids, acid reducers or pain relievers. Interv 1: 30 Interv 2: 30 Controls: 25	Three time periods: immediately post-intervention, 2 and 4 weeks post-into. Followup rate 100%, but study omitted subjects who dropped out from reported sample.	PEP users had significantly greater knowledge and self-efficacy scores than info book only group and controls. Decrease in adverse self-medication behaviors for PEP group; self-medication behaviors did not change over time for other two groups. Satisfaction with program rated high by most participants.	No pretest. Fairly small sample size. Course content addresses OTC and alcohol combined with meds, but inclusion criteria only includes those taking OTC (not those actively consuming alcohol). Followup period very short.

Table 4. Prevention and assessment of late-life medication misuse (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Schommer et al., 2002 [106]	Pretest/Post test Evaluation. Feasibility Evaluation	Participants recruited by parish nurses; attended group education presentation and Q & A, then 1-on-1 session with pharmacist or pharm intern, exit interview	All ages Mean 69.7 Range 26-94	200 male and female volunteer parishioners	Followup survey at 6 months, telephone or in-person (94% followup rate)	Participants reported taking fewer meds on daily basis (4.8 vs. 5.5) and had fewer med-related problems (39 vs 98); showed knowledge increases. No sig differences in % of participants who always took drugs as directed or sometimes forgot to take. Satisfaction with program rated high by most participants.	No controls. Participants self-selected. Individualized program, although not directed specifically at geriatric population.
Alemagno et al., 2004 [105]	Pretest/Post test Pilot Evaluation. Computer Interventio n Feasibility Evaluation	Participants tested "talking" interactive computer intervention to reduce risk of med misuse: 30 min interaction w/ computer videos + checklist and pill box to take home	"Seniors" Mean: 76 Range: 59-97	412 community living seniors recruited from 9 senior centers	2-month followup (63% followup rate)	55% of participants reported using med reminder checklist. 32% took med checklist to doctor to discuss problem issues. 24% indicated "real change" in the way they took meds based on intervention. Participants responded positively to computer intervention.	No controls. Followup rate fair. Further research re: effectiveness of use of med reminder checklist to reduce misuse would be helpful. Feasible to replicate; may be cost-effective.

Table 5. Early intervention with late-life medication misuse

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Cargill, 1992 [127]	RCT Home-based assessment of medication-taking routine	Three arm study Group 1: No intervention (home visit to assess meds/behavior) 2: Home visit with 20-min teaching sessions; pill cassette given 3: Same as group 2, plus followup telephone call 1-2 weeks after home visit	60+ Mean: 72 Range 62-97	70 patients in a VA general medicine clinic	4-6 weeks after first home visit (no followup rate reported).	Significantly greater improvement in medication-taking behavior in group 3 (teaching + telephone call) compared to group 2 (teaching only). Significant difference between control and int. groups in medication-taking behavior scores.	Study details sparse in some areas: difficult to assess quality of data.
Lowe et al., 1995 [117]	RCT. Self Medication Program	Int: Patients given education and increasing responsibility for administering own meds in hospital Controls: Standard care	"Elderly" Int: Mean 77 (57-96) Controls: Mean 79 (59-93)	88 consecutive patients admitted to 4 geriatric inpatient units who would be responsible for self-medication upon discharge Interv: 45 Controls: 43	Home visit 10 days after discharge (90% followup rate)	Compliance with and knowledge of the purpose of their medicines, including pill counts. Int group had significantly higher compliance scores (95%) compared with controls (83%). A significantly higher proportion of Int. group patients (90%) knew the purpose of their meds compared to controls (46%).	Very short followup period; longer term gains of intervention unknown.
Esposito, 1995 [119]	RCT. Discharge medication education	Four arm study. Patients received upon hospital discharge: Group 1: Med fact sheet 2: Med fact + 30 min verbal instruction 3: Med and dosage schedule, list of side effects 4: Med schedule + 30 min verbal instruction	65+ (Mean age by group next column)	42 patients hospitalized at least 24 hours Group 1: n =11 (mean age 74) 2: n=8 (mean age 79) 3: n=10 (mean age 75) 4: n=14 (mean age 76)	Followup home visits made 2 weeks, 1 month, and 2 months post-int.	Groups with medication schedule (3 & 4) had decreased incidence of medication error compared to groups without a schedule.	Small sample size, particularly for between group comparison.

Table 5. Early intervention with late-life medication misuse (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Pereles et al., 1996 [116]	RCT. Evaluation of Self-Medication Program (SMP)	Int: SMP (3 stage program w/pt given increasing responsibility for administering own meds in hospital while compliance is monitored; 20-min counseling by pharmacist 72 hours before discharge. Controls: Standard care (meds administered in hospital by nursing staff); 20-min counseling by pharmacist 72 hours before discharge.	"Geriatric" patients Mean: 80 ± 7	107 consecutive patients admitted to 2 inpatient geriatric units who would be responsible for self-medication upon discharge Interv: 51 Controls: 56	Med knowledge and morale (Philadelphia Morale Scale) assessed at adm, discharge and in home visit 40 days post-discharge (69% followup; most of those lost to followup discharged to long-term care). Pill count also assessed at home followup.	SMP group had fewer med errors, significant improvement in compliance, and fewer serious med errors, compared to controls. No significant differences between groups in ability to self-medicate upon discharge, morale, or medication knowledge, although both groups made significant gains in knowledge from adm to followup.	Rigorous study. Short followup period; longer term gains of intervention unknown.
Rich et al., 1996 [118]	RCT. Multi-disciplinary Intervention on Medication Compliance	Int: Comprehensive patient education, dietary and social service consults, med review, and intensive post-dx followup Controls: Standard care	70+ Mean 79.4 ± 6	156 patients hospitalized with congestive heart failure Interv: n=80 Controls: n=76	Home visit 30 days after discharge	Int. group compliance rate (87.9%) significantly higher compared to controls (81.1%). Int. group also achieved significantly higher compliance rate (85% reached >/= 80 % compliance) compared to controls (69.7%).	Overall compliance rates high (85% for both groups); authors suggest number of factors.

Table 5. Early intervention with late-life medication misuse (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Lowe et al., 2000 [126]	RCT. Medicine Review and Education Program	Two groups received 3 visits from a clinical pharmacist. Visit 1: Survey of meds for both; assessment of ability to use medications (open bottles, etc.) and appropriateness of meds for Int. group Visit 2: 1 month supply meds to both; discussion and reminder chart for Int. group Visit 3: Another 1 month supply (3 wks after visit 2), survey of meds, and pill count of both	65+ Int: Mean: 77.5 Range: 65-96 Controls: Mean: 75 Range: 65-88	161 patients from British general medicine practice taking 3 or more meds Interv: 77 Control: 84	Meds taken and understanding of purpose of meds assessed at visits 1 and 3 (94 % followup rate)	Compliance in Int. group 91.3% compared to controls 79.5% ($P < 0.0001$). Number of Int. group patients correctly understanding the purpose of meds increased from 58% to 88% compared with 67% to 70% in controls ($P < 0.0005$).	Study shows promise of home-based medication review and patient education by a clinical pharmacist. Followup period short.
Al-Rashed et al., 2002 [115]	RCT. Evaluation of Inpatient Pharma-ceutical Counseling	Int: 30 min pre-discharge counseling w/pharmacist, plus standard discharge procedure (below) Controls: Standard discharge procedure, which included med info discharge summary and med reminder card	65+ Int: Mean 80.2 ± 5.7 Controls: 81.1 ± 5.8	99 patients from 2 British general inpatient units to be discharged with 4 or more meds Interv: 45 Controls: 44	Followup home visit ~ 3 weeks and 3 months post-discharge (84 % followup rate for both visits)	Knowledge and compliance significantly better in Int. group compared to controls at visit 1; compliance also had improved at visit 2 for the Int. group. Int. group had significantly fewer unplanned trips to doctor and hospital admissions (19 and 5, respectively) compared to controls (27 and 13). Fewer Int. group patients altered their own meds compared to controls.	One of few studies to measure utilization as outcome (doctor visits and hospital admissions). Randomization by unit increases chances of possible selection bias.

Table 5. Early intervention with late-life medication misuse (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Peterson et al., 2005	Quasi-Experimental Evaluation Guided Psychotropic Dosing System	Int: 2 6-week study periods of highlighted dosing and frequency of psychotropic meds in hospital computer Rx order system Controls: 2 6-week periods with usual computerized order entry	65+ Int: Mean 74.6 +/- 6.8 Controls: 74.8 +/- 6.9	3718 patients from tertiary care hospital whose admissions were contained within one of the 6-week study periods Interv: 1793 Controls: 1925	All assessments occurred during inpatient stay	Patients who received meds during intervention period had increased prescription of recommended daily dose (29% vs. 19%), decreased 10-fold dosing incidence (2.8% vs. 5.0%), reduced prescribing of non-recommended drugs (10.8% vs. 7.6% of total orders), and fewer in-hospital falls. No effects found for length of stay or days of altered mental status.	Intervention increased prescribing patterns in concurrence with expert guidelines; positive patient outcomes resulted. Physician unwillingness to accept computerized dosing guidance a factor. Not randomized.
Griffiths et al., 2004 [128]	Pretest/ Posttest Evaluation. Nursing Intervention	Participants identified through survey assessment received community nursing medication review and individualized intervention	65+ Mean 76.7 $\pm$ 6.1	24 participants identified with demonstrated deficits in knowledge or self-management ability out of 111 assessed participants taking oral meds and receiving community nursing visits	Followup interview at 4 weeks	Participants demonstrated increase in knowledge, some alteration in compliance aids. No significant change in medication regime complexity.	Only 50% (24 of 48) subjects eligible for followup agreed to participate. Intervention not standardized. Small sample size.
Holland et al., 2005 [122]	RCT. HOMER	Int: Home-based medication review with pharmacist at 2 and 8 weeks post-discharge, including education, remove out of date drugs, obtain compliance aid Controls: Usual care	80+ Int: Mean 85.4 $\pm$ 4 Controls: Mean 85.5 $\pm$ 4	872 patients admitted as "emergency" to 10 UK community or acute care hospitals, to be discharged with 2 or more meds Interv: 429 Controls: 426	Outcomes assessed at 6 months (hospital-based data; 97% followup); telephone call with mailed quality of life survey at 3 and 6 months (~80% followup rate)	Significantly fewer emergency readmissions at 6 months for controls (178) compared to Int. group (234). Int. group (sub-sample) also had more home visits by GP doctors. Int. did not significantly improve quality of life or reduce deaths compared to controls.	Authors concluded further research needed to explain counterintuitive finding and identify more effective methods of med review. Med review visit (Int.) was voluntary and patient-initiated.

PREVENTION OF MENTAL HEALTH PROBLEMS

One in five older adults has a significant mental disorder, including more than 16 percent with a primary psychiatric illness and 3 percent with dementia complicated by psychiatric symptoms.[11] Depression and anxiety disorders are among the most common mental health problems in older persons and affect approximately 3-7 percent and 11 percent of the general older adult population, respectively.[12] The prevalence of other mental health disorders such as schizophrenia and bipolar disorder is much lower (less than 1%), although these disorders impart significant functional impairments in older persons. As with substance abuse, the prevalence of these disorders is heightened among persons receiving health care in the primary care system, in outpatient mental health settings, and in nursing homes.[136,137]

This review focuses on the universal, selective, and indicated prevention of the most common mental health problems in older adults. We specifically address the most prevalent conditions (mood and anxiety disorders) and suicide. Similar to the mental health *treatment* literature, most *prevention* programs target depressive symptoms and do not address late-life anxiety or other mental health conditions. Programs that target the reduction of depressive symptoms also heavily inform our reviews of suicide prevention. We specifically excluded the prevention of cognitive disorders, such as dementia, as this area includes a relatively large, rapidly growing, and complex research literature that is outside the scope of this review. The exclusion of dementia is based on the premise that the prevention and treatment of cognitive impairment disorders are most commonly addressed outside of the mental health care system and are, thus, less pertinent to state and local substance abuse and mental health care service providers and administrators.

Depression and Anxiety

Risk factors for late-life depression have been identified through a systematic review of the research literature and a longitudinal study. In a review of 20 studies, Cole and Dendukuri [138] noted that bereavement, sleep disturbance, disability, prior depression and female gender were all significant predictors of depression. Risk factors for depression have also been identified through a survey of older persons living in the community. Using data collected from two questionnaires administered 5 years apart to 1,947 older adults, Strawbridge and colleagues [139] noted that older adults who were more likely to be depressed included those with low and medium physical activity, physical disability or mobility impairment, one or more chronic conditions, fewer than three close friends or relatives, and those who were somewhat satisfied or not satisfied with friendships.[139] Several of these risk factors may be mitigated

by preventive efforts, including programs that attend to persons that are currently suffering from depression or that have a history of recurrent depression, undertreated conditions that commonly precipitate depression, vascular disease, functional impairment, and nutritional deficiencies.[140]

Several search strategies were used to identify programs addressing the prevention and early intervention of late-life depression or anxiety. The PubMed, PsychInfo, CINAHL, Ageline, Social Services Abstracts, and ERIC databases were used to identify published literature using the search terms: depression, minor depression, sub-syndromal depression, anxiety, and prevention. Other search strategies were also employed, including searches conducted through Google and federal grant databases.

The following section describes the evidence supporting prevention and early intervention programs for late-life depression and anxiety. In overview, there are several substantive differences in the evidence base for prevention compared to early intervention for depression and anxiety in older adults. The research literature describing the prevention of depression is relatively small and is largely focused on health promotion and positive aging and includes programs such as exercise, life review, reminiscence therapy, educational classes, and mind-body wellness. Much of this literature is based on the reduction of known risk factors for depression. In contrast, much of the literature on early interventions for depression reflects research findings on the treatment of minor depression or sub-syndromal depression. Early intervention strategies include problem-solving therapy, interpersonal counseling, exercise, nurse case management, and caregiver training. Of note, Cole and Dendukuri [141] recently conducted a systematic review of controlled trials of time-limited brief (less than 12 weeks) interventions to prevent depression. They identified several brief interventions that have the potential to prevent depression in older people (these trials are included within Table 7). Finally, there is little available information to guide the prevention of late-life anxiety.[142] Table 6 and Table 7 provide an overview of prevention and early intervention programs for late-life mental illness. In addition, these studies are reviewed within the text.

Universal Prevention Programs

Exercise

Physical activity has been shown to be a protective factor against the development of depression.[139] In addition, findings from at least two programs show that exercise can help prevent depression in older adults. Wallace and colleagues [97] evaluated a multi-component intervention wherein participants received a 30- to 60-minute visit at a senior center with a registered nurse to review risk factors for disability, develop a targeted health promotion plan, and introduce a supervised exercise

program. This visit focused on current exercise habits, alcohol and tobacco use, dietary habits, and home safety issues. The nurse contacted subjects by telephone to review progress toward goals, motivate continued behavior change, and identify problems with compliance. The exercise program was conducted in groups of 10-15 older adults led by a trained exercise instructor. Each 60-minute exercise session occurred at the senior center and consisted of 10 minutes of warm up, 15-20 minutes of strength training, 20 minutes of walking/aerobic activity, and a flexibility and cool-down phase. As shown in Table 6, positive outcomes included improved health functioning and a reduction in depressive symptoms. A second study conducted by Penninx and colleagues [143] evaluated the effectiveness of exercise in preventing depression in older adults with osteoarthritis. They compared a 3-month facility-based aerobic or resistance exercise program to a control group receiving education on arthritis management. The aerobic exercise program consisted of an indoor walking program that was conducted under the supervision of an exercise leader and that was scheduled three times per week for 1 hour. Each session had 10 minutes of warm up and cool down including flexibility stretches and 40 minutes of walking at an intensity equivalent to 50-70 percent of the heart rate reserve. The resistance exercise program included three 1-hour sessions per week. Each session consisted of a 10-minute warm up and cool down and 40 minutes of repetitions of various upper and lower body exercises using dumbbells and cuff weights, with weights increased in a stepwise fashion. The aerobic and resistance exercise programs were each followed by a 14-month home exercise program with support and supervision from an exercise leader. Evaluation of these programs found that aerobic exercise, but not resistance exercise, significantly reduced depressive symptoms. Together, these findings complement research showing that exercise is an effective treatment for late-life depression [144] and identify benefits of exercise in preventing depressive symptomatology in non-depressed older adults.

Educational Classes

Several educational programs were evaluated to determine their effectiveness in preventing depression, including two that were directly targeted at increasing knowledge of specific medical conditions. A 10-week arthritis education class was associated with significant reductions in depressive symptoms compared to a control group at 1- and 2-year followup evaluations.[145] Similarly, a 6-week diabetes education class combined with a support group was associated with lower incidence of depression at 2-year followup compared to a control group.[146] Finally, classroom and home-based multi-component mind-body wellness courses, including relaxation training, cognitive restructuring, problem solving, communication, behavioral treatment for insomnia, nutrition, and exercise, and instruction on mind-body relationships, were associated with a reduction in depression and anxiety symptoms compared to a control group.[142]

Life Review

Zauszniewski and colleagues [147] examined the effectiveness of a focused reflection reminiscence program in reducing negative emotions in older adults living in retirement communities. The program, entitled "Reflections for Seniors," included members of a retirement community who met for 2 hours per week over a 6-week period. A similar life review program evaluated by Haight and colleagues [148] included nursing home residents who met for 1 hour per week over a 6-week period. Both studies found small effects on the reduction of depressive symptoms in older adults.

Screening and Assessment

Early detection of depression and anxiety disorders among older adults may be a useful strategy for identifying older adults who may benefit from indicated prevention efforts (early intervention). Screening for depression is recommended by the U.S. Preventive Services Task Force in health care settings where providers are prepared to confirm an accurate diagnosis and provide effective treatment and followup.[149] However, evidence suggests that screening alone may be associated with a lowering of depression levels.[150]

A brief review of the literature suggests that several instruments have been used to screen for depression (Geriatric Depression Scale: GDS[151, 152]; Short Zung Scale Interview-Assisted Depression Scale;[153] Patient Health Questionnaire-9: PHQ-9[154, 155]). Of note, the PHQ-9 has been promoted as a practical depression screening instrument among primary care settings.[156] In addition, the Hopkins Symptom Checklist-25 is an effective method for identifying different categories of depressive symptoms, including sub-threshold depression, minor depression, and major depression.[157] Preliminary research suggests that the Center for Epidemiological Studies – Depression (CES-D) scale can be used to detect sub-threshold anxiety in older adults.[158] In addition, the Short Anxiety Screening Test (SAST) [153] also has validity in detecting anxiety disorders in older adults.

Indicated and Selective Prevention Strategies (Early Intervention)

Estimates suggest that sub-threshold or minor depression is present in 8-16 percent of older adults residing in the community, 15-20 percent of those receiving primary care services, 25-33 percent of older adults in an acute care hospital, and up to 50 percent of older adults in long-term care facilities.[136,137] Moreover, the prevalence of anxiety symptoms among older adults may be as high as 20 percent and diagnosable anxiety disorders affect nearly 6 percent of older adults.[159] While this review identified

several programs for the indicated and selective prevention of geriatric depression, little information is available on the prevention and early intervention of late-life anxiety.

Targeted Outreach for Vulnerable Older Adults

The Gatekeeper program was developed to train and encourage non-traditional referral sources to identify and refer older adults living in the community who are at risk for serious substance abuse and mental health problems.[36,37,160] Gatekeepers are the employees of local businesses and community organizations who have contact with older adults (e.g., letter carriers, police officers, bank tellers, landlords, meter readers, and many others). The "gatekeeper" model has been compared with traditional referral sources (e.g., medical providers, family members, informal caregivers, or other concerned persons) to determine its efficacy in identifying vulnerable older adults in need of services.[36,37,161,162] Studies of the Gatekeeper program have found differences in individual characteristics between those referred by gatekeepers and those referred by medical or other traditional sources. Older adults (age 60+) referred by gatekeepers were significantly more likely to live alone, were more often widowed or divorced, and were significantly more likely to be affected by economic and social isolation. These findings suggest that the gatekeeper model may uniquely provide outreach to individuals who are less likely to access services through conventional referral approaches. At the time of referral, individuals referred by gatekeepers were also significantly less likely to use needed services than individuals referred through traditional sources, had similar service needs, and thus had a larger gap between services needed and services received.[36,161,162] At 1-year followup, older persons referred from gatekeepers had no difference in service utilization or out-of-home placements compared to individuals referred by traditional sources.

A study conducted in urban senior congregate housing settings also used gatekeepers to identify older adults at high-risk of psychiatric problems.[163,164] The Psychogeriatric Assessment and Treatment in City Housing (PATCH) model incorporates components of the Gatekeeper program and assertive community treatment. The PATCH psychiatric nurse met with the building administrator, an education program was provided to housing personnel to enhance recognition of high-risk residents and to clarify procedures for making referrals of high-risk residents, and weekly nurse visits included in-home psychiatric evaluation and case management services for residents ages 60 and older. This study of the PATCH model found that outreach services were associated with a decrease in overall psychiatric symptom severity for individuals with a variety of psychiatric disorders.[165]

Psychotherapeutic Interventions

Disability associated with chronic medical disorders in late life is often a precursor to depressive symptoms. As such, interpersonal and problem-solving therapies hold promise for preventing depression among individuals with specific late-life medical illnesses[166] (also see section on Ongoing Selective Prevention Programs Under Evaluation). In addition, these psychotherapeutic approaches have promise in preventing the progression from minor or sub-syndromal depression into major depression.

Problem-Solving Therapy

Two studies have evaluated the effectiveness of problem-solving therapy (PST) for older adults with dysthymia or minor depression.[167,168] The PEARLS program, evaluated by Ciechanowski and colleagues,[169] was found to be associated with improved depressive symptoms and functional and emotional well-being. In addition, compared to a control group, those receiving PST were more likely to achieve remission of depressive symptoms (36% vs. 12%). In contrast, Williams and colleagues [168] evaluated PST compared to an antidepressant medication (paroxetine) or a placebo. They found that neither treatment was associated with a difference in rates of remission compared to placebo. However, for those patients with minor depression, both paroxetine and PST improved mental health functioning in patients with initial low functioning. Only paroxetine was associated with improvement for persons with dysthymia.

Interpersonal Therapy

One study found interpersonal therapy (IPT) to be effective at preventing an increase in depressive symptoms.[169] Mossey and colleagues compared IPT to usual care. IPT was associated with improved self-rated health and after 6 months, three-fifths of the intervention group, compared to approximately one-third of the control group, had experienced a reduction in depressive symptoms.

Exercise

In contrast to the universal prevention study evaluated by Penninx and colleagues that found that resistance training was no more effective than placebo in preventing depression,[170] a study of older persons with pre-existing depressive symptoms (59% with minor depression or dysthymia) found that resistance training was more effective than health education alone in preventing the worsening of

depression.[171] Remission was achieved by six of seven (86%) participants in the resistance exercise group, compared to 4 of 10 (40%) participants in the health education control group.[171]

Interventions for Care Providers

Two studies evaluate whether modifications to the provision of care can affect depressive symptoms. Cuijpers and colleagues [172] evaluated a multifaceted education and support program administered in a residential care setting, compared to usual care. The intervention included training for caregivers and other employees of the residential home, informational meetings for residents and their relatives, support groups, and discussion and feedback sessions for care providers. The target population included older persons who were incapable of living independently due to physical, psychiatric, or psychosocial constraints; yet did not require extensive nursing home care. Results indicate that an intervention providing education, support and feedback to residential care providers can reduce depressive symptoms and maintain health-related quality of life for older persons.[172] Waterreus [173] and Blanchard [174] evaluated the effectiveness of care delivered through a nurse case management system in which the care plan was developed through coordination of a multidisciplinary psychogeriatric team. Compared to a usual care control group, the intervention group exhibited greater reduction in depression severity, but was not associated with fewer cases of depression.

Interventions for Family Caregivers

Family caregivers, such as spouses or children caring for loved ones with dementia are also at risk for developing depressive disorders. In the early 1990s, Mittelman and colleagues developed and tested an intervention consisting of scheduled individual and family counseling sessions, unlimited consultation on request, and continuous support group participation for family caregivers of persons with dementia.[175] This intervention was found to delay nursing home placement by an average of 329 days, prompting researchers to develop, refine, and test similar interventions to support the capacity of natural caregivers to care for their loved one in the home environment. In addition to improving outcomes for the individual with Alzheimer's disease, this intervention also has been found to reduce stress and psychological symptoms for caregivers. The counseling and support provided to families is associated with greater satisfaction with assistance received from others, as well as decreased caregiver depression.[176] In addition, PST has been successfully used to enhance the ability of caregivers to cope with stress and to decrease the incidence of depression and other adverse outcomes. For example, Teri and colleagues studied the effectiveness of PST as an intervention for reducing depression among

individuals with dementia and their caregivers. Caregivers who participated in PST decreased their levels of depression and burden over a 6-month period.[177] Of note, a recent systematic review evaluated major outcomes in family caregiving interventions for dementia, as published in 43 studies since 1996. Findings indicate that the major impact on caregivers includes decreased incidence and severity of depression, moderate decreases in reported anger, moderate improvement in stress management, positive changes in clinical health indicators such as blood pressure and stress, and small improvements in caregiver burden.[178]

Ongoing Selective Prevention Programs Under Evaluation

A search of ongoing research grants identified two projects that are specifically designed to prevent depression in older adults. These studies examine approaches to preventing depression in older adults who have increased risk due to debilitating medical conditions. In the first, Rovner and colleagues [179] are conducting a National Institute of Mental Health (NIMH) supported clinical trial, entitled "Preventing Depression in Macular Degeneration," to evaluate the efficacy of PST among non-depressed older adults with bilateral age-related macular degeneration. Macular degeneration is a progressive eye disease that results in blindness and is associated with high rates of physical disability; up to one-third of older adults with bilateral vision loss develop depression [180]. In this study, older adults who have developed macular degeneration are randomly assigned to either PST or a usual care control condition. The primary outcome measure is a DSM-IV diagnosis of depression. Patients are evaluated at baseline, month 2 (immediately post-intervention), month 6 (for the primary efficacy analysis), and month 12 (to evaluate sustained effects). The study will also assess the impact of PST on levels of disability and vision-related quality of life. Approximately 230 participants are expected to enroll in this trial, which should reach completion in 2005. Preliminary results are not yet available.[179] The second ongoing study designed to prevent depression targets older persons who are at-risk for depression due to a previous stroke. In this study, Robinson and colleagues [181] are evaluating the relative effectiveness of antidepressant medications and PST in preventing depression among older persons who have suffered a stroke. This randomized, double-blind, placebo-controlled trial, entitled "Prevention of Post-Stroke Depression - Treatment Strategy," will treat non-depressed stroke patients with antidepressants or PST to determine the most effective treatments for preventing depression. Participants in this study will be randomly assigned to receive PST, an antidepressant medication (escitalopram), or placebo for 12 months. Participants who display depressive symptoms for 2 weeks or more will be removed from the study. After 12 months, treatment will be discontinued and participants will be monitored for an additional 6 months. Approximately 200 participants are expected to enroll in this study, which began in 2002.[181]

Conclusions

This review highlights the scientific evidence for the prevention and early intervention of depression and anxiety in older adults. As shown, several programs have identified positive effects in preventing depression or reducing depression symptoms. The best evidence exists for the effectiveness of exercise and psychotherapeutic interventions, such as problem-solving therapy and interpersonal therapy. In addition, there is evidence to suggest that targeted outreach to older adults is effective in engaging isolated and vulnerable older persons in treatment for mental health and substance abuse problems. Other potentially effective strategies include life review, reminiscence therapy, educational classes, mind-body wellness, and provider education. Many of these approaches require further evaluation prior to establishing their effectiveness among older adults. Our review also revealed that there is minimal evidence for programs that target the prevention of anxiety among older adults. As one in five older adults experiences symptoms of anxiety,[159] programs are needed in this area.

It is important to acknowledge that several programs developed to prevent depression have not demonstrated effectiveness. For instance, among the brief interventions for older adults with minor depression reviewed by Cole and Dendukuri,[141] several trials showed no effect in the prevention of depression. These studies were primarily focused on bereavement support groups or life review. The lack of effect on the prevention of depression was also noted in a social support network intervention for seniors.[182,183] Finally, it is likely that many ineffective programs are never published or disseminated as they have not demonstrated positive effects on the prevention or reduction of symptoms of depression or anxiety.

It is also important to note that several of the programs evaluated in this review have shown positive effects on reducing depressive symptoms, however these effects have often been small and the design of some of the studies brings into question the validity of their findings (i.e., small sample sizes, inclusion and exclusion criteria, evaluation instruments). However, despite these limitations, it appears that some programs have merit in preventing depression at a universal, selective, and indicated level. As indicated by the studies in progress, there is a great deal to be learned about effective prevention efforts. Bird and Parslow [140] suggest that programs designed to increase understanding of late-life depression for providers and for older adults may hold promise. For example, physician education could include information on the prevalence and costs of depression, warning signs, and available treatments. Older adults could be educated to improve their ability to recognize the symptoms of depression, to reduce stigma, and to access effective mental health treatments.[140] However, to our knowledge, the effectiveness of such programs has not been rigorously evaluated among older adults. Finally, system-wide quality improvement efforts may offer benefits in preventing late-life mental illness. A treatment guideline was

recently released that discusses appropriate care of older persons who are moving to a continuing care facility or who are awaiting hospital discharge. This treatment guideline focuses on promoting nurses awareness of depression in older people, promoting positive mental health and well-being, assessment and care-planning, and education and training. Specific recommendations include: (a) nursing staff attention to physical and mental health needs, (b) easing the transition to assisted living and increase independence and control, (c) minimizing the perceived losses that the person may experience in moving into the care home, (d) care planning focusing on the individuals strengths, coping patterns, and daily activities, (e) enabling access to advocacy services, (f) providing psychosocial support, (g) maintaining community linkages, and (h) engagement in meaningful activities.[184,185] Despite the promise of these approaches, many remain to be tested.

Finally, it is important to remember that late-life depression is often chronic or characterized by a relapsing course. Although this review focuses on the universal prevention of late-life depression and selective and indicated prevention of the exacerbation of minor depression into major depression, an important area of research addresses the prevention of further disability among older adults who have developed depression. Prevention strategies should focus attention on preventing relapse, recurrence, and residual symptoms among older adults with current or remitted major depression [166].

Table 6. Universal prevention of late-life depression or anxiety

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Haight, et al., 1988 [186]	RCT	Life Review (LR); Friendly Visit (FV); No treatment control (NT) LR and FV met for 1 hour/week for 6 weeks.	50+ Mean age ranged from 73 to 79 years.	Homebound elderly subjects randomly selected from Meals-On-Wheels recipients and persons receiving home health services. 78% female. LR: n=16 FV: n=16 NT: n=19	8-week program. 51 of 60 randomized completed the study (85%).	No change in depression. Life satisfaction and psychological well-being were improved in the LR group.	Small sample size. Minimal depressive symptoms in any group at baseline.
Gilden, et al., 1992 [146]	Pre-post	DEC+S: 6-week diabetes educ. class + support group followed by 18 months of support group; DEC: 6-week diabetes educ. class followed by 18 months of support group; Control	Range: 57-82, DEP+S: 69±1 DEP: 69±1 Control: 67±3	Male attendees at a Veteran's diabetes clinic. Groups matched for age and diabetes duration. DEC+S: n=13 DEC: n=11 Control: n=8	6-week program, 24-month followup. 100% followup.	Incidence of depression (based on Zung Depression Scale >50) DEC+S: 17% DEC: 45% Control: 75%	Self-rated depression outcomes. Did not adjust for depression or exclude depressed persons at baseline. Baseline rates of depression are not noted.
Emery, et al., 1998 [187]	RCT	Exercise, education, and stress mgmt (EXESM); Education and stress mgmt (ESM); Waitlist (WL)	50+ EXESM: 65.4±6.4 ESM: 67.4±5.9 WL: 66.6±6.5	Patients with stable COPD for 6+ months. 53% female. EXESM: n=29 ESM: n=25 WL: n=25	10-week program. 92% completion rate. (Drop-outs: 4 in EXESM due to medical illness; 2 in ESM due to transportation issues.) Among 25 persons completing EXESM, they attended a mean of 29.7 sessions.	EXESM greater reduction in depression than ESM. Significant time and time by group effect. EXESM and WL decreased depression, but not ESM. Greater reduction in anxiety for EXESM than for ESM or WL.	Small sample size. WL also showed improved depression. Short duration makes it difficult to determine the duration of the effect.
Haight, 1998 [148]	RCT	Life review for 1 hour/week	Range: 60-104 Mean: 79.6	Nursing home residents Interv: n=60 Control: n=60	6-week program with 12-month followup. 53% completion rate.	Significant difference between the intervention and control group at 12 months in depression, hopelessness, and psychological well-being. Only depression improved at 8-week assessment.	Self-rated depression outcomes. No difference in suicide ideation, life satisfaction, or self-esteem.

Table 6. Universal prevention of late-life depression or anxiety (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Wallace, et al., 1998 [97]	RCT	Disability Prevention Program (including exercise, nutrition, home safety)	65+ Interv: 71.1±4.3 Control: 72.9±4.8	Senior center attendees Interv: n=53 Control: n=47	6-month program. 10% dropout rate. Data collected at baseline, 2 months, and 6 months.	Outcome measures (SF-36 subscales and CES-D scores) improved in the intervention group and declined in the control group. Most differences were found at 2 months, with smaller incremental improvements at 6 months.	Improvement in depression only noted as mean CES-D scores. Proportions were not presented. Feasibility improved by use of low-cost community sites that offer social activation and other resources.
Rybarczyk, et al., 1999 [142]	RCT	Multicomponent mind-body wellness course. Classroom, Home course, and Wait-list Control conditions	50+ Range: 50-87 Mean Age Class: 67.6; Home: 61.5; Wait-list: 64.7	Members of an urban staff model HMO with 6+ primary care visits in the past year and referred by the primary physician. 82% female. Classroom: n=54 Home: n=61 Control: n=63	6-week program. Pre- and post-treatment measures addressed. 15% of participants dropped out.	Classroom and home course resulted in decreased pain, sleep difficulties, and depression and anxiety symptoms, compared to control group.	Only 270 of 527 patients referred to the study agreed to participate and only 210 and 178 completed pre- and post-questionnaires, respectively. Length of followup difficult to interpret. No intent-to-treat analysis. Home-based course has lower costs, greater accessibility, and potential for greater dissemination.
Burns, et al., 2000 [188]	RCT	Geriatric Evaluation and Management (GEM) and Usual Care (UC). GEM included interdisciplinary primary care team with joint comprehensive assessment and continuing long-term care.	Age 65+ Range: 66-95 GEM: 71.7±6.3 UC: 70.8±3.7	Medically ill patients admitted to medical, surgical, and neurological services at a VA clinic. Randomized at discharge. 3% female. GEM: n=49 UC: n=49	2-year evaluation of GEM program. 128 people entered study. 30 died before 2-year followup. Analyses on 98 remaining patients.	Both groups had improved depression, but significantly greater improvement in GEM group. GEM also had more improvement than UC in general well-being, life satisfaction, global social activity, and had fewer IADL impairments. In addition, UC used 40% more clinic visits than GEM.	Mostly male sample. Generalizability limited by VA sample. Most lived within 60 miles of a large metropolitan center. The level of depression was low at study randomization (mean CESD of 11).
Phillips, 2000 [145]	RCT	1.5 hr/week arthritis education classes.	Range: 67-75 Mean: 69.3	Older African Americans with arthritis Interv: n=101 Control: n=101	10-week program with 12- and 24-month followup. 98% completion rate.	Significant difference at 12 and 24 months based on CESD.	Did not adjust for depression or exclude depressed persons at baseline. Multidisciplinary team with each member responsible for two lectures. Done in a community center.

Table 6. Universal prevention of late-life depression or anxiety (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Penninx, et al., 2002 [170]	RCT. Subanalysis of FAST: Fitness, Arthritis, and Seniors Trial	Aerobic exercise; Resistance exercise; Education control	60+ Mean: 68.8±5.6	Older adults with knee osteoarthritis. 70% female. High depressive symptoms (n=98); Low depressive symptoms (n=340) AE: n=149; RE: n=146 Educ: n=144	3, 9, and 18 months. At 18 months, 20% of aerobic group and 17% of resistance group dropped out. No difference in compliance or drop-out between high and low depressive groups.	Aerobic exercise, but not resistance exercise, significantly decreased depressive symptoms compared to controls. Better results for persons who are most compliant	Unknown generalizability to all older adults. Unable to control for social support. No diagnostic evaluation of depression.
Zausniewski, et al., 2004 [147]	Quasi-experimental	Reminiscence therapy through 6 weekly 2-hour group sessions. "Reflections for Seniors"	65+ Range: 67-98 Mean: 84	43 members of retirement communities. 79% female.	6-week program; followup 12 weeks post-intervention. 21% dropped out.	Depressive symptoms reduced from baseline to 6 weeks post-intervention, based on the Emotional Symptom Checklist (ESC)	Small sample size. No comparison condition. The ESC is not a commonly used instrument for measuring depression. No change in anxiety or agitation.

Table 7. Early intervention of late-life depression or anxiety

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Waterreus, 1994 [173] Blanchard, 1995 [174]	RCT	Nurse case management implementation of a care plan created by a hospital-based psychogeriatric team	Mean: 76±6.8	Older adults living at home. 85% female. Diagnoses included 58% with minor depression; 23% with major depression, and 6% with dementia. Interv: n=47 Control: n=49	3, 6, and 14.5 months. After 3 months, 8.5% of intervention group had dropped out and 20.4% of the control group had dropped out. At 14.5 months, 25.5% of intervention and 40.8% of control group had dropped out.	Intervention group had greater reduction on short-CARE[6] depression scores, but no difference in case vs. non-case. With followup of both groups receiving care mgmt protocol by general physician, depression differences only remained in the subgroup with long-term depression	Small sample, low power, variable followup length, low implementation of social and antidepressant treatment, most analyses showed no difference.
Mossey, et al., 1996 [167]	RCT	Interpersonal counseling (IPT) vs. usual care (UC)	60+ Range: 60-91 Mean: 71±7.7	Patients admitted to medicine or surgery at three academic hospitals. 78% female. Patients had a GDS greater than 10 but didn't meet criteria for major depression/dysthymia. IPT: n=35 UC: n=41	6-month followup. 20% of the IPT group and 9% of the UC group did not have 3- or 6-month followup data.	61% of the IPT group and 35% of the UC group had a GDS < 11 at 6-month followup. IPT group also had improved self-rated health, but not physical or social functioning.	UC included variable contact with a primary care physician and low use of or adherence to antidepressant medication.
Singh, et al., 1997 [171]	RCT	Progressive resistance training of large muscles 3 days/week versus "education" control	60+ Interv: 70±1.5 Control: 72±2.0	Community volunteers with major (n=13) or minor depression (n=17) or dysthymia (n=2). 63% female. Resistance: n=17 Control: n=15	10-week followup. No participants dropped out. Median compliance with sessions was 93% in the intervention group and 95% in the control group.	Remission achieved by 86% of intervention group and 40% of control group with minor depression. Remission achieved by 59% and 26% in the full sample. Strength and SF-36 scales of bodily pain, vitality, social functioning, and role emotional were all significantly improved by exercise.	Small sample size. Heterogeneous group of diagnoses. Likely subject to selection bias as only 1% of persons contacted by a recruitment letter were eligible and joined the study.
Florio & Raschko, 1998 Raschko, 1997 Florio, et al., 1996 [36, 161, 162]	Comparison Group	Gatekeeper (GK) vs. medical referral (MD) vs. referral by others	60+ GK: 74.0±10.4 MD: 76.8±12.5 Other: 76.6±12.5	777 older adults with emotional disturbances (63%) or cognitive impairment (60%) living in home or community settings. 68% female GK: n=315 MD: n=217 Other: n=245	No followup period employed in the study.	GK made 40.5% of referrals to elder services. GK referrals had greater economic and social isolation, less physical and ADL impairment, and fewer had a family physician or social support. GK referrals were younger, female, more likely to live alone, and fewer were married. GK referrals had greater unmet need for services.	No symptom outcomes reported. Prevention of poor health outcomes not reported.

Table 7. Early intervention of late-life depression or anxiety (continued)

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Florio, et al., 1998 [37]	Control pre-post	Gatekeeper (GK) vs. referral by medical or other sources (MD/Other)	60+ GK: 78.2±11.2 MD/Other: 79.5±10.0	88 older adults with dementia (53%), depression (16%), or bipolar disorder (5%) living in home or community settings. 68% female. GK: n=40 MD/Other: n=48	1 year followup on 100% of participants.	Older adults referred by GK, MD, and Other sources had similar service utilization and out-of-home placements. Significantly more GK referrals lived alone (70% vs. 35%) and fewer were married (20% vs. 49%).	Clinician assessments. No adjustment for severity, or baseline differences. Model had been in place for many years. Prevention of poor health outcomes not reported.
Rabins, 2000 [163]	RCT	Multidis-ciplinary development of care protocol. Nurse-based outreach – (PATCH). Compared to usual care control group.	60+ PATCH: 75.0±8.4 Control: 75.8±8.5	298 older adults in senior low-income public housing. 85% female in the PATCH group, compared to 70% female in the Control group. PATCH: n=131 Control: n=167	26-month study. Followup data was available on 50% of the PATCH group and on 58% of the control group.	Intervention group had more improvement in psychiatric (BPRS) and depressive symptoms (MADRS). No difference in undesirable moves.	No single standardized treatment. Randomization after identification of mental illness, thus weighting to original sample size. Dropout: 33% death or moved; 13% refusal. Prevention of mental health outcomes not reported.
Williams, et al., 2000 [168]	RCT	Paroxetine vs problem solving treatment (PST) vs placebo (PBO)	Parox: 71±6.8 PST: 71±7.0 PBO: 71±7.2	Primary care patients with minor depression or dysthymia. 41% female. Paroxetine: n=137 PST: n=138 PBO: n=140	11-week treatment. 25% dropped out.	Proportion of patients in remission with either paroxetine or PST did not differ from PBO. For patients with dysthymia, paroxetine improved mental health functioning compared to PBO but PST was no better than PBO. For minor depression, both paroxetine and PST improved mental health functioning in patients with low baseline functioning.	Response to PST was highly variable across study sites.
Cuijpers, 2001 [172]	Quasi-experimental	Training for caregivers and other employees of residential home, info. meeting for residents and relatives, group interventions offered	Interv: Age 71-80: 20.2% Age 81-90: 62.9% Age 90+: 13.6% Control: Age 71-80: 24.2%	Residential care facility. 78.5% female. All residents included, but targeted on depressive symptoms. Interv: n=213 Control: n=211	12 months. 40.6% of participants dropped out within 1 year of the program.	Intervention group had greater improvement in depression (GDS[1]) and Health-Related Quality of Life (SF-20[2]).	Not randomized, high dropout, unknown which participants received group therapy component. Change in GDS is not clinically significant.

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
			Age 81-90: 52.1% Age 90+: 19.9%				
Ciechanowski, 2004 [169]	RCT. PEARLS Model	PST delivered by social workers with psychiatrist supervision & coordination with PCP	60+ Interv: 72.6±8.4 Control: 73.5±8.5	Older adults in senior public housing. 79% female. Diagnoses included dysthymia (49%) and minor depression (51%). Interv: n=72 Control: n=66	12 months. 7% of the intervention group and 9% of the control group dropped out.	Intervention group had more improvement in depressive symptoms and functional & emotional well-being. No difference in service use or social and physical well-being. Remission was achieved by 36% of the intervention group and 12% of the control group.	Intervention group had a greater proportion of dysthymia than control group. The authors believe it to be feasible to add a depression management service to usual case management practices.

Suicide Prevention

Suicide is the ninth leading cause of death among all persons in the United States [189] and is disproportionately common among older adults. Older adults (age 65+) represent 13 percent of the U.S. population,[190] yet account for nearly one fifth of U.S. suicides.[189] Men account for 82 percent of suicides among older adults and have a higher suicide rate than women (38 vs. 5.7 per 100,000 persons).[189] Lethal means are often used in late-life suicide. The most frequent methods of suicide among older adults include the use of firearms (men: 77%; women: 34%) and poisoning (men: 12%; women: 29%).[189,191]

Despite the disproportionate rate of suicide among older adults, most suicide prevention programs have focused on younger persons.[192] However, prevention of suicide in older adults is of special importance for several reasons. Older adults are less likely to report suicidal ideation compared to younger adults, and suicide attempts are more likely to be deliberate and lethal.[193] Compared to younger adults, older adults make fewer attempts per completed suicide.[189] In addition, more than half (58%) of older adults (age 55+) contact their primary care provider within 1 month of completing suicide. This rate is more than twice as high as that for younger persons (23%; age < 35). In contrast, only 11 percent of older persons contact a mental health provider in the month prior to suicide, a rate that is three times less frequent than that of younger persons.[194] It is noteworthy that older adults with active suicidal ideation are more likely to engage in integrated mental health and substance abuse services provided in a primary care setting, as opposed to services provided through specialty mental health clinics (83% vs. 54%).[195]

Early research has identified several risk factors for suicide. Non-modifiable risk factors include older age, male sex, race, and ethnicity.[193] However, several risk factors are modifiable, including the presence of suicidal thoughts and behavior, the presence of a physical or mental illness, alcohol consumption, difficulty adjusting to transitional life events, social support problems, personality vulnerability factors, hopelessness, bereavement, and access to lethal means.[193,196] Significant risk factors for suicide also include depression [197-199] and substance abuse.[14,200] Of note, co-occurring substance abuse and mental disorders are associated with an increased risk for suicide among older adults.[199,201] Moreover, benzodiazepines have been linked with suicide among older adults who have poisoned themselves.[202]

Several search strategies were used to identify programs addressing the prevention of suicide among older adults. The PubMed, PsychInfo, CINAHL, Ageline, Social Services Abstracts, and ERIC databases were used to identify published literature using a combination of search terms: suicide, suicidal ideation, prevention, and older adults. Bibliographic searching helped identify additional references. Other search strategies were also employed, including searches through Google, federal and foundation grant databases, the Center for the Study of the Prevention of Suicide (CSPS), the American Foundation

for Suicide Prevention (AFSP), and the online registry of the Evidence-based Practices in Suicide Prevention Program.[192] *(Of note, the online registry reviewed 14 suicide prevention programs through January 2005. Future reviews of suicide prevention programs will be conducted through the SAMHSA NREPP process. Among the 14 prevention programs, only one focused on older persons (age 60+) and nine focused on school-aged children. Four programs were identified as effective, eight were identified as promising, and two did not receive a rating.)*

The following section describes the evidence supporting approaches to the prevention of suicide among older adults. Although national strategies have been developed to address suicide [203-205] and many sources have discussed the prevention of suicide among older adults,[193,196,206-215] only a handful of studies have evaluated the effectiveness of interventions on reducing completed suicide or suicidal ideation among older adults. The literature describing universal prevention of suicide among older adults is largely based on Japanese studies, with results from indicated and selective interventions derived from American and Italian studies. Universal prevention programs are described in Table 8 and consist of screening for depression, psychoeducation, and group activities. Indicated and selected prevention strategies are described in Table 9 and include treatment of depression and the provision of telephone-based support. A review of these programs is also provided within the text.

Universal Prevention Strategies

The evidence base supporting the universal prevention of geriatric suicide is minimal. Very few programs have attempted to reduce the rate of suicide among older adults using a community-wide approach. However, studies by Oyama and colleagues describe universal prevention programs that provide screening for depression, psychoeducation, and group activities. Please see Table 8 for further details regarding each study.

Oyama and colleagues [216] evaluated the effectiveness of a universal depression screening program, followed by mental health or psychiatric care, and depression education in a rural, agricultural community in Japan. Older residents (age 65+) completed the Japanese version of the Zung Self-Rated Depression Scale. Those individuals who screened positive were evaluated or provided treatment by a public health nurse or a psychiatrist (if warranted). Educational health workshops were offered to residents, including information regarding the signs, symptoms, and potential treatments for depression, along with information on using the mental health system, and developing relationships with other community members and neighbors. The intervention was associated with a reduction in suicide rates of 73 percent among older men and 76 percent among older women, compared to no risk reduction in older

men or women in the comparison regions. Suicide completion in the pre-implementation to post-implementation phase decreased from 11 to 4 for men and from 16 to 6 for older women. In contrast to other suicide prevention programs, this program showed effectiveness for both genders.[216]

Oyama and colleagues [217] also evaluated the effectiveness of a three-component universal prevention program targeting older members of a rural agricultural community in Japan (age 65+). The first component included local and regional mental health workshops at which a public health nurse or psychiatrist provided group psychoeducation on depression and risk for suicide. The second component included a group activity program that provided opportunities for older adults to participate in social, volunteer, recreational, and exercise activities and was designed to promote and enhance the development of social relationships. Finally, a self-report depression questionnaire was distributed to older adults. Older adults were provided a description of how to evaluate their responses and a referral to a psychiatrist or public health nurse was provided to those who required a consultation. Evaluation of this program showed that the incidence of suicide decreased in older women during the 8-year period following program implementation, as compared to the 8-year period prior to program implementation. No reduction in suicide was seen among the control group, nor was it seen among older men in the intervention region.[217]

Assessment

Few scales have been developed specifically for the assessment of suicide risk or suicidal ideation among older adults. The Harmful Behaviors Scale (HBS) is a 20-item scale that is scored based upon observations of direct and indirect self-destructive behavior among nursing home residents. While this instrument has internal consistency and interrater reliability, it is limited in its reliance on observer ratings.[218,219] Two other instruments have been developed that have potential merit in detecting and measuring suicidal ideation among older adults; however, these instruments are longer and have yet to be fully evaluated. They include the Reasons for Living Scale – Older Adults version (RLS-OA) and the Geriatric Suicide Ideation Scale (GSIS).[193] The development and testing of additional tools for evaluating suicide and its prevention may be a useful addition to this field.[212]

Selective and Indicated Prevention Strategies

The evidence base for indicated and selective prevention of suicide among older adults is also small. Programs that target the reduction of modifiable risk factors include depression treatment and telephone-based social support. Please see Table 9 for further details.

Szanto and colleagues [220] recently examined the course of suicidal ideation among older adults (ages 59 – 95) receiving short-term treatment for depression. This secondary analysis evaluated 395 persons with major depression receiving inpatient or outpatient treatment with antidepressant medication alone or in combination with interpersonal psychotherapy. Suicidal ideation rapidly decreased during the initial stages of treatment and then declined more gradually. After 12 weeks of treatment, only 18.4 percent of participants reported suicidal ideation, thoughts of death, or feelings that life is empty, compared to 77.5 percent at the beginning of treatment. Moreover, after 12 weeks of treatment, only 4.6 percent continued to report thoughts of death, compared to 36.2 percent at the beginning of treatment. The decrease in suicidal ideation was more gradual for those with a recent suicide attempt or current suicidal ideation (median response time: 6 weeks) or with recurrent thoughts of death (median response time: 5 weeks), compared to those with no suicide attempt, suicidal ideation, or thoughts of death (median response time: 3 weeks). This study suggests that suicidal ideation can resolve among older adults receiving active treatment for depression. However, it is noteworthy that individuals with the most severe risk for suicide require treatment for an average of 1½ months to see significant reductions in suicidal ideation.

Bruce and colleagues [221] evaluated the effect of the Prevention of Suicide in Primary Care Elderly: Collaborative Trial (PROSPECT) on reducing suicidal ideation among older adults (age 60+) with depression. PROSPECT combines depression treatment guidelines with depression care management. Guidelines consist of a clinical algorithm for treating geriatric depression in a primary care setting and are modified to address the special circumstances associated with the treatment of depression in older adults, including adverse events, medical comorbidity, functional disability, cognitive functioning, and social stigma. A "depression care manager" who works with the primary care physician and a supervising psychiatrist conducts care management. Data suggest that suicidal ideation resolves more quickly in patients receiving care through a depression care management model employing geriatric specific guidelines, compared to those receiving usual care. PROSPECT participants had significant reductions in suicidal ideation by 4 and 8 months, compared to usual care. Of note, reductions were greater among those diagnosed with major depression, compared to those with minor depression. The intervention was also associated with reductions in depression at 4, 8, and 12 months, compared to usual care. Specific protective factors increased through the PROSPECT intervention included the effective

clinical care for mental, physical, and substance use disorders as well as easy access to a variety of clinical interventions and support for help-seeking. The intervention sought to decrease risk factors, including barriers to accessing health care and the presence of untreated mental illness. PROSPECT has been identified as an "effective" selective and indicated prevention program by the registry of evidence-based suicide prevention programs.[39]

DeLeo and colleagues [222] evaluated the effectiveness of the TeleHelp-TeleCheck service for suicide prevention among older persons in Italy (age 65+). The program targeted older persons with a variety of risk factors, including disability, social isolation, psychiatric problems, poor compliance with hospital outpatient care instructions, or individuals waiting for institutional admission. At-risk older persons were referred by their health care physician or social worker to the TeleHelp-TeleCheck service. Participants were provided with a remote alarm device used to trigger a response network (TeleHelp). In addition, TeleCheck included short, informal, twice-weekly telephone interviews by trained staff. These checks were used to evaluate participant welfare and to provide emotional support. Participants were also able to call the TeleCheck line on a 24-hour basis. This service was evaluated over an 11-year period among more than 18,000 older Italians. The intervention was successful in reducing the number of observed suicides among older women, though it did not significantly lower the rate of completed suicides among older men. In addition, the TeleCheck component of the intervention has been associated with fewer requests for physician home visits, hospital admissions, and depression severity.[222]

In addition to the few studies that have specifically addressed the reduction of suicide or suicidal ideation among older adults, several other programs have concurrently targeted both younger and older adults (not shown in tables). For example, a program in Gotland, Sweden provided education to primary care physicians to improve treatment of depression and lower rates of suicide. The rate of suicide decreased following physician training; however, the rate of suicide increased 2 years after the completion of training. The small number of completed suicides and the lack of focus on older adults makes it difficult to draw conclusions from this study.[223,224] In contrast, placing limits on analgesic packaging has been defined as an "effective" universal prevention program within the registry of evidence-based suicide prevention programs.[225] Due to high numbers of self-poisoning associated with analgesics, the United Kingdom passed legislation in 1998 to limit pack sizes of analgesics to 32 tablets per sale at a pharmacy and 16 tablets per sale at non-pharmacy locations. Printed warnings regarding dangers of overdose were also provided. Rates of self-poisoning in the United Kingdom among persons aged 12 and above were evaluated over a 6-year period through a naturalistic design. Packaging limitations, which restricted access to a lethal means of suicide, were associated with a significant decrease (22%) in self-poisoning with analgesics.[226,227] The effectiveness of this approach has not been evaluated in the United States, nor has it been evaluated specifically among older adults.

Conclusions

A review of the current evidence supporting the universal, selective, and indicated prevention among older adults suggests that current prevention programs can reduce the rate of suicide among older women, but have shown more limited effectiveness among older men. Supportive interventions appear to be effective for older women. There is a need, however, for alternative interventions targeting suicide prevention among older men. Of note, several of the prevention strategies have been developed and evaluated in other countries (including Japan and Italy). While these programs have shown effectiveness in their original setting, it is possible that differences in health care systems and characteristics of the older adult populations may limit their generalizability to samples and settings in the United States.

Although there is little data to support the prevention of older adult suicide, national strategies endorse science-based suicide prevention initiatives. The following goals and objectives have been specifically adapted from the National Suicide Prevention Strategy to meet the needs of older adults:[205,212]

- Promote awareness that suicide in older adults is a public health problem that is preventable;
- Develop broad-based support for elder suicide prevention;
- Develop and implement strategies to reduce the stigma associated with aging and with being a senior consumer of mental health, substance abuse, and suicide prevention services;
- Develop and implement community-based suicide prevention programs for older adults;
- Promote efforts to reduce access to lethal means and methods of self harm by older adults;
- Implement training for recognition and assessment of at-risk behavior and delivery of effective treatment to older adults;
- Develop and promote effective clinical and professional practices;
- Improve access to and community linkages with mental health, substance abuse, and social services designed for the evaluation and treatment of older adults in primary and long-term care settings;
- Improve reporting and portrayals of suicidal behavior, mental illness, and substance abuse among older adults in the entertainment and news media;

- Promote and support research on late-life suicide and suicide prevention;
- Improve and expand surveillance systems;
- Implement interventions that improve social relations and decrease isolation in older adults; and
- Increase access to geriatric specialty health care.

Future directions for the prevention of suicide among older adults may include community-based educational initiatives that attempt to de-stigmatize help-seeking, greater use of mental health screening and treatment among older adults, education of stakeholders (including gatekeepers who could serve an important role in identifying at-risk older adults), and training of health care providers in suicide risk and protective factors.[193] Prevention of suicide should focus on age-specific risk and protective factors that address differences associated with race, ethnicity, and gender.[189] While emphasis should be placed on universal prevention strategies that stress educational interventions, their combination with selective and indicated strategies offers the most hope for effecting significant reductions in late-life suicide rates.[212] For instance, preventing or reducing problem drinking and depressive symptoms, particularly in combination, is likely to reduce risk for suicidal ideation and suicide. Finally, special attention should be placed on the identification and treatment of older adults with suicidal ideation in primary care.

Table 8. Universal prevention of late-life suicide

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
Oyama, et al., 2004 [216]	Quasi-experimental	Screening for depression, followup with mental health care or psychiatric treatment, and health education on depression. Comparison group did not receive these services.	65+	7,070 residents of a rural agricultural region in Japan covering multiple municipalities (Joboji), compared to a neighboring region (Iwate).	5-year intensive period; 5-year maintenance period, compared to 5-year preparation period and 5-year baseline period. Approximately 30-60% of eligible older adults participated in program.	Suicide mortality in the intervention area decreased by 73% among men and 76% among women over 10-year study period compared to the 10-year baseline and preparation periods. No change was seen in rate of suicide among residents of the comparison region.	Non-randomized, time series analysis could allow for a regression to the mean; program not utilized by all older members in the region.
Oyama, et al., 2005 [217]	Quasi-experimental	Group activities, psychoeducation, and self-assessment of depression available to all older members of a region. Comparison group did not receive these services.	65+	6,817 residents of a rural agricultural region in Japan covering multiple municipalities (Yuri town), compared to a neighboring region (Chokai town).	8-year period prior to intervention, compared to 8-year period after beginning of intervention.	A 76% reduction in suicide was seen among females (age-adjusted incident rate reduction of 0.24; confidence interval (0.10 – 0.58). No change seen in rate of suicide among men or in the comparison region.	Non-randomized, time series analysis could allow for a regression to the mean, intervention only effective for females, program not utilized by all older members in the region.

Table 9. Selective and indicated prevention of late-life suicide

Reference	Study Design	Model/Conditions	Age	Sample	Followup	Outcome Measures and Results	Limitations/Comments
De Leo, et al., 2002 [222]	Quasi-experimental	TeleHelp-TeleCheck service: Twice weekly telephone support and emergency response for up to 20,000 persons referred by general practitioners or social workers.	65+ Mean: 80.0±6.8 years	18,641 older adults in the Veneto region of Italy. Most participants were widowed (68%), females (84%), lived alone (73%), and were partially self-sufficient (63%).	11-year period. 13% of the participants stopped using the service during the followup (45% due to death, 21% due to institutionalization, and other due to a move out of the area).	Observed suicides were significantly lower than expected (observed=6; expected=21). Resulted in significantly fewer suicides among women (n=2) than expected, but no difference in suicides among men (n=4), compared to expected number (n=9).	Non-randomized, intervention only effective for females. A previous examination of this program resulted in reductions in requests for home visits by general practitioners, hospital admissions, and depression scores.
Szanto, et al., 2003 [220]	Secondary analysis of three RCTs	Active treatment for depression with antidepressant medication or interpersonal psychotherapy.	59+ Range: 59-95 Mean: 72.0±7.4	395 inpatients and outpatients with major depression and active treatment with antidepressant medication alone or in combination with interpersonal therapy.	12 weeks.	Reports of suicidal ideation, thoughts of death, or feelings that life was empty decreased from 77.5% to 18.4%. Decrease in suicidal ideation took more time for those with a recent suicidal attempt or current ideation.	Reduction in suicidal ideation took an average of 1.5 months. Secondary analysis of outcome data from a combination of studies.
Bruce, et al., 2004 [221]	Multisite RCT	PROSPECT trial (Prevention of Suicide in Primary Care Elderly: Collaborative Trial). Depression treatment guidelines for older adults coupled with care management, compared to usual care (UC).	60+ Range: 60-94	Urban primary care patients with major or minor depression. 72% female. 28% minorities. Participants randomized to PROSPECT or usual care by site. Intervention: n=320 UC: n=278	4-, 8-, and 12-month followup. After 12 months, 31% of the intervention and 31% of the usual care group had dropped out.	Rates of suicidal ideation differed at baseline, but were similar by 4-, 8-, and 12-month interviews. Raw rates of suicidal ideation declined 12.9% in the intervention and 3.0% in usual care. Among only those patients with suicidal ideation at baseline, there was significantly greater reduction in suicidal ideation at 8 months in the intervention group compared to the usual care group. Differences in suicidal ideation among this subgroup did not differ at 4 or 12 months.	The intervention group had greater suicidal ideation at baseline and thus greater improvement in the intervention group may represent regression to the mean. Depression scores also improved more in the intervention group. Effects on suicidal ideation were more pronounced in those with major depression compared to those with minor depression. It is not known how suicidal ideation is reflected in suicidal behavior.

PREVENTION OF CO-OCCURRING SUBSTANCE ABUSE AND MENTAL HEALTH PROBLEMS

The prevalence of older adults with comorbid substance abuse and mental disorders varies by population, and ranges from 7 percent to 38 percent of those with psychiatric illness and from 21 percent to 66 percent of those with substance abuse.[228] Co-occurring mental health and substance use disorders are associated with an increased risk of poor health outcomes, greater inpatient and outpatient service utilization, and increased suicidal ideation and attempts, compared to either disorder alone.[199,201,229] Depression and alcohol use are the most commonly cited co-occurring disorders in older adults.

Several search strategies were used to identify programs that address the prevention and early intervention of co-occurring disorders in older adults. The PubMed, PsychInfo, CINAHL, Ageline, Social Services Abstracts, and ERIC databases were used to identify published literature using a combination of the search terms: co-occurring disorders, dual diagnoses, alcohol, substance abuse, depressive disorders, and mental illness. Other search strategies were also employed, including searches conducted through Google and federal and foundation grant databases.

The following section describes the evidence supporting approaches to the prevention and early intervention of co-occurring substance abuse and mental health problems. Data on the prevention and early intervention of co-occurring disorders in older adults are limited. We were unable to locate universal prevention programs for older adults. The absence of universal prevention programs for late-life dual diagnosis is expected, because pre-existing substance abuse or mental health problems places preventive efforts at a selective or indicated level. The research literature describing the early intervention of co-occurring disorders is small and is largely focused on the comorbidity of depression and alcohol abuse. Early intervention strategies include programs that combine medication with psychotherapy for depression and integrated service delivery approaches. Table 10 provides an overview of intervention programs for older adults with co-occurring substance abuse and mental health problems. A review of these programs is also provided within the text.

Indicated and Selective Prevention Strategies (Early Intervention)

Effect of Alcohol Use on Depression Treatment Outcomes

Oslin and colleagues found that concurrent treatment of depression and a reduction in alcohol use was effective in achieving positive treatment outcomes.[230] In this large study of older persons (age 60+) hospitalized for late-life depression, outcomes were evaluated 3 to 4 months following discharge. Treatment during hospitalization for the vast majority (88%) included concurrent treatment with antidepressants and abstinence from alcohol. Surprisingly, those with a history of moderate and high alcohol consumption (compared to light consumption) had significantly better social functioning and energy outcomes and a lower proportion used antidepressant medications. The authors found that the vast majority of those in the moderate and high alcohol consumption group significantly decreased their alcohol consumption at the same time as receiving treatment for depression, with approximately 80 percent of patients reducing their drinking by more than 90 percent.[230] Of note, reducing alcohol use was associated with a modest benefit on depression outcomes, compared to older adults who continued to drink. The results of this study suggest that older adults with co-occurring depression and substance abuse benefit from treatment of depression, especially when consumption of alcohol is decreased.

Effectiveness of Naltrexone Combined With Treatment for Depression

Oslin and colleagues recently conducted a randomized clinical trial among alcohol dependent older adults with co-occurring depression.[231] In this study, older adults (age 55+) were randomized to either sertraline (an antidepressant medication) combined with psychosocial support or sertraline combined with psychosocial support plus adjunctive naltrexone (an opioid antagonist). This study failed to find any additional benefit of naltrexone as an adjunctive agent in the treatment of alcohol dependence. However, the investigators found a strong association between reduced depression and lower rates of drinking and relapse during treatment. The authors concluded that appropriate and optimal treatment of co-occurring depression and alcohol dependence should consist of concurrent treatment of both the alcohol dependence and depressive symptoms.

Effect of Integrated Care Compared to Enhanced Referral Care

The Primary Care Research in Substance Abuse and Mental Health for Elderly (PRISM-E) study compared treatment engagement of older primary care patients (age 65+) receiving care through two distinct services models, including integrated substance abuse and mental health treatment and

enhanced referral to a specialty mental health clinic.[195] A subgroup of participants in this study had co-occurring at-risk alcohol use and depression or anxiety (n=148). Of note, older adults with co-occurring disorders were significantly more likely to engage in the integrated model of treatment (4.0 mean treatment visits) compared to the enhanced model of referral to specialty mental health clinics (1.8 mean treatment visits).[195] Both the integrated and enhanced referral conditions were effective in decreasing alcohol use (as measured by number of drinks per week and the number of binges per month) and improving mental health status (as measured by the mental component score of the SF-36).[232] Unfortunately, it is not possible to determine (in the absence of a non-treatment control group) if the positive outcomes were due to the treatment, or a non-specific study effect. However, these results suggest that co-occurring at-risk alcohol use and depression or anxiety can significantly improve over 6 months among older adults receiving mental health and substance abuse services in primary care or specialty mental health settings.

Screening

A recent study by Philpot and colleagues [233] examined the effectiveness of three screening tests to identify problem drinking in older adults with mental illness. This examination evaluated the Alcohol Use Disorders Identification Test (AUDIT), the AUDIT-5, and the CAGE among 128 older adult patients with a mean age of 77 years. Mental health problems among this sample included dementia (54%), affective disorders (25%), schizophrenia/delusional disorders (11%), substance-related psychiatric disorders (3%), and other psychiatric disorders (7%). The sensitivity, specificity, and positive predictive value of the AUDIT (cut-point 7/8) and AUDIT-5 (cut-point 4/5) were similar and were superior to the CAGE (cut-point 1/2). In comparison with clinical case criteria, the AUDIT-5 performed better than either of the other scales and had a sensitivity of 75 percent, specificity of 97 percent, and positive predictive value of 83 percent using a 4/5 cut-point.[233] This study suggests that the AUDIT and AUDIT-5 are both appropriate screening instruments for detecting problem drinking in older adults with mental illness.

Ongoing Prevention Programs Undergoing Evaluation

A search of the NIH Clinical Trials database did not identify any studies that are currently evaluating the effectiveness of preventing or treating co-occurring substance abuse and mental illness in older adults. A broadened search using the terms “co-occurring disorders, dual diagnoses, alcohol and mental illness, and substance and mental illness” identified only six studies, all of which were focused on

younger persons. Entry criteria limited enrollment to individuals ages 18-65 in three studies, 18-70 in one study, 21-60 in one study, and 12-15 in one study. Three of the studies are evaluating the effectiveness of a pharmacological intervention, while three are evaluating the effectiveness of a psychosocial intervention. In addition, a review of current grants supported by the Robert Wood Johnson Foundation and the Hartford Foundation did not identify any projects focused on the prevention or early intervention of co-occurring disorders in older adults.

Conclusions

Dual diagnosis consisting of co-occurring substance abuse and mental illness among older adults is a growing public health problem. The empirical data on interventions for co-occurring depression or anxiety disorders and alcohol use disorders in older adults is limited. Well-designed prevention, early intervention, and treatment studies are needed that specifically address co-occurring disorders in older adult populations. Further research is needed that provides valid criteria for differentiating the diagnostic subtypes that comprise co-occurring disorders and the corresponding treatment interventions. Moreover, selective and indicated prevention efforts that focus on late-life mental illness alone and substance abuse alone should be applied to older adults with co-occurring disorders. Establishing an evidence base for the treatment of comorbid substance abuse and mental health problems represents a critical area of need for older persons with a mental illness or with a history of alcohol dependence, with current alcohol dependence, or with at-risk drinking.[234]

Table 10. Early intervention of co-occurring substance abuse and mental health problems

Reference	Study Design	Model/ Conditions	Age	Sample	Followup	Outcome measures and Results	Limitations/ Comments
Oslin, 2000 [230]	Pre-post	Effect of concurrent alcohol use on treatment of depression	60+	Patients admitted to inpatient geriatric psychiatric treatment programs. 72% female. All patients had a DSM-IV diagnosis of a depressive disorder and a geriatric depression scale score > 10. 2,666 with admission data; 1,048 with followup data.	3-4 months following discharge. 39% with both admission and followup data.	Patients with moderate/high alcohol consumption (vs light consumption) had better energy and social functioning outcomes and fewer used antidepressants at followup. 80% of patients in the moderate/ high consumption group significantly decreased alcohol consumption (by 90% or more) while receiving treatment for depression.	Intervention not clearly defined. Low completion of followup data.
Bartels, 2004 [195]	RCT. PRISM-e Study.	Integrated substance abuse and mental health treatment. Enhanced referral to a specialty mental health clinic.	65+ 73.5±6.2	Primary care patients. 74% male. Subgroup with co-occurring at-risk alcohol use and depression or anxiety (n=148) Integrated: n=73 Referral: n=75	6 months.	Greater engagement and more treatment visits in the integrated condition than in the referral condition. (79.5% vs. 51.4% engaged) (4.0 vs. 1.8 mean treatment visits)	Unpublished data showed that both groups reduced number of drinks/week and binges/month and had improved overall mental health status [232]. Not possible to determine if outcomes from the integrated or enhanced referral conditions were different than usual care.

Table 10. Early intervention of co-occurring substance abuse and mental health problems (continued)

Reference	Study Design	Model/ Conditions	Age	Sample	Followup	Outcome measures and Results	Limitations/ Comments
Oslin, 2005 [231]	RCT	Sertraline + psychosocial support in addition to: placebo (PBO) or naltrexone	55+ Placebo: 62.5±5.6 Naltrexone: 64.2±6.9	Outpatients meeting DSM-IV criteria for alcohol dependence and a depressive disorder who had successfully completed alcohol detoxification (3 consecutive days of abstinence). 80% male. PBO: n=37 Naltrexone: n=37	12 weeks. 83.8% completed 3 months of psychosocial treatment. Drop-out rate did not differ between PBO and naltrexone.	No evidence for efficacy of naltrexone when added to sertraline and psychosocial support for relapse, abstinence, depression remission, or overall improvement.	Strong association between reduced depression and lower rates of drinking and relapse during treatment. Small sample size. Outcomes evaluated for remission and not for a continuous outcome measure.

SUMMARY

The Current State of the Evidence

In summary, this review highlights programs and practices that have been shown to be effective in preventing substance use and mental health problems and suicide among older adults. The paragraphs below provide a summary of the findings of this review.

Alcohol Misuse

Alcohol misuse is a problem that can potentially be reduced or eliminated among many older adults through prevention and early intervention strategies. Selected prevention strategies such as brief advice by primary care physicians and other health care providers have proven effectiveness in reducing alcohol misuse among older adults. Specifically, brief interventions in health care settings have reduced alcohol consumption among older adults, with these reductions sustained over time (up to 12 months). Few universal prevention programs targeted at the prevention or reduction of alcohol misuse among older adults have been evaluated rigorously. Health education programs have demonstrated increased knowledge among older adults about risky drinking practices and ways to limit hazardous alcohol use. The effect of these programs on behavior change, however, has not been evaluated. A number of screening and assessment instruments have been developed and shown to be reliable and feasible for use with this population. These measures show promise to improve the quality of clinician-initiated discussions regarding patients' substance misuse as well as to increase knowledge and motivate behavior change among older adults. While progress has been made in understanding the effectiveness of preventive alcohol screening and brief interventions with older adults, there are challenges to matching these models to different service settings and different subgroups of older adults. Three research studies currently underway are focused on the identification of and brief intervention with at-risk older drinkers in health care settings.

Medication Misuse

Medication misuse is an important arena for prevention and early intervention among older adults. Many medication-related problems are predictable and thus potentially preventable,[135] but the mechanisms underlying the development of medication problems are complex. The evidence base for

prevention of medication misuse among older adults is limited, but there are indications of some promising advances. Computer-based health education tools have increased knowledge and improved self-efficacy regarding potential drug interactions, as well as improving several self-medication behaviors and reducing adverse self-medication behaviors among older adults. A variety of promising strategies and interventions to address medication non-adherence have been evaluated, such as improving the formatting and effectiveness of medication instructions, nursing-based education interventions, compliance aids, and assessment tools, but the strength of the evidence varies considerably. The development of assessment and screening tools for medication misuse is limited. Clinical trials for early intervention with older adults who are at risk for medication misuse have shown mixed results. Studies have examined several types of early interventions, including interventions with older patients prior to hospital discharge, interventions targeted at provider prescription patterns, home-based medication review, and patient education. Clinical pharmacy interventions have been shown to reduce the occurrence of drug-related problems but have shown limited evidence that they have an impact on morbidity, mortality, or health care costs. Decision support systems for prescribing are another promising avenue to decrease inappropriate or excessive medication use and to prevent related adverse drug events among geriatric populations. No studies were identified currently underway addressing the prevention of, or early intervention with, medication misuse among older adults.

Depression and Anxiety

Depression and anxiety disorders are the most prevalent mental health problems among older adults. Although one in five older adults experiences symptoms of anxiety,[159] little is known about how to prevent the onset of late-life anxiety or worsening of anxiety symptoms. In contrast, several programs have been developed to prevent the development or exacerbation of late-life depression. Among these programs, a moderate amount of evidence supports the effectiveness of PST, exercise, and targeted outreach to vulnerable older adults. Studies of PST have found it to be effective for older persons with minor depression or dysthymia and for reducing depressive symptoms among caregivers of persons with dementia. The effectiveness of PST is also currently being evaluated among persons with macular degeneration and a previous stroke. Aerobic and resistance exercise programs have also been associated with a reduction in depressive symptoms among the general population of older adults, as well as among older adults with minor depression or dysthymia. Other potentially effective strategies include life review, reminiscence therapy, educational classes, mind-body wellness, and provider education. Most of these approaches require further evaluation to demonstrate their potential effectiveness among older adults.

Suicide

Suicide is disproportionately common among older adults and the rate of suicide completion is particularly high among older men. The research literature describes several programs that have shown moderate effectiveness among older adults. Supportive interventions that include screening for depression, psychoeducation, and group-based activities for older adults have been associated with reduced rates of suicide among older adults. Telephone-based supportive interventions have also been associated with a reduction in the rate of completed suicide. Finally, protocol-driven treatment of depression delivered by a care manager has been associated with reduced suicidal ideation. Of note, several suicide prevention programs have been associated with reductions in the rate of suicide among older women, but have shown more limited effectiveness among older men. Efforts are needed to adapt and evaluate suicide prevention programs developed overseas to meet the needs of older Americans.

Co-occurring Disorders

The research literature describing the early intervention of co-occurring disorders is small and is largely focused on the comorbidity of depression and alcohol abuse. Preliminary studies suggest that concurrent treatment of substance abuse and depression may be effective in reducing alcohol use and improving depressive symptoms. Early evidence also suggests that adding naltrexone, an anti-craving medication, to antidepressant medication and psychosocial support does not improve outcomes. In summary, little is known about the most effective ways to prevent or treat co-occurring substance abuse and mental health disorders. In addition, we were unable to identify any ongoing studies that are evaluating interventions or treatments for older adults with co-occurring disorders. The high prevalence of substance abuse among persons with mental illness, and the high prevalence of mental illness among persons with substance abuse, suggests that this is an area that should receive further attention.

Dissemination – Translation, Implementation, and Diffusion

Translating research into clinical practice has been highlighted in reports from the IOM [235] and NIMH [236] as one of the most important priorities in health care. "All too often, clinical practices and service system innovations that are validated by research are not fully adopted in treatment settings and service systems for individuals with mental illness."[236] These reports note that health care services can be continually improved by focusing on the transitions between basic science, the development of new treatments, clinical trials, and implementation into practice settings. Yet, a "Quality Chasm" in health care

separates research defining the most effective treatments from actual clinical practice in usual care.[235] It takes over a decade for research findings on effective treatments to be routinely implemented by health care providers.[237] Barriers to disseminating and implementing evidence-based practices across mental health settings include a lack of specific skills and knowledge among clinical staff, limited time available for training, and a lack of dedicated financing to support implementation and sustainability of systems change.[238]

A first step in bridging the quality chasm is the identification of effective practices and programs supported by scientific evidence. This document provides a current, systematic review of evidence-based practices pertaining to the specific area of prevention and early intervention for substance use disorders and selected mental health problems for older adults. In order to support the process of widespread dissemination, the content of systematic reviews will need to be standardized and widely accessible.

The National Registry of Evidence-Based Programs and Practices (NREPP) is a developing national resource for contemporary and reliable information on the scientific basis and practicality of interventions to prevent and/or treat mental and addictive disorders. To date, NREPP has evaluated few programs that target the prevention and early intervention of substance abuse and mental health problems in older persons. Given the lack of programs specific to older adults, SAMHSA's Older Americans Substance Abuse and Mental Health Technical Assistance Center has prioritized the evaluation of prevention programs and the fostering of NREPP review for these programs. NREPP has established high standards for establishing the scientific merit of programs. In rating the effectiveness of a program or practice, several factors are considered. These include the effect size of the intervention, independent replications, and the quality of the evidence. The quality of evidence incorporates a review of multiple criteria, including: theory-driven measure selection, reliability, validity, intervention fidelity, comparison group fidelity, nature of comparison condition, assurances to participants, participant expectations, standardized data collection, data collector bias, selection bias, attrition, missing data, analysis that meets data assumptions, theory-driven selection of analytic methods, and anomalous findings. It is our hope that several of the practices identified through this review will be evaluated and nationally promoted through the NREPP program.

Challenges to Dissemination and Implementation of Evidence-Based Practices and Programs for Older Adults

The challenges associated with dissemination and implementation are especially pronounced for services provided to older adults. While the evidence base supports a variety of preventive strategies

and early interventions for substance use and mental health disorders in older adults, there are numerous barriers to access and delivery of services. Older adults are particularly vulnerable to age-related economic and physical barriers to care, gaps in services, and inadequate financing of mental health treatments and services.[239-241] Furthermore, the lack of providers with geriatric expertise represents a significant challenge to providing effective substance abuse and mental health services. Although community-based service providers are increasing their capacity to respond to the mental health concerns of older adults, they often lack adequate reimbursement and the staff necessary to provide appropriate prevention and early intervention services.[241]

One of the greatest challenges to improving treatment of mental disorders in older persons lies in the fragmentation of services. Frequently, poor communication and coordination, differences in expertise, and different mechanisms of reimbursement or funding across providers, service settings, and agencies impede implementation of best practices. These significant differences between providers across the array of residential and service delivery settings complicate the implementation of evidence-based treatments. For example, more than half of older persons who receive any substance abuse or mental health services are treated by primary care physicians,[242, 243] yet these providers often have inadequate time to address substance use/abuse and mental health problems with the full range of competing patient needs.[244]

Evidence-Based Implementation

The science of implementation has been extensively studied in commercial industry, and more recently has been extended to implementation of evidence-based practices and programs in health care and health service organizations. Carefully designed reviews and multiple studies have partially determined *what does not work* with respect to successful implementation. These reviews have determined that: (1) information dissemination alone (e.g., distribution of guidelines, algorithms, or summaries of the research literature) is an ineffective approach to implementation; and (2) training by itself is also ineffective as a method of implementation.[245,246] It is noteworthy that these are two of the most widely used approaches by health and human services for attempting to implement programs and practices, despite an extensive literature that has repeatedly shown that they are ineffective. There are literally hundreds of guidelines, algorithms, and protocols that have been developed and disseminated regarding substance abuse and mental health (www.guidelines.gov). Similarly, health service organizations invest substantial resources and valuable time to conduct workshops, conferences, continuing professional education programs, and day-long trainings, despite a lack of evidence that these approaches produce any significant or sustained changes in provider behavior.

Research has also identified core components and organizational change interventions that are effective in achieving successful implementation. There is strong evidence that *what does work* in achieving the adoption of evidence-based practices and programs is a longer-term and sustained multilevel approach. This multilevel approach includes core implementation components at the level of the provider, and organizational components at the level of the organization or system. Core (practitioner-level) components of successful implementation include: (1) selecting appropriate individuals who have the necessary qualifications or characteristics to carry out the practice or program; (2) pre-service training to introduce background information, values, and key components of the practice or program; (3) on-the-job learning with the help of a consultant or coach including behavior change at the level of the practitioner and supervisor; and (4) evaluation of fidelity (accurate application and use of the practice or program) and outcomes (desired impact or objective for the consumer). Organizational (system-level) components include: (1) administrative supports consisting of organizational "buy-in", leadership, and changes that facilitate the practice or program; and (2) systems change to ensure that the practices or programs are supported with the necessary financial, decision support, and human resources to support and sustain the practice or program over time.[245]

Core implementation components cannot be installed nor sustained in the absence of supportive organizational structures and necessary funding or reimbursement. In particular, states and large human service organizations often fail to identify and address policy interventions that are required to minimize barriers and facilitate implementation of evidence-based practices.[247,248] In summary, regardless of the evidence base supporting the effectiveness of a specific practice and amount of resources devoted to dissemination and conventional trainings, implementation is likely to fail and the service will disappear in the absence of a multi-level approach that includes organizational changes, targeted resources, and appropriate funding.

Research Needs and Future Directions

Attention to the prevention and appropriate treatment of substance abuse and mental health problems was identified as a major priority for older adults by the President's New Freedom Commission on Mental Health.[249] As identified in this review, there is a need for organizing, disseminating, and understanding evidence-based prevention and early intervention programs for late-life substance abuse and mental illness. While progress has been made in understanding the effectiveness of these programs and practices for older adults, there are challenges to matching these models to different service settings and different subgroups of older adults.

The growth in the aging population will have a significant impact on the substance abuse and mental health service delivery systems.[11,18,190] In anticipation of this growing problem, it is essential that substance abuse and mental health services meet the specific needs of older adults. For instance, cohorts of the young-old (e.g., baby boomers) and the old-old have different patterns of service utilization and different perceptions of stigma associated with receiving care for substance use or mental health disorders. Moreover, the prevalence of substance abuse, mental health disorders, and suicidal ideation vary across ethnic groups.[199,250-255] Mental health services are infrequently utilized by older minority populations [256] and lower utilization rates may be associated with limited access, stigma, distrust of mental health providers, and limited availability of culturally-competent services.[257,258] The lack of information on specific ethnic differences and culturally-appropriate service provision represents a limitation of the current evidence base. A greater understanding of cultural and ethnic differences is needed to enhance the ability to provide appropriate prevention and early intervention to older minorities with substance use and mental health disorders. For instance, social marketing associated with universal prevention interventions should be specifically tailored to cultural and language differences of ethnic groups. In addition, cultural competence should be enhanced across the full spectrum of prevention interventions.

This report provides a comprehensive review of the evidence for prevention and early intervention of alcohol abuse, medication misuse, depression and anxiety, suicide, and co-occurring disorders in older adults. As indicated by our findings, the development of preventive interventions associated with substance abuse surpasses that associated with mental health problems. However, the development and rigorous evaluation of programs that target both of these areas are sorely needed. In addition, there is a need to identify methods to appropriately translate information from clinical trials and research settings into the health care arenas where older adults most frequently receive care, and into social services settings where they receive other needed services. Likewise, population-based programs that target broad audiences of older adults may also offer hope for the universal prevention of substance use and mental health problems. In summary, substance use and mental health problems pose significant risks for the functioning and well-being of older adults. Although several prevention and early intervention programs have been developed, there is a considerable need for dissemination and implementation of effective programs, as well as for further research aimed at the development and testing of novel programs.

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