Alexis Kuerbis
Alison A. Moore
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Faika Zanjani *Editors*

Alcohol and Aging

Clinical and Public Health Perspectives

Springer

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For Nancy Jack and Stan Kuerbis

—A.K.

For Arthur Brody

—A.A.M.

For Carol and Humbert Sacco

—P.S.

For Farah, Asad, Noah, and Anaya Zanjani, and Joe Remias

—F.Z.

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Part I

Introduction

1 Thinking Behind Alcohol Consumption in Old Age: Psychological and Sociological Reasons for Drinking in Old Age

Catherine Haighton

1.1 Introduction

Population ageing is taking place in nearly all the countries of the world and this is expected to continue over the coming years [1]. Alcohol problems often occur in later life and are associated with notable social, psychological, physical and economic consequences; however, in later life alcohol problems are often less obvious, misdiagnosed or go under-detected and under-reported [2]. Alcohol consumption and alcohol-related deaths or problems have recently increased among older age groups in many developed countries, including the USA, Australia and several countries of the European Union [3–7]. This increase in consumption, in combination with the ageing of populations worldwide, means that the absolute number of older people with alcohol problems is on the increase and a real danger exists that a "silent epidemic" may be evolving [2]. Although there is growing recognition of this public health problem, clinicians consistently under-detect alcohol problems and under-deliver behaviour change interventions to older people [8, 9] while nurses report that they do not engage with older people as they worry about depriving them of the social benefits of drinking [10, 11]. In order for health professionals to successfully intervene with older people who are experiencing alcohol problems, it is important to understand the underlying factors that may increase exposure to, or consumption of, alcohol. An understanding of the different trajectories among older drinkers may also help health professional in directing treatment towards those affected more severely [12].

This chapter will draw on data from a UK-based qualitative study aimed at understanding older people's reasoning about drinking in later life in order to inform future, targeted, prevention in this group [13]. In 2010, a diverse sample of older

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adults in the North East of England (aged 50–95) participated in interviews ($n = 24$, 12 male, 12 female) and three focus groups (participants $n = 27$, 6 male, 21 female). Data were analysed using principles from grounded theory and discursive psychology. Participants aged 50 and above were sought in order to consider views both leading up to and following the transition to retirement, and to consider how problems after the age of 65 may arise in late working life (see Table 1.1). Detailed methods have been reported previously [14].

Table 1.1 Interviewee characteristics

Interviewee number	Age	Gender	From interview: self-reported drinking status /behaviour	From interview: lives with
1	61	m	Recovering dependent drinker	Other residents
			Abstinent for 2.5 years	
2[a]	59	f	Recovering dependent drinker	Adult child
			Sensible drinker for 12 years	Adult child's partner
				Grandchild
3[a]	56	f	Dependent drinker	Husband Adult child
4[a]	61	m	Dependent drinker	Alone
5	52	m	Recovering dependent drinker	Alone
			Abstinent for 2 months	
6	59	m	Recovering dependent drinker	Wife
			Abstinent for 4 weeks	
7	57	m	Recovering dependent drinker	Wife
			Abstinent for 2 years	
8[a]	74	m	3 L whisky per week	Alone
9	62	m	Previously 3–4 pints on 3–4 nights per week	Alone
			Abstinent for 6 months	
10	60	m	Recovering dependent drinker	Alone
			Abstinent for 1 year	
11	55	f	Recovering dependent drinker	Alone
			Abstinent for 9 weeks	
12	51	f	Previously 3 L cider + 2 cans per day	Husband
			Abstinent for 1 year	Teenage children
13	68	m	Recovering dependent drinker	Unknown
			Abstinent for 5 years	
14[a]	58	f	Previously 2 bottles spirits per weekend	Alone
			Reduced to occasional glass of wine for past 2 years	
15[a]	65	m	Previously 13 pints beer per night	Alone
			Reduced to 2–3 pints per night for 1.5 years	

(continued)

Table 1.1 (continued)

Interviewee number	Age	Gender	From interview: self-reported drinking status /behaviour	From interview: lives with
16[a]	52	f	Reducing dependent drinker	Husband
			From bottles of spirits to 4 pints, 5 days a week	Adult children
17[a]	70	f	Bottle of wine a day	Other residents
			Abstinent while hospitalised only	
18[a]	78	f	Occasional minimal drinker	Other residents
19[a]	83	f	Occasional minimal drinker	Other residents
20[a]	90	f	Occasional minimal drinker	Other residents
21[a]	56	m	4–5 pints/night, 2 nights/week	Partner and sons
			Reduced from previous levels	
22[a]	59	f	Previously a bottle a night for a period	Partner
			Reduced to glass or two of wine a night, not every night.	
23[a]	58	f	4 vodka and tonics a night, twice a week	Partner
24[a]	72	m	4 pints beer every night, sometimes two gin and tonics	Wife

Source: From Wilson GB, Kaner EFS, Crosland A, Ling J, McCabe K, Haighton CA (2013) A Qualitative Study of Alcohol, Health and Identities among UK Adults in Later Life. PLoS One 8(8): e71792

[a]Currently consuming alcohol

Each motivation for drinking in old age will be accompanied by a verbatim excerpt from our qualitative data in order to directly illustrate, in the words of older people, their reasons for consuming alcohol. General findings from our data will be compared with the academic literature in order to summarise current thinking on each of these causes.

1.2 Reasons for Drinking

1.2.1 Early Onset

> I had been drinking all my life, since I was 18. I worked 33 years, so actually it was a drink culture; you finish work and straight to the pub. I think I was … you get to the stage where it's the norm, 5 nights a week. You don't pay any attention to it when you're younger, you think it's the norm; you're having a great time. That went on for many years.
>
> (Interview 10, Age 60, Male)

Our data revealed that many participants felt that their drinking had started in their twenties or thirties, and described this as a response to patterns of heavy use in youth or within local or work cultures. Individuals who have had alcohol-related problems over several decades and have survived into old age tend to be referred to as early onset drinkers. It is estimated that two-thirds of older drinkers fall into this

category [2]. Early onset drinkers tend to have a higher prevalence of antisocial behaviour than late-onset drinkers and a family history of alcohol dependence [15]. Family estrangements are also frequently seen in this group [15].

Late-onset drinking accounts for the remaining one-third of older people who use alcohol excessively [2]. Late-onset drinkers usually begin drinking in their 50s or 60s and tend to be of a higher socio-economic status than early onset drinkers with higher levels of education and income [2]. Stressful life events, such as bereavement or retirement, may trigger late-onset drinking in some, but not all, persons [16]. One study demonstrated that 70 % of late-onset drinkers had experienced stressful life events, compared with 25 % of early onset drinkers [17]. Those whose alcohol problems are of late onset tend to have fewer health problems and are more receptive to treatment than those with early onset problems; they are also more likely to recover spontaneously [18].

A motivational model of alcohol use has been developed which could help our understanding of the reasons for alcohol consumption in older people [19, 20]. Although the model was originally developed with adolescents and young adults, it proposes that reasons for consuming alcohol can be categorised as either positive or negative reinforcement, for example drinking for social (positive) reasons or drinking for coping (negative) reasons [19, 20]. While much of the literature around drinking in older age proposes an association with coping with significant negative life events our work [13, 14], and that of others [21–24], also suggests some positive associations. Therefore, both positive and negative explanations for alcohol consumption will be presented later.

1.2.2 Enjoyment/Socialising

> I love a drink … I associate drinking with banter, friends, where I can sit and talk and chat away to somebody and talk about this and that.
>
> (Interview 21, Age 56, Male)

Our focus group participants emphasised strongly that they enjoyed their use of alcohol, no matter how careful they described themselves as being in their choice of drinks. Going out for a drink was associated with a change in surroundings, the opportunity to socialise with old acquaintances and other activities such as bingo. Younger participants in one group tended to stress how much they enjoyed having a glass of wine or two in the house. Those who consumed alcohol outside the home talked positively about needing or liking to meet the ‘gang’, which for them meant going to a pub or somewhere else they could drink. In one woman’s case, going out for a drink with friends was described as an occasional relief from the boredom of staying in as carer for her husband; while another usually went drinking with her daughter. Many interviewees enjoyed drinking and saw it in some cases as having a key role in their lifestyle. Drinking could be associated with laughter, good times and particular ‘ambience’. Some men in the sample described their drinking as being very strongly enmeshed with their cultural and occupational backgrounds.

Drinking patterns arose from those determined by shift working, relationships with drinking acquaintances had developed over a long time and favourite haunts were associated with those people and routines.

Research has revealed that people aged 75 and over who drink are more likely to be people who still have a fairly active and sociable lifestyle [25]. These findings are consistent with a study which examined drinking behaviour among US adults living in a continuing care retirement community. They concluded that alcohol use among this sample of older adults was largely motivated by a desire for socialisation. However, the participants in this study were not necessarily representative of the general population and were not experiencing alcohol-related problems [23]. A similar study of men and women (65–74 years old) living in private residences or retirement villages in Australia also found alcohol use was linked with social engagement in activities and that moderate alcohol use appeared to serve an important function as a "social lubricant" [24]. Community-dwelling older people in New Zealand also reported consuming alcohol for social reasons, before and with meals and because alcohol helped them to relax [21]. In addition, they also cited encouragement from friends and enjoyment of drinking alcohol as reasons for increasing alcohol use [21] a finding that was replicated in the Whitehall II Cohort Study of 6011 participants aged 61–85 years who cited more social occasions as a reason for increases in alcohol consumption [22].

1.3 Self-Medication

1.3.1 Mental Health Problems

> … then depression, the thing was I turned to drink to sort of shave the edges if you like … to put on not so much rose-coloured spectacles, but to shade reality and to get a bit out of reality to … I suppose … not facing things as they are. And depression, you know you have a drink and then have another one or whatever.
>
> (Interview 12, Age 51, Female)

In many of our interviews talk turned to the use of alcohol as a strategy for coping with panic attacks or anxiety or to achieve oblivion, 'blot' things out or 'wipe your mind'. The participant quoted earlier spoke, for instance, of drinking to 'shut down' emotions or 'shave the edges off reality', another of drinking to put himself in his 'domain' or 'safe zone'. We observed that many of our interviewees suffered from mental health problems and in this context the capacity of drink to provide relief from stress was also presented as self-medication in their accounts. As a relaxant, drink could be seen as a means of alleviating panic attacks. Others spoke of using alcohol to moderate their moods or ease depression. Some precise descriptions were given of how much alcohol, how often, would achieve the effect of 'lifting' mood. At other times participants spoke of using alcohol to get 'blotto' and obliterate feelings they associated with depression, for instance guilt at losing a job, or memories of abuse, or to forget troubles from their past or present, rather than cope with them.

Depression, anxiety and other mental health problems are commonly seen in older individuals with alcohol dependence [26] with many older adults who develop depressive symptoms having a higher likelihood for day drinking [27]. A study using daily drink diaries, over a 60-day period, within a community of 154 heavy drinking residents revealed patterns and thoughts surrounding alcohol consumption. People commonly drank alcohol to enhance positive daily experiences and also to mask negative experiences; consequently, the diary entries showed that the individuals increased their desire to drink following negative work or non-work events. Also revealed was that women had a tendency to drink more alcohol when stressed compared to men [28]. Another study reported that the use of alcohol and drugs, to relieve affective symptoms, was common among individuals with mood disorders in the general population. Almost one-quarter of individuals with mood disorders (24.1 %) used alcohol or drugs to relieve symptoms. The highest prevalence of self-medication was seen in bipolar I disorder (41.0 %). Men were more than twice as likely as women to engage in self-medication and self-medication was associated with higher odds of co-morbid anxiety and personality disorders when compared to individuals who did not self-medicate [29]. Similarly an interview-based study with community-based older people reported that 23 % cited using alcohol to deal with mental health problems [30]. It has also been suggested that late-onset alcohol misuse is associated with 'neurotic' and 'depressive' personality traits [31].

However, the relationship between substance use disorders and mental health problems such as depression and anxiety is complex and the direction of causality is often in doubt. For example, does increased alcohol intake result from 'self-medication' in depression, or is the depression secondary to high levels of consumption? Davidson reported that depression and alcohol dependence are frequently found to co-exist but the relationship between these disorders required further elucidation. Therefore, his study tested several hypotheses related to the relevance of whether a diagnosis of depression was made before admission or after detoxification in an episode for those with alcohol dependence. For the episode of drinking which led to admission, a diagnosis of major depression was found in the majority of patients (67 %). Once detoxification from alcohol took place, only the minority (13 %) met criteria for major depression. It is suggested therefore that depression is largely associated with the episode of drinking which led to admission in patients who are dependent on alcohol and may be due to the effect of chronic alcohol intoxication [32].

In stark contrast, a recently published study examining the socio-economic determinants of risk of harmful alcohol drinking and of the transitions between risk categories over time among respondents to the English Longitudinal Survey of Ageing (aged 50 or over) found no association between depression and high-risk alcohol consumption [33].

1.3.2 Physical Health Problems/Insomnia

> The pain, even some of my bones with my osteoporosis, my ankles, my everything … the pain and all that. As soon as I start having a few pints it goes away.
>
> (Interview 4, Age 61, Male)

Despite their concerns regarding the impact of alcohol on health in later life, our participants did discuss and endorse some uses of alcohol for self-medication. Among the group of younger participants, alcohol was repeatedly endorsed as a means of relaxation to cope with stress, while it was frequently described as a useful aid to sleeping or nightcap for older people. Being able to relax or forget about problems was commonly given as a reason for enjoying drinking. Interviewees associated drinking with an enjoyable sense that they had no worries, with a sense of happiness (albeit temporary) or 'freedom'. Drinking was also often regarded as a means of relieving physical pain, for instance from broken ribs, torn muscles or osteoporosis; However habitual, use of alcohol to self-medicate was usually acknowledged as a temporary solution; pain or anxiety relieved with alcohol would return more severely in the night.

Alcohol consumption has been linked to pain in the literature, with the majority of older adults who report drinking problems also reporting severe pain [27]. The "self-medication" hypothesis states that alcohol consumption is increased to combat rising levels of pain and has been positively identified in younger adults. An example is a study in Florida looking specifically at jaw and face pain, which revealed that a quarter of the participants used alcohol to self-medicate [34]. Older problem drinkers in one study reported more severe pain, more disruption of daily activities due to pain and more frequent use of alcohol to manage pain than older non-problem drinkers. More pain was associated with more use of alcohol to manage pain; this relationship was stronger among older adults with drinking problems than among those without drinking problems [35]. However, in a later study examining the relationship between pain and drinking behaviour in late-middle-aged adults, results revealed a positive association between pain and drinking problems/diagnosed alcohol use disorders but no association between the extent of the pain reported and increased levels of consumption [36]. Other literature has reported that 40 % of older people used alcohol for medicinal purposes. This was equally common in females and males and the most common reasons for use were reported to be heart and vascular disorders (38 %) and sleep disorders (26 %) [30]. The use of alcohol in aiding sleep was also seen in a study by Sproule et al., revealing that 6 % of older people chose alcohol as a non-prescriptive medication to help them sleep [37].

1.4 Bereavement

> The day she was buried I spent the day at a guest house on the seafront … absolutely pissed out of my mind. I was so ashamed to meet my children in that condition that I didn't go to the funeral, for which they'll never forgive me.
>
> (Interview 1, Age 61, Male)

Our data highlighted that losing a parent or partner was often pinpointed as an event that had prompted an escalation in alcohol use, with funerals recalled by some men as involving a severe binge. In the aftermath of one or more bereavements, participants recalled drinking increased amounts, and in some cases moving on to

stronger drink. The relationship between bereavement and alcohol use is, however, complex. One study comparing recently widowed men aged 65 years and over with married men of the same age found similar proportions of widowers and married men drinking alcohol. However, recently widowed older men reported significantly greater frequency and quantity of alcohol consumption than married men [38]. This finding is at odds with another study which reported no significant difference between the rates of drinking among married men and men who had been widowed 3 years earlier [39]. One possible explanation for this might be that the excessive alcohol consumption seen in recently widowed older men diminishes after the first year following bereavement. A longitudinal study examining the impact of bereavement on alcohol consumption among both men and women aged 65 and over found that, in men who were married at baseline, death of a spouse did not independently predict a change in alcohol consumption. However, there was a significant interaction effect between death of a spouse and baseline alcohol consumption, with men who consumed greater amounts of alcohol at baseline being more likely to increase their alcohol consumption following bereavement [40]. Perhaps bereavement in men also increases the risk of alcohol use in already established drinkers. A recent systematic review which examined the relationship between late-life spousal bereavement and changes in routine health behaviour over 32 different studies found only moderate evidence for increased alcohol consumption [41].

1.4.1 Retirement/Loss of Work

> When it all started going wrong was when I lost my job. Because when I had my job I hadn't time to drink to extremes. So it's all down to … no job, no work.
>
> (Interview 15, Age 65, Male)

The loss of work through retirement, redundancy or ill health was also seen in our data as having caused drinking to become more problematic. For instance, one man told us that after he retired he had begun drinking through the day to the point where he was consuming 80 pints of Guinness a week. This trigger had not always occurred in later life—two women, for instance, spoke of starting to drink during the day as they found themselves at a loss when they had children and became homemakers—but its effects had lasted for some. Some men saw their dependent drinking as a response to their loss of role, for instance feeling guilty at being unable to provide following redundancy, or no longer feeling important and able to 'put things right' once a business had folded. Drinking was not always described as an active response to the loss of routine and activity in their lives, in that work was often perceived as a damper on drinking that otherwise had free rein to become problematic.

According to one study however, retirement does not predict substantial changes in alcohol use for most persons [42]. Retirement is however an important landmark during a lifetime. In a longitudinal study of older heavy-drinking men, who had already completed a behaviour change intervention for alcohol problems when they were over 60 years of age, it was found that 71 % of those who had not yet retired

when successfully treated for late-onset use began drinking heavily again when they did retire [43]. While other studies have also found an association between retirement and increased alcohol consumption [16] there is evidence showing that men with existing alcohol problems are more likely to retire than men without such problems [44]. Therefore, the effect of reverse causality on the relationship between alcohol use and retirement cannot be overlooked. According to a report on the English Longitudinal Survey of Ageing retirement was positively associated with high-risk alcohol consumption for women but not for men [32].

In a more recent poll of 857 UK adults over the age of 60, 13 % reported increasing their drinking following retirement, 19 % due to depression and 13 % to cope with bereavement [45]. In a larger scale analysis ($n=4674$) of data from the US Health and Retirement Study, retirement was similarly found to be positively associated with subsequent weekly alcohol consumption however this observation was found in men only [46]. A recent narrative review of the literature concluded that some studies did indeed report an increase in alcohol consumption after retirement, whereas others found a decrease or no change at all. Those who retired involuntarily tended to increase their alcohol consumption, whereas retirees who quit voluntarily did not change their alcohol consumption [47].

1.4.2 Isolation

> No, my mother was here but she didn't bother … do you get what I mean? As the time went on I became more isolated in here with her, and I was drinking a couple of cans each night. To me that was just to take the stress away. Dealing with it. But I wasn't dealing with it in a sense.
>
> (Interview 10, Age 60, Male)

The older people we interviewed described being stuck indoors for various reasons such as illness, anxiety about going out or having no reason to do so. Many were living on their own and at a distance from family or relations. Spending considerable time without conversation and with little to do could leave older people inclined to drink alcohol. One interviewee living in a care home felt isolated from others who lived there, and increasingly stayed in her room drinking.

Some interviewees with spouses or partners told us that their relationships had suffered or ended as a result of excessive or dependent drinking. They described arguments and attempts to hide their drinking from their partner, and perceived a gulf growing between themselves and partners who did not drink, or whose drinking was not problematic. Some participants hoped that they could repair the damage that had been caused, while others told us that their partners had left, or asked them to do so, when they could no longer cope with the drinking problem. One man viewed the end of a marriage as potentially a choice of alcohol over the relationship. The loss of relationships with siblings or children could be seen either as a result of excessive alcohol use or as part of wider family problems that the alcohol use was also related to: for instance, previous abuse or the strain of multiple bereavements. Nevertheless, their relationship diminution was associated with alcohol use becoming problematic.

Interviewees acknowledging alcohol problems recalled falling out or gradually not wanting to see family members or be seen drinking by them. Family members without alcohol problems were in turn described as having reached a point where they did not believe that the interviewee would ever give up drinking after repeated relapses, and becoming distant. Friction with adult children around alcohol had led them to issue ultimatums to the interviewee, or become reluctant to bring grandchildren to visit if the interviewee was likely to have been drinking. Some worries were expressed about the risk of losing relationships with grandchildren. One woman living in a care home and drinking hazardously, however, told us that her brother had stopped suggesting that she reduce her alcohol intake when he concluded one day that she had little else to take her mind off the situation she found herself in. In general, those whose drinking had been problematic since mid-life described the breakdown of intimate and family relationships to a greater extent than those who began drinking heavily in later life.

Isolation is a measure of the size and diversity of a person's social network and frequency of social interaction [48]. A study which evaluated a complex intervention for addressing social isolation in older people reported a reduction in alcohol consumption among participants. The Upstream Healthy Living Centre was a mentored intervention for older socially isolated people, designed to provide individually stimulating creative activity and active (participatory and self-determined) social contact. The intervention encouraged a number of participants to take better care of themselves, and improvements in a range of health behaviours were reported including reduced alcohol consumption [49].

1.4.3 Boredom/Loneliness

> You're going to kill some time, and you're going in [to the pub] not to get drunk but to kill some time and just have a couple of drinks, and wander away.
>
> (Interview 9, Age 62, Male)

In our sample, drinking was also frequently described as a response to finding oneself either bored or alone. Sometimes the objective of drinking was reported as 'filling in the day' rather than experiencing the effects of alcohol. Loneliness is prevalent in later life [50] and can be defined as an individual's subjective evaluation of feeling without companionship, isolated or not belonging [51]. Although associated, loneliness is distinct from social isolation, as people with small social networks may not feel lonely. Whereas lonely people may have extensive and diverse social networks [51].

Loneliness has been linked to poor health behaviours including alcohol use [52], with individuals who are dependent on alcohol reporting being lonelier than members of most other groups [53]. While loneliness does not seem to be associated with increased alcohol consumption in students [52], in a survey, 63 % of middle-aged adults, who had been diagnosed with drug or alcohol problems, reported being lonely [54]. In addition, older adults in alcohol day-treatment programmes reported

that loneliness (along with depression and sadness) preceded the first drink on a typical dinking day [55]. Community-dwelling older adults in New Zealand also cited loneliness as a reason for increasing alcohol use [21]. In contrast, in participants aged 50 years and over, from the 2008 wave of the Health and Retirement study, loneliness was associated with reduced alcohol use frequency but not with at-risk or binge drinking [56]. There was no association between loneliness and high-risk alcohol consumption among respondents (aged 50 or over) to the English Longitudinal Survey of Ageing [32].

1.4.4 Homelessness

> Then spent a year … in a tent, where I was blissfully peaceful because I could just lie in this tent drinking wine from the bottle, or martini from the bottle, depending on if I felt rich or poor that particular day.
> (Interview 1, Age 51, Male)

None of the participants in our qualitative study were currently homeless although some of our participants had experienced periods of homelessness throughout their drinking histories. In the UK, 40 % of older homeless men are known to be heavy drinkers or to have alcohol-related problems. The problems are most pronounced among men in their fifties. The majority of these men are White British or Irish, with only a small proportion from minority ethnic groups [57, 58].

1.5 Conclusion

A third of older excessive drinkers start drinking, or increase their alcohol consumption, later in life. The reasons for this change in behaviour have been associated with both positive and negative reinforcement. There are many motivating factors which have been highlighted in academic research over the years including enjoyment, socialisation, self-medication (for mental health problems, physical health problems and insomnia), bereavement, retirement, loss of work, loneliness, boredom, isolation and homelessness. However, the relationship between alcohol use and many of these factors is complex and future research should focus on the direction of causality. An understanding of the different reasons why older people increase their alcohol consumption will however help health professionals identify the most appropriate behaviour change interventions.

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Part II

Epidemiological Perspectives of Alcohol and Aging

Understanding Alcohol Consumption Patterns among Older Adults: Continuity and Change

2

Paul Sacco

Older adults drink in ways that are reflective of earlier life stages, but alcohol consumption also changes as people move from middle age to older adulthood. Habits like alcohol use may continue in later life as people maintain a sense of continuity [1] from earlier life stages. At the same time, the aging process itself may alter drinking behavior, as older adults develop health-related conditions or experience life changes that exert upward or downward pressures on drinking or change the context and pattern of drinking. Understanding alcohol use among older adults requires a life course perspective [2], one that sees biological, social, and psychological factors as an unfolding process over one's life. Broadly speaking, to understand alcohol consumption patterns and associated risks among older adults, one must consider both biopsychosocial processes that emerge earlier in life and aging-specific processes, such as multimorbidity and retirement. The following chapter will explore factors that influence how drinking patterns evolve or remain constant and will define different levels of risk as they are currently framed within public health.

The life course perspective is valuable in understanding the ways in which older adulthood as a life stage fits within an overall developmental framework. One challenge is that the definition of older adulthood itself can vary greatly. For both theoretical and practical reasons, researchers have chosen either age-specific cutoffs (e.g., age 65) or event thresholds (e.g., retirement) for defining older adulthood. One noted developmental theorist defined middle adulthood from ages 40 to 65, with late adulthood beginning with a transition to beginning at age 60 [3]. After age 65, older adulthood has been divided into its own stages: the young-old (aged 65–74), the old-old (aged 75–84), and the oldest-old (aged 85 and older) [4, 5]. Whenever

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possible, the age ranges of studies will be included in discussion of research on alcohol use patterns and older adults with the idea that later middle age samples (aged 50+) may be very different than samples of the oldest-old.

2.1 Older Adult Drinking Seen Within the Life Course

In the population overall, older adulthood is a life stage in which overall alcohol consumption decreases, binge drinking becomes less common, and individuals give up drinking. Brennan and colleagues [6], in a 20-year study of alcohol use among community dwelling primarily white older adults in early older adulthood (ages 55–65), identified overall declines in consumption levels and number of problems associated with drinking. In an analysis of the Health and Retirement Study [7], researchers also identified a decline in alcohol consumption into older adulthood. Older adults in the Rancho Bernardo study, a longitudinal investigation of older adults aged 50–89, also reported declines in daily consumption over a period of 24 years [8]. Other longitudinal research suggests that the process of decline also occurs in late middle age into older adulthood [9]. In addition, data collected internationally supports the assertion that older adulthood is a period of declining drinking. Analysis by Gee and colleagues [10] identified decreases in drinking among Japanese older adults beginning during the sixth decade of life. Similarly, researchers analyzing the English Longitudinal Study on Aging [11] identified decreased quantity and frequency of alcohol consumption over three waves of data collection.

Two forces specific to later life may be at work in decreasing levels of alcohol consumption in late life. First, the "sick-quitter" hypothesis [12, 13] suggests that changes in health during the aging process limit alcohol consumption. With declines in health, older adults decrease the quantity and frequency of their drinking leading to lower average consumption in the overall older adult population [11, 14]. Similarly, differential mortality of heavy drinkers may lead to decreases in alcohol use among cohorts of older adults; these changes in average drinking may be a function of early mortality of heavy drinkers [15].

Although alcohol use generally declines throughout the course of older adulthood, the population of older adults exhibits a great deal of variability in drinking patterns. Within the general population of older adults, some individuals maintain stable drinking habits, and some may increase their drinking and develop problems in older adulthood. Having a history of drinking problems has been found to predict later increases in drinking among older adults [7, 9, 16, 17]. Although the idea that history predicts future behavior is intuitive, it provides a simple foundation for assessing drinking in this population. Measures like the Alcohol Use Disorders Identification Test (AUDIT) include items on lifetime problems [18] as screening questions for assessing current alcohol-related risk. In addition to drinking history, longitudinal research studies have found that older men tend to consume alcohol at higher levels than women, and their consumption levels decline more slowly than women's [6]. Additionally, factors that may be associated with heavier drinking in late-middle age, such as coping motives/tension reduction related drinking, may be

lead a greater decline in drinking with age [19]. Advanced age itself may also contribute to declines in drinking among older adults. As older adults move from so-called young-old age (i.e., 65–74) to becoming the "oldest-old" (i.e. 85+), the process of decreasing alcohol consumption may accelerate [6, 8].

2.2 Understanding Alcohol Abstinence in Older Adulthood

Life course research on alcohol use among older adults points to an overall decline in consumption due to decreasing quantity and frequency of use as well as transitions to abstinent use. Nonetheless, late-life nondrinking is only part of the abstinence picture. Lifetime nondrinkers are a distinct group with characteristics that may be markedly different from those who stop drinking in late life. This is particularly important when considering health and social correlates of drinking. Numerous studies suggest that lifetime nondrinkers are more likely to be female, display greater religiosity (e.g., attend religious services), and have lower levels of education than their moderate drinking peers [20, 21]. Recent research by Choi and colleagues [22] identified significantly lower risk of anxiety and depressive disorders among lifetime abstainers than nonbinge drinkers, while former drinkers displayed a greater likelihood of past-year suicidal ideation. Research on lifetime abstainers and former drinkers has implications for our understanding of drinking patterns in late life. Older adult nondrinkers are a heterogeneous population, and as such, lifetime nondrinkers and former drinkers should be studied separately. This is especially important when considering the issue of health and drinking because the context for abstinence may be different in these two groups [23, 24]. For instance, there is a body of research focused on the so-called, j-curve hypothesis [25, 26], the idea that morbidity and mortality are lower among individuals who drink at low-risk levels compared to those who abstain completely. Lifetime abstainers and former drinkers are likely different in relation to their perceived health status, health conditions, and services utilization [22, 27].

2.3 Late-Onset Drinking Problems: Reevaluating the Evidence

The literature on alcohol use across the life course has delved extensively into the idea that a subgroup of older problem drinkers develops problems only as they reach older adulthood. Late-onset older adult problem drinkers have been identified using treatment samples [28–30]. Definitions of what constitutes late vary between 40 and 60 years of age [31], and numbers of individuals who fall into the categories of late versus early onset also vary from approximately 15 % late alcohol problems [32] to nearly a 50/50 ratio [29]. People with late-onset alcohol problems have been identified as having less severe problems than early onset (<40 years old) drinkers and are seen as responding to age-related life stresses [31].

Data from epidemiologic studies offer a slightly different picture. Longitudinal research on age of onset across adulthood suggests that new onset of alcohol use disorders is rare after age 40, and that the aging process itself leads to lower vulnerability to new onset disorder and recurrence [33, 34]. One longitudinal study [35] of older adult late-onset alcohol problems did identify a subpopulation of individuals who developed mild to moderate levels of alcohol problems which tended to remit over the course of the study. Moreover, the authors did not find evidence of stress-related drinking in their sample. Earlier studies of so-called late-onset alcohol problems have typically utilized samples of older adults in treatment, relying on self-report of individuals who may have only just recognized that they have a problem with alcohol but who may have previously met criteria for an alcohol use disorder. Alternatively, individuals who enter treatment in older adulthood may be more likely to come from the rare group of individuals who develop an alcohol use disorder late in life. Based on this evidence, it is likely that late-onset alcohol-related problems in older adulthood may represent instances of either recall bias or are the result of a low threshold for problem use (i.e., endorsing a single alcohol-related problem) rather than a specific subtype of alcohol use. Late-onset problem drinkers may be low severity problem users, rather than a separate class based on time of onset.

2.4 Drinking Patterns in Older Adulthood: Common Definitions

From the previous discussion, two general concepts are important to understanding alcohol consumption in the older adulthood. In the general population, alcohol consumption decreases and levels of abstention increase as older adults reach late life and continue to age in older adulthood. National survey data estimate that approximately 40–45 % of older adults (65+) drank alcohol in the past year depending on the survey and question wording [36, 37]. Nonetheless, alcohol consumption among older adults is heterogeneous, and different patterns of alcohol use in late life carry different risks to health and well-being. Among older adults, different drinking patterns may also have distinct sociodemographic risk factors leading to different threats to health and well-being. Among older adults, like in younger groups, risks associated with alcohol use come from either endorsement of alcohol diagnostic criteria (e.g., drinking and driving) or by exceeding consumption levels (drinking more than two drinks on a single occasion). The life course perspective informs how risk thresholds are developed and interpreted, and it has informed research about the validity and utility of these risk limits when applied specifically to older adults [38, 39].

2.5 Low-Risk Drinking

A majority of older adults who consume alcohol are low-risk drinkers; they consume within guidelines developed by the National Institutes of Health [40]. For individuals younger than 65, low-risk drinking means consuming no more than 4

drinks on any day and no more than 14 drinks in a given week for men, or consuming no more than 3 drinks on any day and no more than 7 drinks in a given week for women. In the case of both men and women 65 and older, drinking guidelines are the same as they are for younger women, not more than 3 drinks on any day and no more than seven drinks per week.

Low-risk thresholds for adults 65 and older are different because older adults have a decreased ability to metabolize alcohol due to changes in lean body mass associated with aging [41]. Specifically, with older age, body fat increases and total water decreases. This leads to higher levels of blood alcohol at the same level of consumption among older adults compared with younger adults [42]. Also, the ability of the liver to metabolize alcohol decreases as one ages. Both of these aging-related processes may lead to greater risk of alcohol consumption among older adults, which in turn provides a rationale for a lower threshold for at-risk drinking among older adults.

The use of a separate older adult "at-risk" guideline has been the subject of some debate among researchers. For instance, Lang and colleagues [38] analyzed data from two national surveys conducted in the United States and England of a subset of older adults who drank over the specific older adult guidelines but within the guidelines for younger adults at a baseline time point. There were no significant differences between individuals who drank within current older adult guidelines and those who drank over older adult guidelines; however, measures of activities of daily living, instrumental activities of daily living, and cognition were worse 3 years later among those who exceeded young adult thresholds of drinking. Similarly, using mixture modeling, a form of exploratory data analysis which identifies subpopulations based on indicator variables, Sacco et al. [43] identified a "moderate risk" class that displayed low likelihood of endorsing alcohol-related problems but a high probability (>.80) of exceeding weekly drinking limits. Individuals in this class had levels of self-rated health and mental health that were not different from individuals who drank at a low-risk level. Together, these studies cast some doubt on the validity of using a lower consumption threshold for older adults. Further research may shed light on whether exceeding this more conservative threshold actually leads to negative health consequences.

2.6 At-Risk Drinking

Although there is ongoing debate and research about what constitutes consumption-based risk, a proportion of older adults are at-risk drinkers. These consumption thresholds are based on exceeding either the day threshold (over 65: >3 drinks any given day) or week threshold (over 65: >7 drinks any given week) [40]. Although terminology may vary by study or clinician, the term "heavy drinking" refers to individuals who drink over the week guideline and so-called binge drinking or "heavy episodic use" is synonymous with exceeding the guideline for within day alcohol use, although the term heavy drinking can also be used to describe people who exceed both thresholds. It is possible that

these different thresholds are important, as they may be associated with specific risks for older adults' health and well-being. For instance, a study by Holahan and colleagues [44] explored longitudinal outcomes for individuals who were moderate drinkers (below the weekly at-risk threshold) but who engaged in heavy episodic drinking (exceeded day threshold). Individuals were first surveyed between the ages of 55 and 65 and followed for 20 years. Episodic heavy drinkers were twice as likely to have died in the 20-year follow-up period compared with those who were not episodic heavy drinkers.

Figure 2.1 displays data on the prevalence of binge drinking and heavy alcohol use from the 2014 National Survey on Drug use and Health (NSDUH) [45], using general population thresholds for these terms. In keeping with life course-related population declines in alcohol use and consumption levels, rates of past-year use, binge alcohol use and heavy alcohol use generally follow a stair step pattern from age 50–55 to age 60 and older. Among those ages 50–54, rates of past 30-day binge drinking were 23.2 %, and among those aged 65 and older, 8.9 % consumed 5 drinks or more on a single occasion. These rates were low compared to younger adults; rates of at-risk and binge drinking using the older adult specific guidelines would likely be higher. Similarly, prevalence rates for heavy alcohol use in the NSDUH survey are based on a higher threshold of five drinks on five separate occasions in the past 30 days (see Fig. 2.1). Therefore, the rates shown are more conservative than the older adult threshold of seven or more drinks in the past week. Among

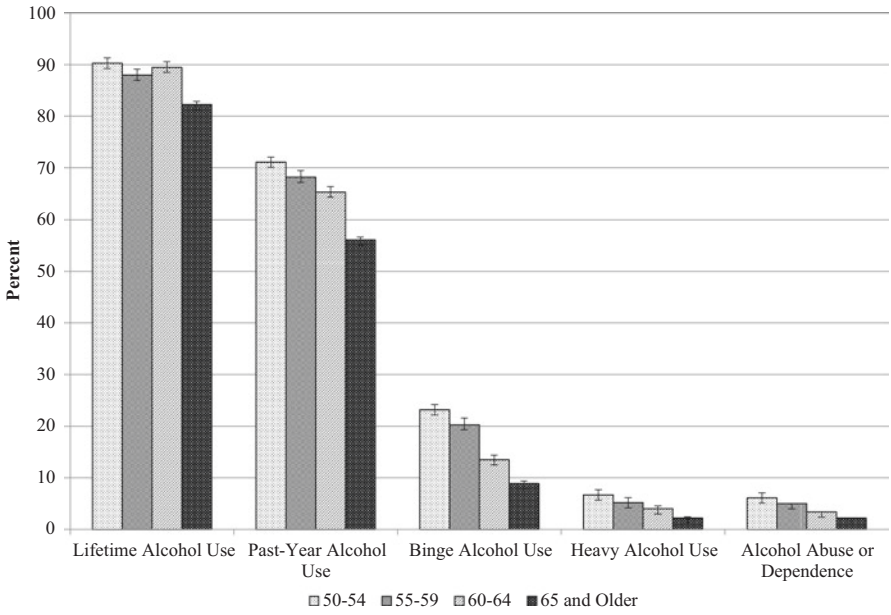

Fig. 2.1 Prevalence of lifetime and past-year alcohol use, at-risk drinking, binge use, and DSM-IV Diagnosis (Data from the 2014 NSDUH [44])

adults over age 50, prevalence of heavy use was 6.7 % for adults aged 50–54, 5.2 % for those aged 55–59, 4 % for adults aged 60–64, and 2.2 % among adults aged 65 and older [45]. Using data from the 2005 and 2006 NSDUH surveys, Blazer and Wu [46] estimated that 17 % of men and 11 % of women aged 50 and older were at-risk drinkers. In this study, these high rates of at-risk drinking are likely accounted for by using the lower threshold of two of more drinks on a given day.

2.7 Problem Drinking, Alcohol Abuse, Alcohol Dependence, and Alcohol Use Disorder

At-risk drinking has largely been defined by level and pattern of consumption. Problem alcohol use and disordered drinking (or having an alcohol use disorder) represent a more severe measure of alcohol-related risk among older adults [47]. A subset of older adults who are at-risk drinkers develop or have preexisting alcohol-related problems from earlier life. This level of alcohol-related harm is usually measured using criteria for alcohol use disorders from the Diagnostic and Statistical Manual of Mental Disorders (DSM) published by the American Psychiatric Association [48, 49]. In recent years, the DSM has undergone a major revision. Previously there were two main diagnoses that represented alcohol problems, *alcohol abuse* and *alcohol dependence*. In the case of alcohol abuse, an individual needed to endorse one or more of the diagnostic criteria in Table 2.1 in the past 12 months. For alcohol dependence, individuals who endorsed 3 or more of the criteria listed in Table 2.1 would meet criteria for a diagnosis.

These two diagnoses were considered hierarchical in that alcohol dependence was considered a more severe diagnosis than alcohol abuse. Moreover, this hierarchical structure was based on the idea that individuals progress from alcohol abuse to alcohol dependence. Research on both of these assumptions about separate diagnoses has little empirical support [50, 51]. Based on this evidence, version 5 of the DSM manual abandoned separate alcohol abuse and alcohol dependence diagnoses, and combined them into a single diagnosis: *alcohol use disorder* (AUD).

The diagnostic criteria for AUD are the same as they were for alcohol dependence and alcohol abuse with two changes. For AUD, the criterion specific to alcohol-related criminal or illegal behavior was removed, and a new criteria focused specifically on alcohol craving was added (see Table 2.1). In addition, criteria have been combined under a unitary AUD (see Table 2.1). An individual has to endorse two or more diagnostic criteria to receive this diagnosis. Additionally, levels of severity can be denoted based on the number of criteria endorsed over the two required (2–3 = Mild; 4–5 = Moderate; 6 or more = Severe) [49].

Because diagnostic measures represent the highest level of severity, rates of DSM-based disorder are lower than rates of binge drinking and heavy drinking. The NSDUH survey estimated a past-year prevalence rate of alcohol abuse or dependence of 6.1 % among those aged 50–54 and 2.2 % among those ages 65 and older. Similar to alcohol consumption measures, a stair step pattern of prevalence was found in the NSDUH, with lower prevalence of disordered drinking with each older

Table 2.1 Alcohol-related disorders: changes from DSM-IV to DSM-5

DSM-IV [47]	DSM-5 [48]	
Alcohol abuse	Alcohol dependence	Alcohol use disorder
1. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home 2. Recurrent alcohol use in situations in which it is physically hazardous 3. Recurrent substance-related legal problems[a] 4. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol	1. Tolerance as defined by either of the following: (a) A need for markedly increased amounts of alcohol to achieve intoxication or desired effect (b) Markedly diminished effect with continued use of the same amount of alcohol 2. Withdrawal, as manifested by either of the following: (a) The characteristic withdrawal syndrome for alcohol (b) Alcohol or a closely related substance is taken to relieve or avoid withdrawal symptoms 3. Alcohol is often taken in larger amounts over a longer period than was intended 4. There is a persistent desire or unsuccessful efforts to cut down or control alcohol use 5. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects 6. Important social, occupational, or recreational activities are given up or reduced because of substance use 7. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol	1. Alcohol is often taken in larger amounts over a longer period than was intended 2. There is a persistent desire or unsuccessful efforts to cut down or control alcohol use 3. A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects 4. Craving or a strong desire or urge to use alcohol[b] 5. Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or home 6. Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol 7. Important social, occupational, or recreational activities are given up or reduced because of substance use 8. Recurrent alcohol use in situations in which it is physically hazardous 9. Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol 10. Tolerance as defined by either of the following: (a) A need for markedly increased amounts of alcohol to achieve intoxication or desired effect (b) Markedly diminished effect with continued use of the same amount of alcohol 11. Withdrawal, as manifested by either of the following: (a) The characteristic withdrawal syndrome for alcohol (b) Alcohol or a closely related substance is taken to relieve or avoid withdrawal symptoms

[a]Criterion Removed DSM-5
[b]Criterion Added in DSM-5

age group in older adulthood. In the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) Survey [52], the prevalence of past-year AUD was similar, but slightly lower, with 1.5 % of older adults (65+) endorsing diagnostic criteria.

Although DSM diagnostic criteria are widely used in clinical settings to measure and document alcohol-related problems, some diagnostic criteria may be less valid for older adults than they are for younger groups [53, 54]. For instance, older adults are less likely to develop tolerance to the effects of alcohol due to age-related physiological changes that inhibit alcohol metabolism. Because of these differences, the tolerance criterion for AUD (Table 2.1; DSM-5 criterion #6) may be less informative in identifying individuals at risk. Using Item Response Theory modeling Kuerbis et al. [47] found the tolerance criterion displayed lower reliability than other criteria in adults aged 50 and older. Conversely, they found that the social and interpersonal problems criterion (Table 2.1; DSM-5 criterion #10) discriminated well between those with alcohol abuse or dependence and those who were not diagnosed. They surmised that given the fact that heavy use is less normative and that social networks of older adults are smaller and more cohesive, they may therefore be more responsive to problematic alcohol use than networks of younger adults or youth.

2.8 Alternative Measures of Risk: Comorbidity in Older Adults

AUD is the most severe manifestation of alcohol-related pathology among older adults, but most alcohol-related harm is not a function of disordered drinking [55]. A number of factors may create risks that are unique to older adults. Moore et al. [56] enlisted an expert panel to develop broader conceptualization of alcohol risk in older adults. Knowledge gained from this study was used to develop a screening measure to assess risk in addition to DSM classification and alcohol consumption [39]. In addition to alcohol consumption, other forms of alcohol related risk were identified: taking medications that may negatively interact with alcohol, alcohol use with medical and psychiatric comorbidity (e.g., high blood pressure or major depressive disorder) where alcohol use may exacerbate the underlying condition, and alcohol use in the presence of somatic symptoms (falls, insomnia, etc.) that may be worsened or caused by alcohol (see Table 2.2).

This approach to alcohol use patterns is the most broadly conceived and consistent with a holistic life course-based approach. It extends the use of older adult consumption limits to a range of aging-specific risk factors. For instance, older adults commonly take medications that interact with alcohol. A recent study of community-dwelling older adults (aged 57+) found that 41 % consumed alcohol regularly and among regular alcohol consumers, 51 % used at least one alcohol interacting medication [57]. An analysis of the Irish Longitudinal Study on Ageing identified a high prevalence of alcohol use (60 %) among individuals taking alcohol interacting medications [58]. Falls are also a common health concern for older adults, and there is evidence of increased risk of falls among older adults who drink more than 14 drinks per week [59].

Table 2.2 Measures of alcohol risk

Alcohol consumption [39]	Alcohol problems [47, 48]	Comorbidity risk [59]
At-risk drinking Men • Greater than 4 standard drinks per occasion *and/or* • Greater than 14 standard drinks per week *Women and aged +65* • Less than 3 standard drinks per occasion *and/or* • No more than 7 standard drinks per week	*Alcohol use disorder* • DSM-IV Diagnostic Criteria met for Alcohol Abuse or Alcohol Dependence *or* • DSM-5 Diagnostic Criteria met for an Alcohol Use Disorder	*At-risk* Alcohol use with the following comorbidities in the last 12 months: • Liver disease • Pancreatitis • Gout • Depression • High blood pressure • Diabetes • Sometimes have problems with sleeping, falling, memory, heartburn, stomach pain, nausea, vomiting, and/or feel sad/blue • Often have problems with sleeping, falling, memory, heartburn, stomach pain, nausea, vomiting, or feel sad/blue Alcohol use and medications taken at least 3-4 times per week currently • Medications that may cause bleeding, dizziness, sedation • Medications used for gastroesophageal reflux, ulcer disease, depression • Medications for hypertension
	Problem drinking • One or more DSM-IV/DSM-5 criteria endorsed	
General population low risk Men • No more than 4 standard drinks per occasion *and* • No more than 14 standard drinks per week *Women and aged +65* • Less than 3 standard drinks per occasion *and* • No more than 7 standard drinks per week	*No alcohol problems* • No DSM-IV/DSM-5 criteria endorsed	
Older adults (65+) low risk • No more than 3 standard drinks per occasion *and* • No more than 7 standard drinks per week		*Low risk* • No alcohol interacting medications or comorbidities • Consumption within low-risk drinking guidelines for older adults
Nondrinking/Abstention • Has not consumed alcohol in the past year *or* • Has not consumed alcohol in lifetime		

Because this measure of alcohol risk focuses more broadly on unhealthy drinking among older adults, prevalence rates of at-risk consumption using these benchmarks are higher. In a medical clinic intervention study targeted at older adults (60+), Moore et al. [60] identified a rate of at-risk drinking of 34.7 %. This prevalence rate was not based on at-risk consumption only (22.3 %), but also drinking with concurrent medication use (21.2 %) and/or alcohol use with medical or psychiatric comorbidities (21.5 %). In a study of alcohol consumption at a continuing care retirement community [61], rates of at-risk drinking that were also higher, 46.5 % for consumption-based risk, 39.4 % for disease comorbidity, 62 % for potential medication interaction, and 40.8 % for symptom comorbidity.

Having a broader measure of unhealthy drinking among older adults has both advantages and challenges from the standpoint of understanding patterns of drinking. Clinically, this approach offers the potential to screen and provide education to individuals who may experience alcohol-related consequences as a result of comorbidity and medication use. Like the use of lower thresholds for consumption among older adults, it is unclear the extent to which drinking at low levels with medication that interaction potential or drinking with comorbidities leads to negative health outcomes among older drinkers. From the standpoint of public health, it is valuable to screen and provide education about these risks as a means of helping older adults make educated decisions about drinking and their health. At the same time, research should attempt to quantify the extent to which low-risk consumption among older adults (<4 drinks at an occasion and no more than seven drinks in a week) combined with comorbidity (e.g., depressive symptoms) or medication interactions (e.g., propranolol) leads to later consequences for older drinkers. It is possible that actual negative outcomes are rare.

2.9 Correlates of At-Risk and Disordered Drinking Among Older Adults

Alcohol use follows a continuum of risk from abstinence to severe alcohol use disorder. Even though overall risk in the older adult population is lower than in younger age groups, subpopulations of older adults are at-risk drinkers or have an AUD. Research findings suggest that a number of sociodemographic factors are associated with different drinking patterns and may be useful in screening and targeting interventions.

At-risk drinking and AUD are more common among the so-called young-old, and as noted earlier in this chapter, risk declines with advancing age. For example, Blazer and Wu [46], in their study of NSDUH data, found that both at-risk drinking and binge drinking were more common among those adults 50–64 years old compared with those 65 and older. Sacco et al. [62] identified that rates of at-risk drinking among women 60 and older (20.5 %) were lower than rates of at-risk drinking among men (29 %), using gender-specific general population thresholds (i.e., 14 drinks week or <5 drinks on one occasion for men and 7 drinks per week and <4 drinks on one occasion for women). This study also found that older age was

associated with decreased odds of both at-risk drinking and AUD among both men and women 60 and older. These differences may be a function of age and gender differences in overall past-year consumption (i.e., risk drinking rates are lower because past-year drinking rates are lower). NESARC survey findings suggest that overall rates of past-year alcohol use are lower in older age groups and among women [36]. In the NESARC survey, men were 83 % more likely to be past-year alcohol consumers than women. Analyzing Medicare data, Merrick and colleagues [63] found that adults aged 65–70 were more likely to consume at unhealthy levels and more likely to binge drink compared to peers in older age groups.

Race and ethnic differences are also important in understanding different alcohol use patterns, but complexities are important in understanding these relationships. Blazer and Wu [46] found that African American racial identification was associated with higher odds of past-month binge drinking, compared with White respondents, in female past-year alcohol consumers only, but this relationship was not present when considering all women over age 50. This relationship is likely a function of differences in nondrinking status by race. Older African American women are less likely to be current drinkers [64], but among women who drink, they are more likely to binge drink. Other research is consistent with the idea that African American older adults have higher rates of both nondrinking status [36, 65] and Alcohol Use disorders [66] and consequences. Sacco et al. [43] analyzed classes of consumption and problem-based risk among older adults, and found that older African Americans were less likely to be in a moderate risk class (based primarily on consumption), but marginally more likely to be in a high-risk class (based on endorsement of alcohol problems). Data from the Medicare Current Beneficiary Survey support the idea that at-risk drinking is less common in the total population of older African Americans, but more common among older African American current drinkers [62]. Differences in alcohol consumption between African Americans and Whites may be explained by greater participation in religious denominations that proscribe alcohol use among older African Americans [64].

Education and income are also associated with alcohol consumption patterns that may reflect class differences in attitudes about drinking. Older adults with higher levels of income and education are more likely to display at-risk drinking patterns [63]. Some research studies have identified gender differences in these patterns with less educated women being more likely to take part in binge drinking, while more highly educated men were binge drinkers [46]. Findings regarding income are equivocal. Overall rates of at-risk drinking are higher with greater education and income, but when only current alcohol consumers are considered, findings are reversed or differences are not seen [63]. Older adults with lower levels of education display higher likelihood of being in a high-risk drinking class [43]. Data from the NSDUH survey found that 36.9 % of adults over 50 who did not finish high school used alcohol in the past year, compared with 55.4 % of those with a high school education and 71.5 % of those who attended college [37]. It is likely that educated older adults are more likely to be at-risk drinkers because they are more likely to drink; however, but if individuals are past-year drinkers, those with less education are more likely to be at-risk drinkers [46]. Among older adults with higher levels of

education and income, alcohol use may be more normative, leading to greater risk in the population of older adults. Among alcohol users, this risk is reversed.

One unequivocal finding regarding drinking patterns and associated risks among older adults relates to marital status among older adults. Those who are divorced, widowed, or separated may be at higher risk for at-risk drinking and AUD. In a national survey, adults over 50 who were formerly married (widowed, divorced, or separated) were 50 % more likely to be at-risk drinkers and 60 % more likely to be binge drinkers than currently married persons [67]. Again, it should be noted that some of the risk associated with divorce in particular may arise from the idea that older adults who are divorced are 24 % more likely to current drinkers than currently married persons [36]. Essentially, at-risk drinking can only happen if an individual is currently consuming alcohol, so differential rates of at-risk drinking may be explained in part by differential rates of current use. Nonetheless, risk associated with being divorced, separated, or widowed is present even in samples of current drinkers only, but findings regarding gender differences in this relationship are mixed. Some studies have found that being formerly married or divorced increases likelihood of at-risk and binge drinking among men only [46], but other studies have identified greater odds of at-risk drinking in both men and women [62].

2.10 Conclusions and Implications

To understand the ways in which older adults consume alcohol in late life, both aging-related processes and lifelong factors should be considered. Although older adulthood as a life stage is a period of declining risk related to consumption, age-related changes in health mean that even low levels of consumption can be considered risky. Moreover, older adults display heterogeneity in drinking patterns from nondrinking, to at-risk and binge drinking and even AUD. To understand patterns of drinking among older adults, one must first consider whether older adults currently drink at all and whether this is a change that has occurred as they reach older adulthood.

Alcohol use in the aging population has been defined through various thresholds of risk. Each approach brings certain advantages and problems. Using alcohol-related disorders as a benchmark misses many older adults who may experience alcohol-related consequences to their health and well-being even though they do not meet criteria for disordered drinking. More conservative measures of alcohol risk may identify at-risk drinking in those for whom alcohol use may never compromise their health. In the future, research should continue to explore more precise and individualized ways of quantifying risk based on alcohol consumption and other health factors. Even so, clinical practitioners in geriatrics and gerontology will have the task of educating individual older adults about their alcohol risk while recognizing that, among light to moderate drinkers, the level of risk is uncertain.

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Alcohol Use and Comorbid Psychiatric and Subsyndromal Disorders Among Older Adults

3

Alexis Kuerbis, Rachel Chernick, and Daniel S. Gardner

The Baby Boom generation, comprising 30 % of the US population, began to turn 65 in 2011 [1]. Due to longer life expectancies [2], the number of older adults is projected to increase from 40.3 million in 2010 to 72.1 million in 2030 [3]. While older adults historically demonstrate much lower rates of alcohol use compared with younger adults [4, 5] and present to substance abuse treatment programs less frequently than their younger counterparts [6], substantial evidence suggests that at-risk alcohol use and alcohol use disorder (AUD) among older adults has been under-identified for decades [7, 8]. Causes of this under-identification include but are not limited to: the commonly held myth that older adults do not drink alcohol excessively, the belief that consequences of alcohol use are simply side effects of normal aging, underreporting of heavy drinking [7] and difficulties with differential diagnoses of AUD in older adults [9].

In addition to the difficulties identifying AUD among older adults, comorbid disorders, including other substance use disorders (SUD) or compulsive behaviors (such as gambling), mood disorders (major depressive disorder, dysthymia, etc.), anxiety disorders (generalized anxiety disorder, social phobia, posttraumatic stress disorder, etc.), and severe and persistent mental illness (schizophrenia, bipolar disorder, etc.) can further complicate assessment, diagnosis, and subsequent treatment [10]. Given the impending "silver tsunami" of individuals with substance use and mental health disorders [3, 11], there is widespread recognition [3, 11, 12] of the need for more information about identification and assessment of and interventions related to comorbid disorders among older adults.

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At present, very little research exists on alcohol use and comorbid disorders among older adults, and as a result, there is a paucity of information related to prevalence, differential diagnosis, and treatment of such disorders for this population. Furthermore, results of epidemiological studies tend to be delayed in publication sometimes by 10 years or more. Thus, the most current information on older adults, AUD, and comorbid disorders has yet to be published.

This chapter will review: (1) age-related complications of substance use and mental health disorders; and (2) prevalence rates of alcohol use and AUD and comorbidity with other drug use and related disorders, gambling, and mental health disorders. Integrated throughout the chapter, the authors will review the scant existing literature on comorbid disorders among older adults. Given the manner in which epidemiological studies are often implemented, prevalence rates of comorbid disorders are often reported in the context of another disorder, rather than as rates in the general population. Prevalence rates of comorbid disorders, where known, will therefore be reported in the section on the primary disorder. Where available, prevalence rates of subsyndromal disorders, defined as symptoms that older adults experience that are clinically significant but do not full meet criteria for a particular disorder, will also be reported.

3.1 Complications of Aging Related to Health and Mental Health

Comorbidity of substance use and mental health disorders among older adults is particularly complex. Given biological changes that occur as a natural part of aging, many criteria used for identification of substance use or mental health disorders manifest differently in older adults compared to their younger counterparts. For example, older adults endorse AUD criteria differently than younger adults [9], suggesting an age-related bias. Criteria such as tolerance to alcohol or not fulfilling a role obligation may not apply to an older adult whose tolerance naturally reduces with age and whose number of roles may be reduced due to events such as retirement. Depressive symptoms also manifest differently among older adults, as they do not demonstrate sadness or depressed mood at the same rates or intensity as their younger counterparts [3]. Similarly, bipolar disorder is often difficult to diagnose among older adults given that they are much less likely to manifest manic or hypomanic symptoms than younger adults.

Comorbidity in older adults manifests primarily via two distinct pathways. The first pathway is an adult who had one or more psychiatric disorders in early adulthood or middle age and has carried those through to older age. The second pathway is late onset, where the older adult experiences psychiatric symptoms, including an AUD, for the first time in later life. Historically, it has been assumed that those with early onset generally present with greater severity of psychiatric problems and more entrenched histories of addiction, which may be considered treatment resistant. For the older adult, however, biological vulnerabilities resulting from natural aging, in addition to chronic disease or maladies that tend to be more common in later years, create a complex picture of health for either pathway.

The Institute of Medicine [3] identified four age-related factors that may pose unique risk for older adults with substance use and/or mental health disorders. First, age-related changes in rates of metabolism of all substances, including prescription medications, can increase risk for development of a SUD or overdose. As one ages, percentages of lean body mass and total body water decrease, and the ability of the liver to process alcohol, medications, and other substances is diminished [10]. In the brain, blood–brain barrier permeability and neuronal receptor sensitivity to alcohol, medications, and other substances increase. Because of these changes, older adults experience higher blood concentrations of alcohol or other substances and may experience increased impairment compared to younger adults [13] at equivalent consumption levels and with less awareness of their impairment [14–16]. For example, benzodiazepines with long half-lives are contraindicated for older adults [17]. Benzodiazepines are fat-soluble drugs, and due to increased body fat common in aging, these drugs have longer duration of action, causing excessive sedation. In addition, even healthy drinking levels established in early to middle age and then sustained through older age may be a risk factor for health problems among older adults [18]. Second, due to their particular life stage, older adults often experience a greater number of and more significant losses, such as death of a spouse, partner, or close friends [19]. Such losses can exacerbate existing depression, substance use, or lead to complicated grief, which is often difficult to distinguish from major depression [3].

Third, both acute or chronic medical conditions common among older adults and the medications used to treat them may cause or exacerbate existing mental health disorders [3]. For example, physical health problems can worsen depressive symptoms and conversely, depressive symptoms can exacerbate physical functioning and cognition [20, 21]. In addition, the risk for harmful drug interactions, misuse, and abuse is elevated for older adults, as they take more prescribed and over-the-counter medications than younger adults [10, 22]. Overall, the number of prescription medications tends to increase as one ages [23]. Among over 3000 community-based older adults aged 57 to 85 who were surveyed, 37.1 % of men and 36 % of women used at least five prescription medications concurrently [23]. The same study found that about 1 in 25 of participants was at risk for a major drug interaction, often involving nonprescription medications.

Dangerous medication interactions in older adults also may occur due to a lack of knowledge about potential interactions or because they see multiple doctors, each of whom may unknowingly prescribe medications that interact with each other and/or with alcohol or other substances. For example, drugs such as barbiturates, benzodiazepines, and opiates [24], which may be legitimately prescribed for a medical condition, may interact with alcohol or marijuana, causing excessive or dangerous sedation. Medications for chronic and terminal illnesses, such as antiretroviral medication for HIV, may not reach therapeutic thresholds in the presence of even moderate amounts of alcohol. Older adults may also unintentionally misuse a medication by borrowing a prescribed medication from another person (e.g., taking a dose of another person's lorazepam or zolpidem for sleep), taking more than intended, or confusing pills.

Fourth and finally, functional, sensory, and cognitive impairments that commonly occur as a natural part of aging may interfere with diagnosis of a mental health or substance use disorder [3]. Differential diagnosis can be extremely difficult as many of the symptoms of mental health and substance use disorders mimic symptoms of medical diseases, such as reduced physical functioning and loss of motor coordination. For example, dementia shares many of the same symptoms of intoxication, such as disinhibition, described further below. This can complicate not only diagnosis but also determining points of treatment initiation [3]. These functional, sensory, and cognitive impairments may also interfere with an older adult's ability to comply with treatment recommendations or medication adherence. The intersection between difficulty with identification and treatment of these disorders causes what is often referred to as a descent or "spiral" of deterioration in physical, cognitive, and psychological health that affects many older adults with co-occurring disorders [3, 20, 25].

3.2 Alcohol Use

Overall, adults reduce their alcohol use as they age [26–29], yet alcohol remains the most commonly used substance among older adults [6, 30]. According to the 2005–2006 National Survey on Drug Use and Health (NSDUH), about 56 % of adults 50–64 years old and 43 % of those 65 years old and older reported drinking alcohol in the past year [31]. For these two age groups overall, past year prevalence rates of the fourth edition of the *Diagnostic and Statistical Manual* (DSM-IV) alcohol dependence, abuse, and subthreshold dependence symptoms were also estimated for the years 2005–2006, with 50–64 year-olds yielding 1.9 %, 2.3 %, and 7.0 %, respectively, and those 65 years old and older yielding 0.6 %, 0.9 %, and 5.2 %, respectively; however, these proportions increase substantially among those older adults who report past year alcohol use. Among those who reported past year alcohol use, 7.4 % of those 50–64 years old and 3.4 % of those 65 years old and older met criteria for AUD. In 2013, 2.1 % of NSDUH respondents aged 65 and older qualified for alcohol abuse and/or dependence [32]. Within clinical settings, older adult rates of AUD range up to 22 % [33–35]. Subthreshold dependence symptoms have been demonstrated to be quite high among older adults who report past year alcohol use, among both 50–64 year-olds (12.5 %) and individuals 65 years old and older (12.1 %) [31].

At-risk drinking is more prevalent among older adults than AUD and is likely responsible for the preponderance of harm caused by alcohol to the health and well-being of older adults. Drinking safety guidelines provided by the American Geriatrics Society and the National Institute for Alcohol Abuse and Alcoholism recommend that older adults drink no more than seven standard drinks (12 oz. beer, 4–5 oz. glass of wine, 1.5 oz. of 80 proof liquor) per week, and no more than three standard drinks on any one occasion [28, 30]. Prevalence rates for older adult at-risk drinking (defined as exceeding the safe drinking guidelines) are estimated to be 16 % for men and 10.9 % for women [36, 37]. This may be in part due to a continuation of drinking habits from middle age.

Binge drinking, generally defined as five or more standard drinks on one occasion, also occurs among older adults [38]. Rates of older adult binge drinking are 19.6 % for men and 6.3 % for women according to the 2005–2006 NSDUH data [34, 39]. In a study of community-based older adults who were seen in internal medicine offices and reported drinking one or more drinks in the previous 3 months, 67 % reported binge drinking in the last year [38]. Those in the 2005–2006 NSDUH survey who endorse subthreshold alcohol dependence were more likely to report binge drinking than those who endorsed no criteria for AUD [31].

Comorbidity. Very few studies have explored comorbidity among older adults who drink. Moore and colleagues [30] used 2001–2002 National Epidemiological Survey on Alcohol and Related Conditions (NESARC) data to estimate lifetime comorbid use of alcohol, tobacco, and nonprescription drugs among individuals 65 years old and older. They found that 43.5 % used alcohol and tobacco, and less than 3 % used a combination of alcohol, tobacco, and nonprescription drugs. For use in the past 12 months, these rates were 7.3 % and less than 1 %, respectively. Older adults 65 years old and older with lifetime AUD were over three times as likely to have a tobacco use disorder in the past 12 months [40].

Sacco and colleagues [41] used a latent class analysis with data from individuals who were 60 years old and older who participated in the 2001–2002 NESARC survey to identify low-, moderate-, and high-risk drinkers. Low-risk drinkers, 89 % of the sample, were characterized primarily by not exceeding recommended guidelines of drinking and no endorsement of AUD symptoms. Moderate drinkers, 9.7 % of the sample, were characterized primarily by their report of exceeding the recommended drinking guidelines and endorsement of some symptoms of AUD but remained subthreshold. Finally, high-risk drinkers, 1.2 % of the sample, had much higher probabilities of endorsing symptoms of AUD than the other two groups. Just under 82 % of the high-risk group met criteria for an AUD. Predictors of belonging to the high-risk group were male gender, younger age, less than high school education, having current major depression, having antisocial personality disorder, being the child of an alcoholic, and being a current smoker.

Using 2005–2007 NSDUH data, Blazer and Wu [31] identified factors among past year alcohol users 50 years old and older that increased the odds of having an AUD. These factors included being 50–64 years old, male, Black, separated, divorced, or widowed; having low income, major depression, current nicotine dependence; using illicit drugs or nonmedical prescription drug use in the past year; and early onset of alcohol use (<18 years old). Thus, a majority of these risk factors were comorbid disorders, particularly other SUD.

3.3 Tobacco

Tobacco use is quite prevalent among older adults. Among adults 65 years old and older in 2000–2001, just under 49.6 % reported lifetime use and 14 % reported use in the last 12 months [30]. Within the same sample, just over 6 % used tobacco and alcohol together in the last 12 months; however, tobacco use may be decreasing

among older adults. Data collected by the Centers for Disease Control in 2008 revealed that only 9 % of individuals aged 65 and older reported being current smokers [42]. Using data from the National Health Interview Survey between the years of 1987 and 2000, Nelson and colleagues [43] demonstrated a decline in smokeless tobacco use among adults 65 years old and older from 6.9 % to 2.8 %. A smaller but still statistically significant decline occurred among 45–64-year-olds from 5 % to 3.1 %. This decline is likely due to the rise in smoking and other tobacco use cessation programs and more rigid policies controlling tobacco marketing. Still, prevalence rates of tobacco use disorder are high among older adults. Using data from the 2001 to 2002 NESARC survey, the prevalence rate of tobacco use disorder for individuals 65 years old and older is 8.7 % and 4 % for lifetime and past 12 months, respectively [40].

Comorbidity. Tobacco use among older adults is associated with greater mortality, risks of coronary events and cardiac deaths, smoking-related cancers, chronic obstructive pulmonary disease, decline in pulmonary function, development of osteoporosis, risk of hip fractures, loss of mobility, and poorer physical functioning [44, 45]. Incidentally, smoking also impairs or inhibits effective treatments for these conditions [46]. Older women are particularly vulnerable to tobacco's effects, as research reveals that older women who smoke have double the mortality rate of those who do not [47]. Tobacco use is also strongly associated, across ages, with mortality rates among those with schizophrenia, depression, and bipolar disorder [48] in that it is associated with almost half of the deaths within these subpopulations. Finally, data from the 2001–2002 NESARC reveal a strong relationship between AUDs and tobacco use disorders, such that older adults with a lifetime tobacco use disorder are more than 2.5 times as likely to have an AUD in the past 12 months [40].

3.4 Illicit Substance Use

Compared to their younger counterparts, illicit substance use rates among older adults remain relatively low. Still, illicit drug use is more prevalent among American older adults than among older adults in almost any other country in the world [49], and rates of illicit and prescription drug misuse among adults over 65 are increasing [5, 6, 30]. Results from the 2013 NSDUH revealed that rates of past month use of illicit substances doubled on average between 2002 and 2013 (from 1.9–3.4 % to 3.9–7.9 %) among 50–65-year-olds [5]—a statistically significant increase driven by the Baby Boom generation [5, 50]. Generally, individuals aged 50–64 report more psychoactive drug use than older groups [37, 51, 52]. For example, in 2012, 19.3 % of adults 65 and older reported having ever used illicit drugs in their lifetime, whereas 47.6 % of adults between the ages 60 and 64 reported lifetime drug use. Among older adults who reported illicit substance use in 2012, 11.7 % met criteria for past year SUD [51]. Despite increasing rates of past month use, the 2013 NSDUH data [32] revealed that only 0.4 % of adults 65 years old and older qualified for an illicit drug use disorder in the past year, whereas among individuals aged 45–64 that rate is 1.1 %. It is important to note, that even with low rates of illicit

drug use and drug use disorder, older adult drug users may use substances quite regularly. For example, using the 2005–2006 NSDUH data, Blazer and Wu [37] found that among cocaine using adults 50 years and older, 57 % reported using cocaine on more than 30 days in the past year.

Comorbidity with illicit drugs other than cannabis. Due to methodological limitations of recruiting ample amounts of older adults in epidemiological surveys, there is very little data on comorbidity among older adult drug users. Generally, it is known, however, that history of past substance abuse and/or mental health disorders are known risk factors for drug abuse in late life [17].

Cannabis. Cannabis use by older adults is considerably more prevalent than other illicit drug use. In the 2005–2006 NSDUH, 2.6 % of adults 50 years old and older reported past year marijuana use, as compared to less than 0.5 % for all other drugs (e.g., cocaine, methamphetamine, inhalants, and heroin) [37]. When broken down by age group, 3.9 % of adults aged 50–64, the bulk of the Baby Boomers at that time, reported past year marijuana use, compared to only 0.7 % of those 65 years old and older [53]. Among those aged 50 and older reporting marijuana use, 49 % reported using marijuana more than 30 days in the past year, with a mean of 81 days.

Relatively little is known about medical use of cannabis among older adults—both licit and illicit. An international survey of just under 1000 older adults across 31 countries reported that 20.8 % and 6.4 % of users of cannabis-based medicines were aged 51–60 years and 61–76 years, respectively [54, 55]. With the passage of medical marijuana legislation and relaxed enforcement of drug possession related to marijuana, the prevalence rate of use (not necessarily abuse) among older adults may increase, either to cope with illness-related side effects [34] or for recreational use.

Comorbidity and risks related to cannabis. The increasingly widespread, legal availability and acceptance of cannabis, for both medicinal and recreational use, may pose unique risks in an aging population. Across age groups, cannabis is known to impair short-term memory, increase one's heart and respiratory rate, and elevate blood pressure [56]. There is also a fourfold increase in risk for heart attack after the first hour of smoking marijuana. For older adults, these risks may be particularly pronounced, especially for those whose cognitive or cardiovascular systems may already be compromised. It is yet unknown which of the earlier described disease correlates to smoking tobacco also appear for cannabis.

3.5 Prescription, Nonprescription, and Over-the-Counter Medication Use

There is a continuum of prescription medication use—from using it as prescribed, misuse by the patient, or prescribing practitioner, to endorsing SUD [57]. Older adults may not use prescription or over-the-counter medications to feel intoxicated, and in many cases, older adult prescription drug use does not mirror use among younger counterparts. They may use medications in unsafe amounts, be at greater risk for drug interactions, and they also may obtain medications from multiple physicians, family members, and friends. Stock piling is also a possibility for older adults.

In 2012, 2.9 million (0.9 % of the US population) adults 50 years old and older reported nonmedical use of psychotherapeutic medications in the past year and, like other substances, they used them less than younger adults [58]. Prescription drugs of abuse may include benzodiazepines, barbiturates or nonbarbiturate sedative-hypnotics, and opioid pain relievers. Women are thought to be more likely to abuse prescription drugs [57], and one estimate of prescription medication misuse among older women is 11 % [17]. Blazer and Wu [52] reported that in 2005–2006, 1.4 % of adults 50 years old and older used prescription opioids nonmedically in the last year, which was higher than sedatives, tranquilizers, and stimulants (all less than 1 %). Actual prescription opioid use disorder among this sample was 0.13 %, yet dependence was more common than abuse [51]. The most common use of pain relievers was combinations of acetaminophen and hydrocodone or propoxyphene, and use of these combinations was much higher for 50–64-year-olds than for those 65 years old and older [52].

Benzodiazepines are the most commonly prescribed psychiatric medication among all adults. While there are contraindications for use of benzodiazepines with older adults, they are not only widely prescribed [59] but disproportionately prescribed to older adults [60]. Rates of benzodiazepine use among older adults have ranged from 15.2 to 32 % [61]. These rates may be impacted by overprescription, misdiagnosis, or polypharmacy rather than intentional misuse or abuse.

Comorbidity. According to 2005–2006 NSDUH data, nonmedical use of prescription medication among those aged 50 and older was associated with marijuana use, alcohol use, and past year major depression [51]. Furthermore, while older adults may use nonprescription opioid pain relievers less than younger adults, there is evidence that mortality rates resulting from such use among older adults are increasing. Between 2006 and 2013, rates of older adult mortality due to opioid use increased and surpassed younger adults in recent years [62]. Data from poison control centers in the US also revealed an increasing trend among older adult prescription opioid misuse and suicidal intent. With the growing elderly population, these numbers are likely to continue to increase.

Using Waves 1 (2001–2002) and 2 (2004–2005) of NESARC survey data of adults 40 years and older, MacKenzie and colleagues [63] estimated the prevalence of psychiatric disorders at Wave 1 and then the persistence of that disorder at Wave 2. More than any other disorder class, SUD (including alcohol, nicotine, and drug use disorders) demonstrated the highest rate of persistence at Wave 2 (60.2 %). This persistence has important implications for comorbidity, and it may be a marker of chronic, severe vulnerability.

3.6 Gambling

Gambling disorder, as described in the fifth edition of the *Diagnostic and Statistical Manual* (DSM-5), is defined as "persistent and recurrent problematic gambling behavior leading to clinically significant impairment or distress," as indicated by a number of symptoms similar to SUDs [64]. It encompasses both problem gambling

and pathological gambling—two terms that are utilized frequently in the epidemiological literature [65]. Generally, problem gambling is thought of as a subthreshold disorder and prodromal to pathological gambling.

Prevalence rates for older adult lifetime gambling disorders range widely from about 0.3 % to as high as 10.6 % [65], across both population studies and community-based samples. Within a systematic review of the older adult gambling literature [65], only one study was found to report a rate of current problem gambling among a community sample of adults 65 and older: 1.3 % [66]. Current rate of pathological gambling in this same study was 2.7 %. In the systematic review, rate of current pathological gambling among older adults ranged from 0 to 3.2 % [65]. Differences in rates of gambling disorders appear to be largely due to differences in measures used—a general diagnostic interview revealed lower rates of gambling disorder whereas a specialized screening tool, such as the Revised version of South Oaks Gambling Screen (SOGS), yielded the highest rates of disordered gambling behavior.

While pathological gambling is more prevalent among older men [65], gambling has been noted to be an emerging problem among older women [67, 68]. Using NESARC 2001–2002 data, a study found that men and women 65 years old and older endorsed criteria for problem gambling (12.3 % and 16 %, respectively) and pathological gambling (10.1 % and 4.8 %, respectively) at high rates [69]. Interestingly, despite the higher rates of more severe gambling disorder in men, older women may be more likely to attend treatment. One study found that treatment seeking pathological gamblers aged 55 and older were more likely to be female, and that older female gamblers were more likely to start gambling at the age of 55 or older [67], compared to their male counterparts who reported an early onset of gambling.

Similar to the general population, racial and ethnic differences in gambling disorder are observed among adults 65 years and older. NESARC (Wave 1:2001–2002) data revealed that lifetime gambling disorder (either problem or pathological gambling) among adults 60 years old and older appeared most prominent among Black respondents (11.3 %), compared to White (9.8 %) or Hispanic respondents (4.7 %) [70], though differences between groups were not statistically significant, likely due to small sample sizes compared to the other age groups.

Older adult gambling may manifest differently than younger gamblers. Among those individuals calling a gambling helpline, older gamblers were more likely to report lower incomes, longer duration of gambling, and more problems with slot machines than younger gamblers [71]. Gambling also may be uniquely damaging to older adults due to a number of life stage factors, including not having enough working years left or income to make up for losses, and older adults may experience cognitive decline that impairs their judgment. A 2004 study [72] of about 800 seniors recruited from primary care found that 11 % made large bets or bet more than they can afford and were identified as at-risk gamblers. In addition, The National Gambling Impact Study Commission found that gambling among senior citizens increased from 20 % in 1974 to 50 % in 1998 [67, 73]. Increased accessibility to slot machines and lotteries overall and in retirement communities, as well as increased online gambling [74], and increased marketing efforts targeting older adults are likely responsible for the increase. This in turn increases the risk for gambling disorder.

Comorbidity. Comorbidity of mental and physical health disorders is prevalent across types of older gamblers [75]. Recreational gamblers surveyed in the 2001–2002 NESARC had significantly higher rates of alcohol, nicotine, mood, anxiety, and personality disorders compared to nongamblers. This same group was less likely to suffer from arteriosclerosis and cirrhosis but more likely to be obese. Among 800 seniors recruited from primary care [72], predictors of at-risk gambling included binge drinking, current symptoms of posttraumatic stress disorder, minority race/ethnicity, and being a patient of the VA. Unlike studies of the general population, at-risk gambling in this sample was not associated with cigarette smoking, gender, or depressive symptoms. In a study of individuals calling a gambling helpline [71], older gamblers were less likely to report a history of illicit behaviors, drug problems, indebtedness, and family problems, which may indicate that those that are treatment seeking may present with less comorbidity.

Within the 2001–2002 NESARC data [75], those respondents aged 60 and older with a gambling disorder were significantly more likely than nongamblers to have an alcohol, nicotine, drug, mood, anxiety, and personality disorders. Disordered gamblers were also significantly more likely to suffer from arthritis and angina. Being an older adult gambler can be a significant marker of mental and physical health comorbidity.

3.7 Mood Disorders

Mood disorders include, among others, major depressive disorder and dysthymia. Due to the relative lack of manic and hypomanic symptoms among older adults [3], even among those who experience bipolar disorder, mania and hypomania will be reviewed with bipolar disorder under severe and persistent mental illness. According to the 2001–2003 CPES data, estimates in the US of lifetime depressive disorders, excluding bipolar disorder, among adults 55 and older who are Non-Hispanic Whites, African Americans, Caribbean Blacks, Latino Americans, and Asian Americans 65 and older are 13.8 %, 5.4 %, 11.2 %, 13.9 %, and 6.4 %, respectively [76]. Prevalence rates of current major depressive disorder among individuals 65 years old and older in community-based samples ranges from 1 to 5 % [77]; with an average of 3.3 % with current major depressive disorder across Western countries [78]. Among older adults across western countries lifetime major depression (16.5 %) is the most common, followed by lifetime AUDs (11.7 %) [78]. About half of cases of major depressive disorder among American older adults are late onset [77]. The prevalence rate for past year dysthymic disorder among adults 65 and older living in the community ranges from 0.6 to 1.6 % [3].

Using Waves 1 (2001–2002) and 2 (2004–2005) of NESARC survey data, MacKenzie and colleagues [63] estimated the prevalence of psychiatric disorders among adults 55 and older at Wave 1 and then the persistence of that disorder at Wave 2. Prevalence rates of past year major depression and dysthymia were 3.7 % and 1.2 %, respectively, at Wave 1. Persistence at Wave 2 of major depressive disorder and dysthymia for those who endorsed criteria for those disorders at Wave 1 were 25.0 % and 16.5 %, respectively. Data from the 2001 to 2002 NESARC survey

demonstrated that among adults 65 and older with major depression, the mean age of onset was 50 [79]. Only about half of these individuals had ever received treatment, even though a quarter had reported contemplating suicide.

Subsyndromal mood disorders are also prevalent among older adults [77]. Subthreshold depressive symptoms have been found in 15–20 % of a community-based older adult population [77, 78]. Due to age biases in the criteria and screening measures themselves [80], it may be that these diagnostic orphans might otherwise qualify for mood disorder.

Comorbidity. Data from the 2001 to 2002 NESARC survey demonstrates that older adults who reported having a lifetime mood disorder were more likely to have a lifetime AUD, and having any mood disorder also demonstrated increased odds of past 12 months AUD [40]. In an alternative analysis of the same NESARC data, Laborde-Lahoz and colleagues [81] examined lifetime comorbidity among adults aged 55 years and older with either subsyndromal depression or major depression. They found that those with lifetime major depression were almost three times more likely to have a SUD or AUD than those without lifetime major depression, after adjusting for age, income, gender, education, marital status, and race and ethnicity.

Depression and anxiety are highly correlated in the general population, and in older adults, there are estimates of anxiety disorders occurring among over 50 % of those with major depression [77, 82]. Depression with comorbid anxiety is usually a marker of greater severity and duration of depression, and among older adults, the two together are associated with higher rates of somatic symptoms, disability, and suicide compared to those who have depression alone.

Major depression is a salient risk factor for suicide, and some studies suggest that about 85 % of older adults who die by suicide had major depressive disorder [77]. Alcohol abuse is also a known risk factor for suicide. Alcohol and depression are found to be closely related in the general population [83], though the causal order of each remains unclear. Individuals with histories of both disorders may be at heightened risk for suicide, especially in older age.

3.8 Anxiety Disorders

Anxiety disorders often include panic disorder, specific phobia, social phobia, generalized anxiety disorder, obsessive compulsive disorder, and posttraumatic stress disorder (PTSD). While in DSM-5, PTSD now belongs to its own category of disorders, research on prevalence of PTSD often occurred in the past with other anxiety disorders, which is why it is reviewed here. According to a review of epidemiological studies of community samples ranging in age from 55 to over 90 years old, prevalence in the US of anxiety ranged from 1.2 to 10.2 % [25]. Subsyndromal presence of anxiety symptoms among these samples ranged from 13.3 to 15 %. Using Collaborative Psychiatric Epidemiology Surveys (CPES) data from 2001 to 2003, estimates in the US of lifetime anxiety disorders, excluding obsessive compulsive disorder, among Non-Hispanic Whites, African Americans, Caribbean Blacks, Latino Americans, and Asian Americans 55 and older is 16.8 %, 11 %, 11.5 %, 15.2 %, and 7.9 %, respectively [76].

Prevalence rates of specific anxiety disorders also range widely, primarily due to differences in measurement methods of symptoms of the disorder [25]. Generalized anxiety disorder (GAD) appears to be consistently the most prevalent anxiety disorder among older adults, though it has often been excluded in epidemiological studies. Prevalence rates for GAD in the past year reported by the NESARC and CPES between 2001 and 2003 ranged from 1.1 to 2.1 % for adults 65 years old and older [3]. Phobic disorder for adults between the ages of 60 and 65 ranges in prevalence from 3.1 to 8.9 % among community samples [25]. NESARC and CPES estimates of past year agoraphobia without panic and social phobia were 0.3 % and 0.9–2.6 %, respectively [3]. Panic disorder across studies of community samples of older adults 60 and older ranges from 0 to 10.5 % [25]. NESARC and CPES data show a range of past year prevalence rates for panic disorder for those 65 and older to range from 0.8 to 1.1 % [3]. Obsessive compulsive disorder, as estimated by community samples of adults 60 and older, ranges in prevalence from 0–1.6 % among males to 0.9–2 % among females [25]. Epidemiological surveys from the early 2000s estimate the prevalence of past year obsessive compulsive disorder among adults 65 and older to be 0.8 % [3].

Posttraumatic stress disorder (PTSD) generally has the widest range of prevalence among older adults, due to the wide range of measures and samples utilized, ranging from 0.6 to 2.6 % among those 65 and older according to data from Wave 1 NESARC and CPES 2001–2003 [3]. PTSD is especially complicated for older adults, who may present with the full disorder PTSD or subsyndromal symptoms, whose symptoms may lessen or worsen with age [84]. Lifetime prevalence for PTSD in Wave 2 of NESARC [84] among adults 60 years old and older is 4.5 % for the full disorder and 5.5 % for subsyndromal PTSD (having just one symptom in criterion D (symptoms of increased arousal), as opposed to two). Rates were higher for women than men, with 5.7 % of women reporting symptoms of the full disorder compared to only 3.1 % of men. Similarly, for those who had lifetime subsyndromal PTSD, women had a prevalence rate of 6.5 % compared to only 4.3 % of men. PTSD may occur in special populations, such as veterans who experienced combat, but also may occur through other experiences such as, unexpected death of someone close, serious illness, or serious illness of someone close.

Comorbidity. Lifetime anxiety disorder is associated with increased odds of lifetime alcohol and tobacco use disorders among older adults [40]. NESARC (Wave 2: 2004–2005) data revealed PTSD to be associated with increased odds of lifetime mood disorder, anxiety disorder, drug use disorder, and borderline or narcissistic personality disorders [84], in addition to decreased psychosocial functioning. Symptoms of PTSD can also be complicated by the onset of dementia, causing the initiation of or exacerbating existing aggressive behaviors [85]. Interestingly, while PTSD appears to be a marker of vulnerability among older adults, it appears to be significantly associated with alcohol use or AUD in only some samples [3, 84]. MacKenzie and colleagues [63] estimated the persistence of anxiety disorders from Wave 1 (2001–2002) to Wave 2 (2004–2005) of NESARC survey data for adults 40 years and older and found that anxiety disorders persisted at Wave 2 for 29.5 % of those endorsing anxiety disorders at Wave 1.

3.9 Severe and Persistent Mental Illness

Severe and persistent mental illness among older adults can include, among other disorders: schizophrenia, schizophreniform disorder, schizoaffective disorder, delusional disorder, other psychosis, bipolar disorders types I and II, mania, and hypomania. The exact prevalence of these disorders is difficult to determine often because other conditions common in older age, such as dementia, may mimic such disorders. Looking across national surveys and literature on severe mental illness among older adults, the Institute of Medicine estimates that 1.4 million to 1.9 million older adults (3–4.8 %) had severe mental illness in 2010 [3].

Schizophrenia in the past 12 months has an estimated prevalence of 0.2–0.8 % [3], according to epidemiological surveys between 2000 and 2003. A recent review of the literature exploring prevalence rates of psychiatric disorders among older adults across western countries found that lifetime rates of mania, hypomania, and bipolar disorder, types I and II, were collectively 1 % of the older adult population [78]. The prevalence rate for adults 50 and older who currently had these disorders was under 0.5 %. Using Wave 1 (2001–2002) and 2 (2004–2005) of NESARC survey data, MacKenzie and colleagues [63] estimated manic episode/hypomania were about 1 % among adults 55 and older. Persistence of these disorders across the Waves was 20.3 %.

A meta-analysis of studies of mental health disorders among adults 50 and older from North America and Europe [78] identified that the rate for lifetime psychosis was 4.7 %, and for current psychosis was 1.7 %. One estimate of prevalence of non-affective psychoses in community-living, older adults was 78,000 people in 2001–2003 [86]. Studies of psychosis in older age are limited, and it is therefore unclear as to whether the prevalence of psychosis: increases with age, age-related symptom presentation differs significantly across the lifespan, or if its increase is more a marker of increased rates of dementia. One study of individuals 71 and older found that, among older adults with dementia, 18.2 % experienced delusions and 14.2 % experienced hallucinations [3]. Participants with dementia also demonstrated high rates of one or more of the following: disinhibition, irritability or lability of emotion, symptoms of anxiety and depression, and agitation or aggression. As dementia takes its course, these symptoms generally increase and worsen.

3.10 Other Psychiatric Disorders

Prevalence rates of many psychiatric disorders remain relatively unknown, such as personality disorders, hoarding, and adjustment disorder. A recently published study of Wave 2 NESARC data reports that among adults 55 and older, 14.5 % had one or more personality disorders [87]. While often present in clinical settings, few population-based estimates of prevalence exist for hoarding and adjustment disorder. Some smaller, community-based studies have attempted to estimate these prevalences. For example, the Massachusetts public health department reported 471 formal complaints of hoarding between 1992 and 1997 [3]. These cases are of course only the ones severe enough to be noticed and reported.

3.11 Two or More Mental Health or Substance Use Conditions

Based on data from Waves 1 and 2 of NESARC and the CPES, it is estimated that between 2 and 2.4 % of adults 65 and older endorse criteria for a diagnosis of two or more mental health and substance use disorders [3]. The rate of having three or more of these conditions is between 0.5 and 0.8 %. Unfortunately, rates are not disaggregated in such a way that we may understand the prevalence rate of general comorbidity among those with AUD alone. Furthermore, as with younger adults, these rates exclude subsyndromal disorders, thus rates are an underestimation of the prevalence of older adults with AUD with comorbid symptoms.

3.12 Identification and Treatment Utilization of Comorbid Disorders Among Older Adults

Identification of comorbid disorders among any population requires thorough assessment across time. Due to the fact that a majority of older adults with comorbid AUD, medical, and other psychiatric disorders present most often in medical settings, such as primary care, emergency departments, and psychiatric hospitals [3], opportunities for specialized assessment are limited. Healthcare workers working in either institutions or residential settings, such as in the home of the older adult, must be aware of and trained in assessing a wide array of symptoms and identifying possible comorbid disorders. Assumptions that older adults do not drink or use illicit substances should not be made. Training must be provided for both medical and psychiatric specialists so that comorbidity is more likely to be identified.

Despite a clear need for services for older adults with comorbid disorders, there is empirical evidence to suggest that older adults access services at rates far lower than their younger counterparts [3, 88, 89]. The 2001 NSDUH data revealed that only about 10 % of older adults with mental health disorders reported receiving any type of treatment [90], compared to 25 % of younger adults [3]. In the 1996 Midlife Development in the United States study, adults aged 65 to 74 with mental health conditions were found 40 to 140 % less like to receive treatment than their younger counterparts [88]. In addition to finding that older adults were less likely to receive specialty care, another study, the 1997–1998 Health Care for Communities household study, found that older adults reported that primary care providers were much less likely to ask about mental health symptoms or treatment [91].

Part of the reason for underutilization, as referred to earlier, is a lack of identification of the disorders or subsyndromal symptoms among older adults. Another reason may be that older adults often do not identify their mental health or substance use disorder as needing treatment [3, 92], sometimes confusing symptoms for a normal part of aging. Additionally, older adults tend to avoid specialized treatment due to stigma [3, 92] related to both the disorders and treatment itself; however, many older adults report positive attitudes toward treatment, and thus, stigma is not the primary cause of underutilization of services. One study of 600

community-dwelling adults 60 years and older [93] revealed that there are a number of additional barriers preventing older adults from obtaining any kind of specialized care: cost, information about accessing services, lack of age or ethnically appropriate services (including languages available), and lack of transportation. A majority (80 %) of participants in the study reported that treatment was more than they could afford. The issue of accessibility is currently a primary barrier to older adults with comorbid disorders.

3.13 Conclusion

Prevalence rates of comorbid substance use and other psychiatric symptoms and disorders among older adults who use alcohol or endorse AUD are generally unknown. Like younger adults, older adults appear to have a high correlation between substance use and mental health disorders, with each being a risk factor for the other. Existing studies also point to evidence that older adults with comorbid disorders, including both physical and mental health conditions, are hard to identify due to both the complexity and overlapping nature of symptom presentation. For these same reasons, they also may be difficult to treat, particularly in situation when accepted treatments for individual disorders have the potential to interact poorly.

Future research must expand upon existing knowledge of the prevalence of mental health and substance use disorders, helping to identify reliable and valid screening measures in order to increase the accuracy with which we identify both substance abuse and psychiatric disorders and their subsyndromal counterparts. For greater understanding of prevalence in the community, research must innovate in its methods for epidemiological studies, which tend to have difficulty identifying and enrolling older adults who will respond [3]. Most researchers generally consider existing estimations of mental health and substance use disorders to be underestimations among older adults.

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Part III

Alcohol Effects on Healthy Aging

Alcohol Consumption and Cardiovascular Disease in Aging Populations

4

Edmond K. Kabagambe and Kenneth J. Mukamal

4.1 Introduction

Cardiovascular diseases (CVD), including heart disease, stroke, heart failure, and hypertension, remain prevalent and are the most common causes of death in the United States [1, 2] and around the world [3, 4]. Highest CVD incidence and mortality rates are seen among men, the elderly and minority populations (e.g., African Americans). While mortality due to CVD has decreased overall, many people across the globe are living with nonfatal forms of CVD [5].

In this chapter, we review effects of alcohol on major CVDs and associated risk factors overall and with a focus on potential benefits and risks of alcohol in aging populations. We highlight age-related reduction in alcohol tolerance and the increased risk for adverse alcohol–drug interactions in the elderly. We also point out that data on cardiovascular effects of alcohol in the elderly are scant, especially in those who are 75 years or older. Further, we highlight the need for more studies on the interaction between alcohol use and medications in old age.

4.2 CVD Incidence and Mortality

According to the American Heart Association and the Centers of Disease Control and Prevention, CVD is the leading cause of death in the United States [1, 2]. For instance, in 2013, heart diseases alone accounted for 23.5 % (611,105 deaths) of all

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deaths in the United States [14]. In the same year, cerebrovascular conditions and hypertensive disorders accounted for 5 and 1.2 % of all deaths, respectively [14]. The CVD burden is higher in older age groups and CVD mortality increases with increase in age. For instance, among US men and women with CVD in 2009, the mortality rates (95 % CIs) per 100,000 population due to CVD were 52.2 (51.5–52.9) for those aged 45–54 years, 132.3 (131.1–133.5) for those 55–64 years, and 299.8 (297.4–302.2) among those 65–74 years old [15]. Also, compared to Hispanic or Asian populations, CVD mortality rates (95 % CIs) are highest among non-Hispanic blacks (MR = 141.3; 95 % CI: 139.9–142.8) and non-Hispanic whites (MR = 117.7; 95 % CI: 117.3–118.1) compared to other populations.

4.3 Alcohol and CVD

Although several studies in the United States and elsewhere have shown that moderate alcohol consumption is associated with reduced risk for heart disease [16–20] and that heavy intake is associated with increased risk of CVD incidence [6, 21] and all-cause mortality in various populations (e.g., in Russia [22], China [23], and the United States [24]), data specific to effects of alcohol in elderly populations remain scant. The few studies available, e.g., the Cardiovascular Health Study, suggest that moderate alcohol use is beneficial and may be associated with reduced Medicare costs among individuals with CVD [25]. The benefits and risks of alcohol consumption are dose dependent with a consistent cut-point for cardiovascular benefits being 1 drink per day for women and about 2 drinks per day for men [21]. These cut-points have also been observed for associations between alcohol consumption and all-cause mortality [21, 26].

Although there are many similarities in the effects of alcohol on CVD across many populations, the magnitude and significance of the association between amount of alcohol consumed and CVD risk remain inconsistent, especially within countries, regions, age, sex, race, and other population strata [24, 27, 28]. For instance, in a large prospective study ($n = 34{,}304$) among men and women (45–69 years at baseline) in Eastern Europe [29], heavy drinking (≥60 g/day) was associated with increased risk of CHD among men (HR = 1.64; 95 % CIs: 1.02–2.64) but not among women (HR for women consuming >20 g/day = 1.39; 95 % CI: 0.34–5.76). In another large prospective study among 220,000 Chinese men, heavy alcohol consumption was strongly associated with increased risk of stroke and ischemic heart disease but the association for moderate alcohol intake, though protective, was not as strong as those observed in western populations [23]. Reasons for the inconsistencies in these associations remain unknown but may be related to age and the distribution of other confounding factors that may interact with alcohol consumption to modify effects of alcohol on CVD. As pointed out in the synthesis of studies from the MIDSPAN cohort in Scotland with 27,000 participants studied over an ~50-year period, variables such as occupation, obesity, and smoking, modified the associations between alcohol consumption and CVD mortality [30]. Genetic differences in alcohol metabolizing enzyme genes may also play a role in modifying the associations between

alcohol and CVD and could in part account for observed differences in effect sizes across populations [31]. Alcohol drinking patterns, e.g., weekend vs. weekday or all-week drinking could also explain some known differences in CVD risk [18, 32]. As shown in a recent review [33], a drinking pattern characterized by moderate drinking without episodes of heavy drinking may be more beneficial for CVD protection when compared to patterns that include heavy drinking episodes.

4.4 Alcohol Drinking Patterns and CVD

In additional to amount of alcohol consumed *per se*, the pattern of alcohol consumption, commonly defined as the number of drinking days per week is also associated with CVD outcomes independent of the amount of alcohol consumed [18, 24, 34–37]. In general, a drinking pattern characterized by alcohol consumption on 4 or more days of the week is inversely associated with MI, stroke, and CVD risk factors (e.g., type 2 diabetes and insulin resistance-related measures) [38, 39]. When moderate amounts of alcohol are consumed on most days of the week, it is possible that the body will have prolonged exposure to moderate alcohol and therefore a sustained effect on nutrient status and metabolic processes leading to better CVD benefits. This consistent exposure to moderate amounts of alcohol in the body is also the proposed biologic mechanism behind the high HDL-C and lower coronary heart disease events observed among slow alcohol metabolizers (who have an ADH1C polymorphism) [31] though this hypothesis has been variably confirmed in other studies [40, 41].

4.5 Alcohol, Nutrients, and Intermediate CVD Markers in Aging

The relation between moderate alcohol consumption and intermediate CVD markers was summarized in two recent reviews [6, 42]. Overall, moderate alcohol consumption is associated with improved concentrations of CVD risk markers, particularly HDL-C concentrations [18, 31, 43, 44]. Whether HDL-C resulting from moderate alcohol intake is functional and beneficial for cardioprotection remains unknown although it does appear to increase cholesterol efflux capacity [45], which itself has been associated with protection beyond HDL-C concentration alone [46]. While moderate alcohol consumption shows no appreciable benefit on LDL-C, it is associated with significant improvement in insulin sensitivity [47], C-reactive protein (CRP) [20, 48], fibrinogen [20, 44], platelet activity [49, 50], blood viscosity [51], and mechanisms that may protect against CVD.

Alcohol intake may also influence CVD markers through its effects on absorption and metabolism of nutrients in the body. This is critical especially in the elderly who may have deficiencies or insufficiencies of nutrients such as folate, vitamin B12, vitamin D, magnesium, and iron. Indeed, moderate alcohol consumption has been shown to improve status of nutrients associated with cardiovascular effects.

For example, it improves iron absorption in humans [52, 53] and is associated with higher vitamin D levels in men [54]. Moderate alcohol consumption also interferes with absorption and metabolism of lead, fatty acids, and B-vitamins, factors also known to affect CVD risk. While moderate alcohol use may confer a benefit on nutrients known to have cardiovascular benefits, heavy alcohol use could lead to adverse consequences. For instance, heavy alcohol consumption leads to deficiencies of magnesium [55], zinc, folate [56], and other nutrients and damages the intestinal lining and the liver impairing nutrient absorption and metabolism [57]. These effects of alcohol are likely to be worse in the elderly. Except for folate, little is known about the impact of alcohol-induced alterations in nutrient metabolism on the cardiovascular system, especially in the older populations where use of dietary supplements is common. For instance, chronic heavy drinking lowers magnesium [55], a nutrient needed for proper metabolism of vitamin D [58], implying that supplementation with vitamin D in heavy drinkers may not be as effective as intended. These effects of alcohol could also extend to prescription medications that are in common use among the elderly.

Age also modifies the effects of alcohol consumption on CVD, with no benefit reported among individuals ≥75 years old in the Honolulu Heart Study [65]. On the contrary, data from the Cardiovascular Health Study showed that alcohol may have similar effects in younger (<75 years) and older people [66]. In the same study, sex did not modify the effects of alcohol on coronary heart disease in participants above age 65 years. Taken together, moderate alcohol seems to protect against cardiovascular disease across the whole life span but the data on older age groups are scanty. Theoretical considerations as well as emerging data on intermediate outcomes such as lipids, suggest that moderate alcohol could beneficially interact with medications such as statins to improve cardiovascular health but heavy alcohol could worsen CVD risk, especially in the elderly. Rigorous studies assessing interactions between alcohol, diet, and medications with regard to CVD in elderly populations are needed.

4.6 Future Studies

While much has been learned about the cardiovascular effects of alcohol in the general population, little is known about effects of alcohol in aging populations exposed to multiple medications. The few available studies (e.g., from the CHS), while very informative, are limited in that they included few minority populations. The latter have a large CVD burden and may be more susceptible to problem drinking. New studies that include diverse populations and focus on how alcohol affects the cardiovascular system in old age, medication adherence, access to CVD healthcare services and the ability to live successfully in institutionalized facilities for the elderly are needed.

Studies that focus on how alcohol interacts with CVD prevention or management practices such as medication use and incidence of adverse events or synergy in benefits are also needed. Most elderly people have never discussed alcohol use with their healthcare providers [67]. Studies on the need for alcohol use assessments, especially before prescribing CVD medications may be useful.

Lastly, most of our knowledge on effects of alcohol in the general population or population subgroups have been based on self-reported alcohol consumption and are susceptible to biases such as confounding bias. While controlled alcohol feeding studies in humans are starting to emerge, they are still very few, short-term, and limited to previous drinkers. Rigorously designed alcohol feeding studies that are large enough to study medium to long-term effects of moderate alcohol are needed. Such studies will help to determine whether modulation of alcohol consumption is important for CVD prevention, especially in the elderly populations who also have a large CVD burden and exposure to multiple medications.

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Cancer, Alcohol, and Aging

5

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5.1 Epidemiology of Cancer Associated with Alcohol Use

According to the World Health Organization (WHO), cancer accounts for almost seven million deaths per year [1]. Alcohol is one of the main risk factors for cancer, with alcohol use attributed to up to 44 % of some cancers [2, 3] and between 3.2 and 3.7 % of all cancer deaths [4, 5]. Since 1988, alcohol has been classified as a carcinogen [6]. Types of cancers linked to alcohol use include cancers of the liver, pancreas, esophagus, breast, pharynx, and larynx with most convincing evidence for alcohol-related cancers of the upper aeordigestive tract, stomach, colorectum, liver, and the lungs [2, 7]. All of these cancers have a much higher incidence and mortality rate in older adults (65 years of age or older). For example, the morality rate in older adults for esophageal cancer is 21.7 per 100,000 deaths, and in those under 65, the mortality rate is 1.5 and 2.1 for persons between 50 and 64 years of age, respectively [8]. For alcohol-associated cancers, 66–95 % of new cases appear in those 55 years of age or older [8, 9]. For alcohol-associated cancers, other than breast cancer, 75–95 % of new cases occur in those 55 years of age or older [8, 10, 11]. In invasive breast cancer, two in every three cases occur in those aged 55 years of age or older [10]. Thus, alcohol-related cancer in the older adult is a serious public health issue.

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Four countries with a decline in alcohol use (France, the UK, Sweden, and US) have also demonstrated a stabilization or decline in the incidence and mortality rates for types of cancers closely associated with alcohol use [12]. Based on data from the National Cancer Institute (NCI), these cancers account for almost a quarter of all new cancer cases in the US [13].

The increased risk for cancer related to alcohol use is based on a combination of both quantity/frequency and duration of use, with those consuming alcohol for 20 or more years at increased risk [14]. This is based on the recommended limits from the National Institute on Alcohol Abuse and Alcoholism that focuses on quantity—how much is consumed, frequency, how often it is consumed and pattern of use, and how often a person consumes alcohol above the recommended limits. The recommended limits are no more than 4 drinks for healthy adult men under the age of 65 on a single occasion and no more than 14 drinks in a week. For women and those 65 years of age and older, the recommended limits are no more than 3 drinks on a single occasion and no more than 7 drinks in a week [15]. Duration refers to lifetime use of alcohol. Those who consume alcohol above the recommended limits over their lifetime are at greater risk for developing alcohol-related cancers [16, 17]. The amount of alcohol consumed over a lifetime is related to the relative risk of being diagnosed with an alcohol-associated cancer, and as evidenced by the National Cancer Institute surveillance data [8], diagnosis is most likely to occur in those over 65. In addition, consumption of alcohol at lower levels may also increase the risk for alcohol-related cancers. Nelson et al. reported that daily consumption of 1.5 drinks or greater accounted for 26–35 % of alcohol-attributable deaths [5]. Thus, the evidence is growing that daily drinking, even at lower levels, increases the risk for developing cancer in later life with the conclusion that there may be no safe threshold level for alcohol consumption below which there is no risk for cancer [6, 16, 17].

Another consideration is the possible impact of combined alcohol and tobacco use on increasing the risk of alcohol-associated cancers. Though many older adults may have stopped smoking, it is important to determine their lifetime history of smoking when considering their risk for alcohol-related cancers. The risk for developing alcohol-related cancer is increased among those who have a history of concurrent tobacco use and at-risk alcohol use [11, 18]. Cao et al. [18] analyzed data from two cohort studies involving 88,084 women and 47,881 men and found that light to moderate alcohol use was minimally associated with the risk of developing cancer and was similar between those currently smoking and those who never smoked. Among those with a history of at-risk alcohol use, there was an elevated risk of developing cancer for those who also used tobacco compared with those who never used tobacco. Talamini et al. [19] also reported a possible synergistic relationship between alcohol and tobacco use. They found a multiplicative risk increase with heavy consumption of alcohol and tobacco use. Thus, patients who have a history of both tobacco and at-risk alcohol use should receive early screening for alcohol-related cancers.

The effects of alcohol and tobacco use are potentiated because smoking increases the capacity of oral yeasts and bacteria to produce acetaldehyde from ethanol, and cigarette smoke contains considerable amounts of acetaldehyde that dissolves in

saliva. Immediately after alcohol consumption, the level of acetaldehyde in saliva can exceed 10–100 times the blood level. If a person has poor dental health, often an issue for older adults, they are apt to have higher levels of bacteria in the mouth; this, combined with the higher level of acetaldehyde in saliva, adds to the risk for upper digestive tract cancer [20]. Holding the amount of alcohol consumption constant, persons who smoke have twice as much acetaldehyde in their saliva as those who do not smoke [21].

Among individuals who have a history of smoking two or more packs of cigarettes and consuming more than four alcoholic drinks per day, the risk of head and neck cancer is increased greater than 35-fold [22]. Leon and colleagues [23] offer several reasons for this synergistic effect: (1) the increased permeability of tobacco-smoke carcinogens through the oral mucosa in the presence of alcohol; (2) the increased solubility of tobacco-smoke carcinogens in ethanol; (3) increased acetaldehyde production from alcohol oxidation by oral bacteria; (4) alcohol-derived increased induction of CYP2E1 in the liver, which can elevate the amount of toxic metabolites during the metabolism of carcinogens present in tobacco smoke (e.g. benzene); (5) alcohol induced increased generation of other cytochrome P450 oxidase system (CYP3A4 and CYP1A2), which can activate tobacco carcinogens; and (6) alcohol-induced inhibition of the family of CYP enzymes, which could result in locally increased accumulation of toxic agents by reduced metabolic activation.

The metabolic processes for breakdown of alcohol to acetate, the genetics and genetic variants for alcohol, and the interaction between alcohol and tobacco smoking aid in understanding the carcinogenic action of alcohol alone and in combination with smoking. Given the high co-occurrence between alcohol and tobacco smoking, the problem of poor dental health, and longer duration of both alcohol and tobacco use, intensive efforts are needed to reduce the harms associated with these carcinogenic substances in older adults.

5.1.1 Head and Neck Cancers

At least 75 % of head and neck cancer is associated with alcohol and tobacco use [9]. Even in the absence of tobacco use, the odds of developing head and neck cancers in those who drink three of more drinks a day is twice that of the general population [24]. The types of head and neck cancers with the highest risk associated with alcohol use include esophagus, larynx, and pharynx cancer [8]. Using the NCI 2012 data, the incidence and the mortality rate for brain and nervous system cancers are higher in older adults compared to those 64 or younger. The mortality rate is 17.9/100,000 compared to 2.5/100,000 and the incidence rate is 18.9/100,000 compared to 4.2 [8].

5.1.1.1 Esophageal

Esophageal cancer accounts for approximately 1 % of all new cancer cases, yet accounts for 2.6 % of all cancer deaths. Only 17.9 % survive 5 years or more. Both alcohol use and older age are risk factors for developing esophageal cancer.

Eighty-six percent of all patients diagnosed with esophageal cancer are aged 55 or older at the time of diagnosis with a median age at diagnosis of 67 and a median age of 69 at death [8, 11, 24]. Using the NCI 2012 data, the incidence and the mortality rate for esophageal cancers are higher in older adults compared to those 64 or younger. The mortality rate is 21.7/100,000 compared to 1.5/100,000 and the incidence rate is 21.4/100,000 compared to 1.5/100,000 [8].

5.1.1.2 Larynx

Larynx cancer accounts for approximately 0.8 % of all new cancer cases and accounts for 0.6 % of all cancer deaths. Just over 60 % survive 5 years or more. Both alcohol use and older age are risk factors for developing larynx cancer, with 82 % of all new cases of larynx cancer occurring in those aged 55 or older. The median age at diagnosis is 65 and 68 at death [8, 19]. Using the NCI 2012 data, the incidence and the mortality rate for cancers of the larynx are higher in older adults compared to those 64 or younger. The mortality rate is 5.3/100,000 compared to 0.4/100,000 and the incidence rate is 12.5/100,000 compared to 1.45/100,000 [8].

5.1.1.3 Oral Cavity and Pharynx

Pharynx cancer accounts for approximately 2.8 % of all new cancer cases and accounts for 1.5 % of all cancer deaths. About 63 % survive 5 years or more. Both alcohol use and older age are risk factors for developing pharynx cancer. Among all new cases, 83 % are aged 55 or older. The median age at diagnosis is 62 and 67 at death [8]. Using the NCI 2012 data, the incidence and the mortality rate for cancers of the oral cavity and pharynx are higher in older adults compared to those 64 or younger. The mortality rate is 11.9/100,000 compared to 1.1/100,000 and the incidence rate is 39.7/100,000 compared to 6.3/100,000 [8].

5.1.2 Breast

There are gender differences in alcohol attributable cancer deaths with over half (56–66 %) of all alcohol-attributable cancer deaths in females resulting from breast cancer [5]. Breast cancer accounts for 14 % of all new cancer cases and 6.8 % of all cancer deaths. Among new cases of breast cancer, 42 % are aged 65 years old and older, with a median age of 61 at diagnosis [8]. Those individuals who are diagnosed over the age of 55 are more apt to die from breast cancer, with this age group accounting for approximately 80 % of all breast cancer deaths. For women, even low-risk alcohol use (5–14.9 g/day or one standard drink of alcohol or less) increases the risk of cancer, mainly breast cancer [18]. Using the NCI 2012 data, the incidence and the mortality rate for breast cancers are higher in older adults compared to those 64 or younger. The mortality rate is 96.3/100,000 compared to 10.4/100,000 and the incidence rate is 431.1/100,000 compared to 81.7/100,000 [8].

5.1.3 Hepatic: Liver and Intrahepatic Duct

Hepatic cancers account for approximately 2.2 % of all new cancer cases, yet account for 4.2 % of all cancer deaths. Only about 17 % with hepatic cancer survive 5 years or more. Both alcohol use and older age are risk factors for developing hepatic cancer. Among new cases of hepatic cancers, 80 % are aged 55 years old or older. The median age at diagnosis is 63 and 67 at death [8]. Using the NCI 2012 data, the incidence and the mortality rate for hepatic cancers are higher in older adults compared to those 64 or younger. The mortality rate is 30/100,000 compared to 2.9/100,000 and the incidence rate is 37/100,000 compared to 4.9/100,000 [8]. Persons with a history of at-risk alcohol use are at higher risk for liver cancer with a confirmed positive association between alcohol use and liver cancer [25]. Alcohol has been classified by the International Agency for Research on Cancer (IARC) as a liver carcinogen since 1988 [6]. Even one alcohol drink per day may be associated with increased risk of liver cancer [20].

5.1.4 Pancreas

Pancreatic cancer accounts for approximately 3 % of all new cancer cases and accounts for 6.9 % of all cancer deaths. Among those diagnosed with pancreatic cancer, only 7.2 % survive 5 years or more. Older age is a risk factor for developing pancreatic cancer, with almost 90 % of all new cases aged 55 or older. The median age at diagnosis is 71 and 73 at death [8]. The relationship between pancreatic cancer and alcohol is less clear; however, those who consumed ≥21 drinks per week and used tobacco were approximately four times more likely to develop pancreatic cancer compared to those who did not [26]. Using the NCI 2012 data, the incidence and the mortality rate for pancreatic cancers are higher in older adults compared to those 64 or younger. The mortality rate is 65/100,000 compared to 3.2/100,000 and the incidence rate is 70/100,000 compared to 4/100,000 [8].

5.1.5 Colorectal Cancer

Colorectal cancer accounts for approximately 8 % of all new cancer cases and accounts for 8.4 % of all cancer deaths. Only 64.9 % with a colorectal cancer diagnosis survive 5 years or more. Older age is a risk factor for developing colorectal cancer, with almost 80 % of all new cases aged 55 or older. The median age at diagnosis is 68 and 73 at death [8]. Alcohol use is associated with a moderate increased risk for development of colorectal cancer [8]. Fredeirko and colleagues [27] reported that relative risk for colorectal cancer among persons at any age who consumed alcohol at moderate levels (≥1 drink per day) was 1.2. For those with a history of heavy alcohol use (≥4 drinks per day), the relative risk was 1.5, thus supporting an

association between even moderate alcohol use and increased risk for cancer. Using the NCI 2012 data, the incidence and the mortality rate for colorectal cancers are higher in older adults compared to those 64 or younger. The mortality rate is 82.9/100,000 compared to 4.8/100,000 and the incidence rate is 184.5/100,000 compared to 16.8/100,000 [8].

5.2 Possible Mechanisms Accounting for Alcohol's Carcinogenicity

Ethanol is the principal type of alcohol found in alcoholic drinks. The effects of alcohol, including both its level of concentration and the concentration of its byproducts within bodily tissues and blood, are determined mainly by the rate that ethanol is metabolized [28]. Most of the susceptible regions to damage are those which are in direct contact with alcohol during what is named the "first passage" of digestion, when alcohol is initially consumed. The absorption of an alcoholic drink starts in the upper digestive mucosa and the stomach; however, the bulk of an alcoholic beverage is absorbed by diffusion in the small intestine into the bloodstream and the body's water content. The distribution phase of alcohol into the bloodstream depends on whether or not food is present in the stomach and whether or not the person is dehydrated; fasting and dehydration raise the rate of absorption and increases the peak alcohol concentration [29]. There are some reports that after alcohol absorption, the concentration of alcohol in the colon is higher than in the blood [30], explaining why alcohol is a risk factor for colon cancer. The majority (90 %) of alcohol consumed is oxidized in the liver, reducing the amount of ethanol that reaches the tissues and organs of the body. Oxidation occurring in the liver explains why alcohol is an important risk factor for hepatic cancer [9]. Elimination occurs via excretion of body fluids, specifically urine and sweat, and in very small amounts, via exhalation.

Ethanol is oxidized to acetaldehyde and then to non-toxic acetate through various metabolic pathways (Fig. 5.1). Acetaldehyde is a cytotoxic, genotoxic, mutagenic, and clastogenic compound [7, 29]. When acetaldehyde binds to DNA, the DNA becomes damaged and proper and complete replication of the cell cannot occur. In molecular genetics, these DNA adducts can be the start of a cancerous cell, or carcinogenesis. As people age, chronic inflammation is an important contributing factor in aging and aging-related diseases. The immune system has an important role in promoting the clearance of damaged cells [30]. As such, the DNA adduct formation as a result of alcohol consumption combined with the inflammation process may place older adults with alcohol-use history and current alcohol use at great risk for cancer and aging-related disease. This carcinogenetic and oxidative process putting older adults at high risk underscores the advice offered by the European Code Against Cancer (ECAC), "If you drink alcohol of any type, limit your intake. Not drinking alcohol is better for cancer prevention." ([31], p. S71)

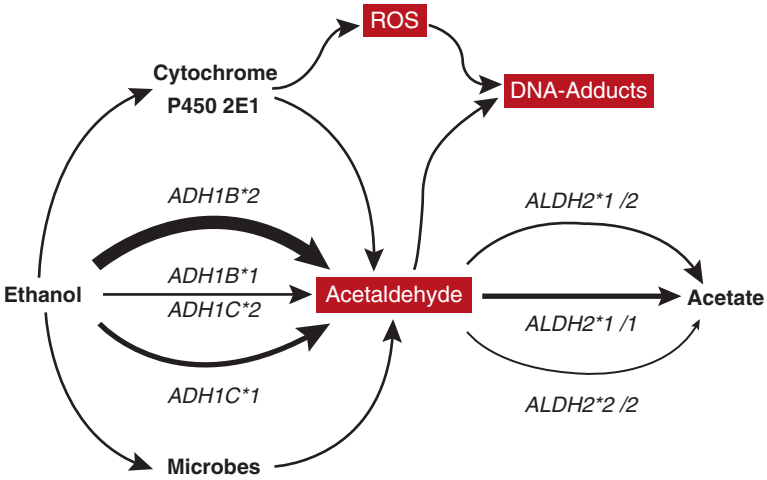

Fig. 5.1 Pathways of ethanol metabolism (From Seitz HK, Becker P. Alcohol metabolism and cancer risk. Alc Res Health. 2007;30(1):38-47 [10].)

5.3 Implications for Older Adults

5.3.1 Counseling Older Adults with Cancer about Alcohol Use

Screening for alcohol use is the first step (see Chap. 13). For those who are 55 years of age or older, it is important to include duration as a measure of possible risk for cancer [32]. Once the initial screening for alcohol use is complete, it is important to establish how long patients have consumed alcohol in both those who are currently drinking and those who are no longer drinking. The longer the use over the life span, the greater the risk for development of an alcohol-related cancer [11].

Recommendations have been made by several organizations regarding screening and management of substance use, but these recommendations are not specific to the older adult or to cancer patients. Oncology-specific organizations, like the National Cancer Institute (NCI) and the Oncology Nursing Society (ONS), discuss substance use primarily in the context of pain management and recommend screening and risk stratification to avoid opioid misuse during pain management treatment [32, 33]. A simple screening tool, such as the AUDIT-C, could be easily incorporated into a standard office visit [34] (Fig. 5.2).

5.3.2 Cancer Therapies and Alcohol Consumption

Alcohol use during cancer treatment can complicate the treatment regimen and lead to poor long-term outcomes. Older adults are more likely than their younger counterparts to rely on prescription medications [35] and are vulnerable to negative

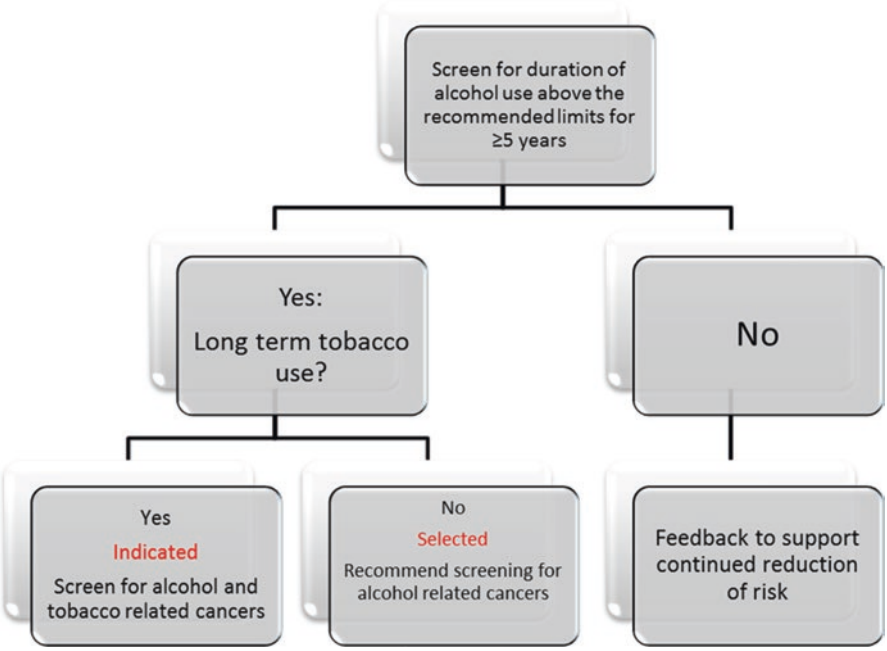

Fig. 5.2 Secondary prevention: screening for alcohol-related cancer risk

effects from the combination of alcohol and alcohol-interacting drugs [36]. Most cancer patients are prescribed new medications as part of their treatment regimen, so this vulnerability has negative implications for both immediate patient safety as well as efficacy of the medication itself in treating cancer. In one study of lung cancer patients receiving treatment, those currently drinking alcohol had a significantly less favorable response to chemotherapy than those in a control group [37].

Alcohol use appears to impact cancer surgery as well. Alcohol use before surgery in cancer patients has been associated with major post-operative complications including more frequent re-intubation, myocardial infarction, pulmonary failure, sepsis, pneumonia, renal failure, and early death [38–41]. Patients with alcohol withdrawal are significantly more likely to suffer post-operative complications, systemic complications such as tachycardia, hyperthermia, and hypertension, and be hospitalized longer than their counterparts [42, 43].

5.3.3 Pain Management

Pain management is a significant issue for cancer patients and is complicated by advanced age and the continued use of alcohol. It has been estimated by the American Pain Society and the National Comprehensive Cancer Network that 33 % of patients actively undergoing cancer treatment experience pain, and up to 75 % of

patients with advanced staged disease suffer from cancer pain [44]. The experience of pain is associated with numerous detrimental physical and emotional consequences such as increased physical symptoms of cancer, increased depression and anxiety, increased spiritual distress, and stressful intimate relationships [45]. There is evidence that substance use and pain frequently co-occur, and some researchers have suggested that patients suffering from a substance use disorder have a higher risk of poor pain tolerance [46]. In addition, the fear of developing a substance use disorder may keep patients from reporting pain or requesting pain medications, leading to higher pain scores and unrelieved pain [44, 47]. These attitudes and beliefs can also apply to those with a prior diagnosis of an alcohol use disorder who are now in recovery. Another issue in pain management is the association between current alcohol use and higher pain medication use over a longer period of time [48, 49]. Thus, effective pain management may require concurrent efforts to assist the patient in addressing their at-risk alcohol use.

5.3.4 Alcohol and Prognosis

Alcohol use is correlated with poor survival outcomes in oncology patients. In a large, prospective correlational study of alcohol use and cancer risk, Breslow et al. found that increased alcohol consumption was associated with higher cancer mortality overall [50]. Jin et al. [51] reported that cancer mortality risk decreased with decreased alcohol consumption. Other researchers have found that alcohol use is negatively associated with overall survival in head and neck cancer patients and non-small cell lung cancer patients [52–54]. In another study, researchers found that pre-cancer alcohol consumption was correlated with disease-specific but not overall mortality in breast cancer patients [55]. Alarmingly, the relationship between the development of cancer and alcohol use does not end with a single cancer diagnosis. Continued alcohol use has also been correlated with the development of second primary cancers, with a dose-dependent relationship demonstrated [56]. (Table 5.1)

Table 5.1 Alcohol-associated cancer risk by quantity of alcohol use per day

	Relative risk		
Organ	7 std drinks (100 g)	4 std drinks (50 g)	2 std drinks (25 g)
Oral cavity and pharynx	6.01	2.85	1.75
Esophagus	4.23	2.21	1.51
Larynx	3.95	1.94	1.38
Breast	2.71	1.67	1.31
Liver	1.86	1.36	1.17
Colon and rectum	1.38	1.18	1.08
Stomach	1.32	1.15	1.07
Pancreas	1.18	1.05	0.98

Source: Data from Bagnardi et al. [17]

5.3.5 Quality of Life

A paradigm shift in cancer care from cure to chronic disease management is currently underway [49]. Because of the grave prognoses historically associated with many cancers, there has been a trend within oncology to prioritize cancer treatment over all other clinical concerns, sometimes at the expense of active management of comorbid conditions [57]. Today, there is a growing recognition of the importance of managing comorbid conditions concurrently with cancer treatment. Thus, it is important to recognize the risks associated with continued alcohol use during chemotherapy, radiation, and in the peri-operative period.

Another issue for patients during cancer treatment is quality of life. Alcohol consumption at higher levels (defined as drinking over 1800 g/m of pure alcohol a month) or patients who screened positive for a possible AUD during cancer treatment experienced worse quality of life outcomes, including problems with pain, sleep, dyspnea, total distress, anxiety, coping, shortness of breath, diarrhea, poor emotional functioning, fatigue, and poor appetite [58, 59]. Current alcohol use has also been associated with higher pain scores and long-term use of opioids [48, 49]. In a prospective quality of life study, head and neck cancer patients with an identified alcohol problem were far more likely to be limited to a soft or liquid diet than counterparts with reported low-risk alcohol use and suffered the worst quality of life outcomes [60].

5.4 Summary

In summary, alcohol-associated cancers are more apt to diagnosed older adults. The mechanism that contributes to the development of alcohol-associated cancers is related to lifetime use of alcohol at higher levels. For patients 65 years of age and older with a history of at-risk alcohol use, there is an increased risk for the development of cancer, poorer outcomes during the perioperative period, and over the long term, increased morbidity, mortality, decreased pain control, and poorer quality of life. Thus, it is imperative for health care providers to screen for alcohol use in older adults and to include an assessment of lifetime alcohol use. This can help to identify older adults at risk for developing alcohol-associated cancers as well as those at risk for poorer outcomes once diagnosed.

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Alcohol and Cognition

6

Brian Downer and Julie B. Boron

6.1 Introduction

Cognition is a multidimensional construct that represents the mental functions that are required for a person to be able to store and recall memories, process and interpret information, make decisions, understand commands, and effectively communicate ideas. With advancing age, it is expected for people to experience subtle declines in cognitive domains related to fluid intelligence such as memory, decision-making, and processing speed [1]. Conversely, cognitive abilities such as wisdom, knowledge, language, and other domains reflecting crystallized intelligence do not typically begin to decline until late in life and can even improve with age [1]. Negative cognitive changes can impair a person's ability to complete complex tasks, but these declines do not prevent successfully accomplishing activities that are necessary for day-to-day living such as cooking a meal or managing medications; hence, individuals experiencing these normative declines are still able to function and live independently in the community. The severity of cognitive decline that occurs with advancing age varies substantially from person to person, is dependent upon genetic, physiological, health, behavioral, social, and cultural factors, and may lead to cognitive diseases such as dementia, specifically Alzheimer's disease.

Prior research has demonstrated that more years of educational attainment, increased physical activity, and greater access to medical care are some factors that have contributed to a decline in the prevalence of Alzheimer's disease [2–4]. However, because advancing age is a major risk factor for Alzheimer's disease, the

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growing number of adults living to old age will ultimately lead to an increase in the number of Alzheimer's disease cases, with many studies estimating that the number of older adults living with Alzheimer's disease will approach or exceed ten million people by the year 2050 [5–7]. In addition, there are concerns that the continued rise in obesity, diabetes, and hypertension will contribute to an increase in the prevalence of dementia [8], as individuals with these conditions are at an increased risk for dementia and cognitive decline.

The dramatic increase in the number of older adults living in the United States, and the expected increase in Alzheimer's disease and other dementias, has motivated research on identifying health behaviors that may be beneficial for cognition and protect against or delay the onset of dementia. Alcohol consumption is one such behavior that has received considerable attention among the scientific community and in the general public. Despite the common understanding that acute effects of alcohol distort cognitive abilities, there are also headlines in popular press touting the potential benefits of consuming alcohol for maintaining cognitive functioning into old age. While there is evidence that consuming light to moderate amounts of alcohol is beneficial for maintaining high cognitive functioning, it is important to also communicate to the general public the negative effects that alcohol can have on the brain and cognition.

Because older adults routinely consume alcohol [9], it is important for researchers and clinicians to have a clear understanding of the impact alcohol consumption has on cognitive health so that older adults can receive appropriate recommendations of what constitutes safe alcohol consumption. This chapter provides a general overview of evidence from research in a variety of disciplines on the positive and negative long-term effects that alcohol consumption has on the brain and cognitive functioning. This synopsis will include the effects that prolonged alcohol consumption has on the anatomical characteristics of brain, the modifying effects of alcohol consumption on cognitive functioning and dementia risk, and plausible explanations for the apparent benefits of light to moderate alcohol consumption on cognition. The chapter will conclude with recommendations for future research on alcohol consumption and cognition and the implications that this area of research has for public health.

6.2 Alcohol and the Brain

It is widely accepted that consuming heavy amounts of alcohol and binge drinking are detrimental to the brain. Animal studies that have examined the anatomical changes that occur to the brain as a consequence of consuming alcohol indicate that heavy alcohol consumption and binge drinking leads to the death of existing neurons [10, 11] and prevents production of new neurons [12, 13]. Even moderate amounts of alcohol consumed over a short period of time may be detrimental to the brain. In a study by Anderson and colleagues [14], male and female adult rats were given a 4% ethanol liquid mixture for a 2-week period to examine the effect of alcohol consumption on the production of new neurons in the hippocampus and

performance on motor and learning tasks. The average blood alcohol content of the rats, given the ethanol mixture, was 0.08 %. There were no significant differences in performance of these rats on the motor or learning measures, but 40 % fewer new neurons were produced in the hippocampus compared to rats in the control group. However, other studies have observed that smaller amounts of alcohol may have no detrimental effect on neurogenesis in the hippocampus [15].

While animal studies indicate that consuming even moderate amounts of alcohol is detrimental to the brain, the evidence from epidemiological studies is less clear. In a study of 589 older adults, subjects who reported consuming light to moderate amounts of alcohol, in particular wine, had larger total brain volume compared to older adults who reported that they did not consume alcohol [16]. These findings are consistent with other epidemiological studies that have observed light to moderate alcohol consumption to be associated with larger hippocampal volume [17], fewer brain lesions [18], and less total brain atrophy [19] compared to abstainers. Conversely, multiple studies have also observed that older adults who reported consuming alcohol had smaller total brain volume [20], greater ventricular volumes [21], and decreased grey matter volume [22]. These discrepant findings may be due, in part, to the unique characteristics of the sample populations (e.g., multiethnic cohort [16] versus only non-Hispanic Whites [20]), the period in which alcohol was measured (e.g., lifetime alcohol consumption [22] versus late life alcohol consumption [17]), and differences in the questions used to measure alcohol consumption (e.g., not differentiating between types of alcohol consumed [18] versus using separate questions for beer, wine, and liquor consumption [21]).

The relationship between alcohol consumption and brain health becomes even more complicated when considering the modifying effects of gender. Multiple studies have observed differences between older men and women when examining the relationship between alcohol consumption and brain health [23–25]. In one such study [26], older men who were moderate alcohol consumers had lower total brain volume compared to light to moderate consumers, whereas no differences in total brain volume according to alcohol consumption status among women were detected [26]. This gender effect may be due to physiological differences between men and women that effect how the body metabolizes alcohol [27, 28].

There are several factors that may account for the inconsistent, and in some cases, conflicting findings among epidemiological studies. First, the relationship between alcohol consumption and brain volume may differ when examined cross-sectionally versus longitudinally. For example, Duriez et al. [29] conducted a cross-sectional analysis on 1451 participants and longitudinal analysis on 1111 participants who were observed 4 years later to examine the relationship between alcohol consumption, total brain volume, and white and grey matter volume among older men and women. In the cross-sectional analysis, a negative association between alcohol consumption, total brain volume, and white matter volume was detected for men, whereas no significant relationship was detected in women. Conversely, the findings from the longitudinal analysis revealed a positive relationship between alcohol consumption and white matter volume for men and grey matter volume for women. These findings may reflect differences according to study design, but may also be

due to differences in the characteristics of the cross-sectional and longitudinal samples, as not all participants from the initial sample returned for the 4-year follow-up. In addition, the cross-sectional results only relay information on age and/or gender differences, while longitudinal studies reveal changes over time as a function of age/gender.

Second, it is important to consider the health characteristics of older adults who consume light to moderate amounts of alcohol compared to older adults who are abstainers. Older adults who report consuming light to moderate amounts of alcohol are often times in good overall health, whereas older adults who report abstaining from alcohol often have to do so because of the risk for adverse reactions due to any current health conditions or medications that may interact with alcohol [30]. Therefore, the positive findings for light to moderate alcohol on brain health reported by certain studies may be due to the overall better health of older adults who consume alcohol.

Third, there is considerable heterogeneity between epidemiological studies in how alcohol consumption categories are defined, what type of alcohol is being consumed, and the types of questions used to ascertain self-reported alcohol consumption [31]. For example, some studies have used different criteria for men and women to define alcohol consumption categories [16], whereas other studies do not use gender-specific categories [18, 21]. This lack of consistency can make it difficult to directly compare findings and these factors need to be considered when interpreting the results from epidemiological studies on the relationship between alcohol consumption and brain health.

6.3 Alcohol, Dementia, and Cognitive Impairment

Consuming even moderate amounts of alcohol can be detrimental to the health of the brain, but there is growing evidence that consuming light to moderate amounts of alcohol may decrease a person's risk for developing dementia during old age and preserve functioning in multiple cognitive domains. The majority of research on the relationship between alcohol consumption and cognitive functioning has focused on the amount of alcohol consumed later in life. However, the growing number of ongoing longitudinal studies that have followed middle-aged participants into old age has allowed for more research to be conducted on the relationship between alcohol consumption during middle age and cognitive outcomes later in life.

6.3.1 Late Life Alcohol Consumption

Epidemiological studies that have examined the relationship between late life alcohol consumption and cognition have frequently reported that older adults who consume light to moderate amounts of alcohol are less likely to develop dementia and have higher cognitive functioning compared to older adults who do not consume

alcohol [32]. However, there is some inconsistency in prior research regarding whether consuming alcohol is protective against specific types of dementia and less severe types of cognitive impairment. In a meta-analysis of 15 prospective cohort studies, consuming light to moderate amounts of alcohol was associated with significantly lower relative risk (RR) for Alzheimer's disease (RR = 0.72, 95 % CI = 0.61–0.86), vascular dementia (RR = 0.75, 95 % CI = 0.57–0.98), and any type of dementia (RR = 0.74, 95 % CI = 0.61–0.91), but not cognitive decline (RR = 0.28, 95 % CI = 0.03–2.83) [31]. These findings are consistent with a previous meta-analysis by Peters et al. [33] in which light to moderate alcohol consumption was associated with a decreased risk for dementia (RR = 0.63, 95 % CI = 0.53–0.75) and Alzheimer's disease (RR = 0.57, 95 % CI = 0.44–0.74), but not vascular dementia (RR = 0.82, 95 % CI = 0.50–1.35) or cognitive decline RR = 0.89, 95 % CI = 0.67–1.17). Vascular dementia, also known as vascular cognitive impairment, is the second most common type of dementia [34] and is caused primarily by the accumulation of strokes that damage the brain [35]. The inconsistent findings for vascular dementia are somewhat surprising given that light to moderate alcohol consumption is associated with a reduced risk for stroke [36] and other vascular events [37].

Alzheimer's disease includes a prodromal period where a patient begins to experience mild impairments in cognitive functioning. Mild cognitive impairment (MCI) has been used to describe the prodromal stage of Alzheimer's disease and is characterized by impairment in multiple cognitive domains, but these impairments are not severe enough to interfere with a person's ability to perform day-to-day activities [38]. There is no strong evidence to suggest that consuming alcohol is protective against MCI [39, 40] and several studies have reported non-significant findings [41–43]. In an analysis of 1445 non-impaired and 121 MCI patients aged 65–84 years, consuming less than one drink per day was not found to decrease the risk for MCI among non-impaired subjects, but MCI patients who reported consuming less than one drink per day exhibited a slower progression to dementia compared to MCI patients who were abstainers [44]. However, older adults with MCI should not be encouraged to start consuming alcohol since heavy alcohol consumption (defined as consuming >300 kg lifetime alcohol consumption) among MCI patients has been associated with increased risk for dementia [45]. Genetic, health, and other characteristics of older adults who develop MCI may contribute to the increased risk for dementia, rather than the alcohol consumption.

Current evidence suggests that the protective effects of light to moderate alcohol consumption may vary according to whether the primary consumption includes beer, wine, or liquor [46–48], although non-significant differences have also been reported [49–51]. Wine has been observed to have the greatest protective effect against dementia compared to other beverage types, whereas older adults who primarily consume beer have not consistently been found to have lower risk for dementia [46–48, 52, 53]. The added benefit of wine has been attributed to several factors including the antioxidant properties found in wine [54] and the sociodemographic, health, and dietary characteristics of wine consumers. Older adults who primarily consume wine tend to be more educated, non-smokers, and in overall better health compared to those who consume beer or liquor [55, 56]. Moderate wine consumption is consistent

with a Mediterranean diet, which has been observed to have health benefits [57]. These characteristics are all predictors of cognitive functioning during old age and may explain the differential effects of alcoholic beverage type on cognition.

6.3.2 Midlife Alcohol Consumption

The majority of research on the relationship between alcohol consumption and cognitive outcomes has focused on the amount of alcohol consumed during old age, but there is a growing body of research that has examined the relationship between alcohol consumption during middle age and cognitive outcomes several years or decades later. The evidence from this area of research is mixed with some studies not detecting a significant relationship [17, 58, 59], while others have reported that light to moderate alcohol consumption is associated with preserved cognition [60] and decreased risk for cognitive impairment [31, 61, 62]. Middle-aged adults who consume heavy amounts of alcohol for prolonged periods of time or engage in frequent binge drinking are more likely to develop wernicke-korsakoff syndrome [63]. Wernicke-korsakoff syndrome is commonly caused by low levels of thiamine and is characterized by retrograde and anterograde amnesia, difficulties with language, decreased sensory abilities, and impairment in executive functions [64].

The relationship between midlife alcohol consumption and cognitive outcomes later in life is complex and may differ according to gender. An analysis of approximately 3000 French middle-aged (35–60 years of age) adults revealed that women who abstained from consuming alcohol had lower cognitive functioning 13 years later compared to women who reported consuming 1–2 drinks per day; for men, abstainers did not have significantly lower cognition, but those who consumed more than 3 drinks per day had higher cognitive functioning compared to men who consumed 1–3 drinks per day [60]. However, men who drank eight or more drinks per day had significantly lower cognitive functioning during old age compared to men who consumed 1–3 drinks per day [60]. Further, the protective effect of light to moderate alcohol consumption for dementia appears to be slightly stronger for men compared to women [31].

There is also evidence that the relationship between the amount of alcohol consumed during middle age and cognitive functioning later in life differs among adults who have a genetic predisposition for dementia. In a study of 1018 of middle-aged adults (mean age 48.3 years), the likelihood of being diagnosed with dementia was significantly higher among infrequent (defined as less than once a month) and frequent (defined as several times per month) alcohol consumers [61], but only among older adults who were *APOE* e4+, which is an established genetic risk factor for dementia [65]. These findings are consistent with another study that reported middle-aged adults who consumed 1–6 drinks per week were less likely to develop dementia, but that middle-aged adults who consumed 14 or more drinks per week and were *APOE* e4+ were over three times as likely to develop dementia compared to *APOE* e4+ abstainers [62]. The *APOE* e4 allele also increases the risk for MCI [66] and the risk for MCI among heavy alcohol consumers may be increased for individuals who carry an *APOE* e4 allele.

6.4 Mechanisms to Explain the Relationship Between Alcohol Consumption and Cognition

Several hypotheses have been proposed to explain the potential benefits of light to moderate alcohol consumption on cognitive functioning. These mechanisms range from the direct effects that alcohol has on the anatomy and physiology of the brain to the overall better health of older adults who consume alcohol. This section summarizes the evidence from research that has sought to identify plausible causal mechanisms to explain the relationship between alcohol consumption and cognitive functioning among older adults.

6.4.1 Increased Cell Proliferation in the Brain

Heavy alcohol consumption and binge drinking is detrimental to the health of the brain and can result in severe brain atrophy, behavioral changes, and dementia. However, animal studies have produced some evidence to suggest that consuming smaller amounts of alcohol may promote the production of new neurons in specific regions of the brain. Aberg et al. [67] observed that female adult mice that had free access to a 10 % ethanol/water mixture and water during a 9-week period exhibited a greater increase of cells in the dentate gyrus compared to mice in the water only control group. In addition, cell proliferation in the dentate gyrus of mice that had free access to the ethanol mixture for 57 days ceased and returned to pre-consumption levels, similar to those observed in the control mice, when this group withdrew from alcohol consumption for the duration of the investigation. This suggests the increased cell production was a direct result of ethanol exposure [67]. It should be noted that these findings contradict those described previously by Anderson et al. [14] in which rats who were exposed to ethanol exhibited decreased neurogenesis in the hippocampus. These contrasting results may be due to differences in how mice and rats metabolize and respond to alcohol [68]. Further, the presence of these differences highlights how important it is to conduct thorough research on human subjects before recommendations on alcohol consumption can be made.

The dentate gyrus is a specific region of the hippocampus that is involved in learning and memory [69]. Greater proliferation of neurons in the dentate gyrus may translate to better cognitive performance, in particular learning and memory among older adults. This hypothesis is supported by evidence from a study in which significantly higher performance on measures of memory was observed in older adults who reported consuming 1–6 drinks per week; this effect was reduced and no longer statistically significant after controlling for hippocampal volume [17].

6.4.2 Antioxidative Properties of Alcohol

Diet plays an important role in health and epidemiological studies have observed that consuming a diet that is rich in plant-based foods, whole grains, legumes, nuts, and low in saturated fat (commonly referred to as a Mediterranean diet) is

associated with a decreased risk for dementia [70]. Many of the foods that make up a Mediterranean diet have moderate to high concentrations of antioxidants [71], which may decrease the risk for several health conditions including cancer [72] and atherosclerosis [73]. Reactive oxygen species (ROS) and free radicals play an important role in many diseases, including dementia, by damaging DNA, proteins, and molecules of cells which ultimately leads to cell death [74]. Antioxidants prevent the damaging effects of ROS and free radicals by halting the oxidative process [75]. Moderate wine consumption is frequently included as part of the Mediterranean diet, and wine, in particular red wine, contains low concentrations of an antioxidant called resveratrol [71]. Animal studies that have examined the effects of resveratrol on the brain have observed that it prevents oxidative stress [76] and reduces the presence of dementia pathology [77, 78].

A limitation of animal models is that oftentimes animals receive concentrations of resveratrol and other antioxidants that are far greater than what can be consumed as part of a normal human diet. This means that the findings from animal studies may not translate to humans and it is unlikely that the amount of resveratrol and other antioxidants consumed as part of a normal human diet are sufficient to have an effect on cognitive health. Some epidemiological studies have identified a benefit of dietary consumption of antioxidants on cognitive functioning [79, 80], but non-significant findings have also been reported [81, 82]. A limited number of clinical trials have studied the effects of resveratrol on the brain and dementia risk (clinicaltrials.gov identifier NCT01219244; NCT00678431; NCT01504854). Early results from these studies indicate that resveratrol is safe and has minimal side effects when taken by older adults diagnosed with dementia [83], but it remains to be seen if resveratrol is beneficial for cognition. Based on all available evidence, it is unlikely that any potential benefits of wine on cognition are due to resveratrol alone, but through additional antioxidants and other properties of wine and other foods consumed along with wine.

6.4.3 Health Characteristics of Alcohol Consumers

Several epidemiological studies have reported that light to moderate alcohol consumption is associated with a decreased risk for stroke, diabetes, and heart disease [36, 84, 85]. Similar to the U-shaped relationship between alcohol consumption and dementia, heavy alcohol consumption has been associated with poor health [86, 87]. The decreased risk for several metabolic and vascular health conditions for alcohol consumers has been attributed to antioxidants [54], greater concentrations of high-density lipoprotein cholesterol in the bloodstream [88], and reduced blood clot formation [89]. Stroke, diabetes, heart disease, and related conditions have all been associated with lower cognitive functioning during old age [90, 91]. The reduced prevalence of metabolic and vascular health conditions among light to moderate alcohol consumers may contribute to the decreased risk for dementia and cognitive decline for older adults who consume alcohol.

A limitation of the hypothesis that the reduced risk for dementia among light and moderate alcohol consumers is conferred through the reduced prevalence of adverse health conditions associated with dementia is the possibility that this relationship is confounded by reverse causality. Alcohol consumption decreases with advancing age and adults may reduce their alcohol consumption in response to the onset of adverse health conditions [92, 93]. Therefore, the higher prevalence of dementia and lower cognitive functioning among abstainers may be due in part to their worse health rather than their alcohol consumption.

6.5 Future Research Directions

Significant progress has been made toward understanding the relationship between alcohol consumption and cognitive functioning during old age, but continued research is needed before definitive statements about this relationship can be made. Three general areas of research that can help advance the field include: (1) addressing biases and limitations in study design and analysis; (2) differentiating former drinkers from non-drinkers; and (3) the modifying effects that genetic, behavioral, health, and social factors have on the relationship between alcohol consumption and cognitive functioning. Continued research is needed so that appropriate recommendations can be made to older adults as to what constitutes safe alcohol consumption. Further, it is essential that longitudinal research be used in these future investigations so that the field can better understand the relationship between alcohol and cognition, as well as potential mechanisms affecting this relationship.

6.5.1 Addressing Biases and Limitations in Study Design and Analysis

A limitation of large cohort studies is that subjects who choose not to participate or are unable to participate are often less healthy than those who do participate. Non-response bias becomes more pronounced with age because only subjects who have survived to old age and are healthy enough to participate are observed. Studies on alcohol consumption and cognition are sensitive to non-response bias because light and moderate drinkers who are not healthy enough to participate in the study will not be observed. Adults who survive to old age despite consuming very high amounts of alcohol represent an even more select segment of the general population because they may have genetic, behavioral, health, social, or other factors that protect them against the negative effects of heavy alcohol consumption. As a result, the analytic sample of epidemiological studies is more likely to be comprised of "healthy" drinkers, which biases results in favor of finding a positive effect of light to moderate alcohol consumption for cognition and health in general. More emphasis needs to be placed on investigators describing the characteristics of participants who are excluded from the final sample due to missing data or incomplete follow-up

when reporting findings and how these differences may influence results. In addition, the effect non-response bias may have on the relationship between alcohol consumption and cognition needs to be communicated to the public since it is unclear if the findings from research are generalizable to the total population.

The incidence of Alzheimer's disease doubles every 5 years after 65 years of age [94] and nearly 40 % of older adults aged 85 and over are diagnosed with Alzheimer's disease [7]. The relatively old age of onset for most dementia cases means the observed protective effect of light to moderate alcohol consumption for dementia may be due to alcohol consumers being more likely to die or drop out of a study as a result of their alcohol consumption before they develop dementia. This bias may be especially strong for heavy alcohol consumers. Not properly accounting for death as a competing outcome has been observed to artificially increase the risk of dementia among older adults with diabetes [95] and the effect that death and other competing outcomes may have on the relationship between alcohol consumption and dementia risk is unclear.

6.5.2 Differentiating Former Alcohol Consumers from Life-Long Abstainers

The majority of epidemiological studies that have studied the relationship between alcohol consumption and cognition treat abstainers as the reference category. This can be problematic because often times the abstainer or non-drinking category includes older adults who stopped consuming alcohol because of poor health or other reasons that may also be associated with poor cognitive functioning. Not differentiating former alcohol consumers from lifelong abstainers has been found to explain some but not all of the benefit of alcohol consumption for preventing mortality from cardiovascular causes [96]. The poor health of former drinkers may also explain some of the benefits of alcohol consumption for cognition and decreased risk for dementia [97].

Former alcohol consumers are a segment of the aging population that warrants considerable attention in research. Data limitations can make it difficult to differentiate between former drinkers and abstainers, but ongoing cohort studies such as the Framingham Heart Study [98] and the Seattle Longitudinal Study [99] are valuable data sources to study this population. These studies and others have assessed alcohol consumption behavior for decades, and in some cases, have followed participants from middle age through old age. This data can be used to characterize the drinking patterns of adults who become former drinkers, approximate the age in which a person stopped drinking, calculate how many years they have been a former drinker, potential reasons for the reduction in alcohol consumption, and identify the biological, behavioral, health, and social characteristics of former drinkers. Future research should focus on these topics and how they may be related to cognitive functioning during old age.

6.5.3 Modifying Effects of Genetic, Behavioral, and Social Factors

6.5.3.1 Genetic Factors

Advances in genome sequencing techniques have enabled large epidemiological studies to collect genetic data from participants. This data can be used to conduct gene–environment interaction research to determine if the benefits of alcohol consumption for cognitive functioning differ among older adults with a genetic predisposition for dementia. The e4 variant of the gene *APOE* is the strongest genetic risk factor for late onset Alzheimer's disease and up to 65 % of patients carry one or two copies of the *APOE* e4 allele [100]. A limited number of studies have reported that the relationship between alcohol consumption and cognitive functioning [58] and regional brain volumes [17, 18] is modified by *APOE* e4 allele status, but additional research is needed to replicate these findings and identify mechanisms to explain this relationship.

The cognitive outcome of older adults with genetic risk factors or family history of alcohol abuse is an underrepresented area of research. Forty to 60 % of the risk for alcohol dependence is explained by genetic factors [101, 102] with the remaining risk being attributed to environmental factors. *ADH1B* and *ALDH2* are two genes involved in alcohol metabolisms, and mutations in these genes are associated with reduced likelihood for alcohol dependence [103]. Specific mutations in these genes cause a person to metabolize alcohol very rapidly, which leads to unpleasant side effects (flushing of the skin, nausea, and/or headache) and often limits alcohol consumption. Research on variations in genes involved in alcohol metabolism and alcohol dependence may provide insight into why alcohol consumption is associated with cognitive health in some older adults and not others.

6.5.3.2 Health and Social Behaviors

It is common for people to engage in other behaviors while consuming alcohol. This complicates the relationship between alcohol consumption and cognition because many of the behaviors associated with alcohol consumption are positively and negatively associated with cognitive functioning. For example, alcohol consumers are more likely to smoke than non-drinkers [104] and smoking has been associated with an increased risk for dementia and cognitive decline [105]. Therefore, the detrimental effects of smoking may nullify or reduce the benefits of consuming alcohol for cognition.

The relationship between alcohol consumption and cognition may also differ between people with or without a history of mental illness. Depression reduces the volume of the hippocampus [106] and there is growing evidence that depression plays an important role in dementia. Depression during middle age is recognized as a risk factor for dementia [107], and high depressive symptoms during old age may be an early symptom of dementia [108]. Middle aged adults with depression or other mental illness who self-medicate with alcohol may be at especially high risk for dementia later in life because of synergistic effects that alcohol and depression has on the brain.

Older adults who participate in social activities and are socially engaged have been observed to have lower rates of dementia compared to isolated older adults [109]. Many adults describe themselves as social drinkers, but the risk for dementia among people who primarily drink socially has not been thoroughly examined [110, 111]. Epidemiological surveys often include questions that assess a person's level of social engagement and these variables can be included in regression models to control for the effects of social engagement on cognitive functioning. However, more detailed questionnaires need to be used in research settings to assess the social context in which people consume alcohol. This data can be used to study the extent to which the benefits of social drinking for cognition are attributed to social interactions.

6.6 Summary

Extensive biological and epidemiological research on the relationship between alcohol consumption, brain health, cognitive functioning, and dementia risk has been conducted. The evidence from animal models indicates that even moderate alcohol consumption can have detrimental effects on the brain, but heavy alcohol consumption and binge drinking have severe consequences to the health of the brain. Consuming small amounts of alcohol may not have any negative effects on the brain and may even promote the generation of new neurons in the hippocampus and limit the severity of neuronal loss that occurs with age. This is supported by some epidemiological studies that have observed light to moderate alcohol consumption to be associated with larger total brain volume and regional brain volumes and fewer white matter lesions. However, the findings from epidemiological studies cannot be interpreted as indicating that there is a causal relationship between alcohol consumption and cognition, but there is evidence from animal models that alcohol may have a causal effect on cognition. Plausible mechanisms include increased cell proliferation in the hippocampus and the antioxidative properties of alcohol that limit the negative effects of oxidative stress on the brain.

Epidemiological studies have consistently observed that light to moderate alcohol consumption, in particular during old age, is associated with decreased risk for dementia and preserved cognitive functioning. Heavy alcohol consumption is associated with poor cognitive outcomes and, in some cases, wernicke-korsakoff syndrome. The relationship between alcohol consumption and cognition is highly complex and may differ according to dementia type, gender, and genetic factors. While current evidence from epidemiological studies indicates that consuming light to moderate amounts of alcohol, in particular wine, does not negatively affect cognition and in many cases is associated with cognitive health, adults who do not consume alcohol should not be encouraged to increase their alcohol consumption until further research clarifies these relationships. Inconsistencies between studies on how alcohol consumption categories are defined make it difficult to determine the "optimal" amount of alcohol consumption to prevent dementia. It is likely that

the optimal amount of alcohol varies according to a person's gender, as well as genetic, physiological, behavioral, and health characteristics, making the issue extremely complex.

Additional research is needed to better determine what constitutes safe alcohol consumption for older adults. Future research that emphasizes addressing biases and limitations in study design and analysis can substantially advance our understanding of the relationship between alcohol consumption and cognitive functioning. Also, it is important to describe how selection of the analytic sample may influence results and acknowledge these biases when communicating findings, especially to the general public. Increasing research efforts on former drinkers and differentiating between former drinkers and non-drinkers can help address bias in previous epidemiological studies. Studying the drinking patterns, the age in which a person stopped drinking, reasons for no longer drinking, and other characteristics of former drinkers can provide insight into why light to moderate alcohol consumption appears to be beneficial for cognitive functioning among older adults. Finally, it is necessary to conduct research on the modifying effects that genetic, behavioral, and social factors may have on the relationship between alcohol consumption and cognition.

In summary, consuming light to moderate amounts of alcohol does not negatively affect cognitive functioning and may protect against dementia and preserve cognition. Older adults who are in good health can continue to consume alcohol, but there is no sufficient evidence to suggest that older adults who are non-drinkers should start consuming alcohol. Furthermore, it is necessary to emphasize that consuming any amount of alcohol can have negative consequences, especially for older adults with chronic health conditions such as diabetes or hypertension or who are taking certain medications. Continued research on the relationship between alcohol consumption and cognitive functioning is necessary to make appropriate recommendations for what constitutes safe alcohol consumption.

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Alcohol, Injury, and Aging

7

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7.1 Introduction

Unintentional injury was the eighth leading cause of death among older adults (aged 65+ years) in the United States in 2013, claiming 45,942 lives [1]. Unintentional falls ($n = 25{,}464$ deaths) and unintentional motor vehicle crashes (MVC; $n = 6333$ deaths) among older adults are especially serious problems and were the top 2 of 10 leading causes of injury deaths, followed by suicide by firearm ($n = 5113$) [1]. However, suicides by firearm, poisoning ($n = 905$), and suffocation ($n = 770$) claimed more lives than MVC in the 65+ age group in 2013 [1]. The data also show that unintentional falls and unintentional MVC ranked first and fourth among the causes of nonfatal injuries treated in hospital emergency departments (ED) for the 65+ age group (and the 55–64 age group) in 2013 [1].

As in younger adults, alcohol use in older adults is significantly associated with injury-related (and noninjury-related) mortality. For example, a case–control study based on two nationally representative samples of individuals aged 55+ years found that drinking at least 12 drinks in the last year of life was associated with a 70 % increase in the risk of death from a fall or MVC and a 60 % increased risk of suicide [2]. A 4-year follow-up study of 3.9 million veterans also found that controlling for age, gender, and race/ethnicity, those aged 65+ with alcohol use disorders (AUDs) had a 2.05 (95 % confidence interval [CI] = 1.77–2.44) times greater hazard of dying by injury (and a 1.56 [95 % CI = 1.51–1.60] times greater hazard of noninjury death)

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than their age peers without an AUD [3]. The study also found that veterans with AUDs, regardless of age, died 15 years earlier, on average, than those without AUDs. A study of 5.3 million ED visits by individuals aged 65+ years in the 2012 National Emergency Data Sample also found that AUDs increased the odds of falls (compared to no falls) as an ED presenting problem by 2.93 (95 % CI = 2.86–3.00) and suicide by 6.58 (95 % CI = 5.74–7.54), after adjusting for age, gender, number of diagnosed chronic physical illnesses, and mental disorders [4]. AUDs also had a small effect (relative risk ratios ranging from 1.20 to 2.35) on the risk of death, hospitalization, transfer to another facility, and leaving against medical advice, compared to discharge after routine care at ED [4].

In this chapter, we summarize previous research on alcohol-related injury and death in older adults, focusing on falls, MVCs while driving under the influence (DUI), and suicide and suicide attempts. We then discuss clinical implications of the research findings including prevention strategies for both unintentional and intentional injuries among the growing numbers of older adults.

7.2 Alcohol's Effects on Injury and Death: Biological and Psychosocial Mechanisms

According to the 2013 National Survey on Drug Use and Health (NSDUH), 42 % of individuals aged 65+ years were current alcohol users (they consumed at least one drink in the past 30 days), 9 % were binge users (5+ drinks on the same occasion [i.e., at the same time or within a couple of hours of each other] on at least 1 day in the past 30 days) and 2 % were heavy users (5+ drinks on the same occasion on each of 5 or more days in the past 30 days) [5]. NSDUH data also show that 54 % of the 60–64 age group were current users, 14 % were binge users, and almost 5 % were heavy users [5]. Although these rates were lower than those in younger age cohorts, older adults are more susceptible to alcohol's harmful effects and are at a higher risk of alcohol-related falls, motor vehicle crashes, and other injuries given age-related physiological changes.

Older adults often have multiple chronic medical conditions, and they use more prescription drugs than younger adults [6, 7]. Alcohol use can be especially harmful because it can exacerbate these physical and mental health conditions, lead to additional diseases, and cause potentially dangerous interactions with prescription and over-the-counter medications [8, 9]. Substantial numbers of older adults drink alcohol regardless of their physical and mental health conditions. A sample of community-dwelling, fee-for-service Medicare beneficiaries aged 65+ years in 2005 found that 31 % (95 % CI = 28.0–34.1 %) of those with at least one of seven chronic conditions (Alzheimer's disease and other senile dementia, chronic obstructive pulmonary disease, depression, diabetes, heart failure, hypertension, and stroke) reported alcohol consumption in a typical month in the past year, and 7 % (CI 6.0–7.8 %) reported drinking in excess of National Institute on Alcohol Abuse and Alcoholism (NIAAA) guidelines [10]. According to these guidelines, older adults (aged 65+) should not exceed 7 drinks per week and no more than 2 per day.

A study based on data from the 2005 to 2008 National Health and Nutrition Examination Survey also found that 14.5 % of drinkers aged 65+ consumed alcohol above NIAAA recommended limits [11]. When health status was considered, 37.4 % had engaged in harmful consumption (i.e., exacerbating or complicating existing alcohol-related problems) and 15.9 % had engaged in hazardous consumption (i.e., drinking which posed risks of future harm) [11].

Drinking quantity does tend to decline with age, but aging- and disease-related physiological changes (e.g., smaller body mass, lower total body water content, and decreased gastric alcohol dehydrogenase) lead to higher and longer-lasting blood alcohol concentrations (BACs) in older adults compared to younger adults [12]. As a result, older adults have decreased tolerance and increased central nervous system sensitivity to alcohol, with more pronounced effect in women than men [13, 14]. Alcohol-induced neurotoxicity in late life—affecting judgment, attention, problem solving, visuospatial and perceptual motor functioning/coordination, information processing, reaction time, and balance—can contribute to falls and other traumatic mechanisms of injury resulting in fractures, delirium, gastrointestinal problems, and mood disorders [15, 16]. Older adults who take multiple prescription and over-the-counter medications are also at higher risk for dangerous interaction effects of these medications with alcohol, which can exacerbate underlying diseases and cause serious physical and mental health complications. Those who concurrently use opioid pain killers or benzodiazepines with alcohol are at especially high risk for fatal/nonfatal overdose, altered mentation, and traumatic injury which leads to more ED visits [17–20]. Older women who drink have significantly increased risk because they generally have less muscle mass than older men; this risk was linked to women's heightened sensitivity to over-the-counter and prescription drugs including tranquilizers or anxiolytics [21].

In addition to impaired coordination and balance, reduced bone mineral density (BMD) in older adults may pose a risk for fall and fractures. However, the relationship between alcohol consumption and BMD is not clear. Most previous cross-sectional and longitudinal studies have found that BMD is higher among recent drinkers and light/moderate drinkers than among long-time abstainers [22–25]. A population-based cohort study of older adults in the Cardiovascular Health Study also found that alcohol intake was associated with BMD of the total hip and femoral neck in a stepwise manner, with approximately 5 % (95 % CI = 1–9 %) higher BMD among consumers of 14+ drinks per week than long-term abstainers in both genders and regardless of beverage types [25]. However, this long-term prospective study (median follow-up lengths for those with and without hip fracture were 7 and 12 years, respectively) also found that 14+ drinks per week, compared to long-term abstention, was linked to a 25 % higher risk of self-reported falls but a nonsignificant 1.18 (95 % CI = 0.77–1.81) hazard ratio of hip fracture [25]. The study's authors concluded that "the fact that heavier drinking did not lower risk of hip fracture, despite being most strongly associated with higher BMD, presumably reflects effects of alcohol outside of bone mineralization, such as on cerebella or peripheral nerve function" (p. 600). A review of clinical and experimental studies also found that moderate alcohol consumption may have a protective effect on bone health in

older adults, whereas excessive consumption is an important risk factor [26]. A study of Australian older men found an inverse relationship between alcohol consumption and bone quality (determined by quantitative heel ultrasound) and BMD at the mid forearm site, but it did not find any difference for BMD at other skeletal sites [27].

Coulson et al. [27] also found that higher alcohol intake was associated with greater total and central adiposity in older adults, and those consuming 5 drinks or more a day were more likely to be obese than nondrinkers. Obesity may reduce injuries from falls, but given the significant association between obesity and falls in older adults, especially among frail older adults [28–30], older adults who are obese and heavy drinkers appear to be at higher fall risk. A study of community-dwelling older adults in the United States also found that obesity and high alcohol consumption (>3 drinks a day) synergistically raised serum alanine and aspartate aminotransferase levels in older adults, increasing the risk of liver injury [31].

Motor vehicle crashes while driving under the influence (DUI) are likely to result from the direct biological effects of BAC that impair ability to concentrate, coordinate, track moving objects, process information, and perceive and respond quickly to a hazardous situation such as an approaching vehicle. Even when there is no measurable alcohol in the blood, a hangover or other chronic effects of alcohol use/misuse (e.g., poor sleep, impaired working memory, attention lapses, malnutrition, anemia, alcoholic neuropathy, liver disease, and other chronic diseases) may increase driving-injury risk, especially in older adults [32, 33]. DUI-related motor vehicle crashes and other unintentional injuries may also stem from alcohol-fueled neurocognitive pathways that can lead to poor decision-making tendencies and high risk-taking behaviors such as speeding and ignoring traffic signs and exposure to more hazardous circumstances [34, 35]. Studies show that poor decision-making tendencies, as indicated by other legal transgressions and other forms of irresponsibility rooted in impulsivity and lack of self-control, are often personality traits among DUI offenders and recidivists [36, 37].

Alcohol expectancy theory may explain continued alcohol consumption among many older adults despite alcohol's association with injury and death. Expectancy theory posits that people engage in certain behaviors because they are motivated by the expectation of particular outcomes (reinforcing effects) as a result of engaging in the behavior [38, 39]. Those with more positive alcohol outcome expectations (e.g., social and physical pleasure, relaxation, coping, and assertiveness) are therefore likely to drink more [40–42]. Studies have found that older adults drink for the same reasons as younger adults—to enhance positive mood or well-being, obtain social rewards (e.g., celebrate special occasions with family and friends), to manage pain and other stressors, for general medicinal purposes, and to cope with and attenuate negative emotions (e.g., to forget worries and alleviate depressed or anxious mood and feelings of loneliness) [43–45]. A 3-year follow-up study of community-dwelling older adults ($n=401$) found that more pain was associated with more use of alcohol to manage pain, which in turn resulted in more health and drinking problems [44]. Specifically, among men, more baseline drinking problems interacted with alcohol use to manage pain predicted more health problems and serious injury.

Among women, more baseline drinking problems interacted with alcohol use to manage pain predicted more drinking problems.

Gilson et al. [43] found that enhancement motives (but not social and coping motives) were associated with drinking quantity and that coping motives had strong direct associations with drinking problems. Significant associations between late-life depression, anxiety, and alcohol and/or drug use [46–48] and between psychological distress and binge/heavy drinking have been found [49, 50]. Psychosocial stressors and vulnerabilities and substance use/abuse may be reciprocally related, with psychosocial stressors leading to substance use/abuse and drinking too much feeding into higher degrees of psychosocial vulnerabilities including depression and anxiety [51, 52]. In a study of suicide attempters, substance-induced depression was found to confer greater risk for suicide attempts than independent depression [53].

Alcohol use/misuse is also more prevalent among suicidal than nonsuicidal older adults, and problem drinking or AUDs can elevate suicide risk by interacting with or exacerbating co-occurring psychiatric illnesses such as major depression and other age-related suicide risk factors including chronic medical conditions and lack of social support [54]. Problem drinking and AUDs can also be an independent risk factor for suicide and suicide attempts in older adults, contributing to a sense of hopelessness, suicidal ideation, and poor impulse control due to intoxication [54].

7.3 Falls and Fall Consequences Among Older Adults

The Center for Disease Control and Prevention [55] provides the following data on falls among older adults:

- Falls are the leading cause of both fatal and nonfatal injuries among older adults, with one in three older adults falling each year, and 20–30 % of people who fall suffer moderate to severe injuries such as lacerations, hip fractures, and head traumas. In fact, falls are the foremost cause of both fractures and traumatic brain injury (TBI) among older adults (and TBI is the cause of about half of fatal falls in older adults).
- Other consequences of falls in older adults include decline in functional abilities, loss of independence, reductions in social and physical activities, associated mental health problems, and reduced quality of life.
- Even if older adults do not sustain injury from falls, the resulting fear of falling also contribute to limiting their mobility and physical activities, which in turn increases their risk of falling.
- In 2013, 2.5 million nonfatal falls among older adults were treated in ED and more than 734,000 of these patients were hospitalized. The direct medical costs of falls were $34 billion in the same year.
- Individuals aged 75+ years who fall are also four to five times more likely than those 65–74 years to be admitted to a long-term care facility for a year or longer.

- Death rates from falls have been increasing sharply over the past decade, and about 25,500 older adults died from unintentional fall injuries in 2013, and men are more likely than women to die from a fall. After taking age into account, the fall death rate is approximately 40 % higher for men than for women, although rates of fall-related fractures among older women are more than twice those for men. Older whites are also 2.7 times more likely to die from falls than their black counterparts.

Risk factors for falls in older adults are multifactorial: poor health, poor neuromuscular function (i.e., gait speed and balance) that may be related to arthritis or stroke, osteoporosis, diabetes, chronic pain, depression, cognitive impairment, frailty, obesity, assistive device use, poor vision, eye disorder, poor nutrition, poor sleep, multiple medication intake, especially sedatives/hypnotics, minimal outdoor activities, male gender, and older age [56–61]. With respect to alcohol consumption, the 2008 Behavioral Risk Factor Surveillance System showed that consumption of at least one alcoholic beverage in the past 30 days increased the odds of falls (OR = 1.19, 95 % CI = 1.00–1.41) and fall-related injuries (OR = 1.30, 95 % CI = 1.02–1.67) among those 85 years and older [62]. The 2008–2009 Canadian Community Health Survey-Healthy Aging also showed that consumption of at least one alcoholic drink per week increased the odds of falling by 40 % among those 65+ years [57]. Furthermore, heavy alcohol use predicts fractures. For example, among those 55+ years old in a health survey in England, men who consumed more than 8 units of alcohol and women who consumed more than 6 units on their heaviest drinking day in the past week had significantly increased odds of fractures (OR = 1.65, 95 % CI = 1.37–1.98 for men and OR = 2.07, 95 % CI = 1.28–3.35 for women) [63].

As described, unintentional fall injuries are the top leading cause of injury-related death and of nonfatal injuries treated in EDs [1]. Our analysis of the 2012 Nationwide Emergency Department Sample (NEDS) data set show that fall-related injury was a presenting problem among 12 % of all ED visits by those aged 65+, with significant differences among age groups: 9 % among the 65–74 age group, 12 % among the 75–84 age group, and 18 % among the 85+ age group [4]. After adjusting for age, gender, and the number of diagnosed physical and mental illnesses, AUD increased the odds of falls as an ED presenting problem by almost three times (OR = 2.93, 95 % CI = 2.86–3.00) among older adults' ED visits.

Fall injuries have significant long-term physical, mental, and cognitive health consequences. A 6-year prospective study of older adults (aged 60–93 years) in Sweden found that those with a history of falls scored significantly lower in health-related quality of life and life satisfaction at baseline and after 6 years, compared to non-fallers, especially in the SF-12 physical component [64]. A study based on data from the Hispanic Established Population for the Epidemiological Study of the Elderly found that having two or more falls was associated with greater decline in Mini-Mental Status Exam scores compared to having no fall over a 6-year period, after adjusting for age, sex, marital status, and education. The magnitude of the association decreased when adjustment was made for high depressive symptoms,

suggesting a possible mediating effect of depression on the association between falls and cognition [65]. Furthermore, a study of community-dwelling Swedish older adults aged 75+ years with a history of at least one self-reported injurious fall severe enough to cause an ED visit within a 12-month period found they had a significantly higher risk for sustaining subsequent injurious falls compared to those with no falls (hazard ratio 2.78; 95 % CI, 1.40–5.50) during a follow-up period of approximately 5 years [66].

Fall injuries also result in higher and recurrent healthcare costs (hospitalization, rehabilitation, and/or long-term care facility-based care). Our analysis of the 2012 NEDS data found that fall injuries, compared to no fall injuries, increased the risk of transfer to another facility (relative risk ratio = 1.69, 95 % CI = 1.66–1.71), after adjusting for age, gender, diagnosed physical illnesses, and mental health and substance use disorders [4]. A study of older-adult ED visitors (70+ years) with fall injuries in Australia found that fall-related ED presentation led directly to hospital admission in 42.7 % of the cases; 78 % of the admitted patients received acute care only (length of stay 14.4 days for men and 13.7 days for women) and 12 % underwent further inpatient rehabilitation (length of stay 35.6 days for men and 30.1 days for women). After hospitalization, 9.5 % of patients became first-time residents of long-term care facilities [67]. Even among those older adults who are discharged into the community, fall injuries often require substantial recurrent healthcare use. However, drinking problems can interfere with continuing treatment and recovery. In general, older adults with drinking problems have been found to use primary and preventive care less often than their age peers without drinking problems [68, 69].

7.4 Motor-Vehicle Crashes due to Driving Under the Influence (DUI)

There were almost 36 million licensed drivers aged 65+ years in the United States in 2012, and almost 24 million licensed drivers aged 70+ years in 2013 [70, 71]. The number of older drivers is expected to double by 2030 as the baby boomers join the ranks of the 65+ age group and as older adults keep their licenses longer [71, 72]. Older drivers tend to have the lowest accident rate (4 per 100 drivers) of all age groups; however, per mile traveled, fatal crash rates increase noticeably starting at ages 70–74 and are the highest among drivers aged 85+ years [73–75]. Older adults also tend to have more serious injuries requiring more healthcare resources (e.g., more hospitalization, longer rehabilitation, and more nursing home placement) than younger drivers [74]. In 2012, more than 5,560 older adults were killed and more than 214,000 were injured in motor vehicle crashes, which translated into 15 deaths and 586 injuries on average every day and constituted 17 % of all traffic fatalities and 9 % of all people injured in traffic crashes during the year [70]. Furthermore, from 2011 to 2012, traffic fatalities and injuries among older adults increased 3 % and 16 %, respectively [70].

Alcohol and/or other drug involvement in crashes is less prevalent among older than younger adults [76], which may explain why previous studies of driving safety

among older adults have focused primarily on age-related declines in cognitive, functional, and visual capacities [77, 78]. In 2012, drivers aged 65+ were 7 % of all drivers involved in fatal crashes who had a BAC ≥ 0.08 g/dL [70]. Older adults tend to restrict or stop driving when physical, cognitive, and/or vision impairments begin to impact their driving abilities [79–81]. However, older adults tend to overrate their driving abilities [82–84]. Alcohol use prior to driving may contribute to older drivers' overrating tendency because these substances affect cognitive functioning, especially reasoning and decision-making abilities.

Our own analysis based on the 2008–2012 NSDUH found that a little over 50 % of respondents in the 65+ age group used alcohol and/or illicit drugs, and of these substance users, 6 % reported driving under the influence of alcohol and 1 % driving under the influence of illicit drugs. In comparison, about 70 % of the respondents in the 50–64 age group (mostly baby boomers) used alcohol and/or illicit drugs and of these substance users, 14 % reported driving under the influence of alcohol and 1 % driving under the influence of illicit drugs [85]. These numbers signal that the proportion of older adults who drive under the influence, especially of alcohol, is likely to increase in the future as the boomers join the ranks of older adults. Our analysis of the 65+ age group in the NSDUH also found that those who reported DUI, compared to those who did not, used alcohol more frequently and in larger quantities. Of DUI reporters, 35 % reported consuming alcohol on 300+ days in the preceding 12 months, nearly 20 % reported heavy drinking in the preceding 30 days, and 28 % reported binge, although not heavy, drinking in the preceding 30 days. More than 21 % of DUI reporters, compared to 2 % of non-reporters, met *DSM-IV* diagnostic criteria for AUD (alcohol dependence or abuse) [85]. Multivariate binary logistic regression analysis confirmed that frequency of alcohol use (OR = 4.72, 95 % CI = 2.98–7.50 for drinking 300+ days as opposed to drinking 0–49 days) and binge/heavy alcohol use (OR = 3.22, 95 % CI = 2.27–4.58) were significant predictors of DUI. In addition, marijuana use (OR = 4.94, 95 % CI = 2.12–11.52), major depressive episode (OR = 4.20, 95 % CI = 1.83–9.63), and being male and a college graduate also increased the odds of DUI. The study also found that of the DUI reporters, 22 % perceived the need for treatment for their substance abuse problems but did not receive it.

Using 2008–2012 NSDUH data, we also conducted a latent class analysis (LCA) to identify subgroups of individuals aged 50+ years who may be at risk of DUI using alcohol and illicit drug use, self-reported DUI incidents, and other criminal history as LCA indicators [86]. We focused on those (n = 11,188; 67 % 50–64 years and 33 % 65+ years) who (1) used alcohol on 50+ days in the past year (i.e., at least once a week on average); (2) engaged in binge drinking in the past 30 days; or (3) used any illicit drug in the past year. The LCA identified four classes in ascending order of DUI risk, with Class 1 (63 %) and Class 2 (19 %) posing no/minimal DUI risk, and Class 3 (9 %) and Class 4 (9 %) posing greater risk. The rate of alcohol abuse or dependence was highest among Class 3 (27 %) and Class 4 (20 %) members. In addition, 14 % of Class 4 members, compared to <0.5 % of the other class members, had illicit drug abuse or dependence. Relative to Classes 1 and 2 (no/minimal DUI risk), Class 3 (greater risk) endorsed higher levels of heavy

drinking, self-reported incidents of driving under the influence of alcohol, and lifetime arrest history but a lower level of other illicit drug use than Class 2. Relative to Class 1, Class 4 endorsed higher levels of binge and heavy drinking, marijuana and other illicit drug use, self-reported DUI, and lifetime arrest history. Class 4 also had higher levels of marijuana, other illicit drug, and tobacco use, self-reported DUI, and lifetime arrest history than Classes 2 and 3. The findings also showed that 92 % of Class 4 members were 50–64 years old and 70 % were men. Class 4 also included the highest proportion of Blacks, divorced or never married individuals, those with less than a high-school education, unemployed persons, and those with income below 100 % of the federal poverty line of all four classes. Although the four classes did not differ in the number of chronic illnesses, Class 4 had the poorest self-rated health and the highest rates of MDE (14 %), anxiety disorder (10 %), serious psychological distress (16 %), and serious suicidal thoughts (8 %) of all four classes. These findings underscore the fact that along with substance use disorders, the highest DUI risk groups have significantly lower SES and higher levels of mental disorders. Temporal order between substance abuse and mental health problems could not be examined because the data were cross-sectional; however, the findings call for treatment of co-occurring substance abuse and mental disorders in older adults with high DUI risk.

For older adults, driving is not just a means of transportation, but an essential tool for staying mobile, socially integrated, and independent [87, 88]. Motor vehicle crash injuries can result in especially serious physical, functional, and emotional problems in older adults. Pereira et al. [89] found that higher proportions of older- than younger-adult (18–64 years) ED patients who had MVC injuries had anticipated times to physical recovery and emotional recovery that were 30 days or longer (41 %, 95 % CI = 28–55 % vs. 11 %, 95 % = CI 9–13 % and 45 %, 95 % CI = 35–55 % vs. 17 %, 95 % CI = 15–20 %, respectively), although both age groups experienced similar pain severities. Motor vehicle crashes due to DUI are preventable; however, despite a projected upward trajectory in the number and proportion of older-adult substance users and the rapidly growing numbers of older adult drivers, DUI among older adults has received little attention from researchers or policymakers compared to DUI among adolescents and young and middle-aged adults.

7.5 Suicide and Suicide Attempts

In the United States, there is one completed suicide for every 25 attempts on average; but the rate among older adults is one completed suicide in every four attempts [90, 91]. Older adults have higher rates of completed suicide than younger adults because they are more likely to have serious intent to end their life and to formulate a lethal suicide plan, have compromised health status making them more susceptible to injury or other harm from suicide attempts, and own a gun or have prescription or over-the-counter medications that can be used to end their life [92, 93]. White men aged 85+ years have the highest completed suicide rate of all age and gender groups (50.8 per 100,000 residents in 2010), a rate more than four times that

of the general population [7]. A study of those aged 60+ years in the 2007–2009 National Violent Death Reporting System (NVDRS) found that men were 82 % of all older-adult suicide decedents and that older male suicide rates are nearly six times that of females (28.3 and 4.9 per 100,000 population) [94]. In addition, males aged 85 years and older had the highest suicide rates (44.8 per 100,000). Male rates generally increased with age, while female rates remained fairly consistent [94].

Our analysis of the 2008–2012 NSDUH data found that 1.7 % of the 65+ age group reported serious suicidal thoughts in the past year; 23 % of these ideators made suicide plans; and 10 % of the ideators carried out nonfatal suicide attempts [95]. (Since suicide decedents were not included in the data set, accurate population-based rates of ideation, planning, and the number of attempts could not be estimated.) In addition, of ideators aged 50+ (we included those aged 50–64 due to the small number of ideators aged 65+), alcohol/drug abuse or dependence did not significantly increase the odds of suicide planning, but it was associated with twice the odds of a suicide attempt (OR = 2.09, 95 % CI = 1.11–3.91) after adjusting for income, employment status, marital status, importance of religion, mental disorders, and mental health treatment use. Less than 30 % of the planners and attempters aged 50+ years received any mental health treatment, and only 8 % of the planners and 13 % of the attempters received any substance abuse treatment either before or after their plan/attempt [95].

Although those making both nonfatal and fatal suicide attempts often end up in the ED, few studies have focused on older-adult suicide attempters in EDs. Using 2006 NEDS data, Carter and Reymann [96] estimated a population rate of 63 suicide-related ED patient visits per 100,000 adults aged 65+ years. Approximately 46 % of all older adult patient visits to the ED for suicide-related injuries were made by those aged 75+ years, with 12 % made by adults aged 85 years or older. Nearly 43 % of all older adult suicide-related patient visits involved DUDs; 13.5 % of patient visits involved AUDs.

Carter and Reyman [96] also found that roughly 1.2 % of older adult suicide-related ED patient visits ended in death, whereas 59 % of patient visits resulted in hospital admission; more than 26 % resulted in discharge after routine care (with or without home healthcare), and an additional 29 % in discharge from the hospital to another facility. Compared to discharge after routine care, once adjustments were made for age, sex, and hospital characteristics, AUDs decreased the odds of death (OR = 0.30, 95 % CI = 0.14–0.64). AUDs were also not associated with the odds of hospital admission, but DUDs increased the odds of death and hospitalization by more than three times among suicide-related visits by older adult ED patients. Using more recent (2012) NEDS data, after adjusting for age, gender, and diagnoses of physical illnesses and mental disorders, we also found that as opposed to discharge after routine care, suicide attempts increased the relative risk of death (either in the ED or at hospital after hospital admission) by 1.67 (95 % CI = 1.21–2.33), hospital admission by 5.96 (95 % CI = 5.54–6.40), transfer to another facility by 18.31 (95 % CI = 16.80–19.95), discharge with home care initiation by 2.08 (95 % CI = 1.36–3.18), and other/unknown destination by 5.65 (95 % CI = 3.69–8.65) [4].

Carter and Reyman [96] also found that the most frequent mechanism of suicide-related injury (when such information was available) among older adult patient visits was poisonings (62.6 %), followed by cutting/piercing (12.1 %), unspecified mechanism (7.1 %), firearms (5.1 %), and hanging/strangulation (1.7 %). Karch [94] found that males are most likely to commit suicide using firearms (78 %), followed by hanging, strangulation, or suffocation (10 %), while females most often utilized poisoning (41 %), followed by firearms (38 %). Poisoning deaths accounted for only 7 % of male suicides; in addition, the type of poisons most often used differed by gender. Males most often died from prescription drug overdose (43 %) followed by inhaling carbon monoxide or other gases (32 %) while females most often died of prescription drug overdose (64 %) and over-the-counter drug overdose (11 %). Of those with toxicology testing, females were more likely than males to be positive for antidepressants and for opiates (45 % vs. 19 % and 37 % vs. 18 %, respectively); however, the percent of positive tests for alcohol, amphetamines, cocaine and marijuana were nearly equal in both sexes. In terms of BAC, 20 % of male decedents and 19 % of female decedents were positive ($p = 0.755$), while 59 % of male decedents and 50 % of female decedents had a BAC > 0.08 g/dL.

A study based on data from the 2005–2010 NVDRS found that 16 % of older-adult suicide decedents, compared to 37 % of the 18–24 year olds, 41 % of the 25–44 year olds, and 35 % of the 45–64 year olds, had a positive (i.e., any) BAC [97]. Those older adults who were drinking were more likely to commit suicide by self-poisoning than by using a firearm or hanging. The BAC level in older-adult decedents with a positive BAC was also lower than among their younger counterparts (0.12 vs. 0.13 in the 18–24 age group and 0.15 in the 25–44 and 45–64 age groups). Regardless of age group, BAC among suicide decedents using alcohol was generally highest among firearm suicides and lowest among poisoning suicides until late life (aged 75+ years), when BAC was higher among poisoning and suffocating/hanging suicides. The higher rates of positive BAC and higher BAC levels among older decedents of poisoning suggest increased lethality of interactions between alcohol and medications among older adults [97]. A study focusing on those aged 60+ years in the 2007–2009 NVDRS found that about 5 % of older adults died of alcohol-only or alcohol and prescription drug poisoning [94]. Another study, based on the 2003–2009 NVDRS, also found that older men had higher BAC levels (≥0.08 g/dL) than older women [98].

Our analysis of the 2012 NEDS data showed that suicide attempts were seen in 0.2 % (unweighted $n = 9{,}086$; weighted $n = 39{,}266$) of all visits by patients 65+ years [4]. Suicide-related visits compared to nonsuicide-related visits were more likely to include AUDs (14.7 % vs. 1.4 %), DUDs (6.9 % vs. 0.6 %), and co-occurring mental and substance use disorders (16.4 % vs. 0.6 %), with significant gender differences in AUDs in suicide-related visits (19.9 % of visits by males vs. 9.7 % by females), but no significant gender differences in DUDs in any presenting problem—suicide attempts, unintentional falls, and other unintentional injuries (overall 7.1 % for male and 6.7 % for female, $p = 0.405$). Binary logistic regression results show medium effect sizes of AUDs (OR = 6.58, 95 % CI = 5.74–7.54) and DUDs (OR = 4.04, 95 % CI = 3.52–4.63) in suicide-related visits versus nonsuicide-related visits, after adjusting for age, gender, diagnosis of physical illnesses, and mental disorders.

7.6 Implications for Clinical Practice, Policy, and Research

Unintentional and intentional injuries have serious deleterious effects on older adults' physical, functional, cognitive, and mental health and independent living capacities. Our review confirms the significant effects of alcohol on such injuries, including falls, unsafe driving for self and others, and suicide and suicide attempts, in addition to alcohol consumption's overall detrimental effects on other aspects of physical and mental health (e.g., cancers; infectious diseases; cardiovascular, hepatic, endocrine, and gastrointestinal diseases; and neuropsychiatric diseases, including AUDs and DUDs) [99–102]. Alcohol's effects, even in low or moderate doses, can be especially harmful for older adults given their decreased ethanol tolerance. Below, we provide recommendations for policy and clinical practice to reduce injuries, especially alcohol-related injuries, among older adults.

7.6.1 Fall Prevention

There are many evidence-based fall prevention programs for older adults. A meta-analysis of 17 randomized clinical trials of exercise programs designed to reduce falls in older adults found that exercise programs can also reduce severe fall-related injuries including fractures [103]. Another review of 19 studies of the effect of "exergaming" also found that it can improve balance control and balance confidence [104]. Fall prevention programs are also cost-effective [105]. However, we found no specific prevention programs focusing on alcohol-influenced falls among older adults. In addition to using the usual fall prevention programs with older adults, we offer several recommendations for reducing falls. (1) Older adults and their informal caregivers should be educated about the link between alcohol use and falls, which can be accomplished through a variety of older adult service programs such as senior centers and home-delivered meal programs as well as healthcare providers. (2) Primary care and ED physicians and other aging service providers should routinely assess for substance abuse problems, provide psychoeducation, brief interventions, and/or make referrals to substance abuse treatment programs when indicated for their older patients. Services which help older adults cease or reduce harmful drinking can result in many mental and physical health benefits, including reduced risk of falling and fall-related consequences. (3) Clinicians should also carefully assess the risks of alcohol use among older adults who take such medications as benzodiazepines since mixing such drugs with even small amounts of alcohol is likely to contribute to fall risks. The usual labels and leaflets dispensed with prescription drugs that warn about the contraindications of consuming alcohol may be insufficient to dissuade some older individuals from doing so given what may be lifelong habits of consuming alcohol with meals, at social occasions, or for relaxation. (4) Drug-induced neurotoxicity levels and potential adverse drug effects specific to older age groups also need to be assessed, particularly for those with DUDs, as they can also lead to falls. (5) Fall prevention programs that include attention to

substance use and substance use problems among older-adults and substance abuse prevention and treatment programs that include fall prevention components should be implemented and evaluated.

7.6.2 DUI Prevention

To prevent and reduce DUI among the growing number of older drivers and promote their driving safety, we also make several recommend recommendations. (1) Health and social service providers should educate older, substance-using drivers about age-related changes that impact substance use effects in general and driving safety in particular and motivate those with substance use problems to seek treatment. (2) Access to evidence-based substance abuse treatment should be facilitated for older adults with substance use problems in general, and older adult DUI reporters in particular, given that NSDUH data show that a substantial proportion of older DUI reporters perceived the need for treatment but did not receive it. Mental health and substance abuse treatment is just as effective for older as for younger adults [106, 107]. Community-based substance abuse treatment programs specifically designed for older adults are needed to increase acceptability of these programs to the older adult population. (3) Given DUI reporters' low SES, treatment should be made affordable and readily available and accessible. New Medicare mental health parity provisions should enable more older adults to afford mental health and substance abuse treatment. (4) This review also underscores the need for research to improve identification of older drivers at high risk of DUI so that effective intervention approaches, taking into account their characteristics, behaviors, and expectations, may be developed to prevent crash and injury and prolong their personal mobility. This includes developing improved protocols for screening for substance abuse and comorbid mental health conditions in addition to assessments of motor, visuoperceptual, and cognitive issue and use of smart technology to prevent driving when it is not safe, for example, by providing a tool that older adults can easily use to self-screen their alcohol-impaired driving limitations.

7.6.3 Suicide Prevention

Suicide attempts and fatalities in late life are tragedies that can be prevented. Screening and treatment for risk factors as well as strengthening protective factors (e.g., social support) remain significant late-life suicide prevention approaches [108]. Our review also indicates that other steps should be taken. (1) Providers in primary care and specialty care settings should carefully conduct suicide risk assessments with older adults, especially those who have mental health and/or substance abuse problems. (2) Since ideators have high rates of MDE, AUD, and DUD, mental health and substance abuse treatment programs should reach out to older adults identified as having suicidal ideation. Information from the NSDUH that nearly one-quarter of those with serious suicidal thoughts made suicide plans and 10 % of

them made nonfatal suicide attempts also underscores the importance of assessing suicidal thoughts and providing the services necessary to prevent suicide, especially among those with mental health substance abuse problems. (3) Findings that less than 30 % of suicide planners and attempters received any mental health treatment and less than 10 % of them received any substance abuse treatment either before or after planning or attempting also underscores the importance of mental health and substance abuse treatment access for those at-risk, especially racial/ethnic minorities and those of lower SES. With rapidly increasing numbers of people in the 50+ years age group, treatment programs for this age group should be readily available, easily accessible, and affordable. Formal and informal care systems need to be prepared to prompt older adults to get treatment. (4) Community-based suicide-prevention education and outreach efforts are also needed to alert informal and formal caregivers of older adults who are at risk of suicide, to help them notice warning signs, and to aid older adults in seeking help. These important steps must be taken in tandem with accessible and affordable mental health and SUD treatment services.

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Medications, Alcohol, and Aging

8

Patricia W. Slattum and Omar E. Hassan

8.1 Introduction

The older population in the U.S. is growing as the baby boomers (individuals born between 1946 and 1964) begin to pass the 65-year-old age milestone. The population in the US of adults aged 65 years and older (44.7 million people) was about 14 % of the total population in 2013 but is expected to increase to 22 % of the population (82.3 million people) by 2040 [1]. The oldest old (those 85 years and older) are predicted to triple from 6 million people in 2013 to 14.6 million by 2040. The older adult population is a disproportionate consumer of prescription and over-the-counter medications. In a nationally representative sample of community-dwelling adults aged 57–84 years from the National Social Life, Health, and Aging Project (NSHAP) in 2005–2006, 81 % regularly used at least one prescription medication on a regular basis and 29 % used at least five prescription medications. Forty-two percent used at least one nonprescription medication and concurrent use with a prescription medication was common, with 46 % of prescription medication users also using OTC medications [2]. Prescription drug use by older adults in the U.S. is also growing. The percentage of older adults taking at least one prescription drug in the last 30 days increased from 73.6 % in 1988–1994 to 89.7 % in 2007–2010 and the percentage taking five or more prescription drugs in the last 30 days increased from 13.8 % in 1988–1994 to 39.7 % in 2007–2010 [3]. As the population ages and the use of prescription drugs increases, the risk of developing a medication-related problem also increases.

Patterns of alcohol use among older adults are also changing. Most older adults in the U.S. are light or moderate drinkers and do not exceed the National Institutes of Alcohol Abuse and Alcoholism (NIAAA) daily or weekly drinking limit for older

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adults. The prevalence of current (defined as at least one drink in the past 30 days), binge (defined as 5 or more drinks on the same occasion in the past 30 days), and heavy alcohol use (defined as 5 or more drinks on the same occasion on each of 5 or more days in the past 30 days) in 2013 was lower among adults aged 65 or older (41.7, 9.1, and 2.1 %, respectively) than among all other adult age groups [4]. However, when health status is taken into account, 28 % of light to moderate drinkers aged 65 and older consumed what would be considered either harmful or hazardous alcohol consumption [5]. Emerging evidence suggests that the current cohort of older adults uses alcohol and psychoactive medications at higher rates than previous generations [6]. Older adults living in retirement communities may be a group at particular risk. A study of older adults residing in a continuing care retirement community (average age greater than 80 years; $n=71$) found that the average days of drinking among study participants was about 4 days per week and the average number of drinks per drinking day was 1.28 drinks [7]. Hazardous drinking, as measured by the 3-item Alcohol Use Disorders Identification Test (AUDIT-C), was observed in 15 % of respondents to a survey conducted in a large retirement community in central Florida, which is higher than reported in the general older adult population (around 10 %) [8]. As the older population grows and prescription and nonprescription medication use increases, alcohol use is also increasing in this population. Concurrent use of alcohol and medications is a growing health concern.

8.2 Physiologic Changes with Aging Altering Response to Medications and Alcohol

The clinical response to a medication is the net result of a complex series of physiological processes. Medications are absorbed into the body, distributed within the body, and metabolized and eliminated from the body. These processes that determine the relationship between the dose of the medication and concentrations of the medication in the systemic circulation are termed pharmacokinetics. While medications are in the body, they interact with receptors, enzymes, transporters, or ion channels to elicit a response. Complex systems act to keep the body in homeostasis. The relationship between the concentrations of the drug in the systemic circulation and the response to the medication is termed pharmacodynamics. There are many sources of variability affecting the response to a medication, including patient and drug product-related factors. Some sources of variability include age, sex, genetics, body weight, health conditions, interactions with other medications and foods, route of administration, dosage form, dosing regimen, and adherence to instructions for use. Alcohol can be considered as a psychotropic medication in this paradigm.

The aging process can affect the response to a medication by altering its pharmacokinetics and pharmacodynamics [9, 10]. Reduced gastrointestinal motility and gastric acidity can alter the rate or extent of drug absorption. Changes in body composition, including decreased total body water and increased body fat can alter drug distribution. For alcohol, changes in body composition result in higher blood alcohol levels in older adults compared to younger adults after the same dose or quantity

of alcohol consumed. Decreased size of the liver, hepatic blood flow, and function of Phase I (oxidation, reduction, and hydrolysis) metabolic pathways result in reduced drug metabolism and increased drug exposure for drugs that undergo Phase I metabolism. Phase II hepatic metabolic pathways are generally preserved with aging. Decreased size of the kidney, renal blood flow, and glomerular filtration result in slower elimination of medications and metabolites by the kidney and increased drug exposure for medications that undergo renal elimination. Age-related impairment of homeostatic mechanisms and changes in receptor number and function can result in changes in pharmacodynamics as well. Older adults are generally more sensitive to the effects of medications and alcohol which act on the central nervous system for example. The consequences of these physiologic changes with aging are that older adults often experience increased drug exposure for the same dose (higher drug concentrations over time) and increased sensitivity to medications (greater response at a given drug concentration) than their younger counterparts.

Aging-related changes in physiology are not the only sources of variability in pharmacokinetics and pharmacodynamics that must be considered for an individual person. Older adults experience more chronic diseases that may decrease drug metabolism and renal elimination than younger cohorts. Frailty may result in further decline in drug metabolism, including Phase II metabolic pathways in the liver [11]. Drug interactions must also be considered as an important source of variability affecting response to medications in older adults, considering the epidemiology of medication use in the older population.

8.3 Drug Interactions in Older Adults

A drug interaction is defined as a clinically meaningful change in the effect of one drug when coadministered with another drug [12]. Many drugs, including alcohol, have the potential for a drug interaction when administered concurrently, but whether a *clinically meaningful* change in effect occurs for a specific person depends on patient-specific factors including age. Drug interactions are generally classified as pharmacokinetic interactions, where one drug alters the absorption, distribution, metabolism, or elimination of another drug resulting in increased or decreased drug exposure, or pharmacodynamic interactions, where one drug alters the response to another medication through additive or antagonistic pharmacologic effects [13]. An adverse drug event occurs when a pharmacokinetic or pharmacodynamic interaction or combination of both results in changes in drug exposure or response that lead to negative clinical outcomes. The adverse drug event could be a therapeutic failure if drug exposure is decreased or the pharmacologic response is antagonistic. The adverse drug event could be drug toxicity if the drug exposure is increased or the pharmacologic response is additive or synergistic. The threshold for experiencing an adverse event is often lower in older adults due to physiologic changes with aging and medical comorbidities, increasing their risk of experiencing an adverse drug event when medications are taken concurrently.

Drug interactions are generally studied clinically during drug development by comparing experimentally the pharmacokinetics of two medications that are expected to be coadministered in practice and hypothesized to have a potential interaction, given alone, with the pharmacokinetics of the medications taken concurrently in healthy young adults. Additional data emerges over time as medications are used concurrently in clinical practice in different patient populations and clinical outcomes are observed by conducting pharmacoepidemiologic studies and monitoring adverse drug event reporting systems [14]. When considering coadministration of more than two medications, predicting the clinical outcome becomes even more complex. The clinical outcomes of drug–alcohol interactions may also depend on the pattern of alcohol consumption. For example, acute ingestion of large quantities of alcohol may inhibit metabolism of some drugs while chronic (daily use over long periods of time) may enhance metabolism of some drugs by enzyme induction. The distribution of alcohol metabolism between cytochrome P450 2E1 (CYP 2E1) and alcohol dehydrogenase is dependent on whether alcohol consumption is occasional or chronic [15]. Older adults may be more likely to experience adverse drug events related to drug–drug and drug–alcohol interactions and our understanding of potential drug interactions in this population continues to emerge.

8.4 Clinically Important Alcohol–Medication Interactions in Older Adults

A large number of potential medication–alcohol interactions have been reported in the literature. Mechanisms of these interactions range from pharmacokinetic interactions affecting either alcohol or medication exposure to pharmacodynamics interactions resulting in exaggerated response. Alcohol–drug interactions particularly relevant for older adults are listed in Table 8.1. This list is not comprehensive and additional resources such as the drug interaction checker on www.drugs.com should be consulted when evaluating the safety of concurrent use of alcohol and medications. It is important to consider age and comorbid health conditions as well when assessing the risk for a clinically important drug–alcohol interaction for a specific person.

8.5 Epidemiology of Alcohol–Medication Interactions in Older Adults

Epidemiologic evidence suggests that concurrent use of alcohol and medications among older adults is common. A variety of methods have been used to categorize levels of alcohol consumption and different definitions of alcohol interacting medications have been employed across different studies. The definition of older adult is not consistent across studies either, with some studies including middle-aged adults (50–65 years of age) in the older adult group. Despite these differences in study methodology, evidence is growing that alcohol–medication interactions are a growing concern for the older adult population as medication and alcohol use increases.

Table 8.1 Alcohol interacting medications

Medication or medication class	Mechanism	Clinical effects
Analgesics		
Acetaminophen	Increased metabolism of acetaminophen by CYP2E1, increasing blood levels of hepatotoxic metabolites	Increased risk of severe liver damage
Opioids	Additive sedative effects	Oversedation, increased risk of fatal overdose due to respiratory depression
Nonsteroidal Anti-inflammatory Drugs (NSAIDs)	Additive damage to the gastric mucosal barrier	Increased risk of gastrointestinal bleeding
Some extended-release opiates	Alcohol coingestion may lead to "dose dumping" of the opiate	Potentially fatal dose of opioid delivered
Methadone	Chronic alcohol use increases hepatic metabolism of methadone; acute alcohol consumption decreases hepatic metabolism of methadone	Chronic alcohol use may decrease the effectiveness of methadone; acute alcohol consumption may increase the risk of a fatal overdose of methadone
Antibiotics		
Ketoconazole, metronidazole, tinidazole	Inhibition of hepatic aldehyde dehydrogenase reducing elimination of aldehyde (a metabolite of alcohol)	"Disulfiram-like" reaction resulting in uncomfortable flushing, nausea, vomiting, and sweating after alcohol consumption
Doxycycline	Increased metabolism with chronic heavy alcohol use	Therapeutic failure
Isoniazid	Increased metabolism of isoniazid and increased production of hepatotoxic metabolite	Therapeutic failure and hepatotoxicity
Anticoagulants		
Warfarin	Acute alcohol intake may decrease metabolism of warfarin. Chronic use may increase or decrease metabolism of warfarin	Alcohol use can increase the risk of bleeding by increasing warfarin effects and by increasing the risk of falling and injury
Antidepressants		
Tricyclic antidepressants	Additive sedative and hypotensive effects	Oversedation, increased risk of orthostatic hypotension
Bupropion	Increased effects of alcohol; acute alcohol consumption and alcohol discontinuation along with bupropion can reduce the seizure threshold	Alcohol intoxication, increased risk of seizures

(continued)

Table 8.1 (continued)

Medication or medication class	Mechanism	Clinical effects
Antidiabetic agents		
Some sulfonylureas (chlorpropamide, glyburide, tolazamide, tolbutamide)	Inhibition of hepatic aldehyde dehydrogenase reducing elimination of aldehyde (a metabolite of alcohol)	"Disulfiram-like" reaction resulting in uncomfortable flushing, nausea, vomiting, and sweating after alcohol consumption
Sulfonylureas, insulin	Alcohol reduces gluconeogenesis and is also a source of calories	May cause severe or unpredictable effects on blood sugar increasing the risk for hypoglycemia or worsening glycemic control
Metformin	Concurrent use may lead to increased blood levels of lactic acid	May cause lactic acidosis (with symptoms of muscle pain, bradycardia, and dizziness)
Anticonvulsants		
Phenytoin	Acute alcohol consumption decreases phenytoin metabolism; chronic use may increase phenytoin metabolism; additive sedative effects	Excessive sedation, altered seizure control
Perampanel	Additive CNS depression	Excessive sedation and psychiatric effects including anger, confusion, and depression
Antihistamines/OTC motion sickness and sleep aids		
First-generation (sedating) antihistamines	Additive CNS effects	Excessive sedation, decreased motor skills, dizziness
Antihypertensives		
Alpha-1-adrenergic blockers (also used to treat enlarged prostate), beta-blockers, calcium channel blockers, vasodilators	Additive hypotensive effects soon after alcohol ingestion	Increased risk of postural hypotension
Antipsychotics		
Atypical antipsychotics	Additive CNS effects and antihypertensive effects	Excessive sedation and postural hypotension
Phenothiazines	Additive CNS effects	Excessive sedation and increased risk of extrapyramidal side effects
Muscle Relaxants		
Skeletal muscle relaxants	Additive CNS depression	Excessive sedation and impaired psychomotor function

(continued)

Table 8.1 (continued)

Medication or medication class	Mechanism	Clinical effects
Sedative-hypnotics		
Benzodiazepines	Additive CNS depression	Excessive sedation and impaired psychomotor function
Nonbenzodiazepine hypnotics	Additive CNS effects	Excessive sedation, impaired psychomotor function, and increased risk of complex behaviors (such as sleep driving)
Sexual dysfunction treatments		
Flibanserin	Additive hypotensive effects	Severe hypotension and syncope
PDE5 inhibitors	Additive hypotensive effects	Increased risk of postural hypotension and tachycardia
Miscellaneous agents		
Statins	Additive hepatotoxicity from both chronic excessive alcohol use and statins	Increased risk of liver damage
Methotrexate	Additive hepatotoxicity	Increased risk of liver injury
Metoclopramide	Additive CNS effects; increased gastric emptying may increase blood alcohol levels	Excessive sedation and impaired psychomotor function
Varenicline	Increased alcohol intoxication	Increased risk of unusual or aggressive behavior

Source: Data from [15, 40, 41]

Results from epidemiological studies in the U.S. older adult population indicate that the potential for alcohol–medication interactions in this population is substantial. In a study of alcohol use and alcohol-interacting medications among older adults using a nationally representative U.S. sample in the National Health and Nutrition Examination Survey (NHANES) 1999–2010, 77.8 % of current drinkers (defined as consuming more than 12 drinks during their lifetime and at least one drink in the past year) used an alcohol-interacting medication in the past month [16]. One-third of those who drank most frequently (5–7 days per week) were concurrently taking alcohol-interacting medications. In a nationally representative U.S. sample of community-dwelling older adults in the National Social Life, Health and Aging Project (NSHAP) 2005–2006, 41 % of participants reported consuming alcohol at least once per week and 20 % were at risk for an alcohol–medication interaction because they were using both alcohol and alcohol-interacting medications on a regular basis [17]. The most common medication use reported by regular drinkers in this study was antidepressants and analgesics. The prevalence of potential drug–alcohol interactions was higher in men for all age groups and increased with age for men but not women. Approximately 8 % of survey respondents reported using more than one alcohol-interacting medication with regular alcohol use. Among participants in the

Pennsylvania Assistance Contract for the Elderly program (aged 65–106 years) taking at least one prescription medication, 77 % were taking an alcohol-interacting medication and 19 % of the alcohol-interacting medication users reported concurrent use of alcohol [18]. Greater risk of concomitant exposure was associated with being in the younger end of the older age group, being male and attaining a higher education level. The most common alcohol-interacting medication combined with alcohol in this study was NSAIDs (20.2 %) followed by prescription antihistamines (20.1 %) and antihypertensive agents (19.8 %). Although these studies do not document adverse outcomes associated with alcohol–medication interactions, they do document that the potential exists for many older adults.

Epidemiological evidence of the potential for alcohol–medication interactions among older adults in other parts of the world is accumulating as well. High prevalence of concurrent use of alcohol and alcohol-interacting medications have also been reported in Australian men (43 % of sedative or anxiolytic users were daily drinkers) [19], in older adults in Finland (42 % of at-risk alcohol users were also taking alcohol-interacting medications) [20], and in older Irish adults (72 % of participants were exposed to alcohol-interacting medications and 60 % of these reported concurrent alcohol use) [21]. Drinking and medication use patterns in older adults may differ across countries, but alcohol–medication interactions appear to be a worldwide concern.

Another approach to thinking about the epidemiology of alcohol–medication interactions in older adults is to consider the role of medications in defining at-risk drinking behavior among older adults. Tools like the Comorbidity-Alcohol Risk Evaluation Tool (CARET) and the Alcohol Related Problems Survey (ARPS) define at-risk drinking considering quantity and pattern of alcohol use as well as comorbidities and concurrent alcohol-interacting medication use. In a study using the ARPS to identify harmful or hazardous drinking among older primary care patients, 11 % were harmful drinkers and 35 % were hazardous drinkers [22]. Most hazardous drinkers were identified as such because of their concurrent use of alcohol and alcohol-interacting medications. The most common alcohol-interacting medications identified through the ARPS were medications for arthritis and pain. In a cross-sectional analysis of survey data from Project SHARE conducted in primary care practices, 35 % of older adults were identified as at-risk drinkers using the CARET [23]. Of the at-risk drinkers, 62 % had alcohol use concurrent with high-risk comorbidities, 61 % had alcohol use concurrent with high-risk medications, and 64 % had high-risk alcohol use behaviors. High-risk drinking was as likely to be due to concurrent alcohol and medication use as it was to high use alcohol consumption patterns. In a study evaluating alcohol use patterns in a continuing care retirement community, more than 60 % of participants were classified as at-risk drinkers by the CARET based on medication interactions, and this was the most common form of at-risk drinking observed in this study [7]. When concurrent medication use is considered in defining at-risk drinking behaviors, medication–alcohol interactions are a major contributor to the overall risk associated with consuming alcohol in older adults. More studies are needed to understand the clinical consequences associated with this “at-risk” classification in older adults.

8.6 Clinical Consequences of Alcohol–Medication Interactions in Older Adults

Potential clinical outcomes associated with individual alcohol–medication interactions in older adults are detailed in Table 8.1. Few studies to date have evaluated outcomes specifically in the older adult population. When at-risk drinking is defined using comorbidity and medication use-specific thresholds of alcohol consumption using the CARET, there is an association between at-risk drinking and mortality in older men but not in older women [24]. The specific contribution of individual medication–alcohol interactions to this association is unknown. In a study using the 2009 Medicare Current Beneficiary Survey (MCBS) data ($n=7163$), at-risk drinking was defined based on the CARET and the effects of potential concurrent use of central nervous system-acting medication and alcohol on the risk for falls was assessed [25]. Almost 6 % of older adults were identified as at-risk drinkers in this study. Use of at least one CNS-acting medication and drinking excessive alcohol (more than 30 drinks per month), or binge drinking (more than four drinks in a single day over the past year), was significantly associated with increased risk of falling in the past year (OR 1.72; 95 % CI: 113–2.61). There was no association detected between alcohol consumption alone and the risk of falling. Alcohol adds to the risk of falling that is associated with the use of psychotropic medications. Polypharmacy in general, and psychotropic burden specifically, has been associated with an increased risk of experiencing a geriatric syndrome such as falls or delirium, in older adults [26, 27]. Based on its pharmacology, alcohol can be considered as a psychotropic drug, and alcohol use should be assessed as part of the medication regimen evaluation to support efforts to prevent or manage geriatric syndromes. More research is needed to elucidate the risks associated with mixing alcohol and specific medications in older adults, especially when the quantities of alcohol consumed fall within recommended drinking limits for older adults.

8.7 Particular Concerns: Poor Sleep Quality and Pain

Alcohol may be used for medicinal purposes by older adults and may be used along with prescription and nonprescription medications for the same indication. In one study, 17 % of older adults reported using alcohol to self-medicate conditions including cardiovascular disease (34 %), sleep disturbance (22 %), the common cold (20 %), indigestion (14 %), relaxation (7 %), stimulation (6 %), and pain (3 %) [28]. In another study, 6 % of older adults reported using alcohol to treat pain [29]. Those with pain who chose to self-medicate with alcohol reported greater pain intensity, had more comorbidities, were at higher risk for adverse outcomes, and were more likely to be depressed than those with pain who did not report self-medication with alcohol. Older adults who reported more severe pain or more pain-related interference with their activities of daily living were more likely to experience drinking problems [30]. Those with chronic pain may report more alcohol use if the alcohol

is used to cope with or manage pain. In a survey of older adults who reported difficulty sleeping in the past month, 13 % reported drinking alcohol to treat their sleep complaints [31]. About half of those using alcohol or OTC sleep medications for sleep had not consulted with their health care provider. Participants were not asked about concurrent use of alcohol and sleep medications in this survey. In another study evaluating use of sleep medications in older adults living in retirement communities, 4 % reported using alcohol to aid sleep and 2 % reported using alcohol along with sleep medications for sleep problems [32]. Combining alcohol and CNS-active medications can be particularly problematic and can shift to a situation of misuse or abuse in older adults experiencing pain, sleep disturbances, or anxiety [6]. Older adults suffering from sleep problems or pain may be a particular risk for alcohol–medication interaction-related adverse events.

8.8 Relevance to Public Health and Health Professionals

Medication–alcohol interactions are a significant concern for older adults. The prevalence of concurrent use of alcohol and alcohol-interacting medications suggests a need for interventions to raise public awareness of the risks associated with medication–alcohol interactions. Written warnings to patients about alcohol use accompanying prescription or nonprescription medications are generally not specific to the older adult population and often recommend that patients "use caution" or consult with a healthcare provider before using concurrently with alcohol. According to a report from the Center for Disease Control and Prevention (CDC), only 9.3 % of adults 65 years of age or older in the U.S. reported ever discussing alcohol use with a health professional, and only 4.2 % reported discussing alcohol use with a healthcare provider in the past year [33]. This percentage is lower than for all other adult age groups. It is unclear whether healthcare providers are adequately prepared to guide patients on the use of alcohol with prescription drugs and whether they are proactively engaging with patients around concurrent alcohol and medication use. In a study of older adults and pharmacists in a community pharmacy setting, older adults reported little knowledge about the risks associated with concurrent use of alcohol and medications and those who reported drinking alcohol in the last few months were less willing to advocate safe use of alcohol with prescription drugs than those who had not consumed alcohol recently [34]. Most pharmacists expressed a willingness to communicate with older adults about alcohol and medication safety, but the more time consuming the intervention, the less likely pharmacists were to be willing to engage in the activity [34].

An additional area that should be discussed is alcohol limits. Recommended alcohol limits for older adults vary depending on the source. Different countries define a "standard drink" differently, ranging from 8 to 14 g of alcohol, and the recommended limit on number of drinks per day varies as well [35]. The rate of drinking is also important. Drinking slowly (i.e., one drink over 2 h) may decrease the rate of rise in blood alcohol concentration. When health professionals offer

recommendations for alcohol limits for older adults, concurrent medication use and medical comorbidities should be considered.

Interventions through healthcare providers can make a difference in patients' knowledge and behavior regarding concurrent use of alcohol and medications. At-risk drinkers aged 50 years and older, as identified by the CARET, who received an educational intervention including a personalized feedback report and educational booklets by mail, were 73 % less likely to be at-risk drinkers than control group participants postintervention [36]. Findings from another randomized controlled trial of this intervention (Project SHARE study) in middle aged and older adult primary care clinic patients who were at-risk drinkers found that the educational intervention reduced at-risk drinking as defined by the CARET, and that the effect of the intervention persisted for 12 months [37]. Most (61 %) of the participants in this study were classified as at-risk drinkers due to concurrent use of alcohol and medications.

An interactive BINGO game to educate older adults about the risks associated with alcohol use and medication interactions has also been evaluated [38]. Participants demonstrated knowledge gains about their own risk, and the majority of a subset of the participants that were surveyed 30 days after the program reported that they were more aware of the risks of using alcohol and medications concurrently. Screening and brief intervention for substance misuse among older adults, as implemented in the Florida BRITE project, has the potential to improve medication and alcohol-related misuse [39]. Public health messaging directed toward older consumers about the risks of drinking alcohol while taking medications has also increased. The National Institutes of Health and the Substance Abuse and Mental Health Services Administration make available web-based and print materials for public education efforts. As the population ages and prescription medication use increases, more research is needed to inform public health efforts directed at reducing harm associated with alcohol–medication interactions.

8.9 Conclusions

With the aging of our population, the increasing use of prescribed medications to manage acute and chronic health conditions, the rise in self-care and over-the-counter medication use, and the increasing use of alcohol and other substances for recreational use among older adults, the opportunities for adverse outcomes from alcohol–medication interactions are growing. Serious adverse outcomes such as falls, accidents, and hospitalization can have a significant impact on quantity and quality of life. The adverse outcomes from medication–alcohol interactions are in large part preventable. To prevent adverse outcomes, it is imperative to raise awareness of the risk associated with alcohol–medication interactions; to educate healthcare providers to recognize and address concurrent use of alcohol and medications; and to develop, implement, and disseminate effective treatment programs directed at concurrent use of alcohol and medications among older adults.

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The Intersection of Elder Abuse and Alcohol Misuse

9

Pamela B. Teaster and Nancy Brossoie

9.1 Introduction

For some older adults, the aging process may accompany an increased reliance on caregivers. A need for assistance can leave older adults vulnerable to abuse, neglect, or exploitation. Data about the prevalence of elder abuse and its circumstances are continuing to be created. Similar to the misuse of alcohol during late life, incidents of elder abuse often remain hidden because of problems with service provision in healthcare and social service sectors such as limited screenings among healthcare providers and underresourced and uneven programs/services available to meet the needs of this nuanced population of older adults. Furthermore, larger societal views also come into play, including the social stigma associated with being labeled as a victim; the potential for severing relational ties; and on an even larger scale, pervasive ageist views held about older persons.

Older victims may experience abuse, neglect, and/or exploitation as a one-time or ongoing event, and they may be victimized by a single type or multiple types of abuse, known as polyvictimization. Also, elder abuse can occur in a variety of community or facility settings, with the reality that anyone may become a perpetrator and anyone may become a victim [1]. Especially for community-dwelling elders, the abuse is most often a form of family violence perpetrated by a trusted other, typically adult children or an intimate partner.

Acierno et al. estimate that one in nine older adults living in the community experiences mistreatment at the hands of a trusted other [2]. Characteristics of abusers include a history of mental illness, difficulty in holding a job, problems in maintaining relationships, and a dependency upon the older adult for whom they are providing care. In many instances, the adult child or intimate partner is also abusing substances such as drugs and/or alcohol [3–5].

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In a national study of Adult Protective Services (APS), Teaster et al. found that for APS there were 253,421 reports of abuse of adults age 60 and over, or 8.3 reports for every 1000 people over the age of 60 [6]. Despite the prevalence of the problem, as well as the growing numbers of older adults in the population generally, state and local mechanisms for identifying, reporting, and investigating suspected cases of elder abuse are inadequate and heavily reliant upon state APS agencies. In many states, the budgets of APS and other responders are inadequate to address the problem. This frequent inadequacy of resources affects the numbers of cases that are reported, investigated, and substantiated. For example, according to a widely cited figure by Pillemer and Finklehor [7], as few as one in 14 cases is reported due to reasons such as fear of reprisal or a reticence by the elder or other family members to report the misdeeds of another family member. A New York study indicated that for every report of elder abuse to an agency, 23.5 instances go unreported [8].

Similar to elder abuse, alcohol misuse in late life is also a largely hidden public health problem that affects approximately 30 % of US adults age 65 and older [9]. Studies worldwide report that alcohol consumption tends to be highest among countries with high incomes but is also prevalent in low-income countries [5]. Though older adults consume less alcohol and in smaller quantities than their younger counterparts [10], alcohol consumption in late life can have a significant effect on elders due to age-related physiologic changes, potential interactions with prescription medications, and dietary changes.

When drinking becomes problematic, it may also contribute to elder abuse. For example, older adults may consume increasing amounts of alcohol to cope with abuse that they are currently experiencing. They may also drink to cope with loneliness, loss of purpose, or depression, thus leaving them open to potential abuse by trusted others, strangers, or to self-abuse or self-neglect. Similarly, individuals who are misusing alcohol may become perpetrators of abuse when they become dependent on older adults for more alcohol, income, housing, and daily needs. Perpetrators may abuse alcohol to cope and to deal with ongoing demands at work and home, increased frustration, and feelings of entitlement to an elder's resources. Alcohol misuse can impair caregiver decision making, lead to neglectful behaviors, and contribute to loss of self-control, all at the expense of an older adult's health and quality of life.

Examining the intersection of elder abuse and alcohol misuse is important in that both issues affect many people. Adults age 65 and older currently represent 13 % of the total population and are expected to reach 18 % by 2020 [11]. If issues surrounding identifying, reporting, and responding to elder abuse and alcohol misuse continue unabated, the same challenges will likely escalate in the next decade.

The purpose of this chapter is to examine the intersection of elder abuse and alcohol misuse. We begin first with a discussion of definitions of elder abuse followed by a presentation of theoretical constructs and frameworks used to conceptualize both problems. Next, we examine settings of abuse and salient scholarly literature on victims and perpetrators as well as the contribution of alcohol to the problem. We then discuss community and societal responses to elder abuse and alcohol misuse and conclude with future directions for research and practice.

9.2 Definitions of Elder Abuse

The field of elder abuse scholarship has long been impeded by definitional problems, such as when it is regarded as a crime, as the definition is derived from state statutes or regulations. When it is considered a "family problem," the tendency is to disregard it, and consequently, elder abuse receives inadequate attention or resources by entities that might intervene. The definitional conundrum has driven the quality and type of research conducted on the topic [12–14].

The most influential publication to date, *Elder Mistreatment: Abuse, Neglect, and Exploitation in an Aging America*, produced by the National Academy of Sciences (NAS), has gained prominence worldwide [15]. Elder mistreatment here is defined as those "(a) intentional actions that cause harm or create a serious risk of harm (whether or not harm is intended) to a vulnerable elder by a caregiver or other person who stands in a trust relationship to the elder or (b) failure by a caregiver to satisfy the elder's basic needs or to protect the elder from harm" (p. 40) [12]. Importantly, the NAS definition stresses perpetration of abuse by a trusted other.

Another important definition promulgated by the World Health Organization (WHO) [5] defines elder abuse as "a single, or repeated act, or lack of appropriate action, occurring within any relationship where there is an expectation of trust which causes harm or distress to an older person." The WHO definition contemplates that elder mistreatment can take on multiple types and repeated acts, or *polyvictimization* [16].

9.3 Types of Elder Abuse

Regardless of living environment, some older adults with vulnerabilities can be at risk for elder abuse: physical, sexual, verbal/emotional, neglect (both active and passive), financial abuse/exploitation, and self-neglect; elder abuse can also include aspects of domestic violence and intimate partner violence. Each type is described as follows using definitions taken from the National Center on Elder Abuse [17] and supported by current research findings (Table 9.1).

Table 9.1 A comparison of prevalence studies and typologies of elder abuse

	Acierno et al. [2]	Laumann et al. [32]	Lifespan of Greater Rochester Inc. [8]	Teaster et al. [6]
Physical abuse	1.6 %	0.02 %	22.4 %/1000	10.7 %
Sexual abuse	0.06 %	–	0.03 %/1000	1.0 %
Emotional/psychological abuse	4.6 %	9 %	16.4 %/1000	14.8 %
Neglect	5.1 %	–	18.3 %/1000	20.4 %
Exploitation	5.2 %	3.5 %	42.1 %/1000	14.7 %
Self-neglect	–	–	–	37.2 %

Physical abuse. Physical abuse involves physical force that may result in bodily injury, physical pain, or impairment. It can include acts of violence such as striking (with or without an object), hitting, beating, pushing, shoving, shaking, slapping, kicking, pinching, and burning. In addition, physical abuse encompasses the inappropriate use of drugs and physical restraints, force-feeding, and physical punishment of any kind [17].

Sexual abuse. Sexual abuse, considered the most hidden of the abuse types [18, 19] refers to nonconsensual sexual contact of any kind. Sexual contact with any person incapable of giving consent is also considered sexual abuse. This type of abuse includes, but is not limited to, unwanted touching and all types of sexual assault or battery, including rape, sodomy, coerced nudity, and sexually explicit photographing [17].

Emotional/psychological abuse. Emotional or psychological abuse is unseen and involves inflicting anguish, pain, or distress through verbal or nonverbal acts. It includes but is not limited to verbal assaults, insults, threats, intimidation, humiliation, and harassment. Also considered emotional/psychological abuse are threatening looks and gestures; infantilizing an older adult; isolating him or her from family, friends, or regular activities; and proffering him or her the "silent treatment" [17].

Neglect. Neglectful acts concern the refusal or failure to fulfill any part of someone's obligations or duties to an older adult. Neglect may include the failure of a person who has fiduciary responsibilities to arrange care (e.g., remuneration for necessary services) or the failure or refusal of a provider to offer and deliver an implied or agreed-upon standard of care [17].

Exploitation. Exploitation is defined as the illegal or improper use of funds, property, or assets. Examples including cashing a person's checks without authorization or permission; forging an elder's signature; misusing or stealing money or possessions; coercing or deceiving an individual into signing a document (e.g., contracts or a will); and the inappropriate use of a conservatorship, guardianship, or power of attorney [17]. An illustration of the magnitude of the problem, a review of incidents involving the exploitation of elders covered in the national media revealed that cases of exploitation reached $2.6 billion in 2009, a figure that increased to $2.9 billion by 2011 [20, 21].

Self-neglect. Self-neglect occurs when the behavior of an individual threatens his or her own health or safety and manifests itself as a refusal or failure to provide himself/herself with adequate food, water, clothing, shelter, personal hygiene, medication (when indicated), and safety precautions [17]. Self-neglect is one of the most vexing of the abuse types because its origin is difficult to pinpoint and because, in its most extreme form, the problem can result in forced removal of the individual from his or her home and concomitant loss of the individual's civil rights. An individual is not self-neglecting if he or she is mentally competent, understands the consequences of decisions, and makes a conscious and voluntary decision to engage in acts that threaten her personal health or safety as a matter of personal choice. Individuals with limited social connections tend to be more susceptible to self-neglectful situations than those with many social connections [17].

9.4 Characteristics of Victims and Abusers

Victims. A study by Acierno and colleagues [2] included self-reported elder abuse data collected from 5,777 older adults: the average age of victims was 71.5 years, with 60.2 % females. Respondents indicated that 56.8 % were married or cohabitating, 11.8 % (677) were separated or divorced, 25.1 % (1,450) were widowed, and 5.2 % (303) had never married. Similarly, the Lifespan prevalence study [8] utilized a survey of 4,136 adults aged 60 years of age and older and revealed that 20.3 % were between 60 and 64 years of age, 38.0 % were between ages 65 and 74, 29.1 % were ages 75–84, and 12.7 % were aged 85+. Victims were mostly female (64.2 %). Respondents were 65.5 % Caucasian, 26.3 % African-American, and 7.6 % were Hispanic/Latino.

Victims' risk factors. Risk factors for elder abuse include older age, lack of social support, female gender, minority race, physical and mental impairments, and substance abuse. Empirical studies concentrating on specific types of abuse (e.g., sexual, financial) have identified adults aged 75 and older as being particularly susceptible to mistreatment [21, 22]. The link between age and risk for abuse maybe due to the increased longevity of the oldest-old age group of older adults, many of whom experience a decline in health that results in greater dependence on others for self-care than that of the general population.

Lack of social support. Acierno [2] and Amstadter et al. [23] stress that low levels of social support are correlated with the occurrence of all types of elder abuse. Elders who are lonely or isolated are significantly more vulnerable to elder mistreatment and alcohol misuse than are those with strong, fleshed-out support systems.

Gender. Older women tend to be victimized at higher rates than their male counterparts [24]. Higher rates of victimized older women can be attributed to their longer life spans, which may heighten their contact with potential abusers [25]. According to Acierno [2], previous exposure to a traumatic life event (e.g., interpersonal and domestic violence) increases the risk of late life mistreatment and offer an explanation of how vulnerabilities related to the intersection of gender and power amplify the risk for abuse [26]. In general, women consume lower levels of alcohol than men in old age, but previous exposure to a traumatic life event, such as violence, increases the risk of alcohol misuse [27].

Race. Lachs and colleagues [28] found that Black elders are at greater risk for mistreatment than their White counterparts; Tatara [29] found that Black and Hispanic elders were overrepresented in data on elder abuse victims, with nearly one in three being from a minority group. Depending on the culture, race may protect or promote the occurrence of a minority elder's risk for abuse [30, 31]. Related to abuse and alcohol misuse, acceptable consumption of alcohol varies by race and culture.

Physical and mental impairments. Poor overall health and disability exacerbate an elder's risk for abuse. According to Laumann et al. [32], older adults who reported any type of physical vulnerability were 13 % more likely to report verbal mistreatment than were study participants who reported none. Similarly, Acierno et al. [2] reported that the likelihood of financial exploitation by both family

members and strangers increased for older adults with severe physical disabilities, and poor health predicted neglect. According to Sherod et al. [33], cognitive impairment increases with age and is perhaps the most pervasive and salient risk factor for financial abuse and exploitation. Alcohol misuse can impair decision making, an outcome exacerbated if an individual already presents with cognitive impairment [34].

Substance abuse. Research connecting the abuse of alcohol and other substances is emergent at present, with most data collected predicated on a report of the victim [35]. Victims may turn to alcohol misuse as a coping strategy, thus lowering their inhibitions and heightening their risk for poor decision-making, such as when making decisions related to finances [36]. Additionally, victims are more likely to abuse alcohol and other substances when the perpetrator is also abusing the same [37].

9.5 Characteristics of Abusers

Although the body of information concerning elder abuse victims is increasing, far less is known about abusers than victims. According to the National Committee for the Prevention of Elder Abuse (NCPEA) [37], substance abuse is the most frequently cited risk factor associated with elder abuse and neglect. Either the victim, the perpetrator, or both may misuse alcohol, drugs, or medications. Substance abuse is believed to be a factor in many types of elder abuse, including physical mistreatment, emotional abuse, financial exploitation, and a significant factor in self-neglect. Amstadter et al. [23] found that perpetrators of physical mistreatment (as compared to emotional and sexual mistreatment) had a greater likelihood of legal problems, psychological treatment, living with the victim, being related to the victim, and substance use during the abuse incident. Brownell et al. [38] discovered that the pathology or impairment of the abuser was a stronger predictor of abuse than risk factors for the victim. Similar to the Amstadter findings [23], impaired abusers were younger than unimpaired abusers, usually lived with the victim, were unemployed, and had previous involvement with the criminal justice system.

9.6 Responding to Elder Abuse

Responding to elder abuse demands an approach that takes into account the context of both victims and abusers. To address the problem as one for which a black and white solution exists is to ignore the subtleties surrounding the problem as well as to potentially trammel on the rights of the older adults to live life as they choose. Rallying community professionals (e.g., faith leaders, healthcare providers, law enforcement, social workers, etc.) who normally come in contact with older adults (and potential victims) in the course of their work to join forces in responding to potential abuse is an ongoing struggle in many communities. A common perception held by community members is that if an older person is being abused or mistreated, he or she will tell a primary healthcare provider or clergy person. However,

individuals in those professions deny hearing about problems. In reality, community professionals are highly unlikely to screen, recognize, and report suspected problems, citing a lack of expertise in screening or intervening, that it is not their role or responsibility, and a fear of embarrassing and then losing the patient/client, and patient/client confidentiality [39, 40]. When a sensitive issue such as elder abuse and/or alcohol misuse is addressed, it is more often than not addressed independently of other services, with the exception of healthcare emergencies. In a crisis situation, state laws generally mandate that law enforcement and emergency healthcare services report suspected problems to Adult Protective Services for investigation.

Adult protective services. "Adult Protective Services (APS) are those services provided to older people and people with disabilities who are in danger of being mistreated or neglected, are unable to protect themselves, and have no one to assist them" (p. 1) [41]. In most states, APS programs are the first responders to reports of the abuse, neglect, and exploitation of vulnerable adults. Most APS programs serve vulnerable adults regardless of age; however, some serve only older persons (based either on age or incapacity). A few programs serve only adults ages 18–59 with disabilities that keep them from protecting themselves. Interventions provided by APS include receiving reports of adult abuse, neglect, or exploitation; investigating reports; assessing risk; developing and implementing case plans; service monitoring; and evaluation. Adult protection may include providing or arranging for an array of medical, social, economic, legal, housing, law enforcement, or other protective emergency or supportive services [41]. Over half of APS programs investigate in both community and facility settings; all are authorized to investigate in domestic settings (100.0 %), with half authorized in facility settings (68.5 %) [41].

The long-term care ombudsman. Area Agencies on Aging (AAAs) are a nationwide network of local programs that help older people plan and care for their needs. AAAs typically house the Local Long-Term Care Ombudsman (LTCO) [42, 43]. Depending on the state, LTCO are advocates for residents of nursing homes, board and care homes, assisted living facilities, and similar adult care facilities. Either paid or volunteer LTCO attempt to resolve problems of individual residents and bring about changes at local, state, and national levels to improve residents' care and quality of life.

9.7 The Intersection of Alcohol Misuse and Elder Abuse

Although a growing body of work on the effects of alcohol misuse in late life is emerging, at present, only a handful of studies examine the contribution of alcohol to the abuse of older adults. Recognizing that alcohol misuse does not cause a person who drinks to take advantage of another person or commit acts of violence, alcohol misuse, among many negative consequences, tends to lower inhibitions and contribute to poor decision-making.

Currently, there is no evidence to suggest that the severity of alcohol use or the blood alcohol level of a perpetrator at the time of an incident translates to harsher

mistreatment. An analysis of fatal incidents of intimate partner violence (IPV) from 1999 to 2007 involving persons aged 50+ indicated that alcohol was found in the blood of 21 % of perpetrators. Among victims of IPV, 29 % had consumed alcohol, and among them, 64 % had a blood alcohol content above 0.07. For individuals perpetrating a homicide–suicide, 22.2 % had been drinking, and nearly half experienced known mental health difficulties that contributed to the violence [44].

Drinking habits and patterns of both victim and perpetrator remain elusive. Estimated rates of alcohol misuse among perpetrators vary from 3 % [45] to 46 % [34]. Methods for identifying use are heavily dependent on victim report. Elders are more likely to report incidences of abuse when they are injured and need to receive medical care [35]. In a retrospective study of incidents of elder abuse [46], victims reported in 20 % of the care records reviewed that alcohol misuse was a greater problem and needed more attention than the abuse itself.

Drinking alcohol is a strategy used by males and females as a means to cope with depression, anxiety, pain, or an uncomfortable situation. Despite providing comfort in coping, drinking is not a protective factor against abuse. It is estimated that 45 % of women who drink heavily are victims of abuse [27]. Victims with long-standing alcohol problems are also at risk for poor decision-making, detecting coercion or fraud, and resisting potential abuse [4]. Use of alcohol as a coping strategy becomes further problematic when the older drinker is cognitively impaired. The ability to plan, make sound decisions, and respond appropriately to people and things is even more impeded by the presence of alcohol in the brain [34].

A study of 23 perpetrators revealed that abusers were twice as likely as nonabusers to drink more frequently and heavily. Compared to child abusers, they were more than three times as likely to drink daily and twice as likely to have reported feeling less inhibited when they drink. Pittaway and Gallagher [46] found that bouts of severe drinking resulted in the harm of an elder in 14.6 % of elder abuse cases.

A victim's use of alcohol should also be factored into discussions of misuse and dependence [45], not because a victim is deserving of abuse, but to better understand the context of the relationship that alcohol plays in the abuse and the available network of support that surrounds a victim [47]. Couples with established drinking partnerships are more likely to experience incidents of IPV [48]. Victims of elder abuse are four times as likely to abuse alcohol or drugs when the perpetrator abuses substances [35]. In a study of couples aged 50+, researchers found that as alcohol-related problems increased between partners, there was a higher likelihood that IPV occurred [47]. Victims are likely to have poor relationships with their families or to be estranged entirely. If they need care, their family members may be unwilling to help or may harbor resentments that impede their ability to provide good care [4].

It is easy to speculate that perpetrators of elder abuse are likely to misuse alcohol as a means to cope with the daily stressors of caregiving [49, 50]. Still, researchers disagree as to the relationship between alcohol misuse and elder abuse by caregivers. Compton et al. [51] stated that no relationship exists; Kleinschmidt [52] suggested that alcohol misuse among caregivers is a strong predictor of elder abuse, and other researchers have suggested that long-standing drinking problems coupled

with histories of mental health issues [53–55] are key to understanding elder abuse. Differences in findings are connected to how alcohol consumption is defined, cultural perceptions of use, and the rates at which elder abuse is reported [56].

Still, the strongest predictor of physical abuse is believed to be a history of alcohol misuse [57]. Similarly, a strong predictor of self-neglect is alcohol and other substance abuse [37, 58]. Not only does self-neglect diminish one's ability to care for oneself, but alcohol further limits one's ability to do so [59].

Researchers and practitioners alike have observed that persons with substance abuse problems tend to regard older family members, acquaintances, or strangers as prime targets for exploitation [4]. They may financially exploit an older family member or stranger for a regular stream of income or to obtain extra money to support their way of life, including substance misuse. They may also move into their victim's home to gain a stronger hold on the victim's resources or even to use it as a base of operation for drug use or trafficking [37].

9.8 Frameworks for Explaining Elder Abuse

Models for explaining elder abuse are often based on interpersonal or relationship models. Historically, acts of elder abuse have been assumed to be the result of frustration over demands of caregiving (paid and informal). Although a caregiver stress model [49, 50] can be useful in explaining some abuse between caregivers and their highly dependent victims, the model omits the potential for identifying reasons for abuse beyond caregiver stress [60]. Following, we discuss interpersonal models, developmental models, and societal models to explain elder mistreatment. Also, as indicated earlier, it is important to understand how alcohol may be contributing in the abuse.

The Cycle of Violence Theory [61] is based on a relationship model derived from domestic violence research on women who survived abusive relationships. It includes four stages of relationship violence: escalation, violence, reconciliation, and calm. The cycle begins with tension escalating between the victim and the perpetrator. Tension builds to a point when abuse occurs. The couple then enters a period of reconciliation, followed by a period of relationship calm. Once tension begins to build again, the cycle repeats. Although the theory is useful for therapeutic work in identifying antecedents, behaviors, and consequences with victims and perpetrators, it does not address the culpability of either participant. Regardless, the theory can play a useful role in advancing our understanding of elder abuse, especially when contributing factors such as alcohol are present. Once identified, these contributors could be removed, thus disrupting the cycle of violence. For example, as mentioned earlier, bouts of severe drinking led to the abuse/harm incident in 14.6 % of elder abuse cases in a study by Pittaway and Gallagher [46].

Other interpersonal models used to explain elder abuse are also used to elucidate alcohol misuse. Social Learning Theory [62] contends that actions are learned through modeling. Individuals adopt the behaviors of others in their social networks such that abuse can be a learned behavior just as alcohol abuse can be learned [63].

Similarly, Social Exchange Theory [64] suggests that when relationship dynamics become unbalanced, such as in caregiving relationships, individuals will resort to certain acts (e.g., elder abuse or alcohol abuse) to restore relationship balance.

National academies of science framework. An important framework for scholarship on elder mistreatment is that proposed by the NAS, mentioned earlier [12]. Unlike other approaches used to explain elder abuse, this framework was developed specifically for elder mistreatment and is based on relationships that elders maintain with others. Included in the framework are dynamics of power, exchange, inequality, and outcomes of mistreatment. The framework considers quality of life but does not include the problem of self-neglect. The NAS framework has saliency for alcohol-related elder mistreatment because of its focus on the relationship of the elder with the perpetrator, who may be abusing alcohol and thus using it to establish control over the older adult. It may also be applicable to the older adult who is using alcohol, the overuse of which may affect his or her quality of life.

Complete reliance on relationship models to explain elder abuse is still quite limiting because elder abuse can take on many forms, and the course of abuse is often not linear. Factors such as health, finances, family support, and social expectations/norms directly and indirectly influence the nature and actions of daily life. However, using theories and models that can account for multiple external influences and personal choice can be useful in examining abuse and the intersection of abuse and alcohol misuse.

Socioecological framework. A model gaining attention for both IPV and elder abuse is the Socioecological (SE) Framework [65]. The SE framework enables researchers to consider a complex set of explanatory variables that affect elder mistreatment. The model suggests that individuals are embedded in a series of ecological systems: (a) the microsystem (i.e., victim within his or her environment); (b) the mesosystem (i.e., the environment in which the relationship between the victim and perpetrator exists); (c) the exosystem (i.e., public environments and systems, such as community services or law enforcement, that focus on the greater good of the community yet, affect individual well-being); and (d) the macrosystem (i.e., ideological values, norms, and cultural and institutional patterns) [6, 31]. The Centers for Disease Control and Prevention [66] uses the SE model to explain violence and examine the efficacy of prevention strategies by considering risk factors for individual, social, and economic systems that permit conditions for elder abuse to fester [67]. The model has also been applied to intervention [68], prevention [69, 70], intimate partner violence [14], and elder mistreatment in nursing homes [71]. Applicable to the intersection of elder abuse and alcohol misuse, various levels of alcohol stimuli exposure can occur at every level, family, community, neighborhood—even geriatric policies on alcohol could play a role in elder abuse cases.

Life course perspective. Another construct for thinking about elder abuse is the Life Course Perspective [72, 73]. The Life Course Perspective involves social and historical factors woven through personal biography and development within which examinations of family life and social change occur. An advantage of this perspective is that it provides a context for action and intervention, inviting multiple approaches to think about and solve a problem. The Life Course Perspective as

applied to elder abuse includes age, historical period, and cohort effects. Disadvantages for its application are its potential for misunderstanding mean values, confounding social change with social forces, confusing concepts of time and change, problematizing choices, and neglecting intercohort variability. Despite these challenges, this perspective could help researchers understand the role of alcohol in an abusive relationship as well as how to mollify its detrimental effects. For example, the Life Course Perspective can help explain how older adults as well as those who abuse them regard abusive incidents (some may not think them abusive at all) and well as intervention efforts.

Other conceptual approaches to exploring elder abuse may also shed light on the issue and its intersection with alcohol. While most are not empirically testable, they may inform the many dimensions of abuse, neglect, and exploitation: Power and Control Wheel [74], Cumulative Inequality Theory [75], Techniques of Neutralization or "Drift" Theory [76], the Public Health Model [77], the Restorative Justice Model [78], Multidisciplinary and Transdisciplinary Approaches [79], Communications Theories [80], and an Ethics of Care Approach [81, 82]. The development of theories, frameworks, and models for elder abuse and the intersection of alcohol misuse will need to consider the contribution of individuals and populations, with neither more important than the other. Continued exploration and application of theoretical models and approaches to the contribution of alcohol to elder abuse stands to improve both intervention and prevention efforts.

9.9 Settings for Abuse

Elder abuse can occur at home, in the community, in long-term care settings, or a combination of settings. Community locations include such locations as an elder's own home or the home of an individual with whom the elder lives. It is estimated that 90 % of all elder abuse occurs in community settings, though an accurate number is difficult to ascertain because of the ease with which elder abuse can be hidden in community settings [8, 19]. What occurs behind closed doors in the home may go unnoticed until someone finally speaks up, as the example of Mamie attests.

Mamie is an 80-year-old woman with mild cognitive impairment. She walks with difficulty, ambulating in a wheelchair more and more often. Living with her, following his recent and third divorce is her only son, Thomas, a 40-year-old engineer, who never seemed to be able to hold a job for any length of time. His relationships with women were intense but fleeting. Over time, Thomas' bouts with depression have increased, and his weekend drinking has extended into the work week as well. Mamie is a generally cheerful woman, but her painful arthritis and back pain mean that she depends on asking Thomas to help her more and more, and she just forgets sometimes that she has asked Thomas for help at all. It seems as though Thomas has become less patient with her. He needs money, for sure, but he now lashes out with his responses to her requests, and over the past 6 months, he has started destroying vases on the tables and pictures on the walls. Recently, Mamie suffered a broken nose and heavy blood loss when Thomas, in a drunken stupor at the time, hit her and the wall behind her. The police were called by a neighbor who heard Mamie's pleas for Thomas to stop.

Mentioned earlier, alcohol-related elder abuse can also occur in long-term care settings (e.g., assisted living facilities, group homes, mental hospitals, and nursing homes). According to Hawes [83], on an average day, approximately 1.6 million people live in a about 17,000 licensed nursing homes, and another estimated 900,000 to 1 million live in about 45,000 residential care facilities. Research suggests that the 2.5 million vulnerable individuals living in facilities may be at a higher risk for abuse and neglect than older persons who live at home because they are compromised physically and mentally, as illustrated in the following scenario.

Nearly all his life, Don lived and worked as a banker in a small town. Don continued to live in the family home after his wife Loris died in her late 70s due to a protracted illness. Don's only child, a son, lived 5 hours away. The son called and visited as much as he and his family could, but over time, Don became lonely, particularly in the winter months, even forgetting to eat at times. Five years after Loris' death, he sold the family home and moved into an assisted living facility (ALF). His gait and balance had deteriorated to the point that he often stumbled and leaned when he walked. His once sharp memory had begun to flag: he confused the many and increasing medications that his doctor thought he should take (Don had suffered a heart attack in his late 60s and later had bypass surgery for blockages). Living at the ALF helped immensely with his eating regular meals, taking medications, and with his loneliness, as he enjoyed the programs offered there. Prior to having dinner and similar to when he was living on his own, Don enjoyed a daily glass of wine, which he bought in boxes when the facility took the residents on weekly shopping outings. During the first year he resided at the ALF, Don's gait and leaning problems increased to the point that he fell in his apartment and had to be taken to the hospital to sew some stitches in his forehead due to gashes. An emergency room nurse smelled alcohol on Don's breath and asked him about his drinking. Although he admitted only to having a small glad of wine, the nurse contacted APS to follow up.

9.10 Looking to the Future

Individual misuse of alcohol increases the likelihood that elder abuse will occur. Both victim and abuser may be involved in alcohol misuse, with the misuse voluntary or forced. Misuse of alcohol may involve physical or mental health problems as well as the voluntary or forced misuse of substances other than alcohol. Older adults may misuse alcohol due to an addiction acquired in earlier years. They may drink because they are depressed, because they are encountering physical pain, or because they are using it as a coping mechanism for the abuse they are currently experiencing. Abusers may be misusing alcohol for many of the same reasons as the elders they abuse. Alcohol misuse alone does not "cause" elder abuse, rather, it is a contributor to the problem.

Although noteworthy, much of the research related to elder abuse and alcohol misuse is dated or focused on one type of abuse only (e.g., domestic violence), suggesting that the topic is deserving of renewed attention. Several factors suggest that the time has come to reexamine this intersection. First, emphasized previously, the

percentage of adults who are living to older ages is increasing as a percentage of the total population. Coupled with the fact that older adults are living to older ages generally and that they may live longer with greater physical and mental impairments, their risk for abuse in later life could grow as well as the sheer numbers of adults of all genders, races, and cultures who experience abuse.

Second, shifts in sectors of the economy may portend uncertainty related to employability or sustained employability for intimate partners and children. Different from previous generations, children may be compelled to return home to live and become dependent on older parents rather than living in domiciles on their own. While helping to care for an elder may happen just at the right time for both, for a child experiencing a combination of mental health and substance abuse problems, a "perfect storm" for abuse may well develop.

Third, inadequacies in mental health treatment are increasingly evident for many populations, and because of this, persons may turn to alcohol as a coping mechanism, one that may devolve into alcohol misuse and include the misuse of other substances as well. For example, upon discharge, many young persons in the armed services are facing delays in acquiring sorely needed treatment, and many older veterans are experiencing the same. Our understanding of the effects of PTSD is better now than in the past, an understanding that its effects are more long lasting than earlier regarded. Also, many persons are being relocated from institutions and are now living in the community with greater freedoms. However, many are offered too few services and supports to help them do so successfully, a circumstance that may increase the current (and escalating) rate of elder abuse coupled with alcohol misuse.

In conclusion, alcohol misuse is a long-standing problem that can contribute to elder abuse. Its deleterious effects amplify when it is combined with a history of mental health problems and the misuse of other substances. Without a full understanding of this complex problem in conjunction with resources that are adequate and appropriate for intervention and prevention efforts, the prevalence of the abuse of older adults in circumstances involving the misuse of alcohol stands to increase in the ensuing years. Current elder abuse literature indicates the significant need to provide better alcohol treatment early in life in order to prevent the effect of long-time alcohol misuse patterns contributing to elder abuse.

9.11 Resources Related to Elder Abuse

Administration for Community Living (ACL).
Website: www.acl.gov
Clearinghouse on Abuse and Neglect of the Elderly (CANE).
Website: http://www.cane.udel.edu/
Elder Justice Coalition.
Website: www.elderjusticecoalition.com
National Adult Protective Services Association (NAPSA).
Website: www.napsa-now.org

National Association of Area Agencies on Aging (N4A).
Website: www.n4a.org
National Association of States Agencies on Aging United for Aging and Disabilities (NASUAD).
Website: www.nasuad.org
National Center on Elder Abuse (NCEA).
Website: http://www.ncea.aoa.gov/about/index.aspx
National Committee for the Prevention of Elder Abuse (NCPEA).
Website: www.preventelderabuse.org
National Clearinghouse on Abuse in Later Life (NCALL).
Website: http://ncall.us/
National Consumers' Voice for Quality Long-Term Care (or Consumer Voice).
Website: http://theconsumervoice.org
National Institute of Justice (NIJ).
Website: www.nij.gov
National Long-Term Care Ombudsman Resource Center (NORC).
Website: www.ltcombudsman.org/
Safe Horizon.
Website: http://www.safehorizon.org/
Social Security Administration.
Website: www.ssa.gov
World Health Organization (WHO).
Website: http://www.who.int/ageing/projects/elderabuse/en/

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Social and Familial Contexts for Drinking Among Older Adults

10

Rachel Chernick and Alexis Kuerbis

10.1 Introduction

America is rapidly aging. In 2014, one in seven Americans, or 46.3 million individuals, was 65 or older. In 2030, by the time the last baby boomer has turned 65, this number will be one in five or 74 million individuals [1]. Demographic shifts such as declining birth rates and longer life spans are combining with the aging of the baby boomer generation to create a dramatic greying of the population [2]. As a result, there has been an increased focus among researchers concerned with how this demographic shift will impact public health at large. One particular area of interest involves the use of alcohol among older adults.

Alcohol consumption ranges from abstinence at one end of the spectrum to very heavy use at the other. It is not always clear at what point low-risk use gives way to high-risk and problematic use, especially for older adults. Some elders develop problems as a consequence of drinking relatively small amounts; others are able to drink much more without negative outcomes. In addition, moderate consumption has been associated with reduced mortality [3], improved cardiovascular health [4], and lowered risk of dementia [5]. Adams [6] found that drinkers rated their health as good or excellent more often than abstainers, exercised more frequently, and were less likely to be taking medications. While it is possible that health problems lead to a reduction in drinking, it is also possible that moderate drinking brings health benefits. Clearly, the relationship between alcohol use and health is a complex one.

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Despite this complexity, there are general guidelines for consumption. The National Institute on Alcohol Abuse and Alcoholism (NIAAA) has proposed low-risk consumption levels specifically for this age group [7]. According to the NIAAA, adults 65 and older who are healthy and do not take medications should have no more than three drinks per day with a maximum of seven drinks per week. Individuals who consume more than this amount are considered to be *at-risk* or *problem* drinkers. An at-risk drinker is one whose pattern of use does not necessarily cause problems but may result in adverse consequences, either to the user or to others [8]. A problem drinker engages in more hazardous use.

While alcohol use generally declines with age [9], many older adults continue to drink regularly. The baby boomer cohort has maintained relatively high levels of alcohol use in older adulthood compared to earlier generations of older adults. Some postulate that this is because this group came of age when alcohol and drug use were both more prevalent and more socially acceptable [10, 11]. In addition, some specific drinking behavior increases among older adults who do drink. The prevalence of binge drinking is a case in point. Binge drinking is defined as the consumption of four or more drinks on one occasion for women and five or more drinks on one occasion for men [12]. Overall, binge-drinking rates among older adults are significantly lower than for younger individuals. However, older adults who *do* binge drink are doing so with greater frequency—5.5 episodes per month, a higher rate than any other age group [12].

In 2013, the general population rates from the National Survey on Drug Use and Health (NSDUH) for *current alcohol use* among older adults, defined as at least one drink in the past 30 days, was 41.7 %. The rate for *binge use*, five or more drinks on the same occasion on at least 1 day in the past 30 days, was 9.1 %. The rate for *heavy use*, five or more drinks on the same occasion on each of 5 or more days in the past 30 days, was 2.1 % [13]. In another nationally representative sample, Blazer and Wu [14] found at-risk drinking behavior in 17 % of men and 11 % of women. A smaller community-based sample identified 27.1 % of women and 48.6 % of men drinking above NIAAA guidelines [15].

While epidemiological studies provide an indication of overall numbers of older adult alcohol users, they do not describe how particular social and familial influences can serve as either risk or protective factors for this use. It is well documented that individual risk factors such as gender, genetic predisposition, and personality traits can influence alcohol use among older adults [16]. The focus of this chapter, however, is on how environmental factors such as familial and social influences either facilitate or hinder the use of alcohol in this group. Specific contexts to be explored include: retirement, residential context, and familial and social networks. Research that discusses these factors in relation to older adult drinking will be reviewed and discussed. In addition, theoretical explanations for the etiology of older adult alcohol use will be examined and research data will be considered in terms of how well they support or contradict these theoretical explanations.

10.2 Retirement

As the population ages, 20 % of the current workforce will be transitioning into retirement in the coming years [17]. As a result, it is important to understand more clearly how this transition affects the health of retirees, including its impact on drinking behavior. Studying the effects of retirement on drinking patterns is complicated by the fact that the concept of retirement is not defined consistently [17, 18]. Many studies use the traditional definition of retirement as a distinct event [10]. According to this conceptualization, an individual is either retired or not—a dichotomous condition. Modern experiences of retirement, however, are not so neatly divided into two distinct categories. Currently, retirement is not necessarily a singular event but rather an extended period of time where work situations can range from full-time employment to partial employment to nonemployment [2, 19, 20]. Retirement today often consists of a "retiree" continuing to be employed either full or part time, even while officially receiving retirement benefits. Since this "bridge" employment status is not always taken into account in research on the topic, study findings can be compromised [18].

As the nature of retirement is changing, it is becoming increasingly important to break down particular aspects of this experience as opposed to assessing the construct as a single entity [17]. Kuerbis and Sacco [17] performed a literature review of 13 studies examining the relationship between retirement and drinking behavior. This review found that retirement as a whole had little to no *direct* impact on alcohol consumption or problems. Specific aspects of retirement, however, such as preretirement job satisfaction, high workplace stress, involuntary retirement, social roles, and the size of social network did affect drinking behavior. Preretirement job satisfaction was associated with more frequent drinking and more problems associated with drinking [21]. High workplace stress preceding retirement was also associated with increased drinking in retirement [22], as was involuntary retirement [23, 24]. When social roles decreased in retirement, alcohol use and alcohol-related problems decreased as well [25]. When social networks increased in breadth in retirement, they influenced drinking if these networks supported drinking behaviors [25].

A number of studies have examined the issue of voluntary versus involuntary retirement on drinking. In a 10-year longitudinal project, Bacharach and colleagues followed 1279 blue-collar union workers from the transportation, manufacturing, and construction industries [19, 21, 23, 26]. Participants were surveyed 6 months prior to retirement, and then once a year for 10 years postretirement. Areas of inquiry included specific drinking behavior and attitudes, behaviors, situations, and conditions that might be related to alcohol use. Findings revealed those who perceived their retirement as voluntary showed less alcohol use and problematic consequences of drinking, while those who perceived the decision as involuntary demonstrated more alcohol consumption [21]. Respondents who felt they had been forced into retirement against their will were more likely to experience the event as stressful, which led to drinking more often and in larger amounts. Those who experienced retirement as voluntary had a more positive outlook; drinking behavior for

this group was less frequent and less problematic. These authors also assessed the relationship between preretirement job satisfaction and drinking, finding that higher job satisfaction before retirement was associated with greater alcohol consumption and drinking problems postretirement [21]. People who are happiest in their jobs are more likely to feel stress related to the loss of employment and to turn to alcohol as a coping mechanism once they have left this employment.

A study of older individuals in the Netherlands found similar findings related to the voluntary/involuntary nature of retirement [24]. Henke, Van Solange and Gallo followed 1604 participants over a 6-year period. During that time, 55 % of the initial sample retired. In this study, involuntary retirement was again associated with an increased risk of drinking more, suggesting that involuntary retirement can lead to alcohol use as a means to cope with stressors related to this type of employment departure.

Richman and colleagues [22] surveyed 1654 individuals who were employed by an urban Midwestern university. Individuals were from a variety of occupations including clerical staff, maintenance workers and faculty members. Six years later, 71 respondents had retired, about 6 % percent of the initial sample. The authors measured sexual harassment, generalized workplace abuse, psychological workload, and drinking levels both during and after employment. Results suggest that workplace stress during employment continued to impact drinking behavior even after the worker was no longer employed and the stressor had been eliminated. Despite the small number of retirees in the study and the short time period of retirement (1–2 years for most), the study does demonstrate the lingering effects of workplace stress and its effects on drinking.

Neve et al. [25] utilized data from a 9-year longitudinal study to examine the relationship between changing social roles in retirement and drinking patterns in a group of Dutch retirees. Here, the authors were specifically interested in exploring alcohol use in relation to age-related transitions in social roles. These authors found that when social roles were reduced in retirement, both alcohol consumption and alcohol-related problems decreased. In this case, the loss of social roles is not correlated with increases in either the use of alcohol or drinking problems, as some have suggested [10].

Bacharach et al. [26] examined whether or not changes in the quality or size and composition of social support in retirement affected drinking. When social networks were consolidated, drinking problems dropped in severity. When social networks expanded, drinking problems increased. A decrease in the quality of social support was also associated with increased drinking problems although retirement was not a significant mediator of this relationship.

In conclusion, distinct aspects of retirement pose both risk and protective factors for increased alcohol use and alcohol-related problems among retirees. Involuntary retirement, high preretirement job satisfaction and preretirement workplace stress are all risk factors for later increases in alcohol use and alcohol-related problems. Protective factors include fewer social roles, a smaller social network, and more social support. The impact of retirement on individual drinking behavior seems to be highly context specific. Retirement can have a variety of effects on an individual depending on the extent to which they are ready for this transition and whether they view their new life stage in a positive or negative light.

10.3 Residential Context

Older adults live in a variety of living environments due to a broad range of abilities, supports, and needs. The 2010 Census documented 40.3 million adults aged 65 and older in the United States. Among this group, 96 % were *community dwellers*, older adults living in distinct housing units. Elders living in private homes, retirement communities, public housing, and assisted living settings are all included in the community dwellers group. The remaining 4 % of older adults were living in a *group quarters* setting, e.g., nursing homes, psychiatric hospitals, prisons, or homeless shelters [27]. Alcohol use in five particular residential contexts will be considered here: (1) community-at-large, (2) public housing/low-income senior housing, (3) continuing care retirement communities, (4) assisted living, and (5) long-term care.

10.3.1 Community-at-Large

The vast majority of older Americans continue to live in the community-at-large well into their older years [27]. Here, community-at-large refers to late-life adults living independently in private, mixed-age, or noninstitutional residential settings. In an AARP study conducted in 2010, three-quarters of respondents ages 45 and older expressed the desire to "age in place" for as long as possible [28]. Perhaps the most comprehensive investigation to date of community-dwelling older adults and drinking patterns was conducted by Brennan, Moos, and Schutte of Stanford University [15, 29–31]. This project is unique in that it follows the same group of participants over a 20-year period. Unlike other research on alcoholism and older adults based on cross-sectional data or longitudinal data from shorter time periods, this study allows for an examination of changes in alcohol use over an extended period of time in relation to other life history factors. Areas of inquiry include stressors, social resources, coping responses, drinking patterns, and psychological well-being.

The initial sample, 1884 individuals, was recruited between 1986 and 1988. Participants had all sought health services at one of two large medical centers in the Western part of the United States. These adults were between the ages of 55 and 65 at that time (61 on average). The authors focused on older adults who reported drinking at least once a week or more; those who abstained or drank very lightly were excluded from the study. Participants were largely White (90 %), married (75 %), and high school educated (81 %). Average annual family income was $44,000.

The first study based on this long-term project was a cross-sectional analysis and compared a group of 501 problem drinkers with 609 drinkers who did not have alcohol-related problems [29]. Problem drinkers responded positively to two or more items on the Drinking Problems Index (DPI) [32]. This 17-item measure was specifically designed to study problem drinking among older adults. Problem drinking items in the DPI focus on areas where difficulties are more likely to manifest in an older population such as "had falls/accidents," "confused," "neglected appearance," and "felt isolated." Investigators explored the relationship between life

stressors and late-life problem drinking [29]. Both acute stressors and chronic stressors were examined. Acute stressors included events such as death of a spouse, being demoted or laid off from work or having a home or car burglarized. Chronic stressors included physical health stressors such as having a cancer diagnosis or high blood pressure, home and neighborhood stressors such as feeling uncomfortable or unsafe in the living environment, or financial stressors such as an inability to pay bills or afford necessities. Results showed that problem drinkers experienced more life stressors than nonproblem drinkers. These stressors included both ongoing adverse life events and short-term acute life events.

The same study also measured the relationship between life stressors and social resources, such as total family income, support at work, and the degree of emotional support from a spouse, a child, or extended family and friends. Problem drinkers had fewer social resources than the nonproblem drinking group. Problem drinkers with more stress and fewer resources drank more alcohol, had more drinking-related problems, were more depressed, and had less self-confidence. The authors suggest that negative life events, chronic stressors, and fewer social supports all contributed to the maintenance of drinking problems in later life. Conversely, drinking problems may contribute to stressful circumstances and diminished social support [29].

In more recent reports based on this longitudinal study, Moos et al. analyzed baseline, 10-year and 20-year data to determine relationships between social and financial resources and high-risk alcohol use [33]. Participants, who were more financially comfortable at baseline and 10 years, were more likely to report heavy drinking at 10 and 20 years. These findings support other studies that have found correlations with excessive alcohol consumption among this population [34, 35]. Older adults with fewer financial resources might limit alcohol purchases in order to economize funds whereas those with more financial resources have greater opportunities to buy alcohol and engage in social activities that involve its use.

In another study with community-dwelling older adults, Resnick and colleagues examined alcohol use and associated factors in a population where the average age was 82 [36]. In this study, a total of 3305 community dwellers were interviewed. Roughly one in five participants reported drinking one to three drinks weekly. Only 1 % acknowledged four to seven drinks weekly, and none reported more than that amount, although 4 % did not answer the question. It is important to note, however, that participants were being interviewed as part of the admissions process to a continuing care retirement community. It is possible that some withheld information out of concern for being penalized and not being granted admission [36]. In addition, researchers asked direct questions about the quantity of alcohol used, as opposed to using a screening tool such as the DPI. Such screening tools can help to identify drinking among those reluctant to answer a direct question about amount of alcohol consumed [36]. The Resident Profile measure, a combined objective and subjective evaluation, was used to evaluate physical parameters, functional performance, mental health status, cognitive status, and the extent and quality of social support [36].

Interestingly, in this study, individuals who reported no alcohol use also scored *worse* on the mental and physical health measures. In contrast, individuals who used alcohol in moderation demonstrated *better* functioning, cognition, and social supports [6, 37, 38]. Again, however, it is important to note that this is a cross-sectional study design. It is impossible to know whether moderate alcohol use actually led to improved health outcomes, or if the reverse is true—those that were healthier drank more because of fewer health concerns [36].

Another interesting component of the discussion of older adults residing in the community-at-large involves neighborhood composition. Research generally shows that socioeconomically disadvantaged neighborhoods tend to have poorer health outcomes, including increased alcohol consumption [39]. Some have suggested, however, that neighborhood ecological characteristics, and in particular, the density of ethnic enclaves, can serve as a protective factors for older adults in these communities [40]. Some ethnic communities may possess advantages related to social cohesion and social support mechanisms that offset disadvantages related to economic hardship [40].

Problem drinking among older adult men (75+) was investigated in a large population-based cohort of Mexican-Americans [41]. In a sample of 2069 individuals residing in five Southwestern states (Arizona, California, Colorado, New Mexico, and Texas), problem drinking was measured with the CAGE instrument. The CAGE consists of four brief questions used to assess problematic drinking. Questions involve querying the participant on (1) efforts to cut down on drinking, (2) feeling annoyed by criticism of drinking by others, (3) feeling bad or guilty about drinking, and (4) requiring an eye-opener first thing in the morning [42].

In this study, two or more affirmative responses were identified as problem drinking and one or zero affirmative answers were identified as nonproblem drinking. Participants who lived in neighborhoods with a smaller proportion of Mexican-Americans were nearly twice as likely to drink problematically as those who lived in neighborhoods with a larger proportion of Mexican-Americans [41]. In this case, it is possible that communities with higher proportions of Mexican-Americans are protective against the influence of socioeconomic disadvantage that can lead to poor health outcomes. Elements of Mexican-American communities that might be protective are interhousehold family and social networks, strong community institutions, intact families, low residential turnover, and home ownership [43]. Stroope and colleagues suggest that certain community characteristics offer stability and structure, possibly alleviating alcohol use related to stress and providing social regulation of overuse of alcohol [41].

Social control theory posits that strong social bonds, particularly bonds associated with family, friends, or spiritual communities can serve as a regulatory function that encourages "socially appropriate" behavior. If these bonds are weakened, individuals will be less likely to adhere to accepted norms and more likely to engage in nonnormative behavior such as excessive use of alcohol. Religious ties in particular are correlated with less alcohol use in older adults [44, 45]. Social control theory is certainly a valid explanation for the protective factors of high-density Mexican-American neighborhoods in the Stroope study [41].

10.3.2 Public Housing/Low Income Senior Housing

Nearly two million older adults live in public housing in the United States [46]. Cummings et al. [47] examined alcohol misuse among 187 older adults living in public housing in a southern city. Seventy-four percent of the sample was African-American. Participants were generally of lower socioeconomic status with about 50 % not graduating from high school. Income levels for the groups were generally low—85 % reported monthly incomes of $900 or below. In this sample, unemployed residents and residents with shorter tenure at their current residence had the highest drinking levels, as did younger, male, African-Americans. Additionally, 47 % of drinkers and 21 % of all residents acknowledged binge drinking.

In other research on low-income older adults, Clapp and colleagues studied 174 residents (60 and older) of a low-income residential senior center in a large city in the southwestern United States [48]. Similar to other epidemiological studies of this population, 10 % of the residents fell into the at-risk drinking category, about 25 % of the total number of residents who acknowledged drinking. In this study, higher levels of education were associated with low-risk drinking, as compared with abstainers. "Younger" older adult men were more likely to drink. By looking at empty recycled drinking containers in the facility, the researchers were able to determine variations in drinking throughout the course of the month. There was a consistent increase in recycled alcohol containers during the times each month when residents received social security checks [48].

10.3.3 Retirement Communities

Continuing care retirement communities (CCRCs) are facilities that provide a continuum of living and care services for older adults that correspond to the changing needs of this population. The goal of CCRCs is to help older adults age in place and minimize stressful relocation if need for support increases. Typically, CCRCs offer apartment or small house independent living, assisted living, and nursing care living [49]. CCRCs also provide opportunities for social engagement and community involvement. Increasing numbers of individuals are choosing to live in CCRCs in their older adult years. In 2010, there were 2000 CRCs in the United States with a total of 640,000 residents, a number that doubled in the preceding decade [49]. CCRCs are the most expensive of all long-term care options. As a result, most CCRC residents are from middle or upper-middle income brackets [50]. In addition, 45 % of new residents of CCRCs have a college education compared with 20 % of the same age cohort in the general population [50]. The demographic make-up of CCRCs is largely White, female, middle to upper-middle class and in their late 70s [49].

Alexander and Duff [51] studied drinking behavior among 260 residents of three suburban CCRCs in California and Oregon. Residents lived in small houses, condominiums or apartments in gated communities. Clubhouses, golf courses, tennis courts, and swimming pools were all available on the CCRC grounds. Leisure activities were plentiful and included bridge clubs, crafting groups, and sports programs.

Residents of these communities were largely middle-class, well-educated, and Caucasian men and women; the average age was 76. The authors here were interested not only in the general prevalence of drinking in these communities, but were curious about the particular relationship between social interaction and alcohol. Were older adults drinking in response to social isolation and personal loss as some have suggested [52]? Or was drinking a facilitator and a result of an active social life?

Results of the study found that drinking in these communities was widespread. Light and moderate drinkers (drinking only on special occasions or limiting use to one drink per day) comprised 59 % of the sample. Heavy drinkers (daily drinking with at least two or more drinks on each occasion) represented 20 % of the sample. Authors also measured degree of social interaction for each participant. Questions on social interaction included items about marital status, close friendships, and participation in community activities. Only 2 % of residents who used alcohol heavily were socially isolated and drank alone. The vast majority of heavy drinkers had high levels of social interaction and consumed alcohol in the context of social events. A strong relationship was found between higher levels of social interaction and alcohol use in these communities. The authors conclude that social drinking is widespread in CCRCs and that alcohol use is a significant part of the social norms in these retirement communities [51].

The authors speculate that perhaps the high prevalence of social drinking is a reflection of the demographic in CCRCs—generally more educated individuals with higher incomes [53]. However, an alternate explanation is that the social life of these communities facilitates alcohol use, and that residents drink as a process of integrating into the community. Interestingly, almost 10 % of the sample increased their drinking after moving into the CCRC and 29 % of participants felt that they had to use alcohol in order to be accepted in some social contexts.

In a study conducted in Australia, Dare and colleagues [54] corroborated these findings. The study consisted of in-depth interviews with 42 men and women living in both private residences and retirement communities. Participants were between 65 and 74 years, were of higher socioeconomic status, and lived in Perth, Western Australia. Most participants were very socially engaged and participated in a variety of social activities, many of which involved drinking. Alcohol was often served as a social lubricant and hence a facilitator of social engagement. Conversely, social engagement also facilitated alcohol use. In retirement communities in particular, regular opportunities for socializing and a built-in social network enhanced residents' opportunities for alcohol use. For participants who did not live in CCRCs, driving was a major constraining factor for drinking. Those who lived in private homes and drove home after social events curtailed their drinking in anticipation of driving. For residents of retirement communities, having access to social events within walking distance increased their likelihood of drinking at these events.

A study conducted by Sacco et al. [55] focused on patterns of alcohol consumption in CCRCs and how drinking motives and affective states influence alcohol use behavior. The study was conducted at a CCRC in the Washington, D.C. metropolitan area with 71 participants, all of whom resided in independent living. Data on drinking behavior was collected via telephone calls for eight consecutive days after

an initial face-to-face interview. During these calls, participants were asked to report on activities, emotions, and alcohol use behaviors for the previous day.

The study [55] found hazardous alcohol use to be rare among the sample although drinking associated with contraindicated medications or disease comorbidities was more common. Almost half of the respondents drank over the recommended NIAAA guidelines [7]—the average percentage of drinking days was about four days per week while the average number of drinks per drinking day was 1.28. In terms of motivation, participants drank for social reasons at much higher levels than for coping reasons, i.e., to manage negative emotional states. This research challenges the notion that older adults use substances primarily as a coping mechanism related to late-life stressors such as loss or loneliness [56].

Burruss et al. [57] explored beliefs and attitudes about drinking among a subsample ($n = 11$) of the older adults from the study described above. These participants all self-identified as regular drinkers, that is, they drank on at least 6 out of the 8 days prior to the screening. Many reported that drinking was a long-term habit or routine carried over from earlier life stages. Drinking for these individuals was not a response to a specific event, but was a routine related to socialization or relaxation. Participants acknowledged that when drinking took place outside of these routines, peer norms and the availability of alcohol in the CCRC did influence use. The authors conclude that drinking behavior for these older adults provides a sense of continuity from earlier life stages and is a normative part of socialization in these continuing care communities.

Social learning theory suggests that alcohol use trajectories are strongly influenced by attitudes and behaviors of an individual's social networks, particularly family and friends. When individuals engage in social activities with family and friends who approve of and engage in drinking, alcohol use, and misuse are reinforced [58, 59]. Evidence shows that among older adults, participation in social activities is correlated with higher levels of alcohol consumption [34, 60]. It is clear from this research that social networks and the desire for socialization have a significant impact on alcohol use in older adults [54] and that retirement communities enhance drinking opportunities and reduce constraints for residents.

10.3.4 Assisted Living

Assisted living (AL) refers to a long-term care setting for older adults who require assistance with a range of activities, including instrumental activities of daily living (e.g., shopping, cleaning one's home, taking medication). Assisted living facilities can range in intensity of services, and some provide support that is almost equivalent to the services provided by nursing homes. Assisted living facilities charge patients directly, whereas nursing homes are generally reimbursed through Medicare or Medicaid. Residents of these facilities are generally from higher income brackets. Because income and alcohol use are correlated [11], it is a risk factor for drinking behavior in AL settings.

Very little research has been conducted with older adults in assisted living. One of the only studies available surveyed 832 nursing aides in Pennsylvania who had recently worked in assisted living facilities [61]. According to these aides, 69 % of AL residents drank alcohol and 34 % residents drank alcohol daily. Close to one-third of aides (28 %) had observed or had evidence of residents making "poor choices for alcohol consumption" and one-fifth (19 %) had observed or had evidence of alcohol use influencing residents' health [61]. These numbers seem high relative to alcohol use in the general population; however, it is important to note that respondents are nursing aides, not older adults themselves. These aides are providing secondhand information about the individuals in their care. In addition, they are not clinicians trained to provide clinical diagnoses. Despite these limitations, the results do indicate that AL staff regularly observe what they label as problematic alcohol use in these facilities. The authors suggest that higher estimates of alcohol use in this study reflect the particular demographics and characteristics of AL environments that are risk factors for problematic use. These include the fact that AL residents comprise a higher proportion of men from upper income brackets and that AL settings frequently offer easy access to alcohol.

10.3.5 Long-Term Care

In the United States, about 3 % of older adults live in nursing homes [27]. Despite the fact that this consists of 1.3 million people, few recent studies have examined alcohol use in these settings. Data from the 2004 National Nursing Home Survey (NNHS) showed the prevalence of current *DSM* alcohol dependence and abuse among older adults in nursing homes to be only 1 % [62]. Weyerer et al. [63] reported higher rates in a study of nursing home residents in Manheim, Germany. These researchers found that 7.4 % of nursing home residents had alcohol use diagnoses. In a 1997 Veterans Administration study, the prevalence of a lifetime history of alcohol problems was 29 % with 9 % drinking within 1 year of admission [64]. In an older study of VA nursing homes, Joseph et al. found 29 % of residents reported active symptoms of alcohol-related problems at admission [65].

Klein and Jess [66] explored the range of institutional policies related to alcohol use in 111 intermediate care and homes for the elderly in a northeastern state. Here, the authors were interested in policies, treatment, training, and staff attitudes related to alcohol use in nursing homes. The authors interviewed facility administrators about alcohol-related policies in their institutions and their own attitudes towards residents' use of alcohol. Most administrators estimated the proportion of residents in their facilities that had alcohol-related health conditions to be about 10 %. These results, however, are somewhat subjective, as only 57 % of the institutions had a formal alcohol screening process upon admission. Given the generally high rates of alcohol-related problems in other older adult residential facilities, this estimate reflects a tendency for these problems to go unrecognized by staff at these facilities [66]. The authors reported that the screening of residents for alcohol use problems, treatment of problems, and training of staff were all limited. Furthermore, institutions

varied greatly in terms of alcohol-use policies. Almost half of respondents felt it was inappropriate for residents to consume alcohol, yet three-quarters allowed alcohol consumption in certain circumstances. The authors identified a generally conflicted view on the part of these administrators as to whether or not alcohol was a drug to be controlled or a social beverage to be enjoyed—a conflict shared by the larger society.

In conclusion, these studies demonstrate how environmental factors can have both risk and protective influences on older adult alcohol use in the settings described above. In the community, the empirical evidence shows that chronic stressors and reduced social supports are all associated with drinking problems in later life. Conversely, drinking problems can also contribute to stressful circumstances and diminished social support. Studies on older adults in specific communities or in higher levels of care demonstrate that being in a higher income bracket is associated with increased rates of drinking, as is having access to income during certain times of the month for those in lower income brackets. A significant protective factor for older adults includes living in high-density ethnic neighborhoods despite the potential risk factors of socioeconomic disadvantage.

Regardless of setting, social networks were found to facilitate opportunities for drinking, as did geographic proximity to social activities that involved alcohol. The relationship between social interactions and alcohol use is a complex one, however. Increased social interaction is associated with improved health outcomes in older adults, therefore to the extent that social interaction does not involve at risk drinking, it is likely to be protective. Risk in this case might be related to the degree to which social interactions facilitate high-risk or problematic levels of drinking.

10.4 Familial and Social Networks

10.4.1 Spousal Factors

In general, alcohol use in younger couples has been found to be highly concordant, that is, individuals in a relationship tend to engage in similar drinking behaviors [67, 68]. Less is known, however, about alcohol use concordance between older couples. Graham and Braun [69] examined similarities in drinking behavior between spouses in a study of 826 community-dwelling older adults in Ontario, Canada. Results showed high concordance of drinking between spouses—whether they drank at all, how much they drank, and how frequently. One factor that was associated with heavier drinking in spouses was higher education, which the authors speculate might be due to an association between education levels and more liberal attitudes towards drinking. In addition, higher education is also correlated with higher income, which in turn is associated with increased alcohol use. Results here clearly indicate that drinking behavior between older spouses is strongly associated.

Graham and Braun [69] also explored how the loss of a spouse impacts drinking for the surviving spouse. The authors hypothesized that men increase their drinking after their wives die due to the loss of the moderating effect on their drinking behavior.

This hypothesis was born out by study results as indicated by higher drinking rates for groups of divorced/separated men and widowed men than married men. Results for women participants did not support this hypothesis, indicating that women and men might respond differently to the loss of a spouse vis-à-vis drinking behavior.

In addition to the concordance of drinking behavior, researchers have also studied the impact of the quality of the marital relationship on drinking. In the Brennan and Moos study that compared problem and nonproblem drinking behavior [29], the authors found that problem drinkers who reported less empathy and support from their spouses consumed larger amounts of alcohol and reported more drinking-related problems. Marital stressors were correlated with higher levels of alcohol use and drinking-related problems. The authors suggest that for problem drinkers, conflicts within the marital relationship and less support from a spouse may be particularly likely to result in problematic drinking. At the same time, these close relationships can be negatively impacted by these alcohol-related problems.

In contrast, when looking at nonproblem drinkers, Brennan and Moos [29] found that married people consumed more alcohol than unmarried people. The authors propose that this might be a result of married people using alcohol in social contexts, perhaps during a meal or at a social occasion when alcohol is served. Among nonproblem drinkers, marital stress was not associated with level of alcohol consumed.

10.4.2 Children

The literature on the relationship between adult children and their older adult parents who might have problematic alcohol use is minimal. Some suggest that adult children might be ashamed of the problem and chose to ignore it [8]. While not referring to children specifically, Moos et al. [33] did find that heavy drinking impacted relationships with extended family members. When older adults in their study reported high-risk alcohol use at 10 years, the 20-year data showed a decline in the quality of extended family relationships. The implication here is that excessive alcohol consumption among older adults can negatively impact family relationships.

10.4.3 Friendships

Brennan and Moos [29] also found that older adults who reported less empathy and support from friends drank more alcohol, were more depressed, and were less self-confident. More stressors involving friends were associated with more drinking problems. Similar to the findings on marital conflict above, conflict in close friendships can prompt alcohol-use problems; conversely, these relationships can suffer as a result of alcohol-related problems. More support from friends was correlated with fewer drinking-related problems, reduced rates of depression, and increased self-confidence. These findings underscore the significance of social support from friendships in late adulthood.

Moos et al. [31] also found a strong element of social selection among participants' drinking. More participation in social activities and friends' with greater approval of drinking predicted increased probability of high-risk alcohol consumption. Individuals who engaged in heavier drinking chose both friends and partners who approved of this type of drinking. As opposed to social network theory discussed earlier where social networks influence behavior, social selection theory proposes that alcohol consumption changes an individual's social context [33]. Studies among younger adults have shown that heavier drinkers chose partners and friends who approve of heavier drinking [70] and that excessive drinking can alienate social networks. The Moos study supports the idea that social selection also has a strong influence on drinking behavior among older adults.

In conclusion, relationships with spouses, children, and friends all impact alcohol use behavior in older adults. In general, there is high concordance of drinking behavior between elderly couples. Separation, divorce, or death are all risk factors for increased levels of alcohol use among men, but not necessarily among women. Less social support from both spouses and friends are also risk factors for increased alcohol use. On the other hand, heavier drinking can negatively impact these marriages and friendships.

10.5 Conclusion

In sum, as the population ages it is becoming increasingly important to understand how older adults are impacted by alcohol use. This chapter reviewed how various social and familial influences serve as either risk or protective factors at all levels of alcohol use—risk, high-risk, and problematic. Overall, it would appear that like their younger counterparts, environmental stress (involuntary retirement) and social factors (marital discord or strong social networks that drink) are highly influential in the older adult's drinking patterns. How those factors come about to influence an older adult's drinking may be unique, given the life stage. Greater understanding of these social and familial factors will allow clinicians, policymakers, and researchers to better serve this group of vulnerable individuals.

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Part IV

Clinical Issues of Alcohol and Aging

Screening and Assessment of Unhealthy Alcohol Use in Older Adults

11

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11.1 Introduction

The older adult population is rapidly growing, in large part due to the aging of the baby boom generation who comprise 30 % of the US population and the first of whom turned 65 years old in 2011 [1]. Baby boomers engage in higher rates of alcohol use compared to previous cohorts [2] and also have a higher prevalence of alcohol and other substance use disorders [3] and treatment admissions for substance use disorders [4]. Though older adults use alcohol at lower rates than younger adults [5], the sheer size of the older adult population and the aging of the baby boom generation are expected to drive up prevalence rates of unhealthy alcohol use including alcohol use disorders (AUDs) among older adults.

11.2 Older Adults' Risks Associated with Alcohol Use

Alcohol use has different risks in older adults than in younger adults. For example, as one ages, the percentage of lean body mass and total body water decrease which results in a higher blood alcohol concentration per amount of alcohol consumed

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compared to younger adults [6]. Also, older adults experience increased brain sensitivity to the effects of alcohol compared to younger adults [7–9] which results in impaired psychomotor performance [10]. Because older adults may have multiple comorbidities and take multiple medications they are also at risk for negative consequences from concurrent alcohol use [7, 11, 12]. Alcohol may worsen common comorbidities like hypertension, depression, insomnia, and gastroesophageal reflux disease (GERD) and interact with medicines like antihypertensives, pain medications, and medicines used for GERD. [13, 14] Because of these facts, it is increasingly understood that health care professionals need to screen and assess for unhealthy alcohol use among aging adults.

11.3 Definitions

Because of the increased risk of health consequences of drinking in older adults, low risk drinking limits for adults age 65 years and older have been defined by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) as drinking no more than three drinks on any day and no more than seven drinks per week [15]. A standard drink in the United States is defined as 14 g of absolute ethanol. Drink equivalents are: 12 oz of regular beer, 8–9 oz of malt liquor, 4–5 oz. of table wine, and 1.5 oz of 80-proof spirits (e.g., whiskey, gin, vodka, tequila).

One challenge to alcohol screening and assessment is the variety of terminology used in the literature on alcohol to refer to various types of alcohol use. Here, we will define *current use* as the use of alcohol within the past 12 months. *Unhealthy use* has been defined as the use of alcohol that exceeds recommended drinking limits and includes a spectrum of risk [16]. *At-risk or heavy* use includes use that carries risk but has not resulted in harm. *Problem drinking* is the use of alcohol that has resulted in harm but does not meet Diagnostic and Statistical Manual of Mental Disorders (DSM) criteria for an AUD.

The formal diagnosis of an AUD relies on the criteria outlined by the Diagnostic and Statistical Manual of Mental Disorders (DSM). The DSM-Fifth Edition (DSM-5) now merges alcohol abuse and alcohol dependence into AUD [17]. To meet criteria for an AUD, one must have at least 2 of 11 symptoms noted in Table 11.1. The severity of an AUD is defined as mild (the presence of 2–3 symptoms), moderate (the presence of 4–5 symptoms, or severe (the presence of six or more symptoms).

Because of the biologic and social factors unique to older adults, some of these symptoms may be less relevant to them and so presents challenges for an accurate diagnosis [18]. For example, because of age-associated physiologic changes that increase the effects of alcohol and other substances, older adults generally experience a reduction in tolerance to substances. Also, interruption in social and occupational roles or other consequences of unhealthy alcohol use may be less likely to occur or less noticeable in older adults [19, 20]. Additionally, clinical symptoms of AUDs may mimic, overlap, and exacerbate common medical and psychiatric symptoms. For example, older adults and their health care providers may not recognize that problems such as depression or falls are related to drinking [18]. Because of

Table 11.1 Alcohol use disorder criteria: considerations for older adults

DSM-5 criterion for AUD [17]	Consideration for older adult
Alcohol is often taken in larger amounts or over a longer period than was intended	Cognitive impairment can prevent adequate self-monitoring. Alcohol may impair cognition among older adults to a greater extent than younger adults
There is a persistent desire or unsuccessful efforts to cut down or control alcohol use	Same as a general adult population
A great deal of time is spent in activities necessary to obtain alcohol, use alcohol, or recover from its effects	Consequences from alcohol use can occur from using even small amounts
Craving or a strong desire or urge to use alcohol	Same as a general adult population
Recurrent alcohol use resulting in a failure to fulfill major role obligations at work, school, or at home	Role obligations may be different for older adults due to life stage transitions such as retirement. Role obligations more common in late life are caregiving for a spouse or family member, such as a grandchild
Continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol	Older adults may not realize the problems they experience are from alcohol use
Important social, occupational, or recreational activities are given up or reduced because of alcohol use	Older adults may engage in fewer activities regardless of their use of alcohol
Recurrent alcohol use in situations in which it is physically hazardous	Older adults may not identify or understand that their use is hazardous, especially when using alcohol in smaller amounts
Alcohol use is continued despite knowledge of having a persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by alcohol	Older adults may not realize the problems they experience are from alcohol use
Tolerance, as defined by either of the following:	Due to increased sensitivity to alcohol with age, older adults may have lowered tolerance
1. A need for markedly increased amounts of alcohol to achieve intoxication or the desired effect.	
2. A markedly diminished effect with continued use of the same amount of alcohol.	
Withdrawal, as manifested by either of the following:	Withdrawal symptoms can manifest in ways that are more subtle and protracted
1. The characteristic withdrawal syndrome for alcohol	
2. Alcohol (or a closely related substance such as a benzodiazepine) is taken to relieve or avoid withdrawal symptoms	

Source: Data from Barry et al [52] and Kuerbis et al. [53]

these challenges, it is likely that AUDs are under-recognized in older adults. One study explored whether there were differences in responses to diagnostic criteria for AUDs using DSM-IV, between middle-aged and older adults [20]. This study found that older adults were half as likely as middle-aged adults to endorse criteria related to tolerance, activities to obtain alcohol, social and interpersonal problems, and physically hazardous situations.

11.4 Challenges in Screening for Unhealthy Alcohol Use in Older Adults

The United States Preventive Services Task Force has recommended that all adults be screened to identify unhealthy alcohol use [21], but older adults, in particular, are rarely asked about alcohol use habits or screened for unhealthy drinking [22, 23]. There are multiple reasons for limited screening in older adults. These include possible stigma associated with disclosure of unhealthy drinking, not being aware that an older adult's drinking habits may be unhealthy, limited time during clinical encounters especially if there are other conditions to address, and similarities of symptoms of unhealthy alcohol use with other conditions in older adults [24].

11.5 Screening and Assessment Methods

Screening should start with questions about alcohol consumption. If warranted, then further assessment should be made. One approach to screening and assessment advocated by the National Institute on Alcohol Abuse and Alcoholism in the publication "Helping Patients Who Drink Too Much" [25] includes four steps: Step 1: Ask about Alcohol Use; Step 2: Assess for Alcohol Use Disorders; Step 3: Advise and Assist; and Step 4: At Follow-up: Continue Support.

11.5.1 Step 1: Ask About Alcohol Use

In the interest of valid responses from patients, clinicians should ask permission first before conducting a screening [26]. This approach may help to put the patient at ease and helps to create a tone of respect for the individual. Among older adults in particular, respectful interaction may decrease stigma about reporting drinking behaviors. Second, we recommend that clinicians avoid any term that could be construed by the patient as stigmatizing, such as "alcoholic" or "problem drinker." Rather, current practice supports the use of objective quantity and frequency of alcohol use.

Two recommended screening questions for unhealthy alcohol use are the following: "Do you sometimes drink beer, wine, or other alcoholic beverages?" If the response is no, stop. If the response is yes, ask: "How many times in the past

year have you had four or more drinks in a day?" If the response is none, it is recommended to give advice to stay within recommended drinking limits and/or to recommend lower limits if the person takes medications that may interact with alcohol and/or have a health condition that alcohol may worsen. If the response is one or more times, the person is considered an at-risk drinker and the person's weekly average of drinking should be assessed by asking "On average, how many days a week do you have an alcoholic drink" and "On a typical day, how many drinks do you have?" To calculate the weekly average, one multiplies these two numbers. This information on heavy drinking days and weekly average should be recorded in the person's record. Next, further assessment for an AUD should occur (see Step 2).

11.5.2 Step 2: Assess for Alcohol Use Disorders (AUDs)

If an older adult endorses the initial screening questions, a full screening can be used as a means of gathering more information about risk. If warranted, a complete assessment of alcohol use in the context of the person's functional status, comorbid conditions, medication used, and symptoms should be performed [7].

11.5.3 Screening Instruments Validated in Older Adults

Screening tools can assess the level of risk associated with alcohol use and several have been validated in older adults including the CAGE [27], the Michigan Alcohol Screening Test-Geriatric Version (MAST-G) [28], the Short MAST-G [29], the Alcohol Use Disorders Identification Test (AUDIT) [30], the AUDIT-C [31], and the Comorbidity-Alcohol Risk Evaluation Tool (CARET) [13] (see Table 11.2). Screening instruments for alcohol provide more information about the level of risk of a specific older adult, but they are not a replacement for a complete substance use assessment. Because these screening measures are brief and in many cases can be self-administered, they offer decision support for health care providers who have to assess older adults and treat medical conditions efficiently.

Table 11.2 Screening tools for unhealthy alcohol use validated in older adults

	Assesses amount of alcohol use	Assesses symptoms of AUD	Number of items	Sensitivity/specificity
CAGE		+	4	86 %/78 %
AUDIT	+	+	10	86 %/87 %
AUDIT-C	+		3	94 %/80 %
MAST-G		+	24	95 %/78 %
SMAST-G		+	10	75 %/69 %
CARET	+	+	26	92 %/51 %

11.5.4 The CAGE

The CAGE questionnaire [27] is the most common screening tool for lifetime problem alcohol use. It includes the following four questions: (1) Have you ever felt that you should **C**ut down on your drinking? (2) Have people ever **A**nnoyed you by criticizing your drinking? (3) Have you ever felt bad or **G**uilty about your drinking? (4) Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (**E**ye opener)? In older adults, the CAGE has a sensitivity of 86 % and specificity of 78 % to detect a lifetime AUD at a cut point of one positive question [32]. One limitation of the CAGE is the inability of the instrument to distinguish between current and lifetime problems. It also does not take into account the unique vulnerabilities of older adults. The CAGE questions do a poor job of identifying at-risk drinkers who may not meet full criteria for an AUD, but are unhealthy drinkers [33].

11.5.5 The MAST-G and SMAST-G

The MAST-G [28, 34] is a modified version of the Michigan Alcohol Screening Test [35] and was the first tool designed to identify drinking problems for the older adult. The MAST-G includes stressors and behaviors relevant to alcohol use in older adults. It contains 24 questions with yes/no responses and five or more "yes" responses indicate problematic use. It has sensitivity of 95 % and a specificity of 78 % to detect an AUD [34]. The Short MAST-G [29] has ten questions with two "yes" responses indicating a problem with alcohol. In one study, it had a sensitivity of 75 % and specificity of 69 % [36]. It can identify lifetime problem use, but it does not ask information about frequency and quantity of alcohol consumption and does not distinguish among lifetime and current problems. The lack of questions specific to quantity and frequency of drinking limits the utility of the MAST-G in that older adults may experience consumption-related alcohol harm even though they do not endorse problems.

11.5.6 The Alcohol Use Disorders Identification Test (AUDIT)

Developed by the World Health Organization (WHO), the AUDIT assesses for current alcohol problems. [30] It contains ten questions about quantity and frequency of use, alcohol dependency, and consequences of alcohol abuse. Unlike the CAGE and the MAST-G, it was developed to better identify the spectrum of unhealthy alcohol use. Each of the questions is scored on a 4-point continuum, with total scores ranging from zero to 40. The cutoff threshold of 5 is used to indicate hazardous drinking in older adults [37]. Compared to the Timeline Follow-Back [38] (a method using a calendar to recall amount of drinking), the sensitivity and specificity of the AUDIT to identify heavy drinking at this cut point exceeded 85 % in a study of 517 adults aged 65–74 years [39]. Similarly the AUDIT-C, a three item test that includes the first three questions of the AUDIT, had a sensitivity of 94 % and a

specificity of 80 % when using a cut point of 4 [39]. We recommend the AUDIT as a measure for use in clinical practice. Because it was developed by the WHO [30], it has been used in a variety of settings, such as primary care, emergency departments [40], and other aging-specific settings like senior centers [41]. Moreover, the AUDIT has been used internationally [42, 43] and with diverse groups [44].

11.5.7 The Comorbidity Alcohol Risk Evaluation Tool (CARET)

The CARET [45, 46] is a screening instrument that identifies older adults whose use of alcohol places them at risk for harm. It is derived from two other measures, the Alcohol-Related Problems Survey (ARPS) and the short ARPS [47, 48]. It asks questions using a past 12-month time frame and uses algorithms to identify at-risk drinkers within seven domains of risk: (1) amount of drinking; (2) episodic heavy drinking (e.g., >4 drinks on one occasion); (3) driving after drinking; (4) others being concerned about the respondent's drinking; (5) medical and psychiatric conditions; (6) symptoms that could be caused or worsened by alcohol; and (7) medications that could interact negatively with or whose efficacy could be diminished by alcohol. Respondents who have one positive response in any of the seven risk categories are considered at-risk drinkers. Using this threshold, it has a sensitivity of 92 % and a specificity of 51 % compared to a criterion standard. [13] Because it includes items on medications and comorbid conditions common in older adults, it identifies older adults who would not be identified as at-risk on other screening measures [48]. The CARET has been used in randomized controlled trials [45, 49, 50] and identifies most older adults as unhealthy drinkers due to combination of alcohol use with medications, symptoms, and medical and psychiatric conditions.

The CARET is distinctive in that it approaches alcohol-related risk broadly from the perspective of medical risk and aging. The CARET is aging-focused like the MAST-G, but includes common comorbid conditions, medications, and symptoms in older adults. The MAST-G focuses on psychosocial aspects of aging and alcohol use such as drinking to cope with loneliness.

11.5.8 Step 3: Advise and Assist

Following the steps in the NIAAA Guide, when the initial screening and assessment (Step 1) and screening and assessment (Step 2) of an older individual indicate they are unhealthy drinkers, it is recommended that clinicians share findings and make clear recommendations (Step 3). For example, a clinician might say: "Based on your responses to the screening questions, your current drinking is more than is medically safe." It is important to relate the advice about drinking to the patient's presenting problem and overall medical findings. This is an opportunity for the health care provider to educate the older adult about the potential health-related consequences of their use. When presenting this information, the clinician should share health information on NIAAA drinking guidelines, as well as identify

possible connections between the presenting health concern of the older adult to unhealthy drinking. For instance, if an older adult presents for the medical treatment of high blood pressure, the clinician can discuss data that suggests higher alcohol consumption is associated with high blood pressure. One crucial aspect of this discussion is maintaining respect for the autonomy of the older adult. Assuming the older adult has decisional capacity, they have the choice to drink in an unhealthy manner. Admonishing the older adult for their drinking will not necessarily change their behavior and may simply engender resentment.

In the interest of building motivation to change at-risk alcohol use, the clinician can have what is often termed a "brief negotiated interview" or BNI with the older adult. Once information is shared with the individual, the provider can use open-ended questions and reflective listening to understand the role of alcohol in the person's life. The discussion can begin by asking the individual about their reaction to the medical information on alcohol use shared after the screening is completed. Drawn from the work of Miller and Rollnick [51] in motivational interviewing, the idea behind the BNI is to help the older adult to identify discrepancies between their current behaviors and their goals. Two techniques from motivational interviewing can be used to help facilitate the BNI: decisional balance and the readiness ruler.

Decisional balance involves asking the client about the "Pros and Cons" of their use. The clinician first asks about the pros or benefits of alcohol use for the person. The purpose of this question is to foster an understanding of how alcohol use is seen by the individual is helping him or her in some way. Then, the clinician asks the person about the cons or problems that they associate with their use. After talking about what they see is positive about their drinking, the person may be more willing to consider the problems associated with their use. The clinician then uses reflective listening and other communication techniques to have the older adult reflect on their use and problems associated with it.

The readiness ruler uses a scaling question to gauge the older adult's readiness to make a change in their alcohol use. The scaling question is simply, "On a scale from 1 to 10, how ready are you to make a change to your use of alcohol right now?" The patient then provides the clinician with a number, such as "4". The clinician then asks the person why they are not a lower number on the scale (e.g., "2"). The purpose of this approach is twofold. It allows for a measure of ambivalence by the patient, as opposed to asking them if they are ready or not. Additionally, it fosters what Miller and Rollnick [51] call "change talk" by the older adult. Instead of lecturing the patient about reasons to change, the patient is reflecting on and offering the provider a list of reasons why they are considering change even if they are ambivalent.

The BNI concludes with a discussion of what the patient would like to do in terms of an action plan. The clinician can help the older adult to identify a goal and make a plan. In the brief intervention model, the clinician should be flexible and patient centered in planning. Planning should be tailored to the personal goals, preferences, and clinical presentation of the person and should be elicited from the older adult. Clinicians should consider approaches that reduce harm and/or help to foster increased insight into alcohol risk. For example, a provider could work with an older adult patient to monitor their use of alcohol to get a sense of how much they are drinking or assist the person to set limits on their drinking in

ways that will reduce risk. For many older adults, alcohol use is a long-standing pattern of behavior so a single office visit combined with advice may not be sufficient for many at-risk or unhealthy drinkers. Instead, we would suggest that providers see the alcohol screening and the brief negotiated interview as a beginning.

11.5.9 Step 4: At Follow-Up: Continue Support

With that in mind, it is important to ask older adults about their alcohol use at each visit, especially those identified as at-risk to monitor for change in alcohol consumption. If they are at-risk, then reinforce and support continued adherence to recommendations. For those who are not dependent, renegotiate alcohol use goals if needed, encourage the patient to return and rescreen regularly. For those who are dependent, ideally coordinate care with an addiction specialist, consider initiating or maintaining medications for alcohol dependence for at least 3 months and address coexisting disorders as needed.

If the patient has not been able to meet and sustain the alcohol use goal, then it is important to acknowledge that change is difficult, support any positive change, relate alcohol use to problems, and consider engaging significant others. For those without dependence, it is useful to renegotiate goal and plan and reassess diagnosis if the patient is unable to make change. For those with dependence, consider, if not done already, referring to an addiction specialist or consulting with one, recommend a mutual help group, and prescribe a medication used for AUDs.

11.6 Conclusions

Alcohol is the most commonly used substance in older adults and has unique risks in this population primarily because of (a) changes in physiology with age that increase blood alcohol levels for a given amount of alcohol and alcohol's sedating effects and (b) increases in comorbidity and medication use. Despite these facts, screening for alcohol use and particularly unhealthy alcohol use is not regularly conducted among older adults. Barriers to screening and assessment include limited time in ambulatory settings, discomfort on the part of older adults and their providers in assessing possible unhealthy use, and similarities of symptoms of unhealthy use and other morbidities common in later life. There are a number of tools available to screen for the spectrum of unhealthy alcohol use developed and/or validated in older adults. One of these tools, the CARET, may also help with assessment as it obtains information about comorbid conditions, symptoms, and medications that may increase risk from alcohol use and may be used to provide specific feedback about risks to the older adult. Assessment using the four step approach advocated in the publication "Helping Patients Who Drink Too Much" [25] may be used for older adults as well as for younger adults. Brief advice or referral to specialty care may be warranted depending on the amount and frequency of alcohol use and the presence or absence of other indicators unhealthy use.

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Treatment of Unhealthy Alcohol Use in Older Adults

12

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12.1 Introduction

Alcohol use disorders are some of the leading causes of disability worldwide; however, alcohol use management is often not appreciated as relevant to the care of older adults [1]. With respect to alcohol use disorders, epidemiological census-based work estimates that approximately 4 % of older community dwelling adults and up to 22 % of older adults in clinical care meet the diagnostic criteria for an alcohol use disorder [2–5]. In addition to the growing elderly population, the prevalence of late life addiction has been predicted to increase because of cohort changes. The current cohort of 60-year-old adults represents a group who were raised during the 1960s, and as such, participated in the increased use of and addiction to heroin, cocaine, tobacco, and alcohol [6]. Both the continued substance use and a history of substance disorders will likely have physical and mental health consequences for this cohort as it ages. The public health impact of alcohol use disorders, as well as other substance use disorders, among older adults will increase over the next several decades.

Although research in late life addictions has developed too slowly, research has demonstrated the efficacy of both psychosocial and pharmacological treatment of alcohol use disorders for older adults. There is also emerging evidence indicating that reduction in alcohol use among older adults can lead to improvement in health and related quality of life. Almost as important has been the scientific identification and better understanding of the effects "at-risk" drinking on the health of older adults and the ability to beneficially reduce alcohol consumption in this group.

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It is projected that by the year 2020, the number of older adults requiring substance use disorder treatment will increase to 5.7 million [7], a significant departure from the estimated 1.7 million in need of treatment in 2000 and 2001 [6]. Hence, in order to meet the special needs of older adults experiencing problems with alcohol, it is imperative that social services, professionals, and providers within primary and specialty care settings, particularly specialty mental health care, learn to recognize signs and symptoms of alcohol misuse and gain a firm understanding of available treatment options. Doing so will enhance efforts directed toward reducing problematic alcohol use and foster improvements in overall quality of life among older adults with substance use problems. This chapter will highlight the recent advances in the understanding of treating late life alcohol use disorders and highlight areas of critical need for further research.

12.2 Terms

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the Substance Abuse and Mental Health Services Administration (SAMHSA) Treatment Improvement Protocol on older adults recommend that persons age 65 and older consume no more than one standard drink/day or seven standard drinks/week [8, 9]. In addition, older adults should consume no more than three standard drinks on any drinking day. These drinking limit recommendations are consistent with data regarding the relationship between heavy consumption and alcohol-related problems within this age group [10]. These recommendations are also consistent with the current evidence for a beneficial health effect of low-risk drinking [11, 12].

Drinking guidelines also highlight an important distinction between problem drinking or at-risk drinking and alcohol use disorders. Understanding patterns of alcohol use can help inform the treatment and counseling of older adults across settings. Thus, in order to capture alcohol use variability, or "spectrum of use," a number of categories have been created to effectively select treatment management regimens, such as problem drinkers, at-risk drinkers, in addition to the well-recognized alcohol use disorders. In general, any level of alcohol consumption that produces negatives outcomes requires treatment; however, the intensity of treatment can vary on the level of drinking and the identified negative consequences.

At-risk or excessive alcohol users among older adults are those who consume alcohol above recommended levels yet experience minimal or no substance-related health, social, or emotional problems. Given the guidelines outlined above, excessive alcohol use can be defined as drinking more than one drink per day. Targeting and identifying older adults in this category is important; although they currently may not be experiencing any detectable alcohol use-related problems, these individuals may have a high risk of developing health problems should their alcohol use remain consistent or increase over time. Preventive brief interventions for at-risk users are valuable and effective, and abstinence or reductions in alcohol use have been shown to improve quality of life for this group. Of particular importance to older adults are the interactions between alcohol and both prescribed and

over-the-counter medications, especially among psychoactive medications such as benzodiazepines, opioids, and antidepressants. Alcohol use is one of the leading risk factors for developing adverse drug reactions and is known to interfere with the metabolism of many medications such as digoxin and warfarin [13–16].

Problem use or misuse describes a pattern in older adults in which alcohol consumption is at a level whereby adverse medical, psychological, or social consequences have occurred or are significantly likely to occur. Thus, this category of use is not defined by the quantity or frequency of use but rather the extent to which alcohol use impairs physical and/or psychosocial functioning. The risks associated with this pattern of alcohol use may be underestimated. Nevertheless, because older adults in this group are at a greater risk of negative consequences such as falls, cognitive impairment, driving-related problems, cardiovascular disease, sleep problems, liver disease, pancreatitis, and harmful alcohol–medication interactions [17], they represent a group that would greatly benefit from screening, identification, and intervention [18–20].

Alcohol use disorder is defined, according to new DSM-5 criteria, as a problematic pattern of alcohol use leading to clinically significant impairment or distress, occurring with a 12-month period [21]. The degree of severity for the alcohol use disorder is met with the level of presence for specified symptoms: Mild (2–3 symptoms), Moderate (4–5 symptoms), Severe (6+ symptoms). The new criteria replace the previous stratified abuse and dependence categorization of the disorder. The current criteria lists 11 specific symptoms used to evaluate the state of individual alcohol use, pertaining to persistent (1) large amounts of alcohol consumption, (2) desire/unsuccessful efforts to reduce alcohol consumptions, (3) large amount of dedicate time for alcohol activities, (4) alcohol cravings, (5) failure to fulfill major obligation due to alcohol, (6) alcohol use despite contributing social/interpersonal problems, (7) withdrawal from activities due to alcohol, (8) alcohol use in physically hazardous situations, (9) alcohol use despite knowledgeable contribution to physical or psychological problems, (10) tolerance, and (11) withdrawal. Alcohol use disorders are associated with the same risks of medication interactions, falls, and cognitive problems as at-risk drinking, but are also associated with significantly increased morbidity and mortality from disease-specific disorders such as acute pancreatitis, alcohol-induced cirrhosis, or alcohol-related cardiomyopathy as well as increasing the risks for such diseases as hypertension and the risk of trauma from falls or motor vehicle accidents [22].

DSM-5 criteria for alcohol use disorders have yet to have been sufficiently validated among older populations to ensure that the symptoms and consequences set forth in DSM adequately capture disordered use in later life [23]. Moreover, determining whether individuals meet diagnostic criteria relies heavily on self-reported behavioral symptoms. This is potentially problematic because self-report is susceptible to bias with the presence of memory impairments, lack of insight or knowledge regarding the adverse effects of alcohol use, or unwillingness to admit symptoms. For example, alcohol misuse may go unnoticed or unreported because an older adult does not link the consequences of alcohol use to their health or social problems. Notwithstanding these limitations in diagnostic criteria, identifying older adults with alcohol use disorders is essential because they represent a group in need of specialized treatment and services.

One final group of older adults to consider is those with a past history of an alcohol use or substance use disorder. The effect of past heavy alcohol use is highlighted in the findings from the Liverpool Longitudinal Study demonstrating a fivefold increase in psychiatric illness among elderly men who had a lifetime history of 5 or more years of heavy drinking [24]. The association between heavy alcohol consumption in earlier years and psychiatric morbidity in later life was not explained by current drinking habits. Therefore it is extremely important to continuously monitor and evaluate, and treat if necessary, the psychiatric health of older adults with a history of alcohol use disorders.

12.3 Diagnosis

The first step in treatment is diagnosis. The simplest and most efficient screen for identifying the broad risk of alcohol use is the AUDIT-C which is a 3-item self-report questionnaire [25]. There are other instruments clinicians can use as a follow-up, such as the SMAST-G [26], AUDIT [27], and the CAGE [28] that have more in-depth questions about consequences, health risks, and social/family issues, but are longer and, in the case of the CAGE, has less sensitivity for detecting at-risk alcohol use. When using a screening tool such as the AUDIT-C, clinicians need to then assess the patient with questions about alcohol-related problems, a history of failed attempts to stop or to cut back, or withdrawal symptoms such as tremors. Clinicians should conduct a diagnostic evaluation and consider specialized alcohol treatment with an emphasis on treatment targeted to older adults. The use of validated assessment instruments such as the Structured Clinical Interview for DSM-5 (SCID [29, 30]) can be of great help to clinicians and researchers by providing a structured approach to the assessment process as well as a checklist of items that should be administered with each older adult receiving an alcohol assessment.

For future research in aging, lifetime patterns of drinking and drinking problems are also important to quantify although validated methods for obtaining lifetime diagnostic information are lacking; however, there is no evidence that in the absence of dementia, self-report of drinking is less reliable in older adults than in younger adults [31, 32]. Self-report of alcohol use remains the principal method of ascertaining history. Biomarkers, such as liver function tests and carbohydrate-deficient transferrin, only have modest specificity and overall low diagnostic sensitivity. There are, however, some laboratory markers of alcohol abuse (e.g., AST, GGT, MCV, and CDT) that may be helpful to consider in special cases [33].

12.4 Treatments

Although there are numerous treatment options for alcohol use in later life, little formal research has been conducted to compare the relative efficacy of these various approaches among older adults. The general recommendation is to begin with the least invasive treatment options for older adults suffering from alcohol use

disorders, and gradually increase intensity as needed, starting with brief interventions, going to more formal outpatient, 12-step programs and medication therapy, then to the most intensive inpatient withdrawal/detoxification treatment programs. Nevertheless, results from existing studies are promising with older adults who engage in treatment being extremely successful at obtaining alcohol goals of abstinence and reduction [34], and having comparable or significantly better outcomes than their younger counterparts [35–38]. Older adults also are more likely to complete treatment than are younger patients [39, 40], and experience immediate benefits [41]. Evidence actually also indicates age-specific treatment can be more beneficial for older adults [42]. Recent evidence from Moore et al. and Ettner et al. also demonstrates the effectiveness of multilevel treatment delivery among older adults [43, 44]. Therefore, despite ageist beliefs, older adults are quite receptive and responsive to treatment, especially in programs that offer age-appropriate care [45, 46] and have providers who are knowledgeable about aging issues [47–49]; however, issues of adherence and engagement [50] and disease-specific appropriateness need to be considered [51].

12.4.1 Brief Interventions/Therapies

Low-intensity brief interventions or brief therapies/advice are cost-effective and practical techniques that can be used in the initial treatment of at-risk and problem drinkers in a variety of clinical settings [52]. Brief interventions are time-limited and should have a nonconfrontational approach. Such interventions are based on the concepts and techniques from the behavioral self-control literature, with one of the hallmarks being the need to encourage individuals to change their behavior through motivational interviewing [53].

Randomized clinical trials of brief interventions for alcohol problems among older populations reveal that older adults can be engaged in brief intervention protocols and find the protocols acceptable [54–56], even over the telephone [51]. Results also point to a greater reduction in alcohol consumption among at-risk drinkers receiving brief interventions as compared with control groups [57, 58]. For example, in one randomized clinical study, older primary care patients randomly assigned to a brief intervention arm received two 10 to 15-min physician counseling visits and two follow-up telephone calls from clinic staff that involved advice, education, and the creation of contracts [54]. Results from this study demonstrated that rates of alcohol use at 12-month follow-up were significantly lower for patients randomized to the brief intervention arm. Likewise, older primary care patients randomized to a single brief intervention session have been shown to have significantly greater reductions in alcohol consumption compared with usual care 1 year later [59]. Although these trials were conducted in primary care settings, brief interventions for older adults are very likely to be effective in mental health care settings as well. Thus, geriatric mental health providers are encouraged to gain familiarity with brief intervention therapy both as a primary treatment tool and, if needed, as a way to motivate patients for more formal addiction treatment.

Brief intervention can also just be a starting point for entry into alcohol use disorder treatment, as demonstrated by Schonfeld and colleagues in the Florida BRITE project [60]. The Florida BRITE project implemented the SAMHSA SBIRT (Screening, Brief Intervention, Referral to Treatment) treatment model to older adults in Florida over an extensive 3-year study. The treatment model utilized brief intervention as the first line of treatment, thereafter if needed more intensive brief outpatient cognitive behavioral therapy was provided over 16 sessions; referrals to other treatment could be provided at any time throughout the treatment window when deemed necessary. Study findings indicated a successful reduction in drinking using the tiered SBIRT treatment model for alcohol misuse.

12.4.2 Psychosocial Interventions

The literature regarding the efficacy of psychological therapies, the next tier of substance use treatment, specifically for the treatment of alcohol use disorders in older adulthood is sparse; however, the existing effective psychosocial treatment intervention programs generally cover outpatient care, with most often multiple intervention aspects, including education, brief interventions, motivational interviewing and enhancement, psychotherapy, individual and group therapy, family therapy, self-management, life skills/problem-solving therapy, case management, medication management, and cognitive behavioral therapy. For example, in one study of older veterans with alcohol problems, Schonfeld et al. [61] showed that individuals who completed 16 weeks of outpatient group-based treatment intervention for relapse prevention were more likely to abstain at 6-month follow-up than noncompleters. Using cognitive behavioral and self-management approaches, the group sessions included modules on coping with factors such as social problems, loneliness, depression, anxiety, and dealing with high-risk situations for relapse. In another treatment study, three different manual-guided, individually delivered psychosocial treatments (cognitive behavioral therapy, motivational enhancement therapy, and 12-Step facilitation) that spanned 12 weeks were found to be effective in reducing alcohol consumption among adults (7 % of whom were age 60 or over) with an alcohol use disorder one year posttreatment [62]. While multiple simultaneous psychosocial intervention use appears to be the norm for treating older adults with alcohol use disorders, there has been some indication that older adults may best perform with cognitive behavior therapies in an outpatient context [63].

Primary care can also be an effective context to deliver alcohol treatment to older adults. Moore et al. [43] and Ettner et al. [44] showed the effectiveness of multilevel treatment delivery within a primary care context. Specifically, during an office visit, older adult drinkers assigned to the study intervention received education, personalized report, drinking diary, advice from the primary care provider, and telephone counseling from a health educator. The multifaceted intervention used with older at-risk drinkers in primary care showed a reduction in the amount of drinking at 12 months.

12.4.3 Twelve-Step Programs

A large proportion of outpatient community-based and residential treatment programs incorporate the traditional 12-step peer support model of recovery and rehabilitation. Originally initiated with the advent of Alcoholics Anonymous (AA) and later adapted by groups such as Narcotics Anonymous (NA), the 12-step model involves group support and encouragement to help members achieve and maintain sobriety. Here participants share their experiences with one another and follow the 12 steps, which include admitting to one's addiction, recognizing the influence of a greater power as a source of strength, and acknowledging and atoning for past mistakes [64].

Although self-help groups have been associated with positive outcomes for many individuals, findings regarding rates of group engagement and outcomes among older adults remain mixed. In their matched comparison of older versus younger and middle-aged adults who participated in age-integrated inpatient residential treatment, Lemke and Moos [65] found that older patients engaged in 12-step programs as frequently as their younger and middle-aged counterparts when assessed at follow-up. Results also indicated that more involvement in self-help groups posttreatment was associated with better outcomes across all three age groups.

Similarly, an investigation of patients who had completed an outpatient treatment program for chemical dependency yielded no age group differences in AA affiliation 5 years posttreatment [38] and found that older adults have favorable long-term outcomes following treatment relative to younger adults. Upon examination of a subset of participants in the sample who reported attending 12-step meetings in the prior year, no age group differences in the actual number of meetings attended emerged; however, despite the fact that rates of attendance appeared to be comparable across age groups, the depth of involvement differed. Older adults were less likely than middle-aged adults to self-identify as being a 12-step group member and were less likely than younger and middle-aged adults to report calling a fellow group member for help. Comparable results were observed in examining 1-month postdischarge outcomes among alcohol-dependent patients admitted to a 12-step residential rehabilitation program [66]. Although rates of postdischarge abstinence and AA attendance did not differ across middle-aged and older adults, older adults were significantly less likely to contact a sponsor. Furthermore, older adults were less likely than middle-aged adults to engage in formal aftercare (31.2 % vs. 56.4 %), with no significant difference in 1-month outcomes.

Taken together, these findings highlight the importance of more careful examination of factors that may be related to 12-step program attendance, such as degree of engagement and identification that lead to undermined treatment outcomes among older adults. These include but are not limited to perceived stigma, level of comfort regarding disclosure of personal information in group settings, degree to which age-relevant issues are addressed during group meetings, and logistical barriers, such as lack of transportation and health problems that may preclude older adults from attending group sessions and engaging with sponsors [13, 14]. Understanding of such factors in 12-step programs can further improve older adult substance use treatment outcomes.

12.4.4 Pharmacotherapy of Addiction

Pharmacological treatments have not traditionally played a major role in the long-term treatment of older alcohol-dependent adults. Until recently, disulfiram was the only medication approved for the treatment of alcohol use disorders, but was seldom used in older patients because of concerns related to adverse effects. In 1995, the opioid antagonist naltrexone was approved by the FDA for the treatment of alcohol use disorders. The use of naltrexone was based on studies demonstrating an interaction between endogenous endorphin activity and alcohol intake. The FDA approval of naltrexone was based upon studies by Volpicelli et al. [67] and O'Malley et al. [68] demonstrating the efficacy of naltrexone for the treatment of middle age patients with alcohol use disorders. In both studies, naltrexone was found to be safe and effective in preventing relapse and reducing the craving for alcohol.

Oslin and colleagues have extended this line of research by studying a group of older veterans age 50–70 [69]. The study was designed as a double-blind placebo controlled randomized trial with naltrexone 50 mg per day. The results were similar to the other clinical trials with half as many naltrexone-treated subjects relapsing to significant drinking compared to those treated with placebo. It is important to note that there was no improvement in total abstinence, but there was improvement in relapse to heavy drinking. Thus, failure to achieve abstinence should not be seen as a failure of treatment. Although this study did not include many elderly subjects, it does raise the hope that opioid antagonists may have clinical efficacy among older alcoholics. Naltrexone can also be effective for managing alcohol disorders in the presence of comorbidity, such as PTSD [70].

Recently, acamprosate has been studied as a promising agent in the treatment of alcohol use disorders. While the exact action of acamprosate is still unknown, it is thought to reduce glutamate response [71]. The clinical evidence favoring acamprosate is impressive. Sass and colleagues studied 272 alcohol-dependent subjects in Europe for up to 48 weeks using a randomized placebo controlled study of acamprosate. Forty-three percent of the acamprosate-treated group was abstinent at the conclusion of the study compared to 21 % in the placebo group [72]; however, here there are no studies of the efficacy or safety of acamprosate among older patients. Topiramate also holds promise in the treatment of alcohol use disorders; however, again, topiramate has not been studied in older adults and carries with it the potential for cognitive impairment as a side effect [73].

12.4.5 Detoxification and Withdrawal

Another important treatment issue to consider is that alcohol withdrawal symptoms commonly occur in patients who stop drinking or markedly cut down their drinking after regular heavy use. The classical set of symptoms associated with alcohol withdrawal includes autonomic hyperactivity (e.g., increased pulse rate, increased blood pressure, and increased temperature), restlessness, disturbed sleep, anxiety, nausea, and tremor. More severe withdrawal can be manifested by auditory, visual, or tactile

hallucinations; delirium; seizures; and coma. During hospitalizations, patients may be particularly vulnerable to alcohol withdrawal if the clinical team is unaware of the use of these substances. Alcohol withdrawal can range from mild and almost unnoticeable symptoms to severe and life-threatening ones. Other substance use disorders, such as those related to benzodiazepines, opioids, and cocaine, have distinct withdrawal symptoms that are also potentially life threatening. Elderly patients have been shown to have a longer duration of withdrawal symptoms and withdrawal has the potential for complicating other medical and psychiatric illnesses in older adults—indicating the possible need for a longer duration of withdrawal treatment; however, there is no evidence to suggest that older patients are more prone to alcohol withdrawal or need longer treatment for withdrawal symptoms [74].

Highlighted by the potential for life-threatening complications, all clinicians caring for older patients who have alcohol use disorders need to have a fundamental understanding of withdrawal symptoms and the potential complications. All clinicians should demonstrate knowledge of the most common withdrawal symptoms and the anticipated time course of the symptoms. In addition, all clinicians should be able to complete a standardized assessment of withdrawal such as the revised Clinical Institute Withdrawal from Alcohol-version A [75]. Those clinicians in settings in which withdrawal management or treatment is available also need to be competent in providing detoxification management. This includes the use of benzodiazepines for the management of alcohol withdrawal. Furthermore, gabapentin has been shown to be safe and an effective alternative to benzodiazepines for treating mild alcohol withdrawal [76, 77], but has yet to be examined in older adults.

12.4.6 Treatment Matching

Future studies will need to clarify the point at which patients are unable to be treated in primary care or mental health clinics but rather need referral for specialty addiction care. To address this point, a contemporary study compared the engagement of older primary care patients referred to traditional specialty mental health providers versus those referred to an integrated care model using a brief intervention within primary care settings [78]. Study results demonstrated that older at-risk drinkers, both problem and nonproblematic, assigned to integrated care showed a considerable decrease in drinking, with slightly greater improvement evidenced in problem drinkers and higher engagement in treatment for both problem and nonproblematic drinkers than those in specialty care. While the study results were able to identify an interaction between treatment context, individual characteristics, and drinking outcomes, the findings could not explain why there were still some older adults that did not show improvement in drinking behaviors. Thus in terms of a public health perspective, there is no one best treatment option across the board. Rather, it is likely that patients with less severe disease can and should be treated in primary care settings, and patients with more severe disease should be treated by their principal clinician in conjunction with specialized mental health care.

12.5 Moderators and Correlates of Treatment Response and Adherence

Outside of treatment availability, context, adherence, and outcomes, it is important to better understand individual variability. The exploration of individual geriatric treatment variability is very limited, and there are indications that further exploration is needed in certain areas. For example, age-specific treatment, or age matching, has been shown to improve treatment completion, specifically higher rates of attendance among older adults at group meetings when compared with mixed-age treatments. In one study of male veterans with alcohol problems who were randomly assigned after detoxification to either age-specific or standard mixed-age treatment, outcomes at 6 months and 1 year showed that elder-specific program patients were 2.9 times more likely at 6 months and 2.1 times more likely at 1 year to report abstinence compared with mixed-age group patients [79]. In this study, treatment involved a special inpatient unit and emphasized peer support, promotion of self-esteem, and time-limited goal setting. The treatment approach involved being respectful of patients' ages, by calling them "sir/ma'am" and reminiscence therapy was used to help participants emphasize past successes.

The type of treatment setting also may affect rates of adherence [80]. In the previously described study comparing engagement outcomes among older primary care patients referred to specialty mental health providers versus those referred to an integrated care model using a brief intervention, 60.4 % of at-risk drinkers attended at least one visit in the integrated care model [78]. In contrast, only 33 % of patients attended at least one visit to a specialty provider. It is important to note that these differences emerged in spite of efforts to address barriers to specialty care, such as co-payments and insurance claims, and to assure appointments within 2 weeks of patients being identified with at-risk drinking. In addition to type of treatment affecting treatment adherence, issues of referral management should be further considered to better engage older adults in referral alcohol treatment when referral care is deemed necessary [81–83].

Finally, certain patient-level characteristics may differentially predict treatment outcomes. For example, women may have more favorable treatment outcomes than men. Satre et al. [84] demonstrated that 6 months after treatment at a private outpatient chemical dependency program, older, alcohol-dependent women were significantly more likely to report abstinence from alcohol and drugs during the prior 30 days than men (79.3 % vs. 54.0 %, $p = 0.02$). Similarly, among patients who were not abstinent, men reported a mean of four heavy drinking days over the prior 30 days, and none of the women reported heavy drinking. In addition to gender, variables associated with older age that may be related to more favorable treatment outcomes include longer retention in treatment and not having close social network members (e.g., family and friends) who encourage alcohol or drug use [84]. Research indicates that individual levels of social support can affect treatment outcomes for older adults. Specifically where low levels of social support can be managed through standard treatment, and for high supported individuals, brief interventions can suffice [85].

Genetic variability is also an understudied, promising area of exploration that would allow for better understanding of how genetic makeup can influence treatment outcomes, for example, why some older adults do and other do not respond to treatment interventions [86]. Genetic lines of research can elucidate effects of polymorphism on alcoholism etiology and treatment response [87]. A better understanding of genetic influences could feed into better treatment outcomes through translation into personalized medicine.

12.5.1 Comorbidity Treatment Issues

Epidemiologic studies have clearly demonstrated that comorbidity between alcohol use and other psychiatric symptoms is common in younger age groups. Less is known about comorbidity between alcohol use and psychiatric illness in late life [88]. A few studies do indicate that concurrent alcohol use disorder increases chances of suffering from mental health problems [89]. Blow et al. [90] reviewed the diagnosis of 3,986 VA patients between ages 60 and 69 presenting for alcohol treatment [90]. The most common comorbid psychiatric disorder was an affective disorder found in 21 % of the patients. Of these patients, 43 % had major depression. Blazer et al. [91] studied 997 community dwelling elderly of whom only 4.5 % had a history of alcohol use problems [91]; however, of these subjects, almost half had a comorbid diagnosis of depression or dysthymia.

Comorbid depressive symptoms are not only common in late life but are also an important factor in the course and prognosis of psychiatric disorders. Depressed alcoholics have been shown to have a more complicated clinical course of depression with an increased risk of suicide and more social dysfunction than nondepressed alcoholics [92–96]. Moreover, they were shown to seek more treatment. Results from a randomized placebo controlled trial examining naltrexone as an adjunct to sertraline and psychosocial support failed to demonstrate an added value of naltrexone [95]; however, there was a robust association with reduction of relapse during treatment, less frequent drinking during treatment, and improved depression response. This trial underscored the need to treat alcohol use disorders concurrently while treating depression. Alcohol use prior to late life has also been shown to influence treatment of late life depression. Cook and colleagues [94] found that a prior history of alcohol use problems predicted a more severe and chronic course for depression [94].

The relationship between alcohol use and dementing illnesses such as Alzheimer's disease is complex. While Wernicke-Korsakoff's syndrome is well described and often caused by alcohol use disorders, alcohol-related dementia may be difficult to differentiate from Alzheimer's disease. Clinical diagnostic criteria for alcohol-related dementia (ARD) have been proposed and now validated in at least one trial, suggesting a method for distinguishing ARD, including Wernicke-Korsakoff's syndrome, from other types of dementia [97, 98]. The epidemiology of ARD has varied greatly with each study because of the prior lack of criteria. In one of the few community-based studies including alcohol survey data, the Epidemiologic Catchment Area

study found the prevalence of a lifetime history of alcohol use disorders was 1.5 times greater among persons with mild and severe cognitive impairment than those with no cognitive impairment [99]. Similarly, Finlayson et al. [100] found that 49 of 216 (23 %) elderly patients presenting for alcohol treatment had dementia associated with alcohol use disorders [100]. As might be expected, patients with alcohol-related dementia who become abstinent do not show a progression in cognitive impairment compared to those with Alzheimer's disease [98].

Sleep disorders and sleep disturbances represent another group of comorbid disorders associated with excessive alcohol use. Alcohol use causes well-established changes in sleep patterns, such as decreased sleep latency, decreased stage IV sleep, and precipitation or aggravation of sleep apnea [101]. There are also age-associated changes in sleep patterns including increased REM episodes, a decrease in REM length, a decrease in stage III and IV sleep, and increased awakenings. Age-associated changes in sleep can all be worsened by alcohol use and depression. Moeller and colleagues [102] demonstrated in younger subjects that alcohol and depression had additive effects upon sleep disturbances when they occurred together [102]. Wagman and colleagues [101] also have demonstrated that abstinent alcoholics did not sleep well because of insomnia, frequent awakenings, and REM fragmentation [101]; however, when these subjects ingested alcohol, sleep periodicity normalized and REM sleep was temporarily suppressed, suggesting that alcohol use could be used to self-medicate for sleep disturbances. A common anecdote from patients is that alcohol is used to help with sleep problems.

12.6 Future Research Directions for Treatment

Alcohol misuse among older adults represents a pressing public health issue, both now and for years to come. In light of changes in demographic and cohort trends, recent years have seen an increase in the number of older adults who misuse alcohol. Moreover, there is a growing awareness that older adults often engage in at-risk or problem alcohol use. Nevertheless, individuals in need of treatment or at risk for future problems often go unidentified and untreated. Thus, research and clinical efforts aimed at improving screening efforts and identifying system, provider, and patient-level factors that may interfere with screening and referral processes for older adults at risk are warranted. In this vein, a better understanding among clinicians and patients of recommended drinking levels and the risks associated with moderate to heavy alcohol consumption is needed, particularly in light of the high prevalence of co-occurring medical and psychiatric problems in this age group. Clinicians also should ensure that screening becomes a part of routine practice when caring for their older patients.

Furthermore, because both provider recommendations and patient engagement are influenced, in part, by the availability of effective treatment, better dissemination of information regarding currently available and efficacious treatments for at-risk use and alcohol use disorders among older adults is needed. It is important to note, however, that treatment studies in addiction have traditionally excluded older patients.

Thus, research endeavors should continue to focus on developing more effective treatments for alcohol misuse in later life, taking into consideration and empirically assessing the various factors (e.g., patient-, treatment-, and system-related) that may moderate treatment engagement and outcomes. Along these lines, more formal research that focuses on the relative efficacy of various treatment modalities, specifically among older adults, is needed. Finally, given that these issues are particularly relevant to older adults, future work may benefit from examining nutrition, vitamin supplementation, and comorbid medical and psychiatric illness, both as foci for treatment and as aspects of health that may be complicated by alcohol use.

Traditionally, treatment studies in addiction have excluded patients over the age of 65. This bias has left a tremendous gap in knowledge regarding treatment outcomes and an understanding of the neurobiology of addiction in older adults. Table 12.1 summarizes the existing knowledge base with important priorities listed for the future. Multiple health behavior change treatment, including alcohol change, can have a major positive health impact; however, thus far it has not been effectively demonstrated and requires further pressing inquiry [103]. It is also important to further understand how older adult choice of treatment effects treatment adherence and treatment outcomes [104].

Unfortunately, there are only a few studies examining changes in health or quality of life after the initiation of abstinence. Among veterans, Lemke and Moos [65] have demonstrated greater improvement in psychological distress and drinking problems at 1 year compared to middle-aged adults in inpatient treatment [65]. Among community programs, older adults have been shown to have robust and comparable improvement in quality of life and comparable rates of

Table 12.1 Summary of randomized treatment research on late life alcohol use disorders

	Evidence base from randomized trials	General effect	Future needs
Problem and at-risk drinking			
Brief treatments	Five randomized trials [43, 51, 54–56, 59, 107]	Brief intervention/advice reduce drinking	Randomized trials in other high-risk settings such as behavioral health, home care, and the emergency room, using differentiated at-risk/hazardous and DSM diagnostic dimensions.
Alcohol use disorders			
Psychosocial treatments	Six randomized trials [42, 50, 63, 79, 84]	Outpatient and inpatient psychosocial programming reduces drinking; greater improvement with age-appropriate treatment	Randomized trials designed to better understand age-dependent adherence and treatment outcomes, using new DSM criteria.

(continued)

Table 12.1 (continued)

	Evidence base from randomized trials	General effect	Future needs
Naltrexone	Two randomized trials [36, 69]	Medication is well tolerated and effective	Clinical pharmacology trials need to begin enrolling older adults rather than excluding them which is the general practice. Greater advocacy from the geriatrics field should be focused on medication treatment in the addiction field. There are specific needs for safety studies as well as efficacy studies.
Antabuse	No trials specifically in older adults	–	
Other condition(s)		–	
Comorbidity	One Randomized trial for depressed alcohol-dependent patients [95]	There was no evidence for efficacy of naltrexone when added to sertraline and psychosocial support	This is a critical area of need both for patients with current alcohol use disorder or at-risk drinking and for those with past histories of alcohol use disorder or at-risk drinking.

abstinence to middle-aged adults [35, 66]. Other researchers have also found that forced abstinence associated with nursing home or rehabilitation placement leads to improvements in activities of daily living, alcohol-related cognitive impairment, and the discharge back to a home setting [98, 105, 106]. These reports of the reversibility of morbidity associated with alcohol use provide perhaps the greatest argument for initiating treatment in older adults; however, further research is needed to better understand health benefits and consequences of alcohol treatment in older adults.

Furthermore, acamprosate, disulfiram, baclofen, topiramate, and nalmefene have not been studied in RCTs in the elderly, nor have any subgroup or post hoc analyses in elderly patients been published. Controlled studies evaluating the efficacy of medication for the treatment of alcohol withdrawal symptoms in older persons are also lacking [47]. Having more hybrid or comparative trials to examine effective alcohol treatments would tremendously advance geriatric addiction science.

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Self-Medication with Alcohol: Aging Issues

13

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The use of alcohol and other substances to personally manage one's physical/mental health problems has been referred to as self-treatment, and more commonly, self-medication. Though there is some variation in its measurement, self-medication is generally conceptualized as the use of alcohol or other substances to relieve discomforting physical/mental health symptoms or to cope with negative affect [1]. The goals of this chapter are to review: the prevalence of self-medication with alcohol among adults in mid- and late life; reasons for self-medication with alcohol; outcomes of self-medication with alcohol; mechanisms by which to identify self-medication with alcohol; and opportunities for treatment and prevention of self-medication with alcohol. A conceptual model based on the extant research is presented as a way to integrate the current state of knowledge in this area. As self-medication with alcohol can contribute to the underlying causal pathway between alcohol use and comorbid health issues in later life, our goal here is to synthesize the available literature on issues of self-medication with alcohol and to suggest avenues for future study.

13.1 Prevalence of Self-Medication with Alcohol

Prevalence estimates of self-medication with alcohol in general and older adult populations range between 5 and 20 %, depending on the population under study and measurement of self-medication with alcohol. In a sample of healthy, retired Caucasian adults aged 65–74 years, 12 % reported using alcohol to cope during a

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stressful encounter [2]. Among community-dwelling adults aged 75 and older in Finland, 19.7 % reported use of alcohol for medicinal purposes [3]. More recently, 5.1 % of a nationally representative community-based sample of US adults aged 54–99 years reported frequently using alcohol to cope with stress [4]. Since health may deteriorate with age, and alcohol is contraindicated when using certain medications, adults with more medical conditions and who use certain prescribed medications may be less likely to use alcohol in general or to cope with stress in particular [4]. Moos and colleagues [5] suggest that older adults with more health problems tend to restrict their alcohol consumption.

Self-medication with alcohol has also been reported in community-based samples of individuals with comorbid mental health disorders in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), though data specific to middle-aged and older adult subsamples is limited. The NESARC assessed self-medication separately for different mood episodes or anxiety disorders, among the general US noninstitutionalized civilian population aged 18 years and older, by asking participants if they ever used substances to relieve their mood or anxiety symptoms. In one study using data from the NESARC, 15.4 % of adults with major depressive disorder, 22.1 % of people with bipolar I disorder, and 23.9 % of people with bipolar II disorder reported self-medication with alcohol [6]. In other studies using NESARC data, self-medication with alcohol was reported by 23.3 % of adults with a diagnosable substance use disorder [7], 18.3 % of persons diagnosed with generalized anxiety disorder, 16.9 % of people with social phobia, and 15.0 % of people with panic disorder with agoraphobia; 7.7 % of adults aged 65 and older with any anxiety disorder reported self-medication with alcohol [8].

13.1.1 Gender and Racial/Ethnic Differences in Self-Medication with Alcohol

Research with both general population samples [8] and older adults [3] has reported similar proportions of men and women who self-medicate with alcohol. Mauro and colleagues [4] reported that 6.1 % of men and 4.3 % of women in a sample of adults aged 54 years and older frequently used alcohol to cope with stress. Other research, however, has identified gender differences in the use of self-medication with alcohol, with men more likely to self-medicate with alcohol than women [9]. For instance, men aged 18 years and older who have mood disorders have been found to be more than twice as likely than women to use substances to relieve distressing mood symptoms [6], and older men are also more likely to use alcohol to cope with pain and arthritis than older women [10–12]. Men have been found to have more reactive drinking behaviors than women in response to social influences and stressors (e.g., to financial/legal problems, death of someone close, and emotional distress) [13, 14]. While women are more likely to report greater exposure to family interpersonal problems, the death of someone close, and emotional distress, men report greater exposure to workplace problems [13]. Future research should extend

these investigations of gender differences by exploring whether older men and women experience similar or unique health outcomes as a result of self-medication with alcohol.

There are also racial/ethnic differences in the prevalence of self-medication with alcohol. Particularly, non-Hispanic/Latino Whites report alcohol self-medication more frequently than other racial/ethnic groups. In a sample of adults aged 54 years and older, frequent alcohol use to cope with stress was reported by 5.3 % of White/Caucasian participants, 2.7 % of Black/African-American participants, 7.3 % of participants who reported another race, 5.3 % of non-Hispanic/Latino participants, and 3.5 % of Hispanic/Latino participants [4]. Non-Hispanic White older adults have also been found to be more likely to use alcohol to self-medicate pain than older adults identifying as Hispanic or non-Hispanic Black [11]. These differences may be partially due to discrepancies in attitudes toward drinking alcohol across racial/ethnic groups [15, 16]. As demographic changes in the US are expected to lead to corresponding changes in the racial/ethnic composition of middle-aged and older adults [17], future studies should explore whether cohort changes are associated with altered patterns of self-medication with alcohol across racial/ethnic groups.

13.2 Negative States Associated with Self-Medication with Alcohol

For purposes of self-medication, alcohol is used as a sedative-hypnotic to enable feelings of relaxation, affection, closeness, or aggression [1]. For instance, middle-aged and older adults may use alcohol as a way to cope with distress, anxiety, depression, sleep problems, and pain.

13.2.1 Self-Medication with Alcohol to Cope with Distress

According to the stress and coping theory, the use of alcohol to cope may be a reaction to problematic life circumstances among individuals who lack more adaptive coping skills and who try to avoid problems or negative affect [18, 19]; that is, alcohol is used as a form of self-medication to manage life stressors. Indeed, stressful life events are associated with greater odds of alcohol use disorders in both older men and women, though the temporal relationship may be bidirectional—alcohol use disorders could lead to more stressors, but increased stress could also result in alcohol use disorders [14]. In addition, having low levels of social support or few social resources in times of stress can lead to alcohol use as a form of self-medication [20].

For older adults experiencing distress, alcohol may be used to ease tension and suffering, and the general declining of alcohol consumption with age may be delayed as a result of stressful events [21]. Increased alcohol consumption to cope with interpersonal stressors is not uncommon. Older adults who experience marital separation, the loss of a friend because of move, illness or injury to a relative, or the

death of a loved one may turn to alcohol to cope with these stressors [21, 22]. The loss of social status may also serve as a means for adults to self-medicate with alcohol. For instance, the loss of support and feelings of despair experienced by retirees can lead to increased alcohol consumption. For persons with drinking problems, retirement may increase stress and exacerbate existing drinking problems [23].

In comparison to these interpersonal stressors, which are associated with increased alcohol consumption, health stressors and health events have been associated with reduced alcohol consumption in later life [5, 24, 25]. Abstinence or less frequent drinking in later life has been associated with poor self-rated health, medical conditions, medication use, and acute health events [24, 26, 27]. Future research should explore the underlying variation across individual decisions to abstain versus self-medicate in the face of different life stressors. For instance, research suggests that older adults who find meaning in religion or have an affiliation to a fundamentalist church, avoid drinking [28]. Having insight into individual differences on whether alcohol might be used to self-medicate, can inform methods for improving management of distress.

13.2.2 Self-Medication with Alcohol to Cope with Anxiety and Depressive Symptoms

Self-medication is a common behavior among persons who experience symptoms of anxiety or depression. In a nationally representative sample of adults aged 18–98 years from the US, 20.3 % of persons with an anxiety disorder also reported using alcohol to manage their symptoms [9]. There was also a significantly greater prevalence of having a family history of alcohol problems among adults with an anxiety disorder who self-medicated compared to adults with an anxiety disorder who did not report self-medication with alcohol (49.8 % vs. 64.7 %) [9]. Such findings are consistent with data from a sample of noninstitutionalized adults aged 15–54, showing that having any anxiety disorder is associated with a 21.9 % prevalence of self-medication with alcohol or drugs; the highest prevalence of self-medication in this sample was among persons with generalized anxiety disorder [29].

As another form of self-medication, alcohol may be used as a way to reduce negative feelings and cope with depressive symptoms. In a sample of noninstitutionalized adults aged 15–54 who reported self-medication with alcohol or drugs, 56.8 % also had major depression, compared with 30.7 % of participants who did not self-medicate [29]. This finding is consistent with data from a sample of US adults aged 18 years or older: people with depression were significantly more likely to drink alcohol to cope when compared to community controls [29]. Drinking to cope was more likely for both depressed patients and community controls who experienced more negative life events or less family support; depressed patients were also more at risk for negative life events or poor family support than community controls. Life context vulnerabilities (i.e., negative life events and poor family support) basically explained the risk for depressed patients to rely on alcohol use coping [30].

13.2.3 Self-Medication with Alcohol to Treat Sleep Problems

Alcohol has also been reported as a way to self-medicate "worries" that cause sleep disturbances, to induce sleep in the general population [31], and to manage sleep disturbances among older adults [3, 32]. In a sample of women aged 85 years and older living in an urban area, all 155 participants reported sleep difficulties and 70 % reported using alcohol to help with sleep [33]. In a longitudinal sample of adults aged 18 years and older, individuals with anxiety disorders or dysphoria at baseline who also reported sleep disturbances because of worry had an increased risk of developing alcohol-related problems over the follow-up period (median 12.6 years) [31]. Among patients in treatment for alcohol dependence, those who report insomnia have been found to be more likely to report using alcohol to sleep (55 %) when compared to patients without insomnia (28 %) [34].

Persons who use alcohol as a sleep aid report greater difficulty falling asleep, lower total sleep time, and greater daytime sleepiness compared to persons who do not use alcohol as a sleep aid [35]. A review of research on the association between disturbed sleep and alcohol use reported that low to moderate alcohol use (up to 2–3 standard drinks) before bedtime initially promotes sleep, but these effects diminish after as few as 3 days of chronic use [36].

Research has found older women to report fewer risks associated with using alcohol to help with sleep, while highlighting the convenience and effectiveness of using alcohol to sleep, as reasons to drink before bed [33]. Qualitative research exploring the reasons why older adults self-medicate with alcohol for sleep disturbances, could identify alterative, more adaptive ways of coping with sleep problems. For instance, if alcohol is considered to be a convenient and effective sleep aid despite contradictory evidence that alcohol use results in more symptoms of insomnia compared to persons who do not use alcohol [35], treatment should include education of the potential risks of self-medication with alcohol.

13.2.4 Self-Medication with Alcohol to Treat Pain

Pain is associated with drinking problems in both cross-sectional and longitudinal studies [37, 38], but the relationship between alcohol use and pain varies based on the amount and frequency of alcohol use and the severity of the pain [38, 39]. Reliance on alcohol to reduce pain has been associated with both more frequent and heavier alcohol consumption and alcohol use disorders among older adults [24]. In a community sample of older adults, problem drinking was associated with pain and the use of alcohol to self-medicate pain [37]. More than a third (37.9 %) of older adults with drinking problems reported using alcohol to cope with pain; up to about 57 % of men and 59 % of women with drinking problems reporting moderate or severe pain also reported using alcohol to cope with pain [37]. Furthermore, among those without drinking problems, 15.1 % of men and 12.5 % of women reported using alcohol to cope with pain [37]. This study also found gender differences in the 3-year effects associated with alcohol use to cope with pain. Among people who at

baseline reported problem drinking and who self-medicated with alcohol, men were more likely to have negative health outcomes (e.g., serious injury) 3 years later, while women were more likely to report heavier drinking at follow-up [37].

In contradiction to the self-medication hypothesis, a longitudinal sample of older adults who reported numerous painful conditions were found to use alcohol less frequently compared to older adults with fewer painful conditions [38]. Though not explored in their study, Brennan and colleagues [38] suggest that these findings may be the result of participants' attempts to avoid medication–alcohol interactions or participants' reductions in social interaction, thus having fewer opportunities to use alcohol. These ideas are supported in recent findings indicating feelings of loneliness were associated with less frequent drinking among middle-aged and older adults [40]. In order to better contextualize these disparate findings, future research should explore the reasons why older adults do or do not self-medicate their physical/mental problems with alcohol.

13.3 Outcomes of Self-Medication with Alcohol

The use of alcohol to self-medicate is considered maladaptive [34] and is associated with a host of negative outcomes. The changing physiology of older adults, along with higher prevalence of comorbid health issues and more frequent medication use [41, 42], exacerbates the risks of self-medication with alcohol. For adults in mid- and late life, self-medication with alcohol has been found to result in the development of alcohol use disorders as well as the worsening of physical and mental health conditions.

13.3.1 Self-Medication with Alcohol Can Lead to Alcohol Use Problems

Self-medication with alcohol has been found to predict alcohol use and drinking problems over a 10-year period in a community sample of adults [43]; to predict risk for excessive alcohol consumption and drinking problems over both 10- and 20-year follow-up periods in community samples of late-middle-aged adults [19, 24]; and to be a risk factor for the development of alcohol use disorders in community samples of adult drinkers [7, 44].

Significantly more average daily alcohol consumption and risk of alcohol dependence have been reported among persons with anxiety disorders who self-medicate compared to individuals who do not self-medicate [9]. Crum and colleagues [45] support this finding with data from the NESARC, indicating that in a population-based sample of US adults aged 18 years and older, there was a greater risk of developing alcohol dependence among participants who reported self-medication of anxiety with alcohol. For these participants, the experience of dependence was more likely to persist. Likewise, Robinson and colleagues [7] found that among participants who had a baseline anxiety disorder and who reported self-medication with alcohol, 12.6 % developed an alcohol use disorder at follow-up.

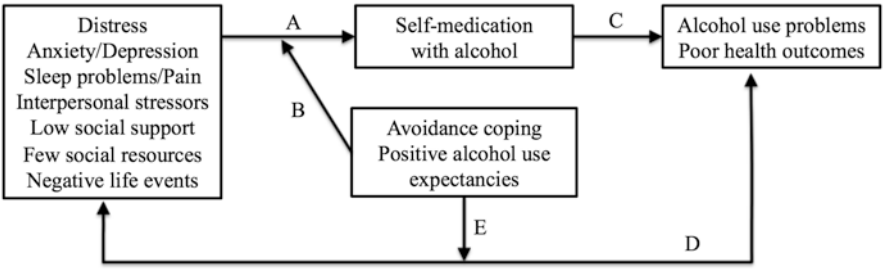
13.3.2 Self-Medication with Alcohol Can Precipitate or Worsen Negative Health Outcomes

The use of alcohol to aid with sleep has been found to disrupt sleep architecture and cause sleep-related problems and daytime sleepiness [35, 36, 46]. Though alcohol is commonly used to aid with sleep initiation, it can worsen sleep-related breathing disorders and cause snoring and obstructive sleep apnea [36]. Alcohol also impairs sleep by increasing movement disorders, periodic leg movements, and sleepwalking; causing gastritis, esophageal reflux, polyuria, and nocturia; and causing unsteadiness and falls, particularly among older adults [36].

Similarly, self-medication with alcohol has been found to increase the risk of being diagnosed with a mood or personality disorder compared to individuals who did not self-medicate [8]; to predict the development of social phobia in participants with baseline subclinical anxiety or baseline alcohol or other drug use disorders [7]; and to be significantly associated with suicidal ideation and suicide attempts in a noninstitutionalized sample of US respondents aged 15–54 years with anxiety [29]. Self-medication with alcohol has also been associated with increased mental health treatment utilization and decreased mental health-related quality of life in a sample of US adults with a diagnosed anxiety disorder [47]. Such associations may be driven by maladaptive coping skills of individuals who self-medicate [29, 47].

13.4 Conceptual Model of Self-Medication with Alcohol

Based on this review of the existing literature, we have developed a conceptual model of self-medication with alcohol (Fig. 13.1) as a way to integrate the current state of knowledge and highlight areas for hypothesis development and testing. Of note, demographic factors (e.g., age, gender, and race/ethnicity) and family history of alcohol problems are potential moderators of these multiple different relationships and should be considered in future evaluations of the pathways leading to or from self-medication with alcohol, as well as alcohol use problems or poor health outcomes.



[a] Age, gender, race/ethnicity, and family history of alcohol problems are potential moderators of these different relationships and should be considered in any evaluation of self-medication with alcohol.

Fig. 13.1 Conceptual model of self-medication with alcohol

Pathway "A" indicates that self-medication with alcohol can result from and result in negative affective states, such as distress, anxiety, depression, sleep problems, or pain, as well as from interpersonal stressors, low social support, few social resources, and negative life events. These risk factors for self-medication with alcohol are moderated by a number of factors in pathway "B," including avoidance coping and positive alcohol use expectancies. Among late-life problem drinkers, being more reliant on avoidance coping strategies to manage stressors has been found to increase the risk that negative events will lead to more drinking problems [48]. Thus, individuals who lack more adaptive coping strategies may be more likely to use alcohol to manage their stress. Moreover, individuals who have positive alcohol expectancies report heavier alcohol use [49, 50]. Those who associate alcohol consumption with positive outcomes may be more inclined to use alcohol to cope.

As noted in pathway "C,"self-medication with alcohol has been found to result in the development of alcohol use disorders as well as the worsening of physical and mental health problems. Thus, the level of alcohol consumption becomes an important consideration, particularly if older adults are drinking more, drinking for longer than intended, or prioritizing drinking over the fulfillment of other roles—are all symptoms of an alcohol use disorder [51]. Future research should explore the variation in when self-medication leads to alcohol use disorders and other negative health outcomes by age, gender, ethnic/cultural, or other subgroup to determine potential moderation of this pathway.

Our conceptual model indicates that self-medication with alcohol does not fully mediate the relationship between negative affective states and negative health outcomes. As indicated by the bidirectional pathway "D," there may be more than one pathway for individuals to experience alcohol use problems or poor health outcomes beyond self-medication with alcohol. Indeed, there could be other mediating pathways between the negative states discussed (i.e., distress, anxiety, depression, sleep problems, pain, and poor social support and resources) and negative outcomes (i.e., alcohol use problems and poor health outcomes). Conversely, alcohol use problems and poor health can lead to distress, anxiety, depression, sleep problems, and pain as well as exhaust social support and resources. Avoidance coping and positive alcohol use expectancies can moderate the relationship between risk factors of self-medication with alcohol and negative health outcomes, as indicated in pathway "E." Research suggests that poor coping skills among individuals with alcohol use problems [20] and positive alcohol use expectancies among drinkers [52] influence drinking, drinking levels, and negative drinking outcomes. For instance, the use of avoidance coping strategies has been found to predict problem drinking in late life; compared with nonproblem drinkers; late-onset problem drinkers reported responding to stressors or negative affect by drinking alcohol [25]. These bidirectional relationships deserve attention in future research in order to tease apart precipitating factors for each pathway.

13.5 Identifying Self-Medication with Alcohol Among Older Adults

As part of regular practice, clinicians should evaluate the use and misuse of alcohol (along with drugs and prescription medications) among older adults who have symptoms of distress, anxiety, depression, poor sleep, and pain. Rather than limit screening to standardized questions of misuse and disorder, which may not capture the use of alcohol as a medicine [3], clinicians should directly ask about self-medication with alcohol among people reporting alcohol use. For instance, as done in the NESARC, clinicians could ask patients about the use of substances to relieve their negative mood or anxiety symptoms. Identifying older adults who self-medicate with alcohol could enable more targeted screenings [53]; in particular asking older patients their reasons for using alcohol could help identify those who may require further assistance or intervention. For instance, if patients are self-medicating with alcohol to cope with their sleep problems, it will be clinically important to attend simultaneously to both their underlying sleep issues and boosting adaptive coping skills to reduce self-medicating behavior. Similarly, improved assessments of pain, sleep difficulties, and underlying symptoms of depression and anxiety, for which older adults are self-medicating with alcohol, are needed [31]. While the development of improved screening measures may help clinicians identify alcohol problems among older adults [54], knowing an individual's alcohol consumption patterns is an important supplement to formal screening tools [53].

Identifying older adults who use alcohol to self-medicate has clinically relevant implications since older problem drinkers have been found to have positive treatment outcomes that persist over time [55]. In conjunction with screening, brief interventions should be incorporated into regular clinical practice, as these may be important first steps in reducing maladaptive self-medication with alcohol and offer important educational opportunities to maximize more adaptive coping strategies [56, 57].

13.6 Treatment and Prevention of Self-Medication with Alcohol

Self-medication with alcohol is one of many ways people may cope with various negative states. However, as evidenced by the prevalence of self-medication with alcohol among middle-aged and older samples, as well as general population samples, the use of alcohol to cope with negative affect is not a universal experience. Many persons affected by distress, anxiety, depression, sleep disorders, and pain do not use alcohol to manage their symptoms. For instance, only 20 % of Menary and colleagues' [9] sample of adults with anxiety disorders reported using alcohol to cope. Accordingly, there is a wide range of coping mechanisms beyond alcohol use to manage negative affect.

Effective strategies for treating negative affect largely include behavioral therapies or pharmacotherapies (e.g., antidepressants, pain or sleep medications). For instance, insomnia treatments include pharmacotherapy, lifestyle interventions

(e.g., the avoidance of caffeine and alcohol), behavioral therapies (e.g., progressive relaxation or sleep restriction), and cognitive-behavioral therapy (CBT, which works to restructure negative or erroneous thoughts, ideas, and attitudes about sleep) [33, 58]. Educating older adults about the risks and consequences of self-medication with alcohol as it applies to their own lives [53] could encourage safer alcohol consumption.

Behavioral therapies can be effective in treating persons with alcohol use disorders [59] and could be adapted to treat self-medication behavior. Such therapies target harmful alcohol consumption behaviors by working to change individuals' underlying thoughts that lead to alcohol use (CBT), encouraging coping skills beyond alcohol consumption (coping skills therapy), identifying and preparing for situations or triggers which might lead to relapse (relapse prevention therapy), and rewarding desirable behaviors while removing rewards for undesirable ones (contingency management) [59]. Cooper and colleagues [49] have also suggested restructuring ideas about and expectations of alcohol use as an appropriate intervention. Indeed, individuals who successfully completed a 12-week CBT treatment program were found to be less likely to endorse positive outcomes of alcohol use compared to those who did not complete treatment [60]. Building competencies that utilize more adaptive ways of coping with negative emotions (e.g., anger management and assertion training) is also of value. Furthermore, since men and women react differently to different stressors, treatments should be adaptable to individual needs and experiences [13].

Additional methods of minimizing self-medication with alcohol include attempts to reduce life stressors and strengthen social supports and resources [48]. Nevertheless, many stressful life events are unavoidable and may trigger an individual's coping responses. Thus, it is important to identify which coping resources older adults utilize to deal with negative affective states, pain, or sleep problems, and to encourage the use of adaptive coping strategies [30]. For instance, reducing avoidance coping [48], increasing the use of mindfulness and acceptance-based coping [61], and problem-solving and approach coping [62] can help older adults who self-medicate with alcohol by appropriately managing the distress and preventing future occurrence.

Avoidance coping may be used more frequently by individuals with alcohol-related problems than adults without alcohol-related problems [62], and better drinking outcomes have been associated with decreased avoidance coping over an 8-year follow-up, particularly for men [20]. Interventions that focus on developing approach coping skills may help older adults manage negative affect. Approach coping is a problem-focused method of coping that makes use of cognitive and behavioral processes to overcome stressors [37]. Acceptance-based interventions, as well, could be used to prevent relapse among alcohol-dependent adults and to improve mood and reduce alcohol craving [61].

13.7 Conclusions and Future Directions

This chapter has outlined the literature on self-medication with alcohol among middle-aged and older adults. Despite the growing body of evidence, a great deal of work remains to be done. First, studies often rely on the use of a single item to assess the use of self-medication with alcohol [9, 30]. However, self-medication with alcohol is complex. Future research should involve teasing out the frequency and amount of alcohol used as a form of self-medication to cope with negative affect and explore how different consumption levels might result in different outcomes. For instance, greater frequency or levels of self-medication with alcohol increase the risk for alcohol use disorders [9].

Longitudinal studies are needed to explore the temporal relationships between negative affect and self-medication with alcohol among older adults. As suggested by our conceptual model, the pathways and antecedents to self-medication with alcohol are complicated and multifactorial. In addition, qualitative research is needed to deepen our understanding of self-medication with alcohol by exploring the individual-level experiences of older adults.

Lastly, as evidenced throughout this chapter, middle-aged and older samples have been largely underrepresented in many population-based studies. As a result, the intricacies of differences in patterns across genders, and racial/ethnic or other sociodemographic subgroups remain understudied. Future research should concentrate on ethnic and cultural variations in self-medication with alcohol in middle to later life, as older adults continue to make up an increasing proportion of the population.

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Adapting SBIRT for Older Adults

14

Lawrence Schonfeld

14.1 Introduction

Since the 1990s, screening, brief intervention, and referral to treatment or "SBIRT" has been a successful model for addressing risky or problematic use among older adults. In some ways, it is a supplement to services offered by formal substance abuse treatment services. This is important, as traditional substance abuse treatment and prevention services more often focus on youth, young adults, and middle-aged adults.

For more than 40 years, published research has shown that compared to younger individuals, and compared to their proportion of the general population, older adults are vastly underserved by substance abuse treatment systems. For example, treatment admissions in 2011 indicated that people ages 55–64 and people ages 65 and older represent 5.6 and 0.7 % of all admissions, respectively, in the USA [1]. A number of factors may contribute to this underutilization including funding, prioritization of target populations, inability of programs to address elders' comorbid health concerns, age-inappropriate assessments, and reliance on indicators that are less likely to occur in the older population. Given state-level funding priorities and appropriations of federal block grants for substance abuse treatment, state-level policymakers are unlikely to earmark funds for elder-specific treatment when adolescents' and young adults' problems are more visible to the systems that serve them and more visible to their families, school systems, and employers. For example, younger adults may exhibit drinking-related problems, such as increased absenteeism at work, automobile accidents, domestic violence, and marital discord. In contrast, many older adults diagnosed with alcohol problems have been shown to drink in

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response to depression, loneliness, grief, boredom, and loss of social support. Recommended limits differ for these two age groups as well.

Research indicates that among the general population of older adults, alcohol consumption declines with increasing age [2, 3]. For certain groups, such as those residing in active, planned retirement communities, drinking can exceed recommended limits but is perceived as part of an enjoyable social activity. Older people who were used to consuming a few drinks a day during their youth and even into middle age may now find that it takes fewer drinks to become impaired because of increased sensitivity resulting from changes in metabolism, interactions with medications, and consequences of medical illnesses. Compounding the problem of older-age drinking is the fact that many older adults are not screened on a routine basis for alcohol problems by their physicians, aging services, and other service providers.

Results from national household surveys and treatment admissions data suggest that substance use among the older population is a growing problem, given the aging of the US population and the projections of future need for formal substance abuse treatment. For example, the 2013 National Household Survey on Drug Use and Health (NSDUH) revealed that among 41.7 % of people ages 65 and older were current alcohol users, while 9.1 % were binge and 2.1 % heavy alcohol users. Adding mature adults aged 50–64 to these numbers doubles these percentages for binge and heavy use [4].

Han and colleagues projected that the number of adults aged 50 or older with substance use disorders would be more than double from approximately 2.8 million annually in 2002–2006 to approximately 5.7 million in 2020 [5]. While there have been a number of studies indicating that specialized programs for older adults with diagnosed substance use disorders have excellent outcomes [6–9], specialized programs for people ages 50 and older are on the decline [10].

14.2 SBIRT as a National Initiative

SBIRT is a method proven to be effective in identifying and intervening with a large proportion of the population: those who demonstrate risky or problematic use of substances. As a national initiative in the USA, SBIRT has been funded through grants from the Substance Abuse and Mental Health Services Administration (SAMHSA). From 2003 to 2015, SAMHSA awarded 17 medical residency training grants, 32 state cooperative agreements, 12 campus screening and brief intervention (SBI) grants, and 14 medical professionals training grants [11]. The model has been applied successfully with various populations. In this chapter, the adaptation of SBIRT for older adults is discussed.

As noted in a study published in 1996 by World Health Organization (WHO) [12], the history of the SBIRT model can be traced to efforts in the 1980s to address harmful use of alcohol (maladaptive pattern of use that leads to physical or mental harm) or hazardous alcohol use (referring to harmful drinking patterns such as frequent intoxication) in primary care settings quickly and effectively for the general population. In the majority of published research studies, brief advice and

counseling were implemented by healthcare providers in primary care, hospital units and emergency departments, and health clinics for intervening with individuals who screen positive.

There is ample evidence supporting the efficacy of screening and brief intervention in these settings. For example, a 1997 meta-analysis involving 12 studies using random control trials concluded that brief alcohol interventions were effective for reducing heavy drinking across gender, intensity of intervention, type of clinical setting, and higher-quality clinical trials [13]. The WHO study group conducted randomized trials of 1260 men and 299 from healthcare centers in eight countries [12]. All participants were considered at risk of alcohol-related problems based on quantity or frequency of use but with no history of alcohol dependence. Subjects were assigned to one of three conditions, all of which received a health interview. One group received five minutes of simple advice and an illustrated pamphlet to promote sensible drinking or abstinence. A second group received 15 min of brief counseling about drinking, a problem-solving manual that described the benefits of moderate drinking or abstinence, ways of coping with high-risk drinking situations, and constructive alternatives to drinking. The control group only received the health interview. At 9 month follow-ups, the results revealed that while all three groups reduced alcohol quantity and frequency, both the simple advice group and brief counseling group had significantly greater reductions than the control group. Other studies involving similar methodologies for brief advice in primary care practices and managed care organizations have also demonstrated its efficacy along with use of educational materials in producing similar outcomes [14–16].

14.3 SBIRT and Older Adults

In the 1980s, the published literature began focusing on the need for developing age-appropriate screening, assessment, and services for older adults who met diagnostic criteria for inpatient or outpatient treatment of alcohol abuse [8, 17, 18]. Despite the development and implementation of effective treatment programs for older adults diagnosed with substance use disorders, relatively few older adults entered treatment, and they remained a disproportionally underserved population.

14.3.1 SBIRT in Primary Care and Emergency Departments

Fleming and colleagues, who had previously applied brief physician advice with a general primary care practice population [16], conducted a randomized controlled trial specifically for primary care patients ages 65 and older [15]. Known as Project GOAL (Guiding Older Adult Lifestyles), the study involved 158 patients from 24 Wisconsin primary care practices, with 146 completing 12-month follow-ups. In the brief advice condition, patients received two 10–15-min sessions of brief advice by their physicians. Each physician utilized a health promotion workbook to provide the patient with feedback about his or her health and review information about

drinking behavior, adverse effects, and cues for drinking. The workbook included a drinking agreement in the form of a prescription to be signed by the patient and physician and drinking diary cards for the patient to record alcohol consumption. Results showed that in comparison to controls, those receiving the brief advice demonstrated reduced weekly alcohol consumption and fewer binges [15].

Screening older adults for substance misuse in primary care physician offices and hospital emergency departments seems logical given data from the 2004–2007 National Health Interview Survey (NHIS) [19]. According to the NHIS, doctor visits in the past 12 months increased from 87.8 % for those aged 55–64 to 94.9 % of people 75–84 years old and then to 96.6 % of those 85 years old and older. Past 12-month hospital emergency department visits also increase dramatically with age ranging from 18.8 % of those aged 55–64 to 32.5 % of those aged 85 and over. In one example of screening in a hospital emergency department, Adams and colleagues [20] screened 205 older adults finding self-reported drinking problems in 14 %, many of which were not detected by their physicians.

14.3.2 SBIRT in Other Venues

Recognizing that older adults with risky or problematic drinking behavior may not always be found in healthcare settings, a number of projects have applied SBIRT to other service provider agencies. In one of the first such applications, the Staying Healthy Project (SHP) was conducted in California, where service providers other than physicians or psychologists were trained to conduct the brief intervention [21]. Screenings were conducted in aging services' settings such as senior housing or senior centers and brief interventions were guided by the health promotion workbook as used in the earlier Project GOAL study [15]. Out of 4322 people ages 60 and older who were screened, 77 % were found to be abstinent. There were 164 participants who screened positive, and then randomly assigned to either a control condition ($n=90$) or brief intervention ($n=74$) conducted by social workers, resident or service coordinators, activity directors, or nurses. While both groups demonstrated a decrease in drinking, the brief intervention group had significantly fewer days drinking liquor and number of beers consumed per day.

14.4 The Florida BRITE Project

The same model was later adapted for the Florida BRITE Project (BRief Intervention and Treatment for Elders) [22]. BRITE served as a pilot project funded by the state of Florida Department of Children and Families (DCF) Substance Abuse Program Office. Florida DCF identified and funded one service provider agency in each in four counties to implement BRITE. Targeting adults ages 60 and older, staff members labeled as health educators were trained to conduct screening in locations where older adults resided (their individual homes or apartments) or where they received aging or other social services. In addition to alcohol use, BRITE also

focused on misuse of prescription and over-the-counter medications, as well as use of illicit drugs. Furthermore, BRITE included brief screens for depression and suicidal ideation, as previous research has shown that older substance abusers were likely to use alcohol or other substances as a palliative for depression. Outreach, identification of people with positive screens, and referral processes were conducted mostly through aging and behavioral health services and their usual referral networks. Only a small percentage of outreach activities were conducted through healthcare settings, such as hospitals or primary care practices.

Health educators typically assessed older adults in their homes, at senior centers, in senior apartment complexes, at health fairs for seniors, and other community-based settings. A total of 3497 individuals were screened. Brief intervention was offered to any individual screening positive for substance use problems. The intervention was guided by the health promotion workbook used in earlier studies but modified to include education for individuals misusing medications and to address any use of illicit substances. All health educators were required to use the workbook along with motivational interviewing techniques.

Results showed that more than half of the screenings were positive for either substance use, depression, or both, and 22 % of those screening positive received at least one brief intervention session using the workbook. Individuals who screened positive for depression and/or suicide risk but negative for any risk of substance use were referred to mental health providers for follow-up assessment and services. Prescription medication misuse was the most prevalent substance use problem, followed in decreasing order by alcohol, over-the-counter medications, and illicit substances (the latter representing only about one percent of the problems identified). An interesting finding was that only about 10 % ($n=339$) of referrals were specifically for alcohol problems, but when screened for alcohol problems, about 16 % ($n=556$) of participants were found to be risky or problematic drinkers. Similarly, while referrals for illicit drug use amounted to about 1 % ($n=40$) of all screenings, more than double actually screened positive as using illicit drugs, such as marijuana. In contrast, the number of referrals for prescription ($n=925$) and over-the-counter medication misuse ($n=272$) were slightly higher than those who screened positive for those categories. Such findings may be indicative of "hidden substance abuse" where older adults may be more likely to be overlooked and under-identified by traditional outreach and screening methods. As expected, depression was more frequently reported as part of the referral process ($n=2248$) and often present among those who screening positive for substance misuse. Results showed that about 21 % of all screenings resulted in at least one brief intervention session. At discharge and 30-day follow-ups, improvement in all areas (alcohol, medication misuse, and depression measures) was demonstrated.

Florida later applied for and received a $14 million, 5-year, state cooperative grant from the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT) to implement SBIRT specific to older adults and to expand the Florida BRITE Project beyond the pilot stage. The Florida effort differed from SBIRT initiatives conducted in other states. First, given Florida's priorities to better serve its large older adult population, rather

than a general healthcare population of potentially all ages, BRITE concentrated solely on older adults (under the SAMHSA/CSAT grant the BRITE minimum age criterion was lowered to 55 years to reach a larger number of people). Second, whereas SBIRT staff in other states screened almost exclusively in healthcare settings (e.g., hospital emergency departments, primary care physicians' offices, and trauma centers), BRITE included many other sites in order to screen older adults, such as where they lived or where they received aging or social services.

The award of the 5-year federal grant required that certain changes be implemented to accommodate the requirements all state grantees had to meet. Changes included a target of total screenings, a requirement that screening be conducted in healthcare settings as well as in other settings, and use of several screening elements including the Alcohol, Smoking and Substance Involvement Screening Test (ASSIST) [23]. For Florida, the target of 66,074 screenings of older adults was determined by SAMHSA/CSAT. The Florida DCF Substance Abuse Program Office oversaw the award of contracts to various healthcare and non-healthcare agencies. BRITE contracts were awarded to specialty hospitals, aging services, behavioral health programs, health clinics, and a veterans' hospital. Over the 5 years of SBIRT funding, health educators employed by one of 29 agencies in 18 counties screened 85,001 people at 75 different sites [24].

One outstanding question when adapting SBIRT to older adults was whether there would be similar proportions of negative screens, as well as positive screens at moderate, moderate to high, or high level of risk compared to other states that implemented SBIRT in a general population. Results from the first cohort of six states receiving SBIRT grants led to expectations about the proportions of negative and positive screens [25]. All six states conducted SBIRT in medical settings, such as hospital emergency departments, community health clinics, federally qualified health centers, trauma centers, and school-based health clinics. A total of 459,599 patients were screened over the 5-year period across all states in the first cohort of state grantees, of which 22.7 % were positive for substance misuse, 15.9 % received a brief intervention, 3.2 % received brief treatment (3.2 %), and 3.7 % were referred to specialty treatment. Thus, the expectations for all grantees were that three quarters of screenings would reveal either no substance use or lack of any substance misuse, and among the positive screens, most would receive a brief intervention immediately after the administration of the screen.

Out of the 85,001 screenings in the Florida BRITE Project, 8165 (9.6 %) adults ages 55 and older were found to be at moderate or high risk for one or more substances. A total of 6600 (80.8 %) actually received SBIRT services with most (83.4 %; $n = 5436$) receiving at least one brief intervention session for alcohol or medication misuse, while the remainder received brief treatment (5.9 % of service recipients, $n = 387$) or referral to treatment (11.8 %; $n = 777$). Therefore, in general, it would appear that SBIRT universal screening for an older population may have a higher proportion of negative screens. Non-healthcare providers identified a higher proportion of the positive screens with 10.1 % for mental health, 10.4 % for aging services, and 11.7 % for substance abuse providers, while healthcare sites identified only 8.4 %. Thus, the elder-specific Florida BRITE Project observed a smaller

percentage of positive screens compared to SBIRT grantees screening a general-age but often younger population. It should also be noted that aging services also completed a much higher percentage (57.4 %) of required 6-month follow-ups, compared to mental health (42.9 %), substance abuse providers (25.9 %), and lastly the healthcare providers (13.5 %) [24].

Some important lessons were learned in implementing an SBIRT model in Florida. In the next section, the components of SBIRT and adaptions for addressing the need of the older adult population are discussed.

14.5 Adaptation of SBIRT for Older Adults

14.5.1 Developing the Network for SBIRT

The first lesson learned from implementing the Florida BRITE Project was related to SAMHSA's requirement that grantees screen in healthcare settings, as SAMHSA regards SBIRT a healthcare-based model. In contrast, our Florida-based project was proposed and funded as a more diverse application of SBIRT in which the Florida Department of Children and Families (DCF) awarded contracts to both healthcare facilities/providers as well as non-healthcare provider agencies. Some contracts were awarded to hospitals, a trauma center, primary care practices, and urgent care clinics. For these sites, hospital or clinic staff conducted screenings and brief interventions. Non-healthcare providers receiving contracts included aging-services, mental health services (community mental health centers and behavioral healthcare agencies), or substance abuse treatment service providers that conducted SBIRT in numerous settings in the community. This latter group screened in various community settings but was also required to screen in healthcare settings. These agencies were initially met with resistance from hospital administrators who were reluctant to sign written agreements permitting BRITE health educators to conduct SBIRT services on site. It often took several months of discussions among providers, Florida DCF, and the hospitals to address concerns over HIPAA, confidentiality, and liability. Once written agreements were enacted, hospital administrators' concerns were allayed, and they began to view SBIRT specialists as a wonderful addition to their programs, with the side benefit of keeping patients engaged during otherwise long and boring waiting periods between tests and examinations by hospital staff.

14.5.2 General Issues Regarding Screening Older Adults

Research suggests the need for adaptation of screening instruments for addressing older adults' misuse of alcohol, rather than relying on criteria typically used with younger people. The first adaptation relates to what constitutes risky or problematic use of alcohol and the quantity consumed. In general, while alcohol consumption decreases with age, sensitivity to alcohol increases. For example, Moos and colleagues [3] in their longitudinal study of 55–65-year-olds followed for 10 and 20 years

found that while health problems increased, alcohol consumption declined with age. The exception was alcohol increases among patients trying to manage pain [3]. While health problems lead individuals to seek medical help, alcohol is typically overlooked or of less concern than those presenting problems. Age-related changes in metabolism and health conditions can lead to higher blood alcohol concentrations in older adults even when they consume less alcohol than their youth, resulting in increased risk for health problems, accidents, and falls. For this reason, expert panels in both the USA and the UK have recommended lower drinking limits for older adults to remain healthy [26, 27]. This in turn indicates the need for modification of quantity/frequency criteria embedded within alcohol screening instruments.

In the Florida BRITE Project, the NIAAA prescreen was used [28], in which males are identified as positive for alcohol risk if they drink more than five drinks on any one occasion and four drinks for females. Yet, expert panels have recommended no more than one drink per day for older men and "somewhat less" for older women [27]. Lowering the criteria for older adults would result in more cases being classified as "at risk"; however, a caveat is that a low criterion may not be applicable to all elders, as is the case in planned retirement communities, where residents seek an active and social lifestyle. Research suggests that many adults in these communities drink beyond recommended limits but regard drinking as part of the social activities, do not report many health concerns, and report a high quality of life. This was seen in a 2012 survey of The Villages, a large retirement community of over 90,000 residents in central Florida. Out of 11,102 surveys returned in which the three-item AUDIT-C alcohol screen was included, hazardous drinking was reported in 1600 (15.4 %) of respondents. Drinking was negatively correlated with depression, and most (three-quarters or more) respondents believed they were more social, more active, and had a higher quality of life than seniors living outside of The Villages [29].

Similarly, there are concerns about what constitutes risk of prescription medications, whether concomitant with alcohol use or not. Younger adults may engage in nonmedical use of prescription medications, such as opioids, for recreational purposes. For many older adults, medication misuse is a problem, but the motivation or intention to misuse is often different than it is for their younger counterparts. Furthermore, many older adults have legitimate prescriptions for the medications and should not be considered as illicit drug users.

In implementing SAMHSA SBIRT grants, several assessments were required. Following a positive prescreen, SAMHSA required completion of the GPRA (Government Performance and Results Act) quantity/frequency measures, as well as administration of the ASSIST [23], which asks participants to respond to questions about ten different forms of substance use. Out of the 85,001 screenings, 8165 adults ages 55 and older were found to be at moderate or high risk for one or more substances. Among these, 31.1 % consumed alcohol to the point of intoxication, and 13.1 % were found to be using illicit drugs. Importantly, misuse of medications could only be categorized using the GPRA classification as "illegal drug use," even when many of the older adults identified were misusing or making errors in appropriately prescribed medications. This categorization has important implications for

intervention. If we viewed adults' medication misuse as illicit behavior, the intervention might be different, focusing on elimination of the medication during the brief intervention sessions. If we view older adults' medication misuse of legitimately prescribed medications as errors rather than intentional efforts to recreate, then patient education would be the appropriate strategy.

14.5.3 Prescreening

As illustrated in Fig. 14.1, SBIRT begins with universal screening, the key element to a public health approach. In medical settings, such as emergency departments or primary care clinics, universal screening is interpreted as everyone who enters those venues is asked to participate in the screening process. Rather than a lengthy instrument, universal screening is actually best implemented by using a very brief prescreen. By this we refer to an instrument with just a few questions (perhaps three or four) that can easily be committed to memory by the interviewer. The prescreen must have sufficient sensitivity to identify older people potentially at risk and have a simple response format (yes/no). The purpose of a prescreen is to determine the need for a comprehensive assessment that will identify the extent or level of severity of the drinking problem. It is possible that a person may have a positive prescreen while assessed as low risk on the comprehensive assessment. In either case, that person would only receive feedback about the results, and no further intervention other than praise for maintaining a healthy lifestyle.

Use of a simple prescreen also increases the likelihood that it will be incorporated into the initial assessment by healthcare, aging, and social service providers. A very brief instrument is also ideal for an older population, where negative screens are likely to be revealed due to increased abstinence or declining alcohol consumption in the general population of older adults. Its brevity allows healthcare and service providers to move quickly on to other issues, such as presenting medical problems. At the same time, a few simple questions are less likely to be perceived by the older adult as threatening and also less likely to cause fatigue or resistance to a lengthy interview.

A number of prescreens are available and have been used to determine need for SBIRT services. The AUDIT-C [30] is a three-item version of the Alcohol Use

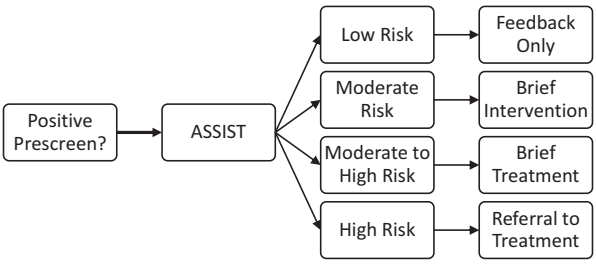

Fig. 14.1 Model for screening and providing SBIRT services

Disorders Identification Test [31]. The items ask: How often do you have a drink containing alcohol? How many drinks containing alcohol do you have on a typical day when you are drinking? How often do you have six or more drinks on one occasion? Bush and colleagues validated the three-item version among mostly older (mean age 67; 91 % were 50 and older) sample of veterans, finding that the AUDIT-C was superior in identifying heavy drinkers compared to the CAGE (which only identified 56 %).

The CAGE is often mentioned because of brevity and ease of use. The name is an acronym derived from key words in its four questions: Have you ever felt you should cut down on your drinking? Have people annoyed you by criticizing your drinking? Have you ever felt bad or guilty about your drinking? Have you ever had a drink first thing in the morning to steady your nerves or to get rid of a hangover (eye-opener)? [32] Similarly, the CAGE-AID uses the same four questions, but modified by inclusion of drug use or alcohol use at the end of each item [33]. A yes to two or more questions indicates further assessment is needed. However, the CAGE alcohol screen lacks a time frame for determining when the alcohol-related behaviors occurred. For older adults, universal screening might reveal positive results due to alcohol problems that occurred in the distant past. Furthermore, the sensitivity of the CAGE for an older population has been found to be rather low [34], with implications that lowering the criteria to just one positive answer may be sufficient to flag the older adult who would benefit from further assessment for alcohol problems.

Another example of a prescreen is published by the National Institute of Alcohol Abuse and Alcoholism [28] as was used in the Florida BRITE Project. The first question is: How many times in the past year have you had five or more drinks in a day (for men; or four or more drinks in a day (for women)? If a person indicates no such drinking, they are provided with some educational material about the content of alcoholic beverages. On the other hand, if the person answers at least once, then they are asked: On average, how many days a week do you have an alcoholic drink? And, on a typical drinking day, how many drinks do you have? By multiplying the answers to both, a weekly average is obtained to determine the need for further screening. This prescreen was used in the Florida BRITE Project; however, as suggested earlier, use of the NIAAA prescreen may lead to under-detection of an alcohol problem in an older adult due to the increased sensitivity for whom fewer drinks on any one occasion may be problematic.

The Short Michigan Alcoholism Screening Test—Geriatric Version (SMAST-G) is a ten-item screen with a yes/no response format developed from a 28-item instrument specifically for older adults [35]. Each “yes” response is scored as one point and scores from 2 to 10 are judged as positive screen for possible alcohol problems. In contrast to the CAGE, Moore and colleagues found that the SMAST-G may result in a higher number of positive screens even with fewer drinks per week, suggesting that the SMAST-G may detect older persons at risk of developing alcohol problems [36]. While recommended by SAMHSA as screen for older adults’ alcohol use, as a universal prescreen it would require a little more time and less likely to be committed to memory by screeners.

Lastly, another possible prescreen, although lengthier, is the National Institute of Drug Abuse's (NIDA) modified version of the ASSIST. The NIDA Quick Screen [37] can be self-administered online, or conducted as an interview beginning with the premise: "In the past year, how often have you used the following?" and followed by four items: Alcohol (For men, five or more drinks a day. For women, four or more drinks a day); tobacco products; prescription drugs for nonmedical reasons; and illegal drugs. For all, the respondent uses the five-point, Likert-type scale with potential responses: never, once or twice, monthly, weekly, or daily or almost daily. For alcohol, if the person responds other than "never," the individual is considered an at-risk drinker, and the screener is advised to begin brief intervention or other services.

In summary, the above instruments indicate that all have certain advantages as a public health approach of universal prescreening of all eligible people. Clinicians will need to decide whether or not such instruments can be easily incorporated into routine, initial health interviews, and level of comfort in administering each. The principle message, however, is to ensure that older adults are asked questions about their drinking. Physicians, nurses, and other healthcare professionals can encourage good behavior following a negative screen.

14.5.4 Comprehensive Risk Assessment

A brief prescreen is used to rule out individuals who do not consume alcohol or illicit drugs, or rule out those who consume alcohol but at low risk levels. For positive screens, the next step is to assess the severity of the problem. The ASSIST (Version 3.0) was required of grantees during the time BRITE was implemented. The ASSIST remains a useful instrument for determining the type of SBIRT intervention appropriate for the level of assessed risk. The ASSIST screens for lifetime as well as recent use of ten substances: tobacco, alcohol, cannabis, cocaine, amphetamines, inhalants, sedatives, hallucinogens, opioids, and other drugs. The first set of questions address lifetime use with an easy response format of yes or no, exempting any with no lifetime use from further questions. Should any "yes" response occur, the sets of questions that follow focus on use in the past 3 months (how often the person used; how often the person had a strong desire or urge to use; and how often the use led to health, social, legal, or financial problems?), followed by questions, again about any use in the past (Has a friend or relative or anyone else ever expressed concern about your use? Have you ever tried and failed to control, cut down, or stop using? Have you ever used any drug by injection?). Response sets use different Likert-type scales on the questions and require use of a response card to help the person keep track of the possible answers from which to choose.

Following a positive prescreen for alcohol, as illustrated in the next level in Fig. 14.1, ASSIST total scores for each problem substance are interpreted as low, moderate, moderate to high risk, and high risk levels. As shown in Table 14.1, there are slight differences in scoring for alcohol problems in comparison to other substances, such as illicit drugs, including abuse of prescription medications (Table 14.1).

Table 14.1 Range of ASSIST total scores and level of risk for alcohol or other substance

	Assessed level of risk			
	Low	Moderate	Moderate to high	High
Alcohol	0–10	11–19	20–26	27+
Other substance	0–3	4–19	20–26	27+

Each substance identified as problematic will result in a total score to guide the SBIRT service delivery. These scores dictate what SBIRT services will be offered. Low risk indicates that the person should receive positive feedback about their ability to abstain or consume alcohol at acceptable levels. Moderate risk triggers the decision to provide an immediate brief intervention session that relies on the use of motivational interviewing to elicit a change in behavior. Moderate to high risk suggests the use of brief treatment, which emphasizes motivational interviewing, problem-solving, teaching coping strategies, and other skills to reduce risk. Finally, high risk indicates the need to refer the individual to a substance abuse specialist or treatment service.

The ASSIST should work well with older adults in their 50s and 60s, but may be more challenging for the oldest group (mid-70s and older) for several reasons. First, the initial, large validation study on the instrument was restricted to individuals ages 18–45, and therefore excluded older individuals [38]. Only one study (conducted in France) appears to have demonstrated the validity for people ages 65 and older [39]. While the ASSIST does not address quantity of substances used, it does not need to be adjusted to reflect the lower, recommended limits for drinking in older adults; however, it does rely on frequency of use measures that may not apply the same to older adults who are at risk compared to younger adults. In the Florida BRITE Project, many screeners employed by aging services reported that the ASSIST was not elder-friendly, in that its structure of the assessment was challenging for older adults with cognitive or memory issues, as well as concerns about fatigue factor from extensive assessments of health, cognition, nutrition, and other domains.

There is also a concern about how the ASSIST addresses older adults' use and misuse of prescription medications, whether concomitant with alcohol use or not. As discussed earlier in this chapter, the ASSIST's categorization of medication misuse was a major concern in conducting the Florida BRITE Project since any use other than the prescribed method had to be categorized as illicit drug abuse in order for the older adult to receive services. Older adults who receive prescriptions often make unintentional errors in taking medications such as underuse or overuse, in contrast to younger adults who might engage in recreational use.

Recognizing that the ASSIST may not be elder-friendly, it remains the preferred instrument for identifying adults' risk levels. This in turn helps the staff member to determine the level of SBIRT services needed and standardizes the approach without relying on individual counselors' judgments. In the final level of Fig. 14.1, the recommended SBIRT services are listed and based on the total score for the substance being evaluated. Individuals at moderate levels would be offered brief intervention.

14.5.5 Conducting Brief Interventions

Brief interventions with older adults have been shown to be effective in reducing risky or problematic use of alcohol and as effective as with younger adults [40, 41]. The intervention utilizes motivational interviewing (MI), the recommended approach for motivating individuals to make a change in their substance use behavior [42]. MI is appropriate for individuals who may be ambivalent or unaware of the harm that their drinking can cause. When implemented properly, the aim is to motivate a person to change behavior using principles and methods such as reflective listening, expressing empathy, avoiding arguments and confrontation, rolling with resistance, use of cognitive dissonance to create discrepancies in one's belief about drinking vs. one's actual drinking behavior, and enhancing the client's self-efficacy. The "readiness ruler" is also used to assess how ready the person is to make a change in their behavior.

The acronym "FRAMES," which stands for Feedback, Responsibility, Advice, Menu of alternatives, Empathy, and Self-efficacy, is used to help providers implement MI effectively and motivate the person with the substance use problem to make a change in behavior. This approach has long been recommended for use with older problem drinkers as well [27].

The first principle, *Feedback*, occurs immediately after assessment (e.g., the ASSIST) to provide the person with information about the risks associated with his/her drinking at current levels, general education about the harmful effects, how drinking relates to current problems, and how older adults in general respond to alcohol. The principle of *Responsibility* refers to emphasis in the conversation that the person is responsible for his/her own behavior, can make choices about drinking, and encourages retaining personal control over drinking and its consequences. *Advice* refers to the health educator providing information about the harmful consequences of continued drinking, to make the person aware that continued drinking could cause or exacerbate significant health problems, and education about the benefits of cutting down or quitting drinking. The next principle is providing a *Menu of Options* to help individuals choose a strategy for change from a list of alternatives suggested in the MI session. Examples may include keeping a log of drinking, learning coping strategies to cope with high-risk situations and alternatives or methods to avoid them, identifying others who can provide them support, providing written materials to help them learn to overcome the problem, and providing a list of community providers of treatment services. The principle of *Empathy* refers to the MI counselor or health educator's approach to use reflection and empathy during the interaction. Finally, the principle of *Self efficacy* refers to building the person's confidence to make a change in behavior and their drinking.

The FRAMES approach provides the trained health educator or brief intervention counselor with positive strategies for motivating the person to change his or her drinking behavior. A related strategy is the "5As approach" [43], referring to the five characteristics used in behavioral and health counseling: assess, advise, agree, assist, and arrange. Healthcare providers are able to bill Medicare for "annual alcohol screening, and for those that screen positive, up to four, brief, face-to-face behavioral counseling interventions per year for Medicare beneficiaries" using code G0443

[44], provided that those four counseling interventions are completed "based on the 5As approach adopted by the United States Preventive Services Task Force (USPSTF)." As listed by Centers for Medicare and Medicaid Services, the 5As are:

1. *Assess:* Ask about/assess behavioral health risk(s) and factors affecting choice of behavior change goals/methods.
2. *Advise:* Give clear, specific, and personalized behavior change advice, including information about personal health harms and benefits.
3. *Agree:* Collaboratively select appropriate treatment goals and methods based on the patient's interest in and willingness to change the behavior.
4. *Assist:* Using behavior change techniques (self-help and/or counseling), aid the patient in achieving agreed-upon goals by acquiring the skills, confidence, and social/environmental supports for behavior change, supplemented with adjunctive medical treatments when appropriate.
5. *Arrange:* Schedule follow-up contacts (in person or by telephone) to provide ongoing assistance/support and to adjust the treatment plan as needed, including referral to more intensive or specialized treatment.

14.5.6 Staff Training Issues

Professionals who deliver brief interventions should receive training that addresses MI and the 5As to ensure that the principles are being followed. Some may seek formal training or certification in MI, while other may receive in-service training or participate in short workshops. While MI is applicable to any age group, training on aging-related issues would be helpful to avoid potential biases and misconceptions due to ageism, as well as educate providers about aging-related changes in metabolism, cognition, physical health, mental health, and social activity.

Health promotion workbook [41] authored by SAMHSA provides structure for interviewing the individual. The workbook covers steps that ask the person to identify future (next 3 months) goals for physical, emotional, social, and financial well-being; providing the person with a summary of health habits (exercise, nutrition, alcohol, medications); education components about drinking and medication use in the older population; alcohol–medication interactions; consequences of at-risk drinking; reasons to cut down or quit; a series of steps to create a plan related to the substance misuse; deciding a drinking limit, keeping a diary of use; handling risky situations; medication management; and a summary of the session. In pilot study of BRITE, it was found that use of the workbook helped the wide array of health educators maintain the MI principles and goals [22].

14.5.7 Brief Treatment

Individuals considered to be at moderate to high levels of risk can be offered participation in brief treatment. As part of the BRITE protocol, health educators had the option of using the SAMHSA manual *Substance Abuse Relapse Prevention for*

Older Adults [9] for individuals at moderate to high levels of risk. The approach based on earlier work with older adults in formal substance abuse treatment involved a 16-session curriculum utilizing cognitive-behavioral and self-management approaches that could be conducted in group or individual sessions. The manual's content provides a curriculum with an elder appropriate assessment for identifying each person's high-risk situations for substance use, perceived positive and negative consequences of use, methods for teaching the person to understand the components of his or her substance use behavior chain, and the curricula to teach clients self-management and CBT skills necessary to deal with high-risk situations and prevent relapse. The curriculum provided examples of high-risk situations appropriate to older adults, such as drinking at home and alone and drinking in response to depression. While designed for older adults, the skills training could readily be adapted for any age group.

During the pilot phase of the BRITE project we found that relatively few providers utilized this protocol, and instead opted to use the brief intervention approach. In SBIRT, for individuals with moderate risk, one session may be sufficient to motivate a person to change behavior. For individuals at higher risk, brief treatment works best if the person can return for several sessions, with each session lasting an hour. Thus skills training can be implemented, and clients can report to the therapist about any high-risk situations encountered, urges to use substances, and what skills the person did or did not employ to avoid a lapse or a relapse.

14.5.8 Referral to Treatment

In SBIRT, referral to treatment is the recommended service for anyone at highest level of risk on the ASSIST. Referral of older adults to formal substance abuse treatment is sometimes a challenge. As noted earlier, while there are increases in older adults requiring treatment, there are fewer elder-specific treatment programs. As a result, referral to treatment programs may be geared towards the higher profile cases involving youth and younger adults. If treatment admission is voluntary, many older adults may find it difficult to identify with younger adults in treatment.

A concern in sending referrals to substance abuse treatment providers is that the staff members are unlikely to have expertise in dealing with an aging population. In interviews with a national sample ($n = 346$) of private treatment center administrators, only 18 % indicated that their center provided special services (separate tracks, special groups, or lectures/services) for older adults. They also found that Medicare payment capability predicted availability of special services [45]. Thus, while there are increasing trends of older adults misusing substances, older adults still remain a small minority of admissions to treatment. If universal screening is implemented, SBIRT providers will need to work hard to develop an appropriate referral network and memoranda of understanding to ensure that older adults scoring at the highest level of risk will have options for treatment services.

14.6 Conclusions

The SBIRT model is an evidence-based practice that has been used for many years with various populations. Primarily designed for screening and intervention with medical patients, the model can be effective in other venues and with older adults. In this chapter, several areas that clinicians should consider as adaptations of procedures with older adults for states that have been funded by SAMHSA to implement SBIRT on a large scale were presented. A first consideration is to adapt prescreening criteria to accommodate older adults' increased sensitivity to alcohol and other substances, as well as lifestyle. Providers should consider whether risk for alcohol should be measured at levels lower than that for younger adults. Secondly, providers should determine if use of lengthier comprehensive assessments, such as the ASSIST, will cause fatigue or resistance among the oldest-old. Finally, an issue to be considered is if and when to use structured or standardized approaches to deliver brief intervention and brief treatment. This refers to using a health promotion workbook or substance abuse relapse prevention manual so that healthcare providers and health educators maintain a consistent style and use of motivational interviewing, as opposed to allow each person to provide brief interventions as he or she sees fit.

Incentives for providers to offer SBIRT services are that they can intervene at an early stage of a previously unidentified alcohol or drug problem, and with the older population, providers can bill Medicare for screening and brief counseling sessions. As with all treatment and prevention services, the more simple the screening and intervention, the more likely it will be incorporated into routine practice. Both healthcare services and aging services should incorporate a universal prescreen for alcohol problems in their routine of initial assessments. Building a referral network of providers through formal agreements and through informal means such as participating in elder-services' coalitions or networks will also enhance coordination of care.

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Long-Term Care and Alcohol Use

15

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Alcohol misuse among older adults has been called the "invisible epidemic" [1] and has long been advocated as a priority area for attention and action. This is based on the notion that alcohol can have a pronounced negative effect on health, quality of life, and health care costs. Alcohol misuse or unhealthy alcohol use is a broad term that includes persons who exceed recommended guidelines (e.g., more than one drink daily), engage in risky behavior, and meet criteria for alcohol abuse or dependence [2]. Despite the importance of alcohol misuse in older adults, very little empirical research exists examining this (or other alcohol-related issues) in long-term care (LTC) settings. In this chapter, a review of the literature of alcohol misuse in LTC settings is presented. In this review, we consider LTC settings for older adults to include nursing homes, assisted living, and senior high-rise communities.

Measurement of alcohol consumption is multidimensional, and terms used to represent use and misuse are varied, including alcoholism, alcohol abuse, alcohol dependence, heavy drinking, and binge drinking. In examining the literature on alcohol use in LTC settings, we include alcohol *misuse*, which we define as heavy drinking: drinking a quantity and frequency above recommended guidelines but not meeting criteria for alcohol abuse or dependence.

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Alcohol misuse is not a new phenomenon among older adults; alcohol continues to be the most commonly abused substance by older adults [3]. More than half of those aged 65 or older report drinking alcohol [4]; however, as described below, older adults living in LTC settings (i.e., assisted living facilities, nursing homes, elderly high-rise communities) may be at higher risk. For example, research by Klein and Jess suggests that up to one-half of nursing home residents suffer from alcohol problems [5].

Older adults are especially susceptible to the adverse consequences of alcohol use because of the physiological changes associated with aging [6]. Aging leads to an impaired ability to metabolize and clear alcohol from one's system due to compromised hepatic and renal functioning, a decreased effectiveness of the blood–brain barrier, and an increased use of medications. For example, older adults respond differently to various drugs because they tend to have a slower metabolism and blood flow that can cause adverse drug reactions. In addition, liver and kidney functioning may also be affected by alcohol consumption. This can lead to a paradoxical situation whereby seniors consume less alcohol, but suffer increasing adverse consequences from consumption [5]. Given the often impaired health status of LTC residents, these adverse reactions may be of particular significance in these settings.

Alcohol misuse in LTC settings has considerable significance. Alcohol-related medical problems are associated with hospitalization of older Americans; indeed, they are associated with hospitalization more often than heart attacks and cost taxpayers more than $230 million yearly in Medicare paid hospital bills [7]. In addition to being associated with increased risk of health complications, alcohol misuse in seniors is also associated with higher health care utilization, which means higher health care costs [8]. Seniors that abuse alcohol often have longer hospital stays [9] and the prevalence of hospitalization and cost of health care services may be much higher than reported because alcohol misuse often goes underidentified and undiagnosed in older adults. These numbers can suggest a lack of training and knowledge of alcohol as a problem by staff and a possible paucity of screening, diagnostic, and treatment services in LTC settings [10].

Moreover, the majority of older adults are using daily prescription medications, which creates further problems if seniors mix prescriptions with alcohol [11]. On average, older adults are prescribed between two and seven medications [11], and these rates are even higher in LTC settings averaging nine prescription medications [12].

Furthermore, LTC residents with alcohol-related problems are more likely to suffer from illness, self-neglect, disability, nutritional deficiencies, depression and anxiety, and behavioral problems such as wandering leading to falls and fractures [9, 10]. Older adults in LTC may also have a higher mortality rate [13], greater psychiatric comorbidity, and require additional mental health and social services [14]. Collectively, these additional psychological and medical conditions result in significantly greater use of health services such as emergency department visits as well as mental health and social services care [15]. Threats to the facility and other residents exist from alcohol-related fires. Thus, alcohol misuse by seniors living in LTC

represents an important concern for the health of residents and quality and safety of the delivery of health care.

Diagnosing alcohol abuse and misuse among seniors can be a challenge for health care providers because individuals may often present with the signs and symptoms that may be typical aging effects (i.e., forgetfulness, loss of balance, and speech problems) [5]. Existing measures of alcohol use, even those developed specifically for geriatric populations, are based on paradigms of alcohol use that have conceptualized alcohol-related problems in terms of disorders. These paradigms are not as useful when applied to older drinkers whose alcohol use, regardless of consumption level, can be problematic because of age-related physiological changes, medication use, and issues related to functional mobility [2]. A lack of adequate detection and diagnostic techniques for older adults means that substance abuse often goes undetected in this population, and those needing treatment do not receive services. Typically, substance-related problems in this population are only identified when these individuals are hospitalized for physical illnesses.

In the following sections, we present findings from the literature regarding alcohol use and misuse in specific LTC settings (nursing homes, assisted living, and senior high-rise communities).

15.1 Nursing Homes

Nursing homes typically act as the permanent residence (home) or as a short-term rehabilitation facility, mostly for older adults [16]. The majority of nursing homes are certified by Medicare and/or Medicaid, while others are licensed by individual states [17]. In the USA, about 16,100 nursing homes exist [18], and approximately 3.5 million people reside in a nursing home in any given year [18].

As noted above, drinking problems are associated with multiple negative health outcomes. However, the mere use of alcohol may not precipitate LTC placement. Kaplan and associates [19] analyzing data collected over 14 years identified that former drinkers and infrequent drinkers were more than twice as likely to be placed in a LTC setting compared to moderate drinkers. Alcohol misuse, on the other hand, may precipitate use of LTC settings [9].

Issues in nursing homes often mirror those of the larger society. Disease (such as HIV) and medical conditions (such as obesity) are common diagnoses among patients in nursing homes. Therefore, it is not surprising that nursing home residents may have prior or ongoing alcohol misuse. Nursing home staff report that a significant number of nursing home residents have health problems related to alcohol use [5]. There are also a high number (26 %) of elders in Veterans Administration (VA) nursing homes that suffer from active alcohol misuse [20]. However, we note that these studies are dated, and more recent rates of nursing home residents with alcohol problems are needed. The authors' ongoing research would suggest that rates are high, but not at the levels reported in these prior studies. Research has also shown that nursing home residents receiving alcohol and drug treatments are somewhat uncharacteristic of typical residents.

Nursing home residents receiving alcohol and drug treatment tend to be younger (less than 50) and male [21]. Two studies conducted at VA nursing homes designed to assess the effect of alcohol use disorders among patients were identified showing higher morbidity rates among younger residents who abused alcohol. Additionally, the level of care and utilization of health care services among residents who had alcohol use disorders was much higher [13, 22]. A study from the National Nursing Home Survey in 2005 also showed older adult nursing home residents with alcohol misuse used hospital inpatient services more frequently, required more mental health and social services, and had longer lengths of stay [14].

Nursing home residents with alcohol misuse also present more challenges for staff [22]. As such, many facilities have alcohol use policies. The National Association Directors of Nursing Administration in Long Term Care (NADONA/LTC) completed a survey on nursing home policies in regard to items brought in from outside of the facility [23]. The survey included items that asked about over-the-counter medications, alcohol, and cigarettes. Of the 299 surveys that were mailed, 94 (33 %) of the nursing homes had a written policy on alcoholic beverages, 178 (60 %) facilities required physician orders to allow alcohol consumption, 67 (22 %) required a physician order and the resident was also monitored, and 64 (21 %) had staff education to support their alcohol policy [23].

As we describe below for Assisted Living, alcohol consumption can be seen as both beneficial and harmful in nursing homes. Harm includes behavior issues and health issues; whereas, benefits include social and quality of life issues. Past commentaries have examined the pros and cons of these alcohol consumption issues [24]. However, the resident population of nursing homes has changed in recent years; residents are older and sicker [16]. So, despite policies that may exist, it may be that alcohol consumption may not be an option for many.

A recent development in nursing homes is the increased use of resident-centered care, which entails moving care towards a more home-like environment in which processes are more resident friendly. Resident-centered care is often referred to as "culture change" [25]. One definition of resident-centered care is "an ongoing, interactive process between residents, caregivers and others that honor the residents' dignity and choices in directing their daily life" ([26], p. 1). Another is "resident centered care is an ongoing, interactive process between residents, caregivers and others that honor the residents' dignity and choices in directing their daily life" ([26], p. 1). This transformative approach caring for residents can lead to facility practices that are different from the past. Facilities attempt to keep seniors' lives as normal as possible; this includes offering social activities, varied meal times, etc.—but, to date little data exists as to whether this includes alcohol consumption.

A further recent development in nursing homes is an emphasis on acute care transfers (e.g., ER use and hospitalization). Due to multiple chronic conditions and frailty, nursing home residents are at high risk for acute care transfers. For example, 20 % of Medicare residents admitted to nursing homes from hospitals are readmitted to the hospital within 30 days [27]. Potential negative resident outcomes from acute care transfers include mortality, physiological decline, and psychological

decline. Yet, it has been noted that approximately 50–66 % of all acute care transfers are potentially preventable [27]. In addition, acute care transfers are an emphasis area for Centers for Medicare & Medicaid Services (CMS), as they contribute to unnecessary health care costs. Nursing homes are under considerable pressure to reduce acute care transfers. Given the association of alcohol use with acute care transfers [14], nursing homes may implement more appropriate alcohol use policies—or at least be more cognizant of alcohol-related issues.

15.2 Assisted Living

In 1997, there were an estimated 11,459 assisted living settings in the USA, rising to a more recent estimate of approximately 40,000 in 2014 [28]. As of 2014, there were about one million Americans living in assisted living/residential care communities [28]. Assisted living is a LTC setting that typically provides care for residents that require support for one or more activities of daily living (ADLs) and/or instrumental activities of daily living (IADLs). The assisted living industry is not regulated by federal legislation, but by individual states. State regulations vary in standards and the oversight used for these settings likewise can vary [29]. Not surprisingly, the quality of assisted living varies. A General Accounting Office (GAO) report noted frequent care problems with "inadequate or insufficient care," "insufficient, unqualified, and untrained staff," and "not providing residents appropriate medications" ([30], p. 3). Care problems could also include inadequate prevention, screening, and diagnosis of alcohol misuse and abuse. The long-term care ombudsman program has reported that problems in assisted living settings are commonly reported [31]; however, alcohol misuse or abuse has not been delineated in these reports.

The cost of assisted living is a factor important to the development of the industry. Assisted living care is generally not reimbursed with federal dollars (i.e., Medicare or Medicaid programs). The out-of-pocket costs that seniors and their families incur for assisted living can be over $60,000 annually [28]. This may be important for alcohol use. Residents of assisted living settings are generally of higher income, and the percentage of older adults drinking alcohol is higher among those with higher income [32].

There are several characteristics of assisted living settings that could potentially lead to AUDs and alcohol misuse among seniors. Influences that can lead to alcohol misuse include stress, isolation, losses, loneliness, cognitive impairment, and onset of illness [33]. For example, 64 % of residents have moderate to severe cognitive impairment [12]. Residents of assisted living settings include a higher proportion of males (approximately 36 %), unlike other LTC settings which overwhelmingly consist of females (approximately 73 %). Males drink more frequently and in higher quantities than females [34]. Placement in an assisted living setting may also be precipitated by prior alcohol abuse or misuse [5].

Alcohol can be seen as both beneficial and harmful in assisted living settings because alcohol is a normal part of an adult's social life. This can lead to different facility practices. Some facilities attempt to keep seniors' lives as normal as

Table 15.1 Alcohol policies in assisted living settings

Question	Yes (%)
We permit residents to consume alcohol at the facility	82
We permit residents' family/guests to bring alcohol into the facility	87
We permit residents' family/guests to consume alcohol at the facility	89
We provide information to residents on the risks of alcohol use/abuse	61
We are aware of specific residents who abuse alcohol	75
We provide happy hours or various social gatherings where alcohol is served	82
We offer staff training on how to recognize alcohol problems	46

Source: Data from authors' ongoing research

possible by offering social activities which may include alcohol. For example, some facilities offer a cocktail hour or allow alcohol in residents' rooms, which can contribute to alcohol problems. In order to help with alcohol problems, some facilities have policies and procedures in place that require staff to retain possession of a resident's alcohol to monitor use and some go as far as to require a physician's permission for a resident to consume alcohol [5].

Recently, Castle and associates [35] examined alcohol misuse and abuse as reported by nurse aides working in assisted living. A total of 832 nurse aides from Pennsylvania were included. These nurse aides believed the majority (69 %) of assisted living residents drank alcohol; these consumption rates are higher than those reported for community-dwelling older adults. Of these residents, 34 % were thought to drink alcohol daily. It was also estimated that in 19 % of cases, nurse aides believed alcohol consumption had influenced residents' health and 28 % were suspected to be making poor choices for alcohol consumption.

A follow-up study examined policies reported by assisted living top managers. A total of 1,800 assisted living settings from most states in the USA were included. As shown in Table 15.1, a majority (82 %) of assisted living settings permitted residents to consume alcohol at the facility. However, staff training on how to recognize alcohol problems was somewhat lower (i.e., 46 %).

Only 9 % of the facilities provided an alcohol screen upon admission to the facility and 13 % of facilities screened patients regularly for alcohol problems. These findings may represent a missed opportunity in LTC to implement (or encourage) effective policies and procedures for prevention and screening, and effective treatment programs for residents with alcohol misuse or abuse. More information on facility practices is needed.

The results of this recent study indicate that assisted living facilities are in a particularly difficult dilemma. On the one hand, they need to attract private-paying clients (who may expect a facility bar, happy hours, and social events including alcohol) and on the other hand they are charged with assuring the health and safety of residents under their care. For example, facility policies around alcohol consumption may benefit some residents by facilitating interaction and reducing social isolation. However, these same policies may be harmful to residents who are at risk

for alcohol abuse or misuse. The potential benefits or detrimental effects of alcohol use vary based on each individual's health situation and need to be weighed against other common health complications of alcohol in older adulthood. Assisted living facilities need to ensure that policies and practices around alcohol use ensure the maximum quality of life and safety of all residents.

15.3 Senior High-Rise Communities

Senior high-rise communities are buildings with 20 or more units offering subsidized housing to elders (they are one specific component of what is generally known as senior housing). Senior high-rise communities are an important component of housing for older adults, with an estimated 1.2 million seniors living in these settings in the USA. However, little is known about the services that are provided in these settings or the services that need to be provided in these settings.

Numerous service problems have been identified in senior high-rise communities. For example, the General Accountability Office (GAO) identified 6 % of public housing units to be in "severe distress" ([36], p. 2), which included lack of appropriate support services, further reports noted that a majority of seniors were "disadvantaged" with respect to health services ([37], p. 4), and many HUD programs were not "designed to provide supportive services for the elderly" ([38], p. 1). Care problems may include inadequate prevention, screening, and diagnosis of alcohol misuse and abuse.

Sheehan [39] found wide variation in estimates of alcohol misuse among residents of 100 public senior housing units. However, in larger units the average percent of seniors considered to be problem drinkers was 9 %. This rate was also considered to be an underestimate by the authors as it was based on staff rather than self-report. The author also identified very little staff training in assessment or policy development in this area and a majority of housing mangers had no policy regarding alcohol misuse.

Examining alcohol misuse in senior high-rise communities may be especially pertinent given the recent development of aging-in-place policies. That is, many older adults wish to age in familiar areas and remain as independent as possible—which is often termed aging-in-place [25]. Policy makers have seized upon aging-in-place as initiatives that may provide cost-effective care. That is, aging-in-place can delay potentially expensive nursing home care. Providers, such as integrated care companies, have also realized the same benefits. Thus, aging-in-place initiatives have developed as potentially important tools for care—they are seen somewhat as a panacea for controlling costs, and as having few detrimental drawbacks. However, the idea of aging-in-place may in some cases have surpassed the capacity of seniors to actually safely do so. The number of older adults in need of substance abuse treatment of any kind is expected to increase from 1.7 million in 2000/2001 to 4.4 million by 2020 [8]. With seniors, policy makers, and providers all pushing for the same goal, the limits of "aging-in-place" may be stretched—including services for older adults with alcohol

abuse issues. In fact, substance abuse prevention and treatment services designed to meet the unique needs of seniors are very limited in the USA. [8].

In 2006, as little as 7 % of substance abuse treatment facilities reported having treatment specifically for older adults [40]. Research indicates that older adults respond well to an age-specific support style in nonconfrontational group treatment settings [41] as well as individualized treatment programs that incorporate group and family counseling [42]. Age-specific treatment options may be key to successfully treating alcohol misuse among seniors.

Findings from a recent study of older adults (conducted in 2012) living in 20 senior high-rise communities in the Pittsburgh region indicate that alcohol use in these senior high-rise communities is "high" and alcohol misuse may be problematic. Data for this study came from an ongoing evaluation of service provision of the 20 senior high-rise communities and included interviews with 320 residents [43]. The response rate was 92 % and seniors interviewed were 58 % female, 67 % minorities, had an average age of 77.4, and had on average lived in the facility 4.2 years. The interviews were conducted in private, in the senior's apartment, and included questions addressing alcohol use. Interview results are provided in Table 15.2. These findings are presented with the caveat that they are from a relatively small sample, and they may not be representative of other regions of the country. Of potential significance, this shows 26 % of seniors report having six or more drinks on one occasion.

The first ten items used in the questionnaire in the senior high-rise communities came from the Alcohol Use Disorders Identification Test (AUDIT; [44]), described further below. A score of 8 or more on the AUDIT is considered to indicate hazardous or harmful alcohol use. From the 320 residents used in our research, 34 % had a score of 8 or more.

Based on these findings, a national mail survey was used to examine alcohol misuse in senior high-rise communities (conducted in 2012). Building managers were asked to complete a questionnaire, and 450 surveys were returned (response rate = 78 %). A majority (72 %) of residents were reported as drinking alcohol. Of those residents who reported consuming alcohol, 34 % were considered to be regular drinkers who had one or more drinks daily. Moreover, 48 % of respondents suspected that residents made poor choices for alcohol consumption. In communities with a high minority representation (i.e., 50 % or more minorities), alcohol misuse and abuse was reported to be high (averaging more than 16 % of residents). These communities were also significantly less likely to report the availability of health services or use of screening tools for alcohol misuse. Also, in 13 % of cases respondents believed alcohol consumption had influenced residents' health.

Protocols in research by Clapp et al. [45] may be advantageous in further examining alcohol misuse in senior high-rise communities (and other LTC settings). These researchers examined drinking behavior among low-income older adults, by using a combination of self-reports and unobtrusive measures such as a bogus recycling program [45].

Table 15.2 Alcohol use items of elders living in elderly high-rise communities

Item	Response scale	Mean
How often do you have a drink containing alcohol?	Never; monthly or less; two to four times a month; two to three times a week; four or more times a week	37 % (four or more times a (week)
How many drinks containing alcohol do you have on a typical day when you are drinking?	1 or 2; 3 or 4; 5 or 6; 7 to 9; 10 or more	31 % (7–9)
How often do you have six or more drinks on one occasion?	Never; less than monthly; monthly; weekly; daily or almost daily	26 % (weekly)
During the past year, how often have you found that you were not able to stop drinking once you had started?	Never; less than monthly; monthly; weekly; daily or almost daily	17 % (weekly)
During the past year, how often have you failed to do what was normally expected of you because of drinking?	Never; less than monthly; monthly; weekly; daily or almost daily	29 % (weekly)
During the past year, how often have you needed a drink in the morning to get yourself going after a heavy drinking session?	Never; less than monthly; monthly; weekly; daily or almost daily	10 % (weekly)
During the past year, how often have you had a feeling of guilt or remorse after drinking?	Never; less than monthly; monthly; weekly; daily or almost daily	36 % (weekly)
During the past year, have you been unable to remember what happened the night before because you had been drinking?	Never; less than monthly; monthly; weekly; daily or almost daily	8 % (weekly)
Have you or someone else been injured as a result of your drinking?	No; yes, but not in the past year; yes, during the past year	9 % (yes, during the past year)
Has a relative or friend, doctor or other health worker been concerned about your drinking or suggested you cut down?	No; yes, but not in the past year; yes, during the past year	17 % (yes, during the past year)
Are you drinking more now than in the past?	Yes; no	58 % (yes)
Does having a drink help you sleep?	Yes; no	33 % (yes)

Source: Data from authors' ongoing research

15.4 Discussion

The previous sections provide findings from the literature regarding alcohol misuse in nursing homes, assisted living, and senior high-rise communities as LTC settings. Clearly, the research in this area is sparse. However, a few areas are worth highlighting as potential areas of future discussion and investigation—detection and caregivers.

15.5 Detection

Because older adults with alcohol misuse have not been thoroughly examined in the research, the dearth of knowledge on screening, diagnosis, and treatment of older adults with alcohol misuse makes it difficult to establish best practices for health care professionals tasked with identifying or treating substance abuse disorders in older adults [46].

There are several tools/instruments designed to detect alcohol abuse and misuse. However, these assessment tools are generally not specifically designed for use with seniors. This can create a detection barrier. As mentioned earlier, the senior population is in a different stage in life and in LTC settings tend to be separated from the rest of society. Many of the assessment tools ask questions that relate workplace issues, school issues, parenting problems, or driving concerns, all of which do not pertain to the LTC older adult population [46].

There are currently three primary screening instruments, among others, used to detect alcohol abuse within the older adult population, the CAGE (Cut-down, annoyed, guilty, eye-opener) questionnaire, The Michigan Alcoholism Screening Test-Geriatric Version (MAST-G), and the Alcohol Use Disorders Identification Test (AUDIT; [44]).

The CAGE questionnaire is meant to be a screening tool for alcohol abuse and dependence. It can be used in primary care settings and was created as an easy tool for health care providers to remember and therefore more likely to be used [47]. It consists of four questions: "Have you ever: (1) felt the need to cut down on your drinking; (2) felt annoyed by criticism of your drinking; (3) had guilty feelings about drinking; and (4) taken a morning eye-opener? The CAGE can be administered orally or as written questionnaire, and can be given at emergency care, surgery, DWI offenders, enlisted Armed Forces, college students, industrial workers, and workers in employee assistance programs.

The AUDIT tool was developed by the World Health Organization (WHO) to assist providers in detecting patients with harmful alcohol patterns [48]. The AUDIT is a ten question screening tool that asks questions on the frequency of one's drinking, alcohol dependence, and problems caused by alcohol. The AUDIT is not as easily applicable as the CAGE tool, but it is no longer than a two to four minute questionnaire that can be administered in a variety of health care settings.

The MAST-G is tailored to seniors. The MAST-G highlights the special employment and social situations of those who may be retired or facing different aging process that may lead to alcohol abuse. It is primarily used in outpatient settings to identify those who are risky alcohol users, abusers, or alcoholism [49].

The screening of older adults can be a challenging task. Many studies have used the AUDIT, CAGE, and the MAST-G to understand the alcohol abuse concerns in the USA. However, in order to further understand the severity of alcohol abuse assistance residents need, the identification and delivery of appropriate interventions are vital. There is an increased need for screening and assessment tools exclusively designed for seniors, along with providers who are more comfortable with using such screening tools. And to assist resident in need, to increase the awareness of increased alcohol use, and to create an easy to use tool for medical providers, the

U.S. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration for Substance Abuse Treatment published, "Alcohol Use Among Older Adults, a Pocket Screening Instrument for Health Care and Social Service Providers" [50].

15.6 Health Professionals

Primary care providers play a crucial role in detecting alcohol abuse among older adults. About 87 % of older adult patients see their primary care physician regularly, an opportunity for early alcohol abuse detection. There are many other important people who also play a role in alcohol abuse detection such as family, friends, social workers, and home health nurses. It is vital that those who regularly interact with the elderly are aware of alcohol abuse concerns, and are also adequately trained to respond to the issue.

The attitude of many medical providers and social service providers can affect the detection of alcohol abuse, as many view this as the patients only pleasure as they enjoy the last years of life. The lack of training can make the alcohol conversation uncomfortable and is often times overlooked as a result of stereotypes or biases. Many clinical providers do not ask the crucial questions, if the senior is having problems with alcohol consumption. Some providers may feel senior patients do not benefit from alcohol treatment. Typically also, older adults do not work, have fewer social obligations, and spend most of their time at home, making it more difficult for people to recognize changes in behavior. When a change in behavior does occur, alcohol abuse is routinely overlooked, and the provider relates the occurrence to other issues associated with aging such as dementia, falls, skin trauma, insomnia, weight loss, hypertension, or other health issues, which are also the effects of alcohol and aging. Provider attribution of alcohol-related problems to age-related health conditions is further exacerbated by the fact that many older adults feel embarrassed by their alcohol use or keep their abuse hidden from providers, family, and friends making it more difficult to identify alcohol abuse or misuse in this population.

Screening and brief intervention specific to nursing homes, assisted living, and senior housing may be useful for medical providers and social service providers. Extensive work in this area by Schonfeld et al. may be an opportunity for new avenues in this area [51]. The Florida Brief Intervention and Treatment for Elders (BRITE) project had significant success in identifying alcohol misuse in older adults (as well as prescription medication misuse, over-the-counter medication abuse, and illicit substance abuse [51]).

15.7 Conclusion

Given the potential importance of alcohol misuse on the health and quality of life for seniors, clearly more research in this area is warranted. Over the past decade, assisted living has experienced rapid growth in capacity, and nursing homes and senior communities still represent numerous institutional care setting for older

adults. We should not miss the opportunity to implement appropriate policies and procedures for prevention and screening, and effective treatment programs for seniors with alcohol misuse residing in LTC.

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Drinking, Aging, and Global Public Policy

16

Marjana Martinic and Anna Sheveland

As a population, older adults generally drink less heavily and are more likely to abstain from alcohol altogether than younger age cohorts [1, 2]. However, because of physiological changes associated with aging, older adults are more susceptible to the effects of alcohol [3] and, therefore, the negative consequences of drinking can be more pronounced. The prevalence of alcohol use disorders (AUDs) among the elderly is also not negligible—in the United States, for example, it is estimated at three percent [4], while statistics from Germany suggest that some 400,000 elderly individuals suffer from alcohol-related problems [5]. There is also evidence from some high-income countries that alcohol-related problems, such as AUDs, are often under-detected among the elderly [6–8]. At the same time, research points to certain physiological and psychological benefits associated with low to moderate drinking among elderly individuals [9–11]. The duality of these outcomes can present a challenge for the crafting of policies and recommendations to appropriately address drinking among the elderly.

The number of elderly individuals worldwide is rising. This is due, in part, to the aging of the "baby boomer" generation in developed countries, but also to increasing longevity in less developed parts of the world. There is also evidence that drinking patterns have been changing among the aging baby boomer cohort; their drinking is heavier than among previous generations [12], and these individuals also seem to be decreasing their consumption at a slower rate as they age [2]. As the world's largest living cohort transitions into old age, absolute numbers of older people are increasing, both in developing and in developed countries, and with them the prevalence of alcohol-related problems [7, 13, 14].

Thus, drinking among the elderly is an issue in need of attention through public policy and interventions. To date, public policies have largely ignored the elderly

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and their particular needs and concerns. This chapter examines current policy measures and intervention approaches specifically targeting older individuals, and discusses areas where additional efforts are needed.

16.1 Alcohol Policies: Regulatory Measures and Targeted Interventions

From a public health perspective, alcohol policies are intended to minimize risk from harm and to maximize benefits for the individual and for society. Since drinking cultures, attitudes, and patterns vary significantly among countries, strategies for reducing harmful drinking should be crafted and applied in ways that are effective and sustainable, but also appropriate for the specific context. Two different yet complementary approaches make up the body of alcohol policies. Regulatory measures governing the physical and economic availability of alcohol, as well as its quality and integrity, provide the policy framework. They rely on legislation and a central role for government in implementation and enforcement. The second approach consists of targeted interventions, tailored to specifically address instances of harm. These do not require legislation and do not rely solely on government intervention. Rather, responsibility for implementation can be shared by various stakeholders and sectors of society. These include, for example, healthcare professionals and researchers, civil society organizations and NGOs, as well as appropriate private sector entities, such as alcohol producers, the insurance industry, and others. Working in partnership with each other, as well as with government, these actors can harness resources and provide a potentially more agile response to key issues than government acting alone. Since policies reflect the state's level of engagement with the individual and its perceived role in fostering the well-being of its citizens, the implementation of regulation versus targeted approaches varies among countries.

Regulatory measures around alcohol are applied at the whole-of-population level and, with a few exceptions, do not differentiate among target groups. They are aimed at the young as much as at the elderly, and at heavy drinkers as much as at those who drink lightly. Generally, public policies around drinking rely on the assumption that reducing average consumption across entire populations will also correspond to a decrease in harmful outcomes. Included in this panoply of measures are restrictions on where alcohol may be sold, to whom and by whom, and rules around hours during which sales are permitted. Taxes on alcohol beverages are an integral part of the regulatory framework for alcohol and in many countries represents a substantial source of government revenue. Regulatory measures are also implemented around the advertising and marketing of alcohol and, in most countries, a legally mandated minimum age for the purchase of alcohol beverages [15] and levels of blood alcohol (BAC) [16] for operating motorized vehicles complete the array. However, regulatory measures, by their very nature, are broad based and suffer from certain limitations. They are insensitive to differences among groups of drinkers, their particular drinking patterns, susceptibility to alcohol, and other potential risk factors.

While age has long been recognized as an important consideration that merits particular attention with regard to policy, in most countries around the world, the emphasis is generally on reducing the potential for harm in young people. There has been far less political will to address the particular needs of older adults through public policies, including that of alcohol. While it has been suggested that those alcohol policy measures that have an impact on middle-aged populations are equally applicable to older individuals [17], older people do not often feature on the list of high priorities for policy makers when it comes to reducing harmful drinking. To date, there is also a lack of consensus on and consistency in what constitutes "old age" and the "elderly," which makes application of measures difficult. Various thresholds have been suggested, including as low as 55 years of age [18], however the most common cutoff seems to be 65 years of age [19].

Recognizing the general dearth of information and good practice around addressing alcohol problems among the elderly, the EU-funded VINTAGE project *Good Health into Older Age* [20] was designed to "build capacity at the European, country and local levels by providing the evidence base and collecting best practices to prevent the harmful use of alcohol amongst older people" ([21], p. 221). A scoping exercise of the number of programs implemented across EU Member States showed that programs had been implemented in only a handful of countries, notably the United Kingdom, Finland, the Netherlands, and Italy. The main reason given for the absence of programs was the lack of public health policies that address prevention strategies around alcohol consumption and related problems aimed specifically at the elderly. Other factors identified include generally low awareness of alcohol problems among, and the special needs of, the elderly, as well as a lack of resources, and the perception among policymakers that old age is too late to address these problems [22].

While regulatory measures provide the framework for alcohol policies, tackling harmful outcomes is often best achieved through the complementary use of targeted interventions that aim to reduce risk and harm in known vulnerable populations. Such interventions are pragmatic, and responsive, and can be tailored to specific needs. Targeted interventions offer options for addressing alcohol-related harm in a flexible, sustainable, and culturally appropriate way [23]. Since they do not rely solely on regulation and legislation, they can be implemented through the involvement of different sectors of society, including health professionals, civil society, the private sector, local and national governments, and intergovernmental organizations.

Targeted interventions can be adapted to address key areas: at-risk drinkers, risky behaviors, and high-risk contexts. Included among these interventions is alcohol education, both formal and informal, covering the range from population-wide campaigns and messaging, to school-based programs, and specific interventions designed to raise awareness and knowledge that can help equip individuals to make informed choices about whether or not to drink [23]. They also include approaches designed to change perceptions around what constitutes "normative" drinking. These interventions also include efforts aimed at the elderly, as discussed later in this chapter.

A second targeted intervention approach is the identification of risky drinking patterns through screening, coupled with measures to change risky behaviors and, depending on the specific needs and severity of the problem, includes referral to treatment. Interventions in this category have been applied with considerable success across different groups and ages, and are reasonably cost effective to implement [24, 25]. They can be integrated into primary health care, can be standalone efforts, or can be linked with screening for other health issues, such as antenatal care, workplace wellness programs, and other similar initiatives.

Another area in which targeted interventions have an important role is alcohol-impaired driving, where common measures include the setting of age-specific BAC limits or graduated driver's licenses. Both of these are aimed at young people. Other interventions that reduce the risk of alcohol-related road traffic crashes include the provision of alternative transportation and designated driver schemes. A concept related to these interventions is that of responsible hospitality, with the training of service staff in retail outlets, bars, restaurants, and other venues to help minimize the likelihood of intoxication among patrons. Related measures include the modification of the drinking environment to make drinking occasions safer, particularly in areas where there is a high concentration of nighttime entertainment venues [23].

While many of these interventions are as applicable to elderly individuals as they are to other age groups, there are a few areas where specific efforts have been made to target the unique needs of older individuals. Education and awareness includes the crafting of drinking guidelines with specific advice and recommendations for the elderly. Tailored screening, intervention, and treatment for alcohol problems can be adapted to meet the needs of older individuals. Related to these measures is also the training and education of service providers for the elderly to be able to offer advice and intervention. Efforts around road traffic safety can be adapted to fit the drinking and driving patterns of elderly individuals. Targeted measures need to take into account not only the chronological age of those for whom they are intended, but should reflect the reality of changing lifestyles among the elderly and related risk.

16.1.1 Drinking Guidelines

Appropriate information on drinking and tools to equip those who choose to drink to understand the relationship with outcomes and to avoid harmful drinking patterns are provided by government bodies, quasi-governmental organizations, and professional societies in many countries around the world [26]. Drinking guidelines offer recommendations around daily or weekly drinking (or both), gender-specific recommendations, and may include considerations around age, health status, and other factors that influence the relationship between drinking and outcomes. However, few official guidelines offer specific recommendations for the elderly (Table 16.1). Where such advice is given, recommendations for the elderly are generally lower than for the general adult population.

Table 16.1 Drinking guidelines for the general adult and aging population (based on national recommendations, unless where noted otherwise)

Country	Guidelines for the general adult population (in grams pure ethanol)	Guidelines specific to older adults
Australia [27]	Men: ≤20 g/day; ≤40 g on any one occasion	"Specific population groups can be at increased risk if they drink alcohol; these include: …older people aged over 60 years."
	Women: ≤20 g/day; ≤40 g on any one occasion	
Austria [28]	Men: ≤24 g/day	"Older people's bodies may be more sensitive to alcohol, therefore they should decrease their alcohol consumption."
	Women: ≤16 g/day	
Denmark [29]	Men: ≤168 g/week	"If you are elderly, be especially careful with alcohol."
	Women: ≤84 g/week	
Finland [30]	Men: ≤2 drinks (20 g)/day	Men: ≤1 drink or 10 g/day
	Women: ≤1 drink or 10 g/day	Women: ≤1 drink or 10 g/day (same as for general population)
Hong Kong [31]	Men: ≤20 g/day	"'Low risk' is not 'no risk.' Even within these limits, drinkers can still have problems if they drink too quickly, have health problems or are older."
	Women: ≤10 g/day	
Italy [32]	Men: ≤36 g/day	Elderly people are also advised to limit the consumption of alcohol to one drink daily. (A drink is defined as containing 12 g of ethanol.)
	Women: ≤20 g/day	
New Zealand [33, 34]	Men: ≤30 g/day, ≤210 g/week, ≤60 g on one occasion	Men over 64 years old: ≤30 g/day, or ≤150 g/week, or ≤50 g on one occasion
	Women: ≤20 g/day, ≤140 g/week, ≤40 g on one occasion	Women over 64 years old: ≤20 g/day, or ≤100 g/week, or ≤40 g on one occasion
Switzerland [35]	Men: ≤26 g/day	"Those over 60 years of age should be aware of differences in how alcohol affects them."
	Women: ≤24 g/day	
United Kingdom [36]	Men: ≤14 drinks (112 g)/week	"Some groups of people are likely to be affected more by alcohol and should be more careful of their drinking on any one occasion:
	Women: ≤14 drinks (112 g)/week	
	(Equivalent to16 g/day for men and women)	• (…) older people."
United States [37–39]	Men: ≤28 g/day, ≤196 g/week	Men: <7 drinks/week, or 1 standard drink/day[b]
		Binge drinking defined as >3 standard drinks/drinking occasion
	Women: ≤14 g/day, ≤196 g/week	Women: <7 drinks/week, or 1 standard drink/day
		Binge drinking defined as >2 standard drinks/drinking occasion
		"Adults over age 65 who are healthy and do not take medications should not have more than:
		3 drinks on a given day
		7 drinks in a week"

Source: Data from [26]

[a]A UK unit is defined as 8 g of ethanol

[b]A standard drink is defined as 12 g in the recommendations for the elderly, while the regular U.S. standard unit is 14 g

Some recommendations go further than simply offering advice in terms of quantity and frequency of drinking. For example, the U.S. government's Substance Abuse and Mental Health Services Administration (SAMHSA) and Administration on Aging (AOA) offer the following guidelines, which state that older individuals should abstain from alcohol completely if they:

> "are taking certain prescription medications, especially psychoactive prescription medications (e.g., opioid analgesics and benzodiazepines); have medical conditions that can be made worse by alcohol (e.g., diabetes, heart disease); are planning to drive a car or engage in other activities requiring alertness and skill; or are recovering from alcohol dependence" ([38], p. 1).

The U.K. Royal College of Psychiatrists has pointed out that recommended limits for consumption are based on research on younger adults. As a result, the Royal College points to changes that accompany aging that make, older adults more susceptible to alcohol-related harm, which means that 'safe' levels of drinking for the elderly may be lower than those offered in guidelines for the general population.[1] The recommendations also note the need for local policies regarding older people with substance use problems to facilitate admission and treatment [7].

In Germany, recently released joint guidelines on prevention, screening, and treatment, issued by a number of scientific and medical associations, now include, for the first time, a chapter specifically dedicated to the elderly, addressing the need for the screening and treatment of alcohol problems [40]. While these guidelines do not recommend particular levels of consumption for older adults, they do point to the need for lower levels of drinking, depending on health status and age [41].

16.1.2 Screening and Brief Intervention

A second area for targeted interventions around drinking that has been adapted for the elderly focuses on the identification of those individuals at heightened risk for alcohol-related harm through screening and the subsequent provision of interventions and referral to treatment. Screening and brief intervention (SBI) approaches are effective in reducing harmful drinking [42–44], including among elderly populations [45, 46], and have an impact on alcohol-related mortality and morbidity [8]. Recent modeling exercises suggest they are also cost effective for governments to implement as a strategy to reduce alcohol-related harm [25, 47, 48].

However, the effectiveness of SBI can differ depending on both the conditions of its implementation, and certain characteristics of the patients screened, such as gender, education level, perceived self-efficacy, or drinking level and frequency [43, 46, 49–51]. The need for tailored instruments that are more sensitive to the needs and life contexts of the elderly than those included in standard screening for adults, has been highlighted [52–54]. It has also been suggested that elderly adults would benefit from regular screening for alcohol problems [55].

[1] It should be noted that at the time of the writing of this chapter, the UK Department of Health had just issued revised guidelines for alcohol consumption, but these were not yet reflected in guidelines issued by the Royal College of Psychiatrists.

In offering advice to elderly people, there are additional factors to be considered. Older people are more likely than their younger counterparts to drink alone and at home, so harmful patterns may not be readily evident [56]. Also, given that elderly individuals are likely to have poorer health than their younger counterparts and more likely to be using prescription drugs for various conditions, SBI should take into account potential interactions and the effect of comorbidity with other health outcomes on drinking and appropriate interventions. Although not as common as among younger age groups, there is evidence of drug abuse among elderly individuals [57, 58], which also requires consideration in the implementation of screening.

A recent systematic review has pointed to some gaps in the evidence around the impact of SBI on older populations, suggesting that further research is warranted [59]. However, some research into the effectiveness of SBI for older age groups suggests that they are most effective when integrated into general primary care settings, rather than through referral to a psychiatric or mental health care facility [49].

16.1.3 Training for Care Providers

Given the particular needs of elderly individuals, specific training is recommended for professionals who work with them—notably physicians, nursing staff, other health workers, and home carers—as there is evidence of a lack of understanding and awareness among many health professionals of drinking problems in elderly patients [14, 60]. Physicians and other health workers often fail to take alcohol consumption and potential problems into account when diagnosing their older patients [61, 62] and may mistake alcohol-related problems with those related to aging [63].

It has also been suggested that a network of so-called gatekeepers, who have regular contact with the elderly and whose help can be enlisted in looking out for problems and for referrals to health and other professional services may be needed [64]. These "gatekeepers" would include meter readers, postal workers, delivery persons, paper carriers, and grocers; in a word, all those with regular contact with the elderly. While such broad networks may not be a realistic goal to achieve, there is a more immediate and important role for family members, friends, and neighbors, who should be aware of the issues facing the elderly with regard to alcohol and able to recognize when intervention is needed. In particular, community workers and social workers may also have easier access to the elderly than health workers and can be enlisted for this purpose. However, it is clear that broader public awareness and information campaigns to raise the overall level of knowledge around drinking among the elderly and its potential outcomes are needed.

16.1.4 Road Traffic Safety

The various challenges of aging include the loss of mobility and independence. For many older adults, particularly in developed countries, the ability to drive an automobile or other motorized vehicle directly symbolizes the retention of autonomy over at least some aspects of daily life. However, given the deterioration of

vision and reaction time that accompany aging, along with research showing that older drivers display greater impairment after consuming alcohol than younger drivers [65], greater attention is needed to educating older adults and the general public about special considerations around drinking and driving among the elderly. Stopping short of legislating lower BAC levels for older adults, which are likely untenable for both practical and political reasons, there may be room to craft particular recommendations around lower consumption levels, or around abstaining from drinking altogether when operating a motor vehicle. Alternatively, encouraging older adults to use alternative transportation when they have been drinking offers a pragmatic solution through a targeted intervention. Serving staff in bars, restaurants, taverns, and other outlets that serve alcohol can also be encouraged to pay particular attention to older patrons' drinking, and to offer transportation, as has been done for younger populations.

16.2 Concluding Remarks

Global demographics are changing rapidly. With the movement of the largest living generation into old age and increasing life spans in many countries around the world, the global population is growing older and will continue to for years to come. This has implications for the importance of public policies that are sufficiently well crafted to account for the specific needs of the elderly.

By virtue of sheer numbers, the current health burden from older individuals will be greater than that from previous generations, creating an imperative for prevention in earlier years, but also increased emphasis on addressing harmful outcomes and reducing risk for harm in older age. Their growing numbers combined with the adoption and persistence of drinking patterns (e.g., heavier drinking overall, more drinking among women, and less reduction in consumption with age) that differ substantially from previous cohorts, mean that the elderly are likely to increasingly contribute to the burden of harmful drinking.

To date, harmful drinking among aging individuals in both developing and developed countries has received relatively little attention in terms of public health policy. This is in part a reflection of a shortage of political awareness and will to tackle the issues, and in part the result of insufficient resources. In many countries, notably in the developing world, drinking in old age is not a public health priority and there is a dearth of information on drinking patterns and alcohol-related harm among older people.

It seems clear, therefore, that governments are ill equipped to tackle the issue alone. A new model is therefore needed that allows government to retain its role and mandate but also allows engagement by other stakeholders in contributing to the reduction of harmful drinking among the elderly. As a point of departure, governments have a role in providing information to their citizens about health issues, including about alcohol consumption, in order to encourage informed decisions about drinking. Drinking guidelines that pay attention to the elderly are needed. These should point to potential health risks associated with alcohol consumption for older adults, but also reflect the potential health benefits of moderate drinking that apply to many older individuals. Governments also have an important role in

collecting information about the health and welfare of their citizens. This includes information about consumption patterns and outcomes. Such information is essential in describing the extent of the problem but also in helping to identify possible solutions. Another basic and essential role of government is the strengthening of health services so that they are equipped to handle alcohol-related issues among the elderly.

Beyond this, however, the answer to policy and interventions likely lies in multistakeholder engagement. This approach also reflects current global trends in health and development, such as those laid out in the U.N. Sustainable Development Goals, and calls for the engagement of actors outside of government. Among them are researchers who provide evidence-based advice that will inform interventions and approaches to prevention. Civil society can offer the engagement of communities and grassroots movements, and the private sector can bring its knowledge and much-needed resources to the table.

The insurance industry, for example, which bears a significant portion of the economic burden of an aging population and their so-called longevity risks, would be an obvious stakeholder with an interest in the well-being of older adults. Attention to the risks, but also to some of the benefits for cardiovascular health, type II diabetes, and dementia that are associated with moderate drinking, seems an appropriate area for insurance providers to address. Investment in wellness programs aimed at older adults, which also cover drinking and the prevention of alcohol-related harms are potentially cost-effective ways of improving health and preventing harmful outcomes. Such programs can be a useful tool in reducing the burden of disease associated with harmful drinking.

There is also a role for the companies that produce alcohol beverages, and whose efforts include partnerships with a range of other stakeholders in an effort to reduce alcohol-related harm. Commitment to corporate social responsibility is high on the agenda of such companies. While it is generally aimed at preventing underage drinking and harm to young people, the scope of such interventions and activities can be broadened to also include older individuals. Included are activities such as educational programs, support for prevention, and the provision of information on responsible drinking.

There is an urgent need for comprehensive, integrative policies around drinking as it relates to older adults that can be put into place at the national and also the international level. Yet public policies in their strictest interpretation are likely inadequate to address the challenges and provide the requisite resources for action. A whole-of-society approach offers itself as a viable complement to public policies. In this model, each actor has a well-delineated role to play and each can bring different expertise and resources to bear in the interest of the public good.

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Part V

Future Directions

Future Directions for Aging and Alcohol

17

Alexis Kuerbis, Alison A. Moore, Paul Sacco, and Faika Zanjani

This edited book highlights a variety of areas in the study of alcohol and aging with each chapter considering gaps in research specific to different topic areas. In this chapter, we take a broad view, and make recommendations for research, policy, and practice in the field of alcohol and aging. The proposals put forward in the chapter respond to relatively understudied areas in the field of alcohol and aging but also delve into areas where research can be enhanced using innovative methods that have not been applied to older adult populations extensively. In addition to research, the chapter identifies areas where policy and practice change is crucial to improving outcomes for older adults. Even though many possible avenues for research and practice change are discussed, it is clear that opportunities for research, practice, and policy innovation are abundant and hold the potential to decrease unhealthy drinking and improve older adult health.

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17.1 Research

Research on alcohol use among older adults emerged as alcohol researchers began to explore older adults as a subpopulation. In a monograph published by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in 1998 [1], Edith Gomberg and colleagues wrote a chapter focused on identifying research priorities in alcohol and aging. They noted that gerontology in alcohol research was an emerging area, discussed the frustrations of having a dearth of research in on aging and alcohol use, and recognized challenges going forward.

Now, nearly 20 years later, the depth, breadth, and sophistication of research on alcohol use among older adults is clear. Looking forward, we identify some important areas where the field can build on important findings from the last 20 years. Since Gomberg et al. [1], some areas of research have progressed extensively, while some of the gaps they identified remain. Additionally, the passage of time itself means that aging research faces new challenges and new opportunities. The aging of the population is no longer part of an imagined future, and findings from research conducted on earlier generations of older adults may not be as pertinent for or applicable to new cohorts of older adults. New methods utilizing emerging technologies promise to provide new insights about alcohol use in older adulthood and give researchers the opportunity to revisit research questions with powerful new tools.

17.1.1 The Aging Tsunami: The Storm Has Come

Population aging has fueled a sense of urgency related to the mental health of older adults including expansion of research [2]. This makes sense given the seismic changes in the demographic makeup of the United States and the world. To assess future need for alcohol and other substance treatment services, Gfroerer and Han [3, 4] conducted two analyses using data from the National Survey on Drug Use and Health to estimate prevalence of substance use disorder and treatment need in 2020. They forecasted very large increases in the number of individuals with substance use disorder (2.8–5.7 million) and needing treatment (1.7–4.4 million).

For the purposes of responding to treatment need and fostering prevention, future research should delve into the emerging cohort of older adults. Specifically, are the projected numbers of individuals needing treatment materializing? If numbers are increasing, is this a function of simple population change or is the prevalence of older adults with alcohol and other drug-related conditions changing? Research has suggested that the Baby Boom cohort is distinct from earlier cohorts of older adults related to their use of alcohol. To respond effectively to treatment needs of this generation, research should explore how this generation of older adults may be distinct qualitatively from previous cohorts of older adults. For instance, research suggests that inpatient treatment admissions for comorbid alcohol and drug use are increasing as a proportion of total treatment admissions among older adults [5]. Research should explore risk factors in light of comorbidity including tobacco use, illicit drug use, and prescription drug misuse.

Beyond prevalence of use and co-occurring drug use, researchers should explore how generational shifts in attitudes toward drinking may be driving changes in use. For instance, relatively little research has focused on drinking motives [6, 7] and alcohol expectancies [8, 9] among older adults. It would be useful to understand how these concepts map on to consumption, at-risk drinking, and alcohol problems as a means of developing treatment models in this population. More generally, data should be gathered on perceptions of drinking among older adults, as generational shifts may be at taking place. Whereas age grading [10, 11] (i.e., the idea that certain behaviors are appropriate or not appropriate based on age) may have suppressed alcohol use among older adults in previous generations, current older adults may not ascribe to the idea that it is appropriate to decrease or quit drinking in older adulthood.

17.1.2 Diversity in Older Adulthood: Opportunities for Alcohol Research

The current cohort of older adults and future generations of older adults are more diverse than earlier cohorts. Relatively little research has focused specifically on diversity in older adulthood and alcohol use including race/ethnicity [12–15], gender [16, 17], socioeconomic status [18, 19], religion [12, 15], and sexual orientation and sexual identity [20]. Through research on older adult subpopulations, the field can adapt a more nuanced understanding of older adults and aging. Scholarship in this area can identify groups who may be at higher risk and characterize potential mechanisms that contribute to that risk.

Diversity is also important in life course development. In their work exploring issues and future directions in alcohol research, Gomberg and colleagues [1] discussed the challenges of defining the cutoff for older adulthood. Since that time, the fastest growing segment of the population is the so-called oldest-old [21], yet there is very little research on alcohol use in this population [22]. On the other end of the age spectrum, late middle age is becoming an area of increasing concern, as research has recently identified increases in mortality rates in this group, possibly attributable in part to alcohol [23]. Broadly speaking, we recommend that research studies consider development within older adulthood by targeted sampling of groups at different ages, through recognition of event-based markers of older adulthood (e.g., retirement) and by designing studies that bridge earlier life stage development (i.e., midlife) and older adulthood through longitudinal designs. National longitudinal studies such as the Health and Retirement Survey (HRS) and the Midlife in the United States (MIDUS) Study are examples of existing data that have supported research on life course development and drinking. Thus, opportunities for expanding knowledge about developmental transitions already exist and need to grow further.

17.1.3 Social Context and Drinking: Implications for Older Adult

Research on older adults and drinking has tended to consider older adults as a monolithic group, largely neglecting contextual factors. Compared with research on young adults and adolescents, scant research has explored how alcohol use is associated with social support and social networks among older adults [24, 25]. (See Chap. 10 for more on social support, social networks, and drinking.) Social network-based research has primarily focused on social support for recovery [25] and consumption changes during the retirement process [24]. This research is a solid foundation for future study that can further examine potential causal links between social network constructs and alcohol use. We recommend increased utilization of methods such as social network analysis to research how social networks influence individual older adult use. For instance, researchers utilized data from the Framingham Heart Study to analyze social networks and alcohol consumption and found that changes in one's social network's drinking influenced personal alcohol consumption [26] among a sample of participants who were middle-aged adults at baseline. Research by Bacharach and colleagues [24] suggests that among those with a history of problem drinking, changes in social network size may lead to decreases in alcohol consumption among older adults.

Even less is known about the role of neighborhood context in alcohol use among older adults. In a study [27] conducted in Baltimore, Maryland, researchers identified associations between "neighborhood psychosocial hazards" and binge drinking among late middle aged and older women but not men. Aside from this study, there is limited research on neighborhoods that includes older adults as a specific population of interest. (For a more in-depth review of neighborhood research and aging, see Chap. 10.) Research on the influence of neighborhood on older adult health is extensive [28]; perhaps these studies could be extended to include alcohol use.

In the area of behavioral health research, the use of ecological momentary assessment Ecological Momentary Assessment (EMA) [29] or "experience sampling" has advanced our understanding of within- and between-person variation in alcohol use. EMA studies are designed to gather data on individual experiences that vary over time within an individual (e.g., alcohol craving) and are collected using paper diaries or through technological means (e.g., mobile phones). The advantage of these approaches is the ability to assess between-person (e.g., individuals who are prone to craving) and within-person (e.g., when a person experiences increased craving) influences on alcohol-related outcomes. Although this method is becoming more widely employed in other areas of alcohol research [30–32], its use specific to older adults and alcohol use is limited [33].

17.1.4 Genetics

Similarly, in alcohol research specific to aging, genetically informed research is very rare [34, 35] compared with the body of literature on alcohol use. Considering the importance and growth of genetic research in understanding alcohol use,

research is limited in the context of aging in mid to late life. We recommend inquiry into the relative genetic and environmental contributions to alcohol-related problems in the population of older adults using twin methodologies. Research could also compare how contributions of genes and environment may be different in older adult populations versus younger groups. In a similar manner, very little research has considered developmental change in genetic contribution to alcohol use among older adults. Longitudinal research conducted with younger groups (i.e., young adults) suggests that developmental processes are an important component to the understanding the importance of genes and environment in alcohol use [36]. Perhaps genetic studies of late life development can add to our overall knowledge of how genetic risk and environment play out later in the life course.

17.1.5 Understanding Drinking by Understanding Abstention

Lifetime abstinence is another area where risk can be understood from a life course perspective. In assessing the role of alcohol on health among older adults, data suggests that current and past alcohol use may be important and that lifetime abstainers are different from former drinkers [37, 38]. Research studies should consider alcohol transitions beyond onset of drinking to explain factors that contribute to the decision to quit drinking in older adulthood. Morbidity and disability may be an important component in forecasting use or abstention among future cohorts of older adults, as illness may exert downward pressure on alcohol use. Similarly, little research has explored long-term recovery among older adults with a focus on health and psychosocial correlates of recovery. It is likely that past problematic alcohol use can create greater health difficulties in older age [39], but research is limited regarding how older adults with past alcohol problems fare in old age.

17.1.6 Alcohol and Medications: Quantifying Risk

Although a solid body of research has identified comorbid alcohol and medication use as potentially problematic [40–42] (see Chap. 8), there is little evidence about the specific hazards of alcohol and medication co-use [43]. Which medications are particularly hazardous when combined with alcohol? When alcohol is combined with medication, what are the specific acute and chronic risks? Little is known about actual public health impacts of alcohol and medication co-use among older adults. We would contend that at the current time, most data regarding observable outcomes (e.g., falls, bleeding, and hospitalization) are speculative when considered outside the lab, and researchers have suggested that many potential interactions do not display a clinical effect [44]. Pharmaceutical and medical record data may be a source of data to quantify serious events associated with alcohol and medication co-use.

17.1.7 Treatment and Older Adults

In the long term, while older adults seem to have more positive alcohol treatment recovery [25], mechanisms to aid in understanding the success are mostly unknown. Research on treatments adapted for older adults must be expanded. Little is known about the efficacy of specific established evidenced-based practices, such as motivational interviewing, among older adults, despite the assumption that it works equally well for clients of all ages. (See Chaps. 12 and 14 for more information.) Like adolescents, older adults may experience differential motivation to change certain behaviors later in life. In the existing, albeit limited, literature, structured treatments, such as cognitive behavioral therapy, appear to be more successful than other less structured treatments.

17.1.8 Health Promotion

There is a need for increased research in community-level health awareness campaigns and behavioral change programs for older adults [45]. Relatively few community health programs are geared toward improving the health of older adults, and even fewer focused on healthy drinking among older adults [45–47]. Public health campaigns on alcohol and aging need to be clear about recommended drinking limits for older adults, the age-related hazards of alcohol consumption, and be able to identify when specialized clinical treatment for alcohol behaviors is needed. After the development and implementation of such programs, extensive evaluation needs to be conducted for wider dissemination. For example, research could evaluate how alcohol-warning labels [48] can be enhanced by adding a component on alcohol and aging indicating drinking limit recommendations and age-related hazards, and also providing alcohol drink equivalents or serving sizes to improve personal regulation.

Another important area for health promotion research among older adults is stigma. Stigma has been consistently identified as a major treatment barrier among older adults [49–51]. More research is needed to design and identify effective prevention models to combat stigma surrounding alcohol use among older adults. These efforts hold the promise of decreased unmet treatment need by removing barriers to treatment based on older adult attitudes about seeking help for an alcohol problem.

17.2 Health Policy and Clinical Practice

Research has the potential to influence future outcomes for older adults, but policy and practice must be responsive to population changes that are already taking place. For the sake of public health, scholars in alcohol and aging should advocate not only for research but also for concrete changes in policy and clinical practice related to

older adults. Multiple evidence-informed steps can be taken to prevent unhealthy alcohol use among older adults as well as improve services to those who have alcohol-related problems. Although the following recommendations are not exhaustive, they provide a starting point for responding to the challenge of older adults, substance use, and alcohol use in particular.

17.2.1 The Challenge of an Ill-Prepared Workforce

While existing clinical treatments have been shown to be effective for at least the older adults who self-select into treatment (described in Chap. 12), there is an urgent need for expansion of treatment services for older adults at all levels of care. Workforce issues are primary—few professionals, across disciplines, are educated about the unique needs of older adults, particularly in relation to mental health and substance use disorders [52–54]. A severe shortage of professionals specializing in geriatrics and aging, along with shortage of behavioral health specialists is already upon us.

One way to begin to address such an overwhelming shortage is to educate health care professionals and existing providers in geriatric care. Most providers will undoubtedly encounter older adult patients and clients that they may not be currently trained to treat effectively. In addition, targeted recruitment of new health care professionals into geriatrics, with training in behavioral health, is also needed. A reliance on lay persons (e.g., community health workers) who have been given proper training and oversight to help with the shortage of fully trained providers may be a reasonable solution [52]. For example, utilizing models tested in low- and middle-income countries that have poorly resourced health care systems, innovative interventions can be used to address workforce shortages for addressing population health among older adults [52, 55].

17.2.2 Improving Access to Care

In addition to workforce issues, access to specialized care for older adults is suboptimal. In addition to a dearth of available specialized treatment programs with age-specific services [56], there are additional barriers for older adults to access specialized mental health and substance abuse treatment—particularly integrated care that addresses both. In the few studies that have examined such barriers, prohibitive cost and lack of transportation are two primary challenges that older adults who wish to pursue more specialized services face [57, 58]. These barriers are also primary barriers for other subpopulations experiencing difficulties with mental health and substance use disorders [59]. Barriers more specific to older adults include a concern about services being oriented only to younger people and attitudes that reflect a perception that they are too old to change [57, 58]. More than other groups, older adults may be influenced by friends or family who encourage getting help and/

or if a serious disease or health condition warrants change. Addressing these barriers and facilitators to treatment should become a primary goal of the health care system preparing to better service these clients.

Existing treatment programs should expand services to include age-specific components, such as special and adapted groups, in order to tailor treatment to and reduce isolation of older adult patients. In addition, community outreach by existing treatment programs to the older adult community will also go a long way in welcoming potential patients and clients who might otherwise avoid treatment due to the fear of being the only older person struggling with behavioral health issues. Most importantly, service providers must take into account that older adults are an extremely heterogeneous group with vastly different needs as they age. Tailoring to the individual as much as possible could be considered ideal treatment at any age.

In primary and specialty care settings, the increase in the utilization of medications for substance use could be an important way to expand frontline interventions for older adults and ultimately improve access to care. While many medications have been demonstrated to be safe, some medications, such as disulfiram, which can have adverse cardiovascular effects, may be contraindicated for this group [60].

17.2.3 Moving to Integrated Care for Older Adults

Older adults express a desire for integrated mental health and substance abuse services, which, with some exceptions, are still rare for all age groups due to a persistently siloed healthcare system. Many programs and policies have attempted to address this bifurcation of mental health and substance abuse services; however, these integrated services remain relatively scarce. Expanding access to care through increased third-party payment, such as through Medicare and increased availability of age-specific integrated care will be crucial to addressing the low utilization rates of specialized treatments by older adults.

Studies, such as Healthy Living as You Age [61] and Project SHARE [62, 63], demonstrate that with a multipronged approach and repeated contact, older adults can significantly improve their health outcomes in a short time with lasting effects. Integrated care and case management interventions, such as the services provided and tested in the PRISM-E [64–66] study, also provide important information about how supportive services can directly improve outcomes, as well as facilitate successful treatment and recovery.

A primary obstacle for these types of services is that payment mechanisms are still being negotiated among third-party payers. While case management services are paid for in some states under Medicaid reformation, such as in New York with the advent of so-called Health Homes, reimbursement rates are generally low, and hospitals and agencies must cover the gap in costs. For future success of these kinds of services, payers must recognize the long-term cost benefits of utilizing continuing care and case management services.

17.2.4 Implementation of Screening and Brief Intervention Models

Primary care remains the main access point to healthcare and services for mental health and substance abuse treatment. Physicians and other health care providers working in primary care must be educated on how to assess the older adult for mental health and substance use issues. Assessment must include questions similar to the CARET (as described in Chap. 11) that ask about alcohol use, illicit drug use, prescription medication, and health and mental health symptoms. Many symptoms of hazardous alcohol use can mask themselves as conditions or diseases more common in later life. Providers must be trained effectively to identify and differentiate these symptoms and potential conditions.

As described in Chap. 12, SAMHSA has supported a specific brief intervention protocol known as Screening, Brief Intervention and Referral for Treatment (SBIRT), to identify and engage those in need of mental health and substance abuse treatment [67]. More information on SBIRT as an intervention and SAMHSA's support for this model can be found at the SAMHSA's online SBIRT portal [68]. In Chap. 14, Schonfeld describes in detail the benefits and challenges of a statewide SBIRT project targeted specifically to older adults. The Florida BRITE Project is one of the few programs to be implemented on such a large scale, and it shows incredible promise in engaging older adults in discussions and services regarding alcohol, drug, and mental health issues.

One of the most striking components of the success of the BRITE Project is its engagement with older adults in community settings—sometimes within their own homes. Education and intervention can be maximized by incorporating dissemination of information, initial assessment, and brief intervention in nontraditional settings—outside the healthcare system. Senior centers or beauty and barbershops and other aging-specific settings offer unique opportunities to reach community members. Using these venues can significantly reduce stigma and provide a way to normalize issues as common and treatable.

17.2.5 Potential for Online and Mobile Health Interventions

Another avenue for future expansion of intervention is via online or mobile health interventions, such as short message service (SMS) or text messaging to provide continued support for positive alcohol change. While still in its infant stages, online and text messaging interventions have already been piloted [47] and implemented [69] to address a multitude of health conditions, including hazardous alcohol use and alcohol use disorder. Despite stereotypes to the contrary, older adults pursue education about their alcohol use and its consequences online already [70, 71], and they are generally quite open to engaging with interventions utilizing mobile technology for other health conditions [72, 73]. For example, alcoholscreening.org, an online screening and feedback tool that provides preliminary information about risks for continued drinking, had 18,564 visitors aged 50–64 and another 3485 aged 65–80 in 2013 [71]. Online and mobile interventions offer unique opportunities to address some of the primary barriers to care among older adults.

17.2.6 Enhancing Community Prevention

Community agencies need to address alcohol and aging as a component of their prevention strategy. For example as part of the Older Americans Act, a wide array of service programs have been authorized through a national network of State Agencies on Aging, area agencies on aging, and service providers [74]. With a goal of improving older adult heath, substance abuse needs to be implemented regularly in educational campaigns and behavioral change programming to reduce alcohol risk. Collaboration between government entities (e.g., Area Agencies on Aging) and local community partners (e.g., aging services agencies) are crucial to the effectiveness of these efforts [75].

17.3 Conclusions

Research, policy, and practice initiatives need to be responsive to demographic changes arising from the aging of the Baby Boom generation. Shifts in substance abuse risk profiles at different points across the lifespan demand that we reevaluate our singular focus on youth and young adulthood in alcohol research and practice. Recent research documenting trends of increased mortality among white middle-aged individuals nationally pointed specifically to heavy drinking as a contributing factor [23], while trends for alcohol-related risk behavior among youth show a declining trend [76]. Researchers, policy makers, and clinicians must direct attention and resources to the second half of life.

Just as the overall population is changing with respect to risk for alcohol-related problems, the population of older adults is more diverse than ever before. Approaches to research and efforts at health promotion should be mindful of this diversity. Sophisticated research approaches that use design and methodological elements to understand this diversity will yield a more valid understanding of alcohol use problems, causes, and consequences. Similarly, respect for diversity in clinical practice and alcohol policy will lead to effective prevention and intervention models.

One important component of this diversity relates to physical health and mental health. In both research and practice, stakeholders should be mindful of the interconnectedness of somatic health, mental health, and behavioral health. In research, this entails thinking holistically when asking research questions and developing research designs that consider these domains together. For practitioners and policymakers, integrated care should become the norm.

Just as integrated care models address horizontal domains, research and practice must also be vertically integrated. Research should address multiple levels of influence, individual, family, and larger community systems. Conceptualizing research at multiple levels can inform prevention and intervention models aimed at alcohol use among older adults. At the same time, stakeholders in prevention and intervention should consider the role of social context at multiple levels using a research-informed understanding of the interplay of individual, family, and larger influences on use.

Although this text has been directed at readers interested in alcohol and aging specifically, effective research and practice should start by conceptualizing older adulthood as part of a continuum of life course development. Understanding diversity of outcomes (like alcohol use) in older adulthood requires that we understand how earlier influences shape the aging process. Our recommendation therefore is to consider not only the individual and effects of multiple influences on alcohol use, but finally to remember that these influences unfold over time.

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