Strategies to reduce AOD-related harms among older adults

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Please note that as with all statistical reports, there is the potential for minor revisions to data in this report. Please refer to the online version at https://www.unsw.edu.au/research/ndarc/resources/strategies-to-reduce-aod-related-harms-among-older-adults.

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Executive Summary

This report was commissioned by the Alcohol and Drug Foundation (ADF) and presents information regarding: i) preferred sources and content of alcohol and other drug (AOD) related information among older adults, and ii) an overview of evaluated interventions aimed at reducing AOD harms among older adults (defined as ≥50 years).

Older Adult Preferences

Source of information

- Healthcare providers appear to be the preferred source of AOD information among older adults.
- However, reluctance (from both older adults and practitioners, excluding pharmacists) to engage in conversations around alcohol consumption and its harms was noted, and there was some uncertainty regarding the appropriate etiquette for such discussions.
- Conversations between authorised prescribers and older adults regarding psychotropic medicines are likely more common than conversations regarding alcohol use, though many adults appear to be dissatisfied with the depth and duration of these conversations.
- Many older patients appear to be passive recipients in the prescribing of psychotropic medicines.

Content of information

- One study found that the favoured rationale for deprescribing either preventive or symptomatic relief medicines focused on the risk of side effects.
- Awareness of alcohol-related harms alone is unlikely to motivate older adults to change their consumption, with alcohol playing a positive social role in many older adults' lives.
- However, this may vary depending on the type of 'harm', with one study finding that most older participants who consumed alcohol reported that they would adhere to low-risk guidelines if they were told that doing so could reduce their risk of dementia.
- Engagement with the large segment of the older population who consider themselves to be responsible drinkers, and emphasising their perceived experience of drinking 'wisely' in a controlled manner, could be effective.
- Materials that convey information to older adults about substance use and harms would benefit from use of larger text, actors with whom the viewer can identify based on life stage and, where relevant, subtitles.
- We identified no studies that addressed preferences of older adults regarding conversations about illegal drugs and possible associated harms.

Evaluated Interventions

- Relatively few evaluations of interventions to reduce AOD-related harms among older adults have been published in the past 10 years, with interpretation of the available evidence complicated by heterogeneity across interventions, outcome measures, and follow-up periods.
- Further, many interventions involved multiple components, with significant reductions often observed in control and/or comparator groups, making it difficult to determine which components of an intervention are effective.

Alcohol

- There is some evidence for the efficacy of brief interventions (including educational tools/leaflets, personalised reports that indicate a participant's own

level of risk, and diaries), and/or psychological treatments.
- A recent systematic review of studies that *included* (but were not specific to) older adults identified three elements of effective interventions: the provision of information on several alcohol-related issues, personalised feedback about drinking behaviours, and being in contact with others and communicating with them about (alcohol) problems.
- There were no identified interventions, specific to older adults, that included the third of these elements (i.e., contact with others). This is a notable omission given the relationship between the use of alcohol in older adults and loneliness.
- One small study found that exercise, in particular yoga, had beneficial effects on alcohol consumption that were comparable to telephone counselling.

Benzodiazepines and benzodiazepine receptor agonists

- Patient-empowerment interventions, in particular EMPOWER, appear to be effective in driving sedative-hypnotic cessation among older adults.
- Two studies found that adding additional components to an educational intervention (e.g., a follow-up call with pharmacist) yielded no improvement in outcomes compared to receiving only the educational component, suggesting that pharmacist contact may not significantly increase discontinuation likelihood beyond the effectiveness of educational materials.

Opioids

- Evidence regarding opioid-related interventions among older adults was particularly limited, noting that the review was restricted to studies published within the past 10 years, and did not include pharmacological interventions such as opioid agonist treatment and naloxone.
- However educational and psychological (primarily the Mindfulness-Oriented Recovery Enhancement model) interventions showed some evidence of effectiveness.
- Community pharmacies may be a valuable resource for identifying and reducing health harm in patients who use pharmaceutical opioids.

Other

- There is limited information in this age group regarding peer-led or co-designed interventions, or interventions that aim to reduce harms associated with illegal substances (including cannabis).
- There is also an absence of information regarding particular subsets of older people that may have higher rates of substance use, including those who identify as LGBTIQA+, First Nations Australians, and those from migrant and multicultural community groups.

See Table 1 for a tabular overview of these key findings, as well as recommendations that are based on the current report, as well as the 'Analysis Report' (i.e., Trends in Substance Use and Related Harms Among Australians Aged 50 Years and Older 2001-2021).

Table 1: High-level summary of findings, and recommendations

	Aim 1: Preferred sources and content of information [#]	Aim 2: Evaluated interventions to reduce harms among adults aged ≥50 years	Recommendations and identified gaps[##]
Alcohol	**Preferred sources**: ○ Healthcare providers, yet there was some uncertainty regarding appropriateness of such conversations. ○ Personal stories/lived experience. **Preferred content**: ○ Accessible information (e.g. large font, optional translation, subtitles). ○ Age-appropriate characters. ○ Transparent information (e.g., how drinking guidelines developed). ○ Multi-faceted information: delivered verbally, accompanied by written materials. ○ Awareness of alcohol-related harms alone unlikely to motivate changes in consumption, esp. among those who consider themselves healthy.	○ 22 studies identified: variation in the types of interventions, including intensity, duration and delivery mode. ○ Some evidence for the efficacy of brief interventions, and/or psychological treatments. ○ One study (small sample size) found yoga had effects on alcohol consumption comparable to telephone counselling. ○ Review of studies that *included* (but were not specific to) older adults identified three elements of effective interventions: the provision of information on alcohol-related issues, personalised feedback about drinking behaviours, and contact/communication (re: alcohol problems) with social network.	**Recommendations** ○ Training to ensure key healthcare providers are equipped to identify and intervene where drinking patterns may constitute risk of harm. ○ Promote social and leisure opportunities that do not involve alcohol. ○ Messaging about protecting current level of health. ○ Interventions should consider inclusion of educational information and personalised feedback. ○ Future research should investigate how social networks could contribute to a successful intervention. **Gaps** ○ Interventions in rural/remote areas, and among First Nations, LGBTIQ, and migrant and multicultural communities. ○ Work-to-retirement interventions. ○ Cognition or dementia based outcomes. ○ Australian studies.
Benzo	**Preferred sources**: ○ Healthcare providers. ○ Yet, older adults often passive in prescribing decisions and dissatisfied with the length and depth of consultations. **Preferred content**: ○ Accessible information (e.g. large font, optional translation, video subtitles). ○ Multi-faceted information: delivered verbally, accompanied by written materials. ○ Clear, and comprehensive information. ○ One study found that older adults' preferred rationale for deprescribing	○ 25 studies identified, mostly categorised into education-based interventions and cognitive behavioural therapy for insomnia (CBTi). ○ Patient-empowerment interventions, in particular EMPOWER, show some effectiveness in improving sedative-hypnotic cessation among older adults. ○ CBTi shows some effectiveness as a multi-dimensional approach to treating sleep problems, and reducing sedative-hypnotic use, among older adults.	**Recommendations** ○ Prescribers should adapt communication based on patients' attitudes to medicines and preferences regarding involvement in the decision-making process. ○ Programs to improve health literacy. ○ Interventions may benefit from focusing on patient-empowerment models, such as EMPOWER. **Gaps** ○ Evidence for 'younger' older adults (i.e., data predominantly focused on those aged≥ 70 years).

	medicines focused on the risk of side effects.		○ Underrepresentation of some populations (e.g., those with psychiatric comorbidity). ○ Interventions on overdose awareness/prevention. ○ Australian data.
Opioids	**Preferred sources**: ○ Healthcare providers. ○ Yet, often passive in prescribing decisions and dissatisfied with the length and depth of consultations. **Preferred content**: ○ Accessible information (e.g. large font, optional translation, video subtitles). ○ Clear, and comprehensive information. ○ Multi-faceted information: delivered verbally, accompanied by written materials.	○ 12 studies identified: considerable variation in the types of interventions that were delivered. ○ Educational and psychological (primarily the Mindfulness-Oriented Recovery Enhancement model) interventions showed some evidence of effectiveness. ○ Community pharmacies may be a valuable resource for identifying and reducing health harm in patients who use pharmaceutical opioids.	**Recommendations** ○ Prescribers should adapt communication based on patients' attitudes to medicines and preferences regarding involvement in the decision-making process. ○ Programs to improve health literacy. ○ Consider leveraging community pharmacies, and offering take-home naloxone. **Gaps** ○ Holistic interventions that consider impact of disability on quality of life. ○ Evidence for 'older' older adults (i.e., data predominantly focused on those in their 50's). ○ Illegal opioids. ○ Interventions on overdose awareness/prevention. ○ Australian data.
Other substances	**Preferred sources**: Unknown **Preferred content**: Unknown	○ Notable, near-total lack of evidence in this area. ○ Preliminary supportive data for combined therapies in older adults with HIV (CBT + tai chi + text message support).	**Gaps** ○ Evident lack of research specific to illegal, or recently medicalised, substances (e.g., cannabis). ○ Evaluations of peer-delivered interventions. ○ Under-researched populations common across substances: migrant and multicultural community groups, LGBTQIA+, First Nations. ○ Australian data.

[#] Findings were not always specific to these particular substances (e.g., referred to 'medicines' more broadly), but are applicable across a range of substances. [##] Recommendations and gaps are based on the findings from both reports commissioned by the ADF – i.e., the current report, and *Trends in Substance Use and Related Harms Among Australians Aged 50 Years and Older 2001-2021*. Recommendations are also provided, in more detail, in chapter 3 of this report: Recommendations to reduce AOD-related harms among older adults.

Background

Alcohol consumption is increasing amongst older adults, as are the risks of harm associated with risky alcohol use. Changes to alcohol use as people age are occurring alongside an increased likelihood of prescription medication use, often with multiple medications (polypharmacy) concurrently used. Interactions between these medications and alcohol can further compound alcohol-related harm: indeed, even moderate alcohol use by those using a number of medications increases the risk of adverse effects and poor health outcomes.

As a part of the ageing process, older adults also experience an increase in biological sensitivity to the effects of alcohol. This makes older adults who drink alcohol more susceptible to falls, bone fractures, and other injuries.

The number of older adults using illicit drugs has also grown over time. However, it is worth noting that this may be driven by the fact that people who have previously used illicit drugs are continuing to do so as they age, rather than increasing levels of new uptake. The most common illicit drug used by older Australians is cannabis, and its recent and lifetime use has trended upwards in these age groups

However, older adults are not a heterogenous group, with harms differentially experienced by some subgroups (e.g., healthy versus unhealthy adults). Substance use behaviours have often been established for many years and are difficult to change. Effective messages to shift behaviour are likely to vary depending on the characteristic and motivations of various subgroups.

Aims and Purpose

One of the ADF's priority areas of focus is to develop evidence-based practices through research and evaluation driven by evidence, evidence gaps and community needs.

Through the Older Adults In-depth Research Project, the ADF collaborated with NDARC to ensure data quality and enhanced understanding of how to enable better outcomes for older adults currently experiencing AOD harms within Australia.

For the purposes of this project, age groups of focus for 'Older Adults' have been revised to include those aged ≥50 years (from ≥65) to capture data and trends during this transitional life period, and to identify AOD behaviour trends earlier in the lifecycle.

The aims of this report are two-fold:

1. Provide a narrative review of who older adults prefer to receive AOD information from, as well as the preferred content of such information.
2. Provide an overview of evaluated interventions to reduce AOD-related harms among older adults.

Methods

The focus of this report was guided by findings from the first report created as part of this program of work: Trends in Substance Use and Related Harms Among Australians Aged 50 Years and Older 2001-2021. Analysis of drug-related hospitalisations, drug-induced deaths, treatment episodes and substance use among Australians aged ≥50 years identified alcohol, opioids and benzodiazepines as the substances that contribute to the greatest level of harm among this population. Thus, while all substances were within scope of the current report, particular attention was given to these three substance classes.

Aim 1: Narrative Review: Searches were conducted in PubMed using a combination of keywords, with handsearching of reference lists of identified articles. Because this was a narrative review, there were no specific inclusion/exclusion criteria. Studies identified via the Rapid Review process (see below) that were deemed suitable for Aim 1 (e.g., qualitative reviews)

were also included. These results were grouped thematically, into 'preferred sources of information' and 'preferred content of information', the latter which includes layout, quality and language.

Aim 2: Rapid Review: Ten-year searches for relevant reviews of any type (e.g., systematic, scoping, narrative, rapid) were conducted using PubMed, CINAHL, PsycINFO, and Embase, followed by a supplementary search in PubMed for any evaluations undertaken within the last five years (to identify any recent primary studies that may not have been captured in the reviews). Searches used a combination of database-relevant terms (such as MeSH terms), keywords, and filters (see Table 2 for search terms).

Searches were undertaken based on the following criteria:

Inclusion criteria

- Conducted in adults aged ≥50 in community settings (or where follow-up occurred in the community).
- Included changes in consumption/harms in outcome reporting.
- Focused on alcohol, prescription/pharmaceutical drugs (primarily pharmaceutical opioids and benzodiazepines), or illicit drugs (particularly cannabis, methamphetamine and cocaine).
- Interventions such as education strategies targeted at patients/those who use alcohol/drugs, including primary and secondary interventions.
- Education interventions targeted at health professionals (e.g., pharmacists, GPs) accepted.

Exclusion criteria

- Studies conducted in older adults residing in non-community settings, such as prisons.
- Studies focused on use of tobacco, nicotine, caffeine, or non-psychoactive substances.
- Interventions that were pharmacological in nature, such as opioid antagonist therapy and naloxone, or interventions such as real time prescription monitoring systems, needle and syringe programs, residential rehabilitation or supervised injecting facilities.
- Community–wide interventions.
- Tertiary preventative measures (e.g. treating conditions and preventing reoccurrence).
- Non-peer-reviewed sources, grey literature, editorials, commentaries, case studies.
- Papers published more than 10 years ago (note: discretion utilised when assessing inclusion of the primary studies included in reviews).
- Studies with a broad focus on polypharmacy or potentially inappropriate prescribing.

The review-focused, 10-year search returned 5,264 results, while the supplementary five-year search returned 432 results. After removal of duplicate articles, the papers were initially screened based on relevance of their titles and abstracts, with full-text reviews done in all cases where eligibility was either ambiguous or likely. The details of papers included for each type of substance are included individually in substance-specific sections (alcohol, benzodiazepines and benzodiazepine receptor agonists (BZD/BZDRA), and opioids), however a brief overview is provided below.

Alcohol-related interventions

Four existing reviews of interventions to reduce alcohol-related harm among older adults were identified, as well as four which focused on substance use more broadly. Collectively, these reviews identified 22 unique alcohol-related studies that evaluated changes in alcohol consumption, only 7 of which were published from 2014 onwards (and therefore within the original scope of the report). Given these small numbers, all studies were retained (Table 3). There was considerable variation in the types of interventions that were delivered, as well as the intensity, duration and delivery mode. Briefly, the interventions included motivational enhancement and interviewing, various educational tools, brief advice or brief interventions (which varied in definition, but included things like personalised reports, diaries, information pamphlets), telephone counselling, web-based interventions, and targeted community nursing. The majority of the studies took place in the USA (16/22), with

the remaining occurring in Denmark, the United Kingdom, Croatia and Germany. None of the studies were conducted in Australia.

BBZD/BZDRA-related interventions

We identified 14 reviews assessing interventions to reduce benzodiazepine use and harms among older adults. Due to the breadth of these reviews, with some of the included studies dating back to the 1980's, each of the 14 reviews were manually assessed and only studies that met the inclusion/exclusion criteria outlined above were retained. This resulted in a total of 25 studies, which have been categorised as either education-based interventions (n=10, Table 4), cognitive behavioural therapy for insomnia (CBTi, n=14, Table 5), or other (n=1). All 10 of the education-based studies originated in high-income countries, including the USA, Canada, Australia (one study), Japan, and Spain. The interventions were varied and included materials such as videos, hard copy information provided via mail, brief interventions, or cognitive behavioural therapy.

Studies evaluating CBT for insomnia took place in Sweden, South Korea, Japan, USA, and Canada. None of the studies were conducted in Australia. The interventions were delivered across a range of modalities (e.g., digital, in-person, self-administered).

Opioid-related interventions

Four existing reviews of interventions to reduce opioid-related harm among older adults were identified. A supplementary search for primary studies published in the past five years identified 8 original studies, 7 of which were retained. Further citations were obtained through hand-searching, resulting in a total of 12 relevant studies for inclusion (Table 6). Overall, the included studies identified interventions that can be categorised into four broad themes: education-based interventions targeted at patients (2 studies), clinician-targeted interventions (4 studies), pharmacist-initiated interventions (2 studies), and psychological treatments aimed at those with long-term opioid use in the context of chronic pain (4 studies). All included studies focused on use/extra-medical use of pharmaceutical opioids. Almost all (11/12) studies were conducted in the US, with the remaining paper conducted in Britain.

1

Preferred sources and content of AOD-related information among older adults

This chapter provides a narrative review of older adults' preferences regarding the source and content of AOD information.

Preferred sources and dissemination locations

Summary

- Healthcare providers predominate as the preferred source of AOD-related information among older adults.
- However, there was some reluctance (from both older adults and practitioners) to engage in conversations about alcohol consumption and its potential harms, with qualitative studies demonstrating a recurring theme of unclear etiquette regarding the conduct of such discussions.
- As such, conversations between older adults and health practitioners (excluding pharmacists) regarding alcohol consumption appear to be uncommon. This arguably represents missed windows of opportunity, particularly given the relatively high frequency with which older people present to primary care settings.
- There is potential scope to address the workforce development needs of key healthcare providers and to ensure that they are adequately skilled to appropriately identify and intervene where an older person's drinking patterns may constitute risk of harm. Community pharmacies may be a potentially valuable resource for identifying older adults at risk of alcohol-related harm, given existing routine discussions about potential interactions with medicines.
- Many older patients appear to play a passive role in the prescribing of psychotropic and other pharmaceutical drugs and were often dissatisfied with the length and depth of consultations. It is unclear how much of this is due to a lack of confidence, with some studies showing that older patients do not want to be part of the decision-making process.
- To enable shared decision-making in primary care, prescribers would ideally adapt aspects of communication based on patients' attitudes to medicines and preferences regarding involvement in the decision-making process.

Despite the small number of studies on this topic, there appears to be consensus that older adults predominantly receive, and prefer to receive, information regarding substance use and related harms from a health provider (1-7). Such information was ideally received verbally, although written materials were also considered valuable (8). This was true in relation to both alcohol and medicines, though there were mixed findings in relation to the perceived role of doctors in discussing alcohol consumption with older patients. For example, one Canadian study found that, although doctors and other health care providers (e.g., nurses, home care providers, pharmacists, and dentists) were identified as the most appropriate professionals to disseminate knowledge of low-risk drinking guidelines to older adults, some participants reported that they would feel judged if their doctor spoke to them about this, and that such conversations were only appropriate for those known to consume higher quantities of alcohol. Along these lines, one participant commented "My doctor? Well, unless he thinks I'm an alcoholic, there's really no need to" [engage in conversation about my alcohol use], while other participants raised the importance of using respectful and non-stigmatising language if doctors were to initiate such discussions (9). Interestingly, similar concerns have also been highlighted in surveys with health practitioners (10, 11), with one practitioner stating that: "sometimes we worry about raising it because we assume patients are going to feel judged" (11). Practitioners also reported concerns about patients' willingness to make changes in old age, particularly given that drinking practices are often well-established by that time, and that such habits may promote much-needed social connectedness and emotional wellbeing in later life. Given these concerns, it is perhaps not surprising that many older patients reported that healthcare providers had not enquired about their alcohol use (9), with the exception being pharmacists, who regularly ask older patients about their alcohol use due to potential interactions with medicines. Indeed, a number of studies have highlighted the need for regular, opportunistic and universal screening of potential substance use in older adults in settings where they live or receive services (12, 13), or at relevant public events, such as health fairs.

Given that psychotropic medications are prescribed by doctors, conversations about potential harms or adverse effects of such medicines are more common than is observed for alcohol. Despite this, patient satisfaction with these conversations is variable. A systematic review documenting patients' experiences of seeking and using benzodiazepines and z-drugs (BZD) (14) found that many older participants felt dissatisfied with the length and depth of consultations with general practitioners

(GPs) and pharmacists, with some suggesting that the availability of a specialist service for BZD withdrawal, or support networks similar to Alcoholics Anonymous, would be positive developments for those with BZD use problems. Further, a narrative review of challenges and potential solutions relevant to deprescribing among older adults found that one of the key patient-level challenges was that they often occupy a passive role in the prescribing of medications, with lack of involvement in the decision-making process considered a normal doctor-patient dynamic (15). Some studies have even identified that some patients do not want to be part of that decision-making process (16, 17), or that they were content with the current doctor-patient dynamic (18). This is illustrated via studies which have found that while most older adults (84-95%) thought that all their medications were necessary, similar numbers (71-93%) were willing to consider deprescribing if their doctor thought it were possible (19). Thus, to enable shared decision-making, it is important that prescribers adapt their communication based on their patients' attitudes to medicines and preferences for involvement in care. There is some evidence to suggest that this could be a particularly important consideration for patients being prescribed opioids, with some pain patients feeling as though opioid analgesics had been rapidly withdrawn without any appropriate discussions (due to increasing scrutiny around opioid prescribing), and subsequently reducing patient quality of life (20-22). Indeed, studies have identified that older patients view caring relationships with health professionals, and appropriate communication of medication information, as key components of self-care management.

A small number of studies have reported that older adults obtain (or would like to obtain) information regarding substance use and related harms online. For example, Kuerbis, Hail (23) found that the largest proportion of older adults reported that they would prefer to receive help for reducing or abstaining from drinking from an internet-based intervention with a dedicated website (44%), followed by a preference for in-person counselling sessions (34%). However, it is worth noting that participants for this study were recruited online and were 'computer knowledgeable' (23), perhaps creating selection bias. In a separate study, older patients with rheumatoid arthritis were asked about the suitability of e-health technologies to address their medication needs (24). Although many of these patients recognised the advantages of e-health technologies (e.g., less time-consuming to use, easily accessible), traditional, in-person visits were still preferred by most patients. Relatedly, another study found that older patients thought that e-learning modules were a good way of 'supplementing' information provided to them verbally, as it allowed them to take in the information at their own pace (25). However, patients were concerned that these technologies would contribute to impersonal care by *replacing* face-to-face interactions with health care providers and expressed concerns about the implications of this in terms of privacy and data security. Patients also highlighted concerns around conflicting information, given the abundance of health-related websites and online information, which previous research has shown can be associated with both medication nonadherence and medication-related anxiety (24). Interestingly, a study examining knowledge of alcohol as a risk factor for cancer found that older participants had lower odds of being well-informed about alcohol-related cancer risk, which the authors speculated may have been due to lower levels of engagement with online health information compared to younger participants (26).

To our knowledge, only one study asked older adults where materials containing information about alcohol risk guidelines should be disseminated. Participants in this study most commonly reported that such materials would be best disseminated in medical settings such as walk-in clinics, hospitals, waiting rooms of medical centres, pharmacies and care facilities (9). However, they also suggested that places where older adults regularly gather (including seniors' centres, community centres, veteran's organisations, churches, and other cultural and social gathering locations) should occupy a role in disseminating the guidelines, with the potential for workshops to be held in these locations. For example, one participant noted:

> "Well, certainly my seniors' centre that I go to, they often do have talks that people put on—on all kinds of things . . . There's a lot of health-related ones and I could see that this could be the kind of thing that they might put on" (9).

Postings in locations that may be frequented by older adults were also suggested. Such setting included supermarkets, bottle shops, petrol stations, libraries, schools, bars, casinos, and public transport locations. Posting information in senior housing areas (e.g., in residential elevators) was identified as possible way to disseminate the guidelines to older adults who

are isolated or homebound. Some participants also suggested that information about the guidelines could be taken by older adults back to their communities and shared during informal conversations.

Content

Summary

- Materials that convey information to older adults about substance use and harms would benefit from the use of larger text, actors with whom the viewer can identify based on life stage, and subtitles in conjunction with audio.
- One study found that older adults' preferred rationale for deprescribing medicines focused on the risk of side effects.
- However, there was variability, highlighting the need for clinicians to understand the patient's (or caregiver's) priorities so that they can tailor their language and individualise deprescribing recommendations accordingly.
- Broader literature on older adults' perceptions of alcohol use and harms suggests that positive engagement with the large segment of the older population who consider themselves to be controlled and responsible drinkers, as well as emphasis on older people's perceived history of drinking with sufficient moderation, could be effective.
- Clinicians should also be aware of the social role of alcohol and should try and identify the best means by which alcohol consumption could be reduced, whilst still maintaining meaningful social connections that benefit quality of life in older adults.
- New social and leisure opportunities that do not involve alcohol are ideally needed to replace those associated with heavy or risky drinking.
- We identified no studies that examined older adults' preferences regarding conversations related to the use of cannabis or illegal drugs.

Layout and presentation of information

A small number of studies have explicitly asked older adults about their preferred layout and presentation of informational or educational materials. These studies mostly related to prescription medicine labels, although there was one study focused on alcohol guidelines and another on alcohol-medicine interactions. The most common theme to emerge across all these studies was that materials should be available in large font (8, 27-31). Older patients also highlighted the utility of translating prescription medicine labels into multiple languages (29-31), although studies that reported this finding were all undertaken in Singapore, where such labels are written in English, but not everyone speaks or reads English. It was found that that this practice often results in older patients relying on family members or pharmacy staff to help them interpret prescription medication labels (30). In this context, the utility of pictograms on prescription medicine labels or pamphlets has also been assessed, with mixed results (32, 33). In addition to larger font size, red coloured precautions (instead of black), precautions listed in a dot point format (instead of in prose format), tabular-style presentation of frequency of dosage instructions, and the use of numerals (instead of text) for dosage information were preferred by some older adults (28). In some studies, older adults also preferred to receive prescription medicine labels with a QR code that could lead them to a website containing more information about their medications (31).

In relation to educational materials about the risks created by alcohol-medication interactions, older adults in one study reported that, in a short video that they were shown, the actors spoke too quickly and did not enunciate words enough for them to be properly audible to older adults with hearing impairment (34), highlighting the importance of including subtitles. However, the sample otherwise responded positively to the actors in the video (an older male and a female couple), indicating that the portrayal of adults of similar age would encourage older adults to pay attention. In a separate study on alcohol guidelines, it was suggested that educational materials be simple and visually appealing, and that local and national resources for helping older adults who need professional assistance to reduce alcohol use be included with the low-risk drinking guidelines (9).

Quality of information

Studies additionally noted a common theme of participants wanting unambiguous, comprehensive, and high-quality health information. In a study of 280 older adults in Singapore, most patients expressed a need for more information than was currently provided, in particular about side effects, drug–drug interactions, and long-term consequences of medication use, reporting that this would help them to feel more in control and to seek medical advice when appropriate (28). Similarly, a systematic review of older patients' experiences and perceptions of communication about medication management found that such communication was often ineffective across transitions of care (35). Older patients expressed frustration with the lack of appropriate communication about their medications, especially when their medications were changed, or new medications were prescribed. Conversely, it was found that communication strategies that contributed to enhanced medication management included frequent conversations with health professionals, alongside plain-language written information about medications and medication education before discharge from healthcare facilities.

Studies specific to alcohol were more limited. However, one study examined the acceptability of intervention materials (i.e., a poster, a patient brochure, pharmacist brochure, and 60-second public service announcement) containing information about alcohol and medication risks. Most participants agreed that the collective presentation of all of the available materials (poster, brochures, and public service announcement) was the most effective mode of delivery (34). Further, in a study relating to low-risk alcohol guidelines, participants described wanting to know where the guidelines originated from and what evidence base there was to support the recommendations (9). As summarised by a female participant: "These days one has to question so much. 'Are these the fake guidelines?' or, 'What is the research that backs this up?'"

Language and content of information

Medicines

To our knowledge, there is only one published study that has explicitly examined preferred language regarding medicines, and this was in relation to deprescribing (36). In this study, 835 older adults were provided with 7 different rationales that a clinician may use to explain why a patient should reduce or stop an unnecessary or potentially harmful medication (i.e., statin or a sedative-hypnotic). The phrase most preferred by participants, to explain reducing or stopping either of these medicines, was: "Given your age and other health problems, I'm worried that you are at increased risk of side effects from this medicine." In relation to sedative-hypnotics, other preferred phrases included "This medicine is not good for you in the long run; let's work together to slowly reduce the dose and get you off it over time," and a reference to the medicine causing the patient "more harm than good." The former of these phrases may have been preferred by many respondents because it conveys that deprescribing will be a shared decision between the patient and doctor and that the change will be made gradually. Less preferred phrases focused on the risk of dependence, use of non-pharmacologic alternatives, and appropriateness of use in relation to prescribing guidelines. These findings suggest that, among older adults, the preferred rationale for deprescribing both preventive and symptom-relief medicines involved emphasising the risk of side effects. Indeed, in a recent systematic review of barriers and enablers of deprescribing benzodiazepine receptor agonists (BZDRAs) among older adults, it was found that one of the key barriers was the belief, present in both clinicians and older patients, that chronic BZDRA use retains its initial efficacy across time, and comes with few adverse effects (37). It is therefore perhaps not surprising that older adults preferred messaging that focused on side effects, though it should be noted that there was substantial variability in respondents' preferences. This highlights the need for clinicians to understand a patient's (or their caregiver's) priorities so that they can individualize deprescribing recommendations and tailor their language accordingly.

These findings are broadly consistent with those of Fried, McGraw (38). This study of older patients with multimorbidity found that the decision as to whether to take a medication was largely influenced by the type and severity of the adverse effects associated with the medication, rather than the degree of benefit obtained from the medicine (although this varied depending on the type of condition being treated) (18). For example, patients were less likely to take a medicine to obtain symptomatic relief of joint pain if doing so increased their risk of myocardial infarction but were more likely to take a

medication to improve breathing in respiratory disease with the same risk of myocardial infarction. When taking into account competing outcomes, older adults valued ongoing quality of life more than extending life expectancy, suggesting that, if the side effects from a particular medication were too significant, they may consider discontinuing that medication (19). The importance of being able to consider different trade-offs and prioritise competing health outcomes (38) highlights the value of asking about patient preferences/priorities for treatment, and treatment outcomes/goals. This also supports the previously noted theme of older adults wanting clear, comprehensive and transparent information, to enable informed decision making regarding their health.

Similarly, there is evidence to suggest that warnings about side effects is one of the key pieces of information that older adults would like included on prescription medicine labels. Specifically, a study of 204 older adults in Melbourne found that the main information that they would like on their prescription medicine label was when and how to use the medication, followed by the treatment indication and possible side effects (3). Similarly, a study of 280 older adults in Singapore found that the three most preferred content attributes were indication, precautions, and the impact of using the medicine alongside other medicines or substances (i.e., interaction effects) (28). In this study, precautions referred to things to look out for when taking or using a medication (e.g., may cause drowsiness; if affected, do not drive or operate machinery; for external use only; swallow whole; do not crush), or appropriate responses to medication problems (e.g., seek medical advice). Medication information such as instructions about medication-food interactions, expiry date, and recommendations about what to do in the event of a missed dose were ranked as relatively less important. Considering the lack of space on prescription medicine labels, it was suggested that the less preferred medication-related content attributes could be incorporated in additional patient education materials such as patient information leaflets or patient medication lists.

Alcohol

Despite widespread use and acceptance of alcohol, research surrounding *how* to engage in discussions about alcohol, and age-related changes that impact alcohol consumption, is largely absent from the literature. One study, undertaken in Canada, conducted workshops with 66 older adults aged between 51 and 86 regarding their preferences for engaging in discussions around alcohol and adherence to low-risk drinking guidelines (9). In this study, participants overwhelmingly reported the need to use non-stigmatising and respectful language when engaging in such conversations. They also highlighted the importance of recognising older adults' autonomy and discussed the value in thinking of the low-risk drinking recommendations as "guidelines" rather than rigid rules, which would allow them to incorporate the guidelines into their lives in personally negotiated ways. Participants also wanted the drinking guidelines to describe the consequences of drinking above recommended limits without alarmism, using strong and simple (yet catchy and 'provocative') messages to which older adults can relate. Relatedly, in a separate study of willingness to adhere to low-risk alcohol guidelines among people aged 50 and over (39), it was found that most (74%) participants who consumed alcohol reported that they would adhere to low-risk guidelines if they were told that doing so could reduce their risk of contracting dementia, although there were certain groups (i.e., men and people with more lifestyle risk factors, including smoking, obesity, and excess alcohol consumption) who were less willing to do so.

Given the extant research explicitly examining preferred messaging of alcohol-related harms among older adults, the broader body of literature regarding their experiences and perceptions of alcohol use may provide insight into factors that should be taken into account when conversing with, or developing interventions for, this population. Bareham, Kaner (40) conducted a qualitative review of 25 studies on this topic and identified four key themes, with arguably the most important (in the current context) being the 'self-image as a responsible drinker'. Bareham, Kaner (40) found that there was a general perception among older adults that 'problematic' and 'normal' drinking behaviours were separate entities. 'Problematic' drinking was associated with a lack of control and with risk. Alcohol harms were often perceived by older adults as affecting these 'other' heavier, more 'problematic' drinkers, while identifying themselves as 'normal' drinkers. Indeed, in a recent study of older Australians' perceptions of alcohol-related harms and low-risk alcohol guidelines, it was found that most risky drinkers self-identified as 'social drinkers', while approximately one-third incorrectly self-identified as occasional or light

drinkers (41). Bareham, Kaner (40) also found that many older adults framed their consumption as controlled and responsible, with behaviours maintained through self-imposed limits or rules (e.g., not drinking alone, or after a certain time) and viewed as acceptable as long as day-to-day responsibilities remained fulfilled. However, it was also acknowledged that many personal responsibilities that would generally be deemed incompatible with drinking (such as working and fulfilling parental duties) no longer shape people's use of time in later life, which in turn enabled increased alcohol consumption (e.g., "Now that I am retired, I have even more freedom. When you're working, you can't have a glass of wine with lunch. But now I can"). In contrast, some older adults took on new responsibilities during retirement (such as volunteer work, or caring for a sick partner), which restricted drinking.

The second important finding is that justifications of drinking emphasised positive experiences with alcohol (40). Alcohol was valued for its ability to create feelings of pleasure and relaxation, which were perceived as an important part of enjoying one's later stage of life. Alcohol was also believed by participants to have positive effects for health and wellbeing in older age, with many older adults viewing alcohol as protective to health, particularly when taken in moderation and for certain types of alcohol (i.e., red wine, whiskey). Interestingly, this led some to believe that *not* drinking could be negative for health, suggesting that there remains some misinformation around the harms associated with alcohol consumption. Another study found that media reports about reputed cardiovascular benefits of alcohol consumption may have resulted in increased alcohol consumption in older adults, including participants with existing cardiovascular disease "drinking more alcohol than they otherwise thought they should" (42). Indeed, while older adults are often aware of the negative effects of alcohol, this is mostly in relation to the short-term consequences associated with intoxication, such as hangovers, accidents, and blackouts. Longer-term damage is perceived to be associated with heavier intake, with some authors noting that these negative consequences were usually discussed by older adults after prompting, rather than spontaneously described (40).

However, it appears that knowledge of harms, in and of itself, is not enough to instigate behaviour change. Chapman, Harrison (41) found that, although knowledge of safe drinking levels has increased among most groups of older Australian adults in recent years, risky alcohol consumption patterns in this age group have also increased over the past decade. Similarly, Canham, Humphries (9) found that some participants admitted that knowledge of low-risk alcohol guidelines would not affect their own behaviours. This sentiment particularly applied to 'old' older adults – e.g., "If somebody is, I don't know, mid to late to even [in their] 90s, then who are we to tell them to change their lifetime habit, enjoyment, whatever?" and "Some people, they don't care [about recommended drinking limits], they know the side effects and everything. They just want to finish their life." Further, Bareham, Kaner (40) found that older adults who were currently in good health were less likely to consider the risks of their own drinking, with some older adults justifying their heavier drinking habits through the lack of noticeable effects on their health.

In contrast, having either personally experienced the negative health impacts of alcohol, or being exposed to them through others' experiences, was the most common reason for reported reductions in alcohol use among older adults (40). A similar finding was reported by Canham, Humphries (9), who found that some participants reported that personal stories might encourage them to rethink their own use:

> "The personal stories that everybody talked about here is really the strongest way to get any message out. If I came here and [anonymous participant] was speaking to me and telling me she used to have a glass of wine a day and then she developed a health issue . . . that resonates with me . . . There's a million ways to get the message out, but I think the message has to be tailored to be personal."

This suggests that countervailing factors other than knowledge of risks and harms alone may contribute to the drinking patterns and behaviours of older age groups, and that any public education campaigns seeking to increase older people's knowledge of alcohol guidelines should be complemented with additional systemic strategies.

2

Interventions to reduce AOD-related harms among older adults

This chapter provides an overview of evaluated interventions to reduce AOD-related harms among older adults. This information was obtained via a rapid review of peer-reviewed literature published during the past decade (2013-2023), with a focus on substances that are associated with the greatest level of harm among older adults in Australia (i.e., alcohol, benzodiazepines, and opioids).

Alcohol

Summary

- There is a relatively small body of literature regarding interventions to reduce alcohol use and harms among older adults.
- Interpretation/synthesis of the available evidence is hindered by considerable heterogeneity across interventions, outcome measures, and follow-up periods. Further, many interventions involved multiple components, with significant reductions in drinking often observed in control and/or comparator groups. Combined, these factors make it difficult to determine which components of an intervention are effective.
- Nevertheless, there seems to be some evidence for the efficacy of brief interventions (including educational tools/leaflets, personalised reports that indicate a participant's own level of risk, and diaries), and/or psychological treatments.
- Indeed, a recent systematic review of studies that *included* (but were not specific to) older adults suggest that there are three elements of effective interventions: the provision of information on several alcohol-related issues, personalised feedback about drinking behaviours, and being in contact with others and communicating with them about (alcohol) problems.
- Notably, interventions looking at the role of contact with others in the reduction of alcohol use were underrepresented. This is concerning given the complex relationship between alcohol use and factors such as social exclusion and loneliness, which may be driven by life changes more likely to affect this population (e.g., retirement and bereavement). Future research could investigate how family and social networks that are present in the lives of older people could contribute to a successful intervention.
- Few studies examined the impact of alcohol prevention or reduction strategies on cognition or dementia in older people - a key gap in the literature given the prevalence of these problems in older people - although there is an Australian study currently underway that includes cognition and alcohol consumption as primary outcomes (84).
- One recent study suggested that yoga has positive effects on alcohol consumption among older adults that are comparable to telephone counselling, although considerably more research is needed to support these claims.

Background

There is evidence across high-income countries that alcohol use and related harms are increasing among older adults, although there is considerable cross-country variation, which is not surprising given well-documented differences in drinking cultures across countries. Birth cohort studies have shown that older cohorts have much higher drinking participation than younger cohorts (e.g., 43), while analyses of 179,881 adults aged ≥50 years observed repeatedly between 1998 and 2016 found that the proportion of older adults who drink alcohol increased in 13 of 21 countries (44). In the Australian context, alcohol is widely consumed by older Australians and maintains substantial social and cultural relevance.

Alcohol consumption can have a range of negative health effects and has been linked to conditions prevalent in older age groups, such as hypertension (45), liver conditions (46, 47), and some forms of cancer (48-50). Consumption may also affect immunity (51) and gastrointestinal function (52), and has been linked in some assessments to older adults' risk of falls (53, 54). The connection between alcohol consumption and the relative risk of dementia (or the timing of its onset) has also been widely discussed, with emerging evidence that high risk alcohol use is associated with dementia, although the impact of moderate or low alcohol consumption remains unclear. Due to how widespread alcohol consumption is and the fact that people tend to underestimate their level of drinking, these effects can be substantial at the population level. Indeed, our previous analysis found that alcohol-related hospitalisations and alcohol-induced deaths among Australians aged ≥50 years have increased over the past two decades. Thus, there is a need to determine which interventions may be effective in reducing such harms.

Alcohol-related interventions

Four existing reviews of interventions to reduce alcohol-related harm among older adults (55-58) were identified, as well as four which focused on substance use more broadly (59-62). Collectively, these reviews identified 22 unique alcohol-related studies that evaluated changes in alcohol consumption, only 7 of which were published from 2014 onwards (and therefore within the original scope of the report). Given these small numbers, all studies were retained (Table 3).

As can be seen in Table 3, there was considerable variation in the types of interventions that were delivered, as well as the intensity, duration and delivery mode. Briefly, the interventions included motivational enhancement and interviewing, various educational tools, brief advice or brief interventions (which varied in definition, but included things like personalised reports, diaries, information pamphlets), telephone counselling, web-based interventions, and targeted community nursing. Many of the interventions included multiple components, making it difficult to synthesise the evidence, or to group them thematically. Further, many of on the control groups also received some kind of intervention, including alcohol-related leaflets, general health booklets, brief advice and feedback, self-help booklets, or received 'usual' care or treatment (though it was sometimes unclear what this entailed). In some studies, different interventions were being compared (e.g., 63, 64), while in others, there was no control or comparator group. It was acknowledged across reviews that these complexities made it difficult to determine which *elements* of these interventions were effective. Further, many of the studies were determined to be at unclear or high risk of bias. Some studies additionally had relatively low proportions of women.

With these limitations in mind, overall, findings were mixed. The majority (18/22) of the evaluated interventions demonstrated improvement in at least one outcome, and at least one follow-up point. However, in several of these studies there was no significant difference between the interventions (63, 64, 70), or between the intervention and the control group (70-74), which often involved some level of brief intervention or 'treatment as usual'. Further, some studies documented an initial effect of treatment that was no longer significant at longer term follow-up, while others had no control or comparator group at all (65-69). This leaves seven studies in which the evaluated intervention demonstrated a sustained statistically significant change overall and compared to the comparator intervention/control group (75-81), although two of these studies had relatively short follow-up periods (3-6 months). These factors, combined with differences in outcome measures and follow-up periods, create difficulty in making any nuanced claims about what kinds of interventions are effective, except to say that there appears to be broad evidence that older adults respond to brief interventions (including educational tools/leaflets, personalised reports that indicate a participant's own unique level of risk, and diaries), and/or psychological treatments.

In their review of interventions to prevent/reduce excessive alcohol consumption in older people, Kelly Olanrewaju (56) tentatively concluded that more intensive interventions could be most effective, though caution was recommended due to the small number of studies (three) used to support this claim. Indeed, there are numerous other studies in which a more intensive intervention did not result in an improved outcome. For example, Coulton, Bland (71) found that participants in their stepped care intervention, in which individuals were referred to a more intensive intervention if they were still drinking at hazardous levels four weeks after the initial study intervention, did no better than a control group who only received brief advice, feedback, and a self-help booklet. Similarly, Andersen, Behrendt (63) found that adding up to eight additional motivational interviewing sessions did not result in any improved outcome when compared to the effect of participants having had only four sessions. Further, Purser and Lemieux (58), who included only brief interventions in their review, concluded that brief interventions in older people may be effective overall, noting that improvements in some of the minimal-intervention control groups suggests that even simple interventions (such as leaflets or alcohol assessments with advice to reduce drinking) might also have some positive effect. However, as previously noted, Purser and Lemieux (58) ultimately concluded that there is not yet consistent information about the effective *components* of these brief interventions.

There are, however, some studies that have attempted to identify the effective elements or components of particular interventions. Ettner, Xu (75) found that the Senior Health and Alcohol Risk Education (SHARE) program resulted in a significant decrease in at-risk drinking among older adults at 12-month follow-up, however the specific mechanism/s that

resulted in this reduction were unclear. Duru, Xu (80), therefore, conducted further analysis to investigate the extent to which participation in different intervention components was associated with the observed behavioural changes. They found that discussing alcohol risk with a doctor, making a drinking agreement, and/or self-reporting the use of a drinking diary were associated with lower odds of at-risk drinking at follow-up. Interestingly, a subsequent study examined whether these reduced rates of at-risk drinking demonstrated by the SHARE intervention translated into improved health and health-related quality of life (HRQL) (82), finding statistically significant improvements in health and HRQL but concluding that these were not necessarily *clinically* significant. The effects were found to be most prominent for patients who received discussions with doctors, suggesting counselling from a health provider may be a critical component of primary care-based interventions targeting at-risk alcohol use in older people.

Further, Boumans, van de Mheen (83) conducted a systematic review with the aim of identifying *how* (which elements of interventions)*, in which context,* and *why* (which mechanisms) interventions prevent or reduce (problematic) alcohol consumption among older adults. This review identified 61 studies, but the vast majority of these (n=58) were studies that included (though were not specific to) older adults. With this caveat in mind, the authors concluded that there were three main effective elements to these interventions. The first element was the provision of information on several alcohol-related issues, including the health disadvantages of drinking behaviour; coping strategies and control measures for many alcohol-related issues; and changing participants' lifestyles regarding personal relationships, nutrition and exercise. The second element involved providing participants with personalised feedback about their drinking behaviour, and the third element involved being in contact with others and communicating with them about (alcohol) problems. Interestingly, the authors noted that the third of these elements (i.e., contact with others) was not included in any of the studies specific to older adults, which is a noteworthy omission given the relationship between the use of alcohol in older adults (in particular men) and loneliness.

Notably, none of the interventions detailed in Table 3, and only four (out of 61) of the studies identified by Boumans, van de Mheen (83) were conducted in Australia, none of which were specific to (though included) older adults. Given considerable cross-country differences in alcohol cultures and health systems, this means that some of these findings might not necessarily be transferrable to the Australian context. There is one Australian study currently underway, which will develop and evaluate a 12-month internet-delivered controlled trial for an intervention called *Rethink My Drink* (adapted from the UK intervention *Down Your Drink*, and adapted specifically for older adults between 60-75 with hazardous or harmful drinking) (84). Participants will be randomly allocated to receive access to *Rethink My Drink* (intervention) or *Alcohol: The Facts* (a comparator), an online patient information booklet currently made available by New South Wales Health. The primary outcomes will be average weekly alcohol consumption and cognitive function.

Given this absence of Australian interventions, it is worth noting a recent study by Grigg, Manning (85), who tested a brief alcohol intervention (Health4Her) that aimed to improve knowledge of alcohol as a breast cancer risk factor (primary outcome) and to improve alcohol literacy and reduce alcohol consumption among women attending a breast screening service (secondary outcome). The ages of participants ranged from 40-87 years but had a mean of 60 years. The intervention comprised an animation that included a four-minute brief alcohol intervention and three minutes of lifestyle health promotion (physical activity, maintaining a healthy weight). Participants were given a take-home pamphlet summarising the alcohol information in the animation, and one on nutrition strategies for maintaining a healthy weight. The information included personalised feedback and comparison with gender- and age- specific drinking norms, negative messages about the risks and harms of alcohol use (particularly the link between alcohol use and breast cancer), positive messages about the health benefits of reducing alcohol use (particularly for reducing breast cancer risk), and alcohol harm reduction strategies. In contrast, the control group viewed only the three-minute animation about health promotion that focused on physical activity and maintaining a healthy weight for reducing breast cancer risk. They also received the pamphlet on nutrition for maintaining a healthy weight. They found that the combined intervention (animation that included both a brief intervention and more general health promotion) improved awareness of the increased breast cancer risk associated with alcohol use and alcohol literacy more broadly, compared to the control group. However, this did not translate to a change

in alcohol consumption. The authors hypothesized that this may have been due to the recruitment of women regardless of drinking level, in contrast to many other brief intervention trials which typically include only people who consume alcohol at hazardous levels. That is, the inclusion of non- drinkers and women drinking at lower levels may have limited the capacity of the intervention to change alcohol consumption.

Further, there is one recent study (86) that examined the effect of exercise on alcohol consumption, and, while not specific to older adults, it had an average age of 53.7, and stratified its results by age. The study randomised 140 physically inactive adults aged 18–75 diagnosed with alcohol use disorder to either aerobic exercise (n =49), yoga (n =46), or treatment as usual (i.e., telephone counselling; n =45) for 12 weeks. While alcohol consumption declined in all three groups, no significant differences in primary or secondary drinking outcomes were found at follow-up. Per-protocol analyses showed that the mean number of drinks per week reduced more in both the treatment as usual and yoga groups compared to aerobic exercise. There were no group differences when stratified by age (18-54; 55-75). Overall, these findings indicate that exercise, in particular yoga, has beneficial effects on alcohol consumption that can be comparable to telephone counselling (usual care). Given the small group sizes, findings should be interpreted with caution.

Pharmaceutical substances

There is a considerable body of literature on the effectiveness of interventions to reduce polypharmacy and 'potentially inappropriate prescribing' among older adults (19, e.g., 87, 88-92), both of which may involve substances of interest such as benzodiazepines and opioids. However, it was outside the scope of this review to include these often broad-based studies, as it was often not clear which medicines were being included (i.e., psychoactive versus non-psychoactive medicines), with the focus being the overall number of medications taken. Reviews about 'deprescribing' were excluded for similar reasons, except if they related to a particular (relevant) substance.

Given that benzodiazepine receptor agonists and opioids are the main (psychotropic) pharmaceutical drugs involved in drug-related harm among older adults in Australia (93), and that benzodiazepines are the most commonly prescribed potentially inappropriate medication in older populations globally (94), we have only included literature that focused on these substances. As noted in the inclusion and exclusion criteria, data presented does not include studies that focused on health system-wide reforms to prescribing, real-time prescription monitoring, inpatient treatment, and substitution with other pharmaceutical/alternative drugs. Given the limited studies published within the target timeframe of 2013-2023 and specifically focusing on people aged ≥50 years, age-appropriateness of participant groups was determined based on a *mean* age of study participants of ≥50 (this predominantly occurred in relation to insomnia-focused CBT trials and opioid studies). Studies in which every participant was 50 years of age or older have been marked as such.

Benzodiazepines and benzodiazepine receptor agonists (BZD/BZDRA)

Summary

- Patient-empowerment interventions, in particular EMPOWER, appear to be effective in improving sedative-hypnotic cessation among older adults.
- Interestingly, two studies found that adding additional components to the educational intervention (e.g., follow-up call with pharmacist) yielded no improvement in outcomes compared to those who received the educational component only. This suggests that pharmacist contact may not significantly increase discontinuation likelihood beyond the effectiveness of educational materials.
- CBTi shows some effectiveness as a multi-dimensional approach to treating sleep problems, and reducing sedative-hypnotic use, among older adults.
- However, there may be a need for further research in populations who do not have diagnosable sleeping problems, and in community-dwelling older people with diagnosed psychiatric comorbidity and/or a history of military service, in whom approaches appeared less effective.

Background

Benzodiazepines and medications targeting related receptors (benzodiazepine receptor agonists or, more commonly, the subset referred to as 'z-drugs' [zopiclone, zolpidem, and zaleplon]) may be medically indicated for conditions that commonly affect older populations, such as anxiety and sleep disturbances. Despite this, use of these medications in older adults often falls outside of prescribing guidelines (which advises their use to be limited to no more than one month of continuous use), with a recently published systematic review and meta-analysis finding that benzodiazepines are the most commonly prescribed potentially inappropriate medication in older populations globally (94).

Benzodiazepine prescribing practices, as well as those of related benzodiazepine receptor agonist medications (such as zopiclone and zolpidem) constitute an ongoing public health concern in older adult and geriatric populations (95), particularly due to the consistently documented (96) association with increased fall risk in older adults. These medications may have other health hazards in this population, such as cognitive impairment, memory loss, prolonged somnolence, impaired standing and balance, walking problems, delirium, car accidents, and fractures – effects that occur in addition to the well documented risk of extra-medical use and withdrawal syndrome (97). Several studies have also suggested a potential link between BZD use and dementia. As such, the American Geriatric Society Beers criteria provides strong recommendations against the use of BZDs and BZDRAs in the elderly (98).

BBZD/BZDRA-related interventions

We identified 14 reviews assessing interventions to reduce benzodiazepine use and harms among older adults. Due to the breadth of these reviews, each was manually assessed and only studies that met the inclusion/exclusion criteria previously outlined (see Methods) were retained for this review. This resulted in a total of 25 studies (99-123), which have been categorised as either education-based interventions or cognitive behavioural therapy (CBT; used with or without advice about medication tapering) for insomnia.

Education-based interventions

The body of literature examining education-based interventions for reducing BZD use among older adults is detailed, with studies that have been included in a number of reviews originating as early as the mid-1980s. Overall, the vast majority of studies in this area were undertaken in the 1990s and early 2000s, and have been excluded from this review for this reason, or due to either inpatient setting (commonly residential aged care facilities) or use of alternative drug classes as part of the cessation/dose reduction program. Notably, of two Cochrane reviews focused on BZD use, one centred on psychosocial interventions (124) and included only 2/31 papers published within the target timeframe for this review (both from 2013, with the review including studies from as early as 1986). Similarly, the second review, which was restricted to pharmacotherapeutic approaches (125) was withdrawn by its authors for containing data that was considered excessively out of date. Given the often-extensive timescale used in BZD dose reduction/cessation reviews, it appears that research in this space has stagnated substantially in recent years.

Nevertheless, 10 papers evaluating the impact of patient-targeted educational approaches on sedative hypnotic reduction/cessation and published within the last 10 years were identified (Table 4). Sample sizes ranged from 42-609, participants were predominantly in their 70s, and women were well-represented. All included studies originated in high-income countries, including the USA (three studies), Canada (four studies), Australia (one study), Japan (one study), and Spain (one study). Evaluated outcomes varied. Many focused on rates of BZD dose reduction or cessation, while others focused on intention to pursue sedative hypnotic cessation or reduction in response to the intervention. The interventions themselves also varied and included materials such as videos, hard copy information provided via mail, brief interventions, or cognitive behavioural therapy.

Four of the included papers evaluated EMPOWER (Eliminating Medications through Patient Ownership of End Results), a patient education intervention distributed using a direct-to-consumer model. It includes a booklet containing information about the health hazards of chronic BZD use, a self-assessment quiz on harms, an inspirational story of cessation from a 'peer champion', advice for the patient to consult their doctor about tapering the medication, and a suggested tapering regime. This intervention was first evaluated by Tannenbaum, Martin (110), who found a robust intervention effect across age, indication, dose, and duration of benzodiazepine use (see Table 4 for details). In the three subsequent papers examining the same intervention, one (which was a secondary analysis of data from the original Tannenbaum paper) found that, compared to participants with normal cognition, those with mild cognitive impairment exhibited the same ability to acquire new knowledge and change their beliefs following the intervention, while Wilson, Lee (121) found that, among inpatients with a sedative prescription, a significantly greater percentage had been successfully deprescribed 30 days post-discharge compared to 'the historical baseline rate', although numbers were small and there was no control group. In contrast, an Australian study conducted at Royal North Shore Hospital, Sydney, found no significant difference between the intervention and control groups in the withdrawal of benzodiazepines at 1 month post discharge, nor in patient attitudes towards benzodiazepine deprescribing (99), although this may have in part been due to the small sample size and short follow-up period of the study. Further, the authors hypothesised that many of the participants were charted for benzodiazepine use on an 'as-needed basis' and so may have been less likely to be dependent on them than participants in other studies.

In addition, one study based its educational materials on those developed for the EMPOWER trial but modified content to discuss Z-drugs only, and tailored information to be consistent with existing educational resources and practices related to sleep and tapering of Z-drug use (112). An additional arm/intervention featuring telephone follow-up with a pharmacist added on to the education intervention was included. Consistent with the original 2014 EMPOWER trial, both intervention groups were more likely to have discontinued Z-drugs compared to the control group, however there were no differences between the two intervention groups, suggesting that pharmacist contact may not significantly increase participants' likelihood of discontinuing sedative hypnotics to any greater extent than can be achieved with educational materials alone. A similar finding was reported by Vicens et al. (111), who found that the more intensive intervention of the trial (i.e., educational intervention plus written follow up) performed no better than the purely educational intervention arm.

Of the remaining four studies, two did not measure cessation per se, but rather intention to reduce medication use, and risk perception (100, 103), finding significant improvements in the intervention group in both cases. Interestingly, Amagai et al. (103) conducted further analysis to examine factors associated with intention to reduce medication use and found that 'memorable content about side effects' was one of four significant explanatory variables. This is broadly consistent with the earlier finding that the preferred rationale among older adults for deprescribing sedative-hypnotics focused on the risk of side effects ("given your age and other health problems, I'm worried that you are at increased risk of side effects from this medicine" (36)).

Overall, only two of the identified studies (99, 113) found no significant change in the intervention group, suggesting that older adults respond well to a broad range of educational interventions focused on benzodiazepine cessation.

Cognitive Behavioural Therapy (CBT) for insomnia

Due to the indications for z-drugs as predominantly sleep medications trials regarding their discontinuation generally centred on interventions designed to improve sleep quality and/or quantity. Pharmacological substitution with alternative hypnotic or anxiolytic medications as a means of BZD or BZDRA cessation was outside of the scope of this review.

Several national medical representative bodies and societies, such as the American Academy of Sleep Medicine (126), the Royal Australian College of General Practitioners, the British Association for Psychopharmacology (127), and the European Sleep Research Society (128), have noted the role of insomnia-focused CBT (CBTi) in sedative/hypnotic tapering and cessation and there is a considerable body of literature about its utility for this purpose (129-131). A 2021 narrative review (132) included 95 studies conducted from 1974-2020 regarding the effect of insomnia-focused CBT on sedative hypnotic (SH) use. Interventions included in the review were CBT administered in any form, including in-person, mixed modes and

digital. However, studies using SH reduction or cessation as the primary or secondary outcome were uncommon, and many were more than 10 years old. After manual screening, followed by removal of irrelevant papers based on age group, setting, and publication date, 14 papers were deemed relevant to this review and are detailed in Table 5.

Studies evaluating CBTi typically had smaller sample sizes and younger participants than those centred on educational interventions for BZD/BZDRA reduction. There were no Australian studies, with the 14 identified studies occurring in Sweden, South Korea, Japan, USA, and Canada. In the majority (13/14) of included studies, the proportion of women studied exceeded that of men. Definitions of "cessation" and use reduction also varied across studies.

Findings regarding CBTi were more mixed than those observed for educational interventions. This may have been due to varying intensities of the intervention (for example, some involved 5 CBTi sessions, while others had 10 sessions), whether or not the intervention included instruction/materials regarding medication tapering, specific characteristics and use patterns of medication taken by participants (e.g. half-life of drug, frequency of use, dose used, etc.), the participants' baseline level of dependence on the medication, and the interaction of the intervention with the type of withdrawal effects that those involved may have been differentially experiencing. Studies measuring sleep medication outcomes of CBTi were included on the basis of average participant age of ≥50, but in many cases had substantial age ranges, potentially reducing the usefulness of findings when it comes to older population-specificity.

Nevertheless, the findings of CBTi studies measuring sedative hypnotic reduction or cessation suggest that such approaches can be effective at reducing sedative hypnotic use in older adults, across a range of delivery modalities (e.g., digital, in-person, self-administered). However, there may be a need for further research in populations who do not have diagnosable sleeping problems, and in community-dwelling older people with diagnosed psychiatric comorbidity and/or a history of military service, in which approaches appeared less effective. In addition, it would be beneficial to collect data in a well-powered study including solely older participants and solely sedative hypnotic users, due to the substantial variation in participant ages and medication use in the included studies.

Although not within the scope of the current report, it is worth noting that MacLeod, Musich (133) conducted a tailored literature review of non-pharmacological interventions for sleep problems among older adults. In addition to noting the promising evidence base for CBTi, based on their assessment of 98 articles MacLeod, Musich (133) also argue that mindfulness and interventions that integrate stress management have shown promise in improving sleep quality and health outcomes within this population. They therefore conclude that further development of multidimensional sleep interventions integrating stress management with seniors is warranted.

Non-educational patient-targeted interventions

Fernandes and colleagues (123) undertook a single arm, non-randomised trial with 66 participants who had average age of 67.4 years and a median of 10 years using BZD. The trial was designed to determine the feasibility, effectiveness, and safety of a primary care setting-based BZD discontinuation protocol. The percentage of patients with successful discontinuation was the primary endpoint of the study, and reduction of daily dosage by at least 80% (as well as mean daily dosage reduction) were secondary endpoints. Participants were first switched to an equivalent dose of diazepam. Reasons for this were not stated but may have been to allow for comparability across participants throughout the course of the taper or, as previously described by the Royal Australian College of General Practitioners, may be related to the long half-life of diazepam and the utility of that for those withdrawing from BZDs. Cessation was then achieved in 59.4% of sample, with a reduction of 80% or more of the original dose occurring in 62.5% of the sample. Men in the study had a higher probability of success (relative risk = 0.51, P = 0.001), and this gender association remained significant after adjustment. The effectiveness of the intervention across time was durable, with 85% of those who had reduced their use maintaining that reduction 12 months later.

Opioids

Summary

- Evidence regarding opioid-related interventions among older adults is limited, noting that the review was restricted to studies published within the past 10 years, and did not include pharmacological interventions such as opioid agonist therapy and naloxone.
- Further, interpretation/synthesis of the available evidence is complicated by considerable heterogeneity across interventions, settings, outcome measures and follow-up periods.
- With these caveats in mind, educational and psychological (primarily Mindfulness-Oriented Recovery Enhancement and pharmacist-conducted motivational interviewing) interventions showed some evidence of effectiveness. The majority of psychosocial interventions successfully produced reductions in opioid use while also reducing pain and improving participants' mental health.
- Community pharmacies may be a valuable resource for identifying and reducing health harm in patients who use pharmaceutical opioids.
- Preoperative opioid education targeted at patients can have long-term benefits in the prevention of later opioid dependence that can otherwise result from surgical and post-surgical use of opioids, but more data is required in this area.
- While the average age of included studies was strictly within the 'older adult' definition applied to this review, included studies were generally not older adult specific.
- Effective strategies to limit illegal opioid use in this population were absent from the identified body of literature.

Background

Outside of palliative care, in older adult populations, the use of opioid analgesics is commonly tied to chronic cancer and non-cancer pain or acute surgical pain. In the context of chronic pain of non-cancerous origin, for which opioids may be used but are not recommended, the risks of opioid use may rise across time if the pain is poorly controlled. For example, one review highlighting the risk associated with opioid pharmacotherapies for chronic pain suggested that the rate of problematic use can range from <1% to as much as 81% (134). Further, use of opioids in surgical contexts can result in prolonged periods of opioid use (e.g., 135), which in turn can increase the risk of dependence. In fact, it has been hypothesised that the surgical utilisation of opioid analgesics constitutes an independent risk factor for later opioid misuse (136). This, combined with the aggressive marketing of pharmaceutical opioids in countries such as the United States, has created a 'new' population of people who use, and experience harms from, opioids.

While opioid dependence and overdose are the central detrimental effects of opioid use from a public health standpoint, other adverse effects of use include constipation, drowsiness, nausea, and respiratory depression. Opioid prescribing reforms have been introduced in Australia, particularly in the last six years, with the aim of reducing rates of dependence and other adverse effects associated with the use of opioids and have included steps such as reducing access to codeine, changing pack sizes and eligible indications, implementing packaging warnings, and introducing reformulated products which are less easily crushed and injected. However, there is also a need to understand which interventions may be effective in reducing opioid use and related harms among older adults.

Opioid-related interventions

Four existing reviews (137-140) of interventions to reduce opioid-related harm among older adults were identified, with 103 studies in systematic reviews and additional papers in a non-systematic review. The majority of studies contained within the identified reviews were not usable for this review due to average participant age (i.e., <50 years), inpatient setting, use of opioid agonist therapy as part of the intervention, or age of the study (i.e., published >10 years ago). A supplementary

search for primary studies published in the past five years identified 8 original studies, 7 of which were retained. Further citations were obtained through hand-searching, resulting in a total of 12 relevant studies for inclusion (Table 6).

Many of the more recent papers located by the search focused on the growing body of literature documenting the successful undertaking of opioid-free or opioid-reduced surgeries. These have predominantly not been included due to the age of the cohort, the fact that opioid use/limitation was discretely centred on the surgical procedure itself, or because evidence was considered too indirectly relevant to the aims of this review (for instance, outcomes strongly focused on short-term pain). One surgical paper that included longitudinal follow-up specifically related to opioid dependence was included (141), as well as an additional surgical paper that evaluated post-surgical chronic opioid use rates (142). Such papers were included due to documented effects of surgical and post-surgical opioid use on new persistent opioid use/dependence.

Overall, the included studies (n=12) identified interventions that can be categorized into four broad themes: education-based interventions targeted at patients (2 studies), clinician-targeted interventions (4 studies), pharmacist-initiated interventions (2 studies), and psychological treatments aimed at those with long-term opioid use in the context of chronic pain (4 studies). All included studies focused on use/extra medical use of pharmaceutical (i.e. non-illicit) opioids, and studies relating to co-prescription of BZDs and opioids have also been included in this section. Almost all (11/12) studies were conducted in the US, with the remaining paper conducted in Britain. Patient participants were also, on average, younger than those in BZD/BZDRA intervention cohorts profiled in this review. Included trials were generally recent (only 1/12 was published prior to 2018) and randomised control trials represented the bulk of the studies (8/12).

Given the small number of studies, and the diverse array of interventions, settings and outcome measures, it is difficult to draw any strong conclusions about the effectiveness of these interventions. However, both of the patient-targeted education interventions demonstrated significant reductions in opioid use/harms, as did three of the four psychological interventions, all of which included mindfulness and two which used the same model: Mindfulness-Oriented Recovery Enhancement (MORE). This intervention includes mindfulness training to promote self-awareness, self-regulation, and self-transcendence; reappraisal training to engender meaning and psychological growth in the face of adversity; and training in savouring pleasant events and emotions to enhance natural reward processing and positive affectivity. The two associated studies found that those in the intervention group reported significantly greater opioid use reductions than those in the comparator group (i.e., support group), suggesting that opioid harms among (some) older adults may be addressed by increasing positive psychological factors like positive emotions and meaning in life.

The two pharmacist-led opioid interventions reported reductions in opioid dependence (143, 144) and use (143), although the latter of these studies included no statistical analyses and the former was largely focused on examining the 'feasibility and acceptability' of the intervention, with the authors noting that the intervention should be evaluated within a "fully powered clinical trial framework". Though these studies do not provide strong evidence of the effectiveness of these interventions, they tentatively suggest that community pharmacies may be a potentially valuable resource for identifying and intervening with patients who use opioid medications.

A number of studies conducted with pain patients in community settings documented participants' long-term use of pharmaceutical opioids for chronic pain (most frequently of the back, and in some cases associated with more than a decade of opioid use). Despite this, the effect of opioid dosage reductions on validated measures of pain and/or its interference with life in studies was variable (that is, pain did not necessarily increase as opioids were tapered in studies). In all but one (145) of the included psychological treatment trials, intervention groups experienced both improved pain related-measures and reductions in opioid use that were superior to control groups. In some cases, reduction in opioid use was explicitly described as being mediated by the positive affective impacts that the intervention produced, which bolsters the view that psychosocial interventions may have a valuable place in addressing opioid use in older pain populations. In contrast to CBT-supportive findings reported in this review in the context of sedative hypnotic use, the one CBT study for opioid use that was eligible for inclusion in this review (145), which was not specific to older adults but had a mean participant age of 60.3,

did not reduce opioid use to any greater extent than in a control group – though, interestingly, a reduction in participants' benzodiazepine use was documented.

Indeed, in the initial review of interventions to reduce opioid use for pain management among older adults, Langford et al. (139) concluded that, due to the lack of studies, they were unable to make any clinical recommendations with a high level of evidence. Only two recommendations (the successful management of both orthopedic and non-orthopedic surgery pain with non-opioids) had enough research available to result in a moderate strength of evidence, though the small numbers of studies limited precision of the findings.

Other substances

Summary

- There is very limited information in this age group in terms of interventions that aim to reduce harms associated with illegal substances (including cannabis). Additionally, there is an absence of information regarding peer-led or co-designed interventions, and a lack of evidence regarding particular subsets of older people, including people who identify as LGBTIQA+, First Nations Australians, and those from migrant and multicultural communities. Future studies would benefit from considering these gaps in data.

Virtually no studies that had explicitly evaluated interventions to reduce use of cannabis or illegal substances among older adults were identified in this review. The absence of specific interventions to reduce cannabis harms among older adults was particularly surprising, although one broad-based 2022 review that focused on lower-risk cannabis use (146) suggested that some health risks disproportionately common to older age groups may be attenuated by the use of low-potency cannabis, titration of doses, and other intake precautions. A number of studies evaluating cannabis-related interventions have been published in the last five years, but average participant ages were generally in the 20s or 30s, and some studies used drug substitution as the treatment method. Of note, the Florida Brief Intervention and Treatment for Elders (BRITE) included older adults who had used alcohol, medicines, and/or illegal drugs, but use of illegal drugs was very low, and the relevant outcome measure appeared to be use, rather than any measure of 'harm'. In any case, the intervention was found to have no impact on illegal substance use, likely because of small numbers (69), with the overall quality of the study rated as poor (62).

Further, there was one intervention that had aimed to address chronic pain, substance use (including alcohol and illicit/illegal drugs) and decreased physical functioning among 55 older people living with HIV (147). Participants were randomized to a an 8-week behavioural intervention combining cognitive-behavioural therapy and tai chi reinforced with text messaging (CBT/TC/TXT) (n=18), routine Support Group (SG) (n=19) and Assessment Only (AO) (n=18) and followed up over 12 weeks. The substance use outcomes included number of days in the past 30 days of a) using a preferred substance; b) using any substance; c) using any drugs; and d) heavy drinking (defined as ≥ 5 drinks for men and ≥ 4 drinks for women). Efficacy indicators showed within-group improvements from baseline to week 12 in the CBT/TC/TXT group, including all four substance use outcomes, pain relief in the past 24 hours, and in two physical performance measures. Observed between-group changes included greater reductions in days of heavy drinking in the past 30 days for both CBT/TC/TXT (19%) and SG (13%) compared to the AO group.

Although not an evaluated intervention, Washburn, Hagedorn (148) note that virtual reality (VR) is an emerging evidence-based approach that has been successfully used in a number of small studies to address substance craving, substance use disorders, and chronic pain in young and middle-aged adults, and contend that it should also be considered for older adults. They provide an overview of considerations for researchers wishing to develop and test VR-based intervention approaches for older adults impacted by substance dependence, including hardware considerations (e.g., wireless headsets and controllers to avoid older adults tripping or losing balance), contraindications (e.g., dementia), simulation sickness, balance issues and limited mobility, impaired vision or hearing, and limited manual dexterity. In light of these considerations, the

authors highlight the importance of including older adults to develop and help pilot test new virtual environments. Indeed, interventions co-designed with older adults, or which were peer-led, seem to be largely absent from the literature, and this an area that would benefit from further research.

Van Orden and Lutz (149) highlight some peer programs in the area of substance use recovery, although none appear to have been evaluated in this population. For example, the Certified Older Adult Peer Specialists (COAPS) program utilises mental health certified peer specialists (CPSs) to address aging-related challenges in mental health and substance use 'recovery'. Peer specialists not only undergo the required 2-week CPS training but also complete a 3-day COAPS-specific training. These specialists are adults aged 50 and older who are in recovery from mental illness and/or substance use disorders and are trained in issues related to mental health and aging (e.g., depression and anxiety, substance use, trauma, suicide), and "implementation" (e.g., motivational interviewing, positive psychology, legal issues, advocacy, and working in behavioural health systems). COAPS began in Pennsylvania (USA) and has expanded to New Jersey and Massachusetts. There are no published studies to date on outcomes of this program, although program evaluations and feedback by the peer specialists indicate that they, as well as the patient population, receive benefit from involvement in the program.

3

Recommendations to reduce AOD-related harms among older adults

This chapter provides a series of recommendations to reduce AOD-related harms among older adults. These recommendations are based on the results of both this report and the closely related Analysis Report (Trends in Substance Use and Related Harms).

This review, combined with analysis of trends in AOD-related use and harms (i.e., hospitalisations, deaths and treatment episodes), has identified several priority populations, as well as considerations for AOD-related interventions. These are outlined below:

Information sources

- Health practitioners are trusted sources of information for older adults, yet conversations regarding alcohol and illegal drug use and associated harms appear to be uncommon. While there are likely structural barriers to this (e.g., limited practitioner time), these represent potential missed opportunities, particularly since older adults are increasingly likely to present to health practitioners as they age. There is substantial scope to address the workforce development needs of key healthcare providers and to ensure that they are adequately skilled to appropriately identify and intervene where an older person's drinking patterns may constitute risk of harm.
- Upon dispensing, pharmacists routinely discuss the interaction effects of medicines - thus community pharmacies may be a valuable resource for identifying and reducing AOD-related harm in older adults.
- Although we identified no evaluated peer-led programs, qualitative research suggests that older adults may value peers' personal stories of recovery. Thus, there may be utility in leveraging the expertise of older adults who have previously experienced, or are currently experiencing, AOD-related harms. This could be done via existing social networks such as men's sheds, women's circles, seniors' centres, community centres, veterans' organisations, churches, and other cultural and social gathering locations.

Content

- AOD-related information should be provided in a range of ways, with older adults expressing a desire for simple, easy to understand information, alongside more detailed, comprehensive information that is transparent about the evidence on which it is based. Written information should be available in large text, and videos accompanied by subtitles.
- There is evidence that many older adults are passive recipients in the prescribing of psychotropic medications and may be dissatisfied with the length and depth of consultations. Programs that improve the health literacy of older adults may be beneficial, fostering greater confidence to engage with health providers/participate in shared decision making, access information, and navigate health services.
- When engaging in discussions with older adults about deprescribing, there may be utility in focusing on the risk of side effects, with older adults indicating they would be most motivated by this rationale to reduce/cease medication use.
- In contrast, knowledge of alcohol-related harms alone is unlikely to motivate older adults to change their consumption, with alcohol playing a positive social role in many older adults' lives. Attempts to reduce alcohol consumption should recognise the importance of maintaining meaningful social connections that improve quality of life in older adults.
- Nevertheless, education campaigns that aim to shift beliefs and produce better decision making may be useful. For example, this could focus on perceived health benefits of drinking, with some older adults believing that alcohol provides greater preventative benefit than is objectively the case. To improve the palatability of such messaging, it may be preferable to frame such discussions in terms of protecting existing health.

Interventions

- Alcohol-related interventions should consider providing multi-faceted information (e.g., the health disadvantages of drinking behaviour; coping strategies and control measures; lifestyle changes regarding personal relationships, nutrition and exercise), and personalised feedback about drinking behaviours.
- There is also evidence that contact with others and communicating with them about (alcohol) problems can be effective in reducing alcohol harms/risky alcohol consumption, though there are no identified interventions specific to older adults that have included this component. Future research could investigate how family and social networks that are present in the lives of older people could contribute to a successful alcohol intervention.

- New social and leisure opportunities that do not involve alcohol are needed. This could include activities such as volunteering, exercise, and group social activities.
- Interventions aimed at sedative-hypnotic cessation in older adults may benefit from focusing on patient-empowerment models, such as EMPOWER.

Although not identified via the current report, findings from our analyses of trends in AOD-related use and harms (i.e., hospitalisations, deaths and treatment episodes) identified a range of issues that should also be considered when developing interventions. Specifically:

- Opioids and benzodiazepines continue to be the most common drugs involved in overdose deaths among older Australians, with most overdoses occurring at home. While we identified interventions aimed at reducing opioid and benzodiazepine harms among older adults, none of these were specifically focused on overdose awareness/prevention. Educational interventions focused on how to recognise and respond to overdose may be warranted, and would ideally target older adults, as well as their partners, family members, and home carers.
- Importantly, many overdoses were intentional, with self-harm and limitation of activities due to disability the most common contributing psychosocial factors. This highlights the complex nature of AOD-related harm, and AOD interventions may benefit from taking a more holistic view of older adults, including mental health and disability.
- Further, most AOD-induced deaths involve more than one drug class, with opioids and benzodiazepines the most common combination in 2020-21. Risks regarding concomitant use of these medicines should be clearly articulated to older adults when prescribed, and GPs and pharmacists should consider discussing take-home naloxone when opioids are prescribed.
- The highest rates of alcohol-related harm occur in remote and very remote areas, indicating that resources should be allocated to these areas to fund implementation and evaluation of alcohol-related interventions.

Gaps and future directions

- There is evidence of increasing methamphetamine, cocaine, and cannabis-related harms among older Australians, yet there appears to be little to no research that has explicitly evaluated interventions focused on reducing harms from these substances among this population. This is particularly surprising in relation to cannabis, given that it is both a commonly used recreational substance and one that is now readily prescribed in Australia for a range of acute and chronic health conditions. Further research is needed to fill this knowledge gap.
- Given that the highest rates of AOD-related harms among older adults occur among those aged 50-59 years, there may be utility in trialing/evaluating workplace interventions, including those that facilitate the transition from employment to retirement. No such interventions were identified in the current review.
- Few of the identified studies in the current report were Australian. Given cultural differences in alcohol consumption, and policy differences in how medicines are prescribed/marketed, findings documented from the US and elsewhere may not necessarily be generalizable to older adults in Australia.
- Future studies may benefit from focusing on sub-populations of older adults who may have higher rates of AOD use and related harms, including older people who identify as LGBTIA+, First Nations Australians, or those who are from migrant and multicultural community groups.
- One recent study suggested that yoga has positive effects on alcohol consumption among older adults that are comparable to telephone counselling, however considerably more research is needed to support these claims.

References

1. Shah S, Gilson AM, Jacobson N, Reddy A, Stone JA, Chui MA. Understanding the Factors Influencing Older Adults' Decision-Making about Their Use of Over-The-Counter Medications—A Scenario-Based Approach. Pharmacy. 2020;8(3):175.
2. Si P, Koo KN, Poon D, Chew L. Knowledge of prescription medications among cancer patients aged 65years and above. Journal of Geriatric Oncology. 2012;3(2):120-30.
3. Thompson S, Stewart K. Older persons' opinions about, and sources of, prescription drug information. International Journal of Pharmacy Practice. 2011;9(3):153-62.
4. Donohue JM, Huskamp HA, Wilson IB, Weissman J. Whom do older adults trust most to provide information about prescription drugs? Am J Geriatr Pharmacother. 2009;7(2):105-16.
5. Usidame B, McQueen Gibson E, Diallo A, Blondino C, Clifford J, Zanjani F, et al. Understanding the preference for receiving mental health and substance use support in African Americans 50 and older. Journal of Prevention & Intervention in the Community. 2023;51(3):268-86.
6. Westerlund T, Barzi S, Bernsten C. Consumer views on safety of over-the-counter drugs, preferred retailers and information sources in Sweden: after re-regulation of the pharmacy market. Pharmacy Practice (Granada). 2017;15(1).
7. Haighton C, Wilson G, Ling J, McCabe K, Crosland A, Kaner E. A Qualitative Study of Service Provision for Alcohol Related Health Issues in Mid to Later Life. PLOS ONE. 2016;11(2):e0148601.
8. Wongtaweepkij K, Corlett S, Krska J, Pongwecharak J, Jarernsiripornkul N. Patients' Experiences and Perspectives of Receiving Written Medicine Information About Medicines: A Qualitative Study. Patient Preference and Adherence. 2021;15(null):569-80.
9. Canham SL, Humphries J, Kupferschmidt AL, Lonsdale E. Engaging in Community Dialogues on Low-Risk Alcohol Use Guidelines for Older Adults. Journal of Applied Gerontology. 2020;39(12):1332-9.
10. Bareham BK, Kaner E, Spencer L, Hanratty B. Health and social care providers' perspectives of older people's drinking: a systematic review and thematic synthesis of qualitative studies. Age and Ageing. 2020;49(3):453-67.
11. Bareham BK, Stewart J, Kaner E, Hanratty B. Factors affecting primary care practitioners' alcohol-related discussions with older adults: a qualitative study. British Journal of General Practice. 2021;71(711).
12. Hammock K, Velasquez MM, Alwan H, von Sternberg K. Alcohol Screening, Brief Intervention, and Referral to Treatment (SBIRT) for Girls and Women. Alcohol research : current reviews. 2020;40(2):07.
13. Lauderdale SA, Martin KJ, Oakes KR, Moore JM, Balotti RJ. Pragmatic screening of anxiety, depression, suicidal ideation, and substance misuse in older adults. Cognitive and Behavioral Practice. 2022;29(1):105-27.
14. Sirdifield C, Chipchase SY, Owen S, Siriwardena AN. A Systematic Review and Meta-Synthesis of Patients' Experiences and Perceptions of Seeking and Using Benzodiazepines and Z-Drugs: Towards Safer Prescribing. Patient. 2017;10(1):1-15.
15. Wu H, Kouladjian O'Donnell L, Fujita K, Masnoon N, Hilmer SN. Deprescribing in the Older Patient: A Narrative Review of Challenges and Solutions. International Journal of General Medicine. 2021;14(null):3793-807.
16. Belcher VN, Fried TR, Agostini JV, Tinetti ME. Views of older adults on patient participation in medication-related decision making. J Gen Intern Med. 2006;21(4):298-303.
17. Weir K, Nickel B, Naganathan V, Bonner C, McCaffery K, Carter SM, et al. Decision-Making Preferences and Deprescribing: Perspectives of Older Adults and Companions About Their Medicines. The Journals of Gerontology: Series B. 2017;73(7):e98-e107.
18. Caughey GE, Tait K, Vitry AI, Shakib S. Influence of medication risks and benefits on treatment preferences in older patients with multimorbidity. Patient Preference and Adherence. 2017;11(null):131-40.
19. Gillespie RJ, Harrison L, Mullan J. Deprescribing medications for older adults in the primary care context: A mixed studies review. Health Science Reports. 2018;1(7):e45.
20. Haines S, Savic M, Nielsen S, Carter A. Opioid-related policy changes: Experiences and perspectives from people who use opioids to manage non-cancer chronic pain. Drug and Alcohol Review. 2023;42(6):1482-92.
21. Boogs M. Survey Report: Impact of opioid regulatory reforms on people living with chronic pain [internet]. Painaustralia; 2022.
22. ChronicPain Australia. 2023 National Pain Survey Top Results [internet]. 2023.
23. Kuerbis AN, Hail L, Moore AA, Muench FJ. A pilot study of online feedback for adult drinkers 50 and older: Feasibility, efficacy, and preferences for intervention. J Subst Abuse Treat. 2017;77:126-32.

24. Mathijssen EGE, Vriezekolk JE, Eijsbouts AMM, van den Hoogen FHJ, van den Bemt BJF. Support needs for medication use and the suitability of eHealth technologies to address these needs: a focus group study of older patients with rheumatoid arthritis. Patient Preference and Adherence. 2018;12(null):349-58.
25. Throfast V, Hellström L, Hovstadius B, Petersson G, Ericson L. e-Learning for the elderly on drug utilization: A pilot study. Health Informatics Journal. 2019;25(2):227-39.
26. Ma R, Ma Z. Social media use and demographics predicted knowledge about alcohol as a cancer risk factor. American Journal of Health Promotion. 2022;36(6):1025-8.
27. Liu F, Abdul-Hussain S, Mahboob S, Rai V, Kostrzewski A. How useful are medication patient information leaflets to older adults? A content, readability and layout analysis. International Journal of Clinical Pharmacy. 2014;36(4):827-34.
28. Malhotra R, Suppiah SD, Tan YW, Sung P, Tay SSC, Tan NC, et al. Older adult patient preferences for the content and format of prescription medication labels – A best-worst scaling and discrete choice experiment study. Research in Social and Administrative Pharmacy. 2023;19(11):1455-64.
29. Tan YW, Suppiah SD, Chan A, Koh GC-H, Tang W-E, Tay SSC, et al. Older adult and family caregiver experiences with prescription medication labels and their suggestions for label improvement. Exploratory Research in Clinical and Social Pharmacy. 2021;4:100087.
30. Malhotra R, Suppiah S, Tan YW, Group PSGPS. CHALLENGES FACED BY OLDER PERSONS IN USING PRESCRIPTION MEDICATION LABELS: WHAT NEEDS TO CHANGE? Innovation in Aging. 2019;3(Supplement_1):S709-S10.
31. Suppiah SD, Tan YW, Tay SSC, Tan VSY, Tan NC, Tang W-E, et al. Challenges encountered by pharmacy staff in using prescription medication labels during medication counselling with older adults and solutions employed: A mixed-methods study. Exploratory Research in Clinical and Social Pharmacy. 2023;9:100226.
32. Malhotra R, Suppiah S, Tan YW, Tay SSC, Tan VSY, Tang W-E, et al. Validation of pharmaceutical pictograms among older adults with limited English proficiency. Patient Education and Counseling. 2022;105(4):909-16.
33. Malhotra R, Bautista MAC, Tan NC, Tang WE, Tay S, Tan ASL, et al. Bilingual Text With or Without Pictograms Improves Elderly Singaporeans' Understanding of Prescription Medication Labels. The Gerontologist. 2017;59(2):378-90.
34. Zanjani F, Allen H, Schoenberg N, Martin C, Clayton R. Acceptability of intervention materials to decrease risk for alcohol and medication interactions among older adults. Evaluation and Program Planning. 2018;67:160-6.
35. Ozavci G, Bucknall T, Woodward-Kron R, Hughes C, Jorm C, Joseph K, et al. A systematic review of older patients' experiences and perceptions of communication about managing medication across transitions of care. Research in Social and Administrative Pharmacy. 2021;17(2):273-91.
36. Green AR, Aschmann H, Boyd CM, Schoenborn N. Assessment of Patient-Preferred Language to Achieve Goal-Aligned Deprescribing in Older Adults. JAMA Network Open. 2021;4(4):e212633-e.
37. Evrard P, Pétein C, Beuscart JB, Spinewine A. Barriers and enablers for deprescribing benzodiazepine receptor agonists in older adults: a systematic review of qualitative and quantitative studies using the theoretical domains framework. Implement Sci. 2022;17(1):41.
38. Fried TR, McGraw S, Agostini JV, Tinetti ME. Views of older persons with multiple morbidities on competing outcomes and clinical decision-making. J Am Geriatr Soc. 2008;56(10):1839-44.
39. Oliveira D, Jones KA, Ogollah R, Ozupek S, Hogervorst E, Orrell M. Willingness to Adhere to Current UK Low-Risk Alcohol Guidelines to Potentially Reduce Dementia Risk: A National Survey of People Aged 50 and Over. J Alzheimers Dis. 2019;69(3):829-37.
40. Bareham BK, Kaner E, Spencer LP, Hanratty B. Drinking in later life: a systematic review and thematic synthesis of qualitative studies exploring older people's perceptions and experiences. Age Ageing. 2019;48(1):134-46.
41. Chapman J, Harrison N, Kostadinov V, Skinner N, Roche A. Older Australians' perceptions of alcohol-related harms and low-risk alcohol guidelines. Drug and Alcohol Review. 2020;39(1):44-54.
42. Medling T, Gobeil K, Sawalha K, Abozenah M, Tavares P, Friedman P, et al. Do Reported Health Benefits of Moderate Alcohol Use Influence Drinking Behavior in Patients with Heart Disease? Journal of the American College of Cardiology. 2021;77(18 Supplement 2):9.
43. Livingston M, Raninen J, Slade T, Swift W, Lloyd B, Dietze P. Understanding trends in Australian alcohol consumption—an age–period–cohort model. Addiction. 2016;111(9):1590-8.
44. Calvo E, Allel K, Staudinger UM, Castillo-Carniglia A, Medina JT, Keyes KM. Cross-country differences in age trends in alcohol consumption among older adults: a cross-sectional study of individuals aged 50 years and older in 22 countries. Addiction. 2021;116(6):1399-412.
45. Husain K, Ansari RA, Ferder L. Alcohol-induced hypertension: Mechanism and prevention. World J Cardiol. 2014;6(5):245-52.

46. Roerecke M, Vafaei A, Hasan OSM, Chrystoja BR, Cruz M, Lee R, et al. Alcohol Consumption and Risk of Liver Cirrhosis: A Systematic Review and Meta-Analysis. Am J Gastroenterol. 2019;114(10):1574-86.
47. Im PK, Millwood IY, Kartsonaki C, Guo Y, Chen Y, Turnbull I, et al. Alcohol drinking and risks of liver cancer and non-neoplastic chronic liver diseases in China: a 10-year prospective study of 0.5 million adults. BMC Medicine. 2021;19(1):216.
48. Yoo JE, Shin DW, Han K, Kim D, Jeong S-M, Koo HY, et al. Association of the Frequency and Quantity of Alcohol Consumption With Gastrointestinal Cancer. JAMA Network Open. 2021;4(8):e2120382-e.
49. Sarich P, Canfell K, Egger S, Banks E, Joshy G, Grogan P, et al. Alcohol consumption, drinking patterns and cancer incidence in an Australian cohort of 226,162 participants aged 45 years and over. British Journal of Cancer. 2021;124(2):513-23.
50. Bagnardi V, Rota M, Botteri E, Tramacere I, Islami F, Fedirko V, et al. Alcohol consumption and site-specific cancer risk: a comprehensive dose-response meta-analysis. Br J Cancer. 2015;112(3):580-93.
51. Boule LA, Kovacs EJ. Alcohol, aging, and innate immunity. J Leukoc Biol. 2017;102(1):41-55.
52. Butts M, Sundaram VL, Murughiyan U, Borthakur A, Singh S. The Influence of Alcohol Consumption on Intestinal Nutrient Absorption: A Comprehensive Review. Nutrients. 2023;15(7):1571.
53. Bye EK, Bogstrand ST, Rossow I. The importance of alcohol in elderly's hospital admissions for fall injuries: a population case-control study. Nordisk Alkohol Nark. 2022;39(1):38-49.
54. Sun Y, Zhang B, Yao Q, Ma Y, Lin Y, Xu M, et al. Association between usual alcohol consumption and risk of falls in middle-aged and older Chinese adults. BMC Geriatrics. 2022;22(1):750.
55. Armstrong-Moore R, Haighton C, Davinson N, Ling J. Interventions to reduce the negative effects of alcohol consumption in older adults: a systematic review. BMC Public Health. 2018;18(1):302.
56. Kelly S, Olanrewaju O, Cowan A, Brayne C, Lafortune L. Interventions to prevent and reduce excessive alcohol consumption in older people: a systematic review and meta-analysis. Age Ageing. 2018;47(2):175-84.
57. Megherbi-Moulay O, Igier V, Julian B, Franchitto N, Sordes F. Alcohol Use in Older Adults: A Systematic Review of Biopsychosocial Factors, Screening Tools, and Treatment Options. International Journal of Mental Health and Addiction. 2022.
58. Purser GL, Lemieux CM. Brief alcohol interventions with older adults: a systematic review of literature. Journal of Social Work Practice in the Addictions. 2022;22(2):120-36.
59. Bhatia U, Nadkarni A, Murthy P, Rao R, Crome I. Recent advances in treatment for older people with substance use problems: An updated systematic and narrative review. European Geriatric Medicine. 2015;6(6):580-6.
60. Hafford-Letchfield T, McQuarrie T, Clancy C, Thom B, Jain B. Community Based Interventions for Problematic Substance Use in Later Life: A Systematic Review of Evaluated Studies and Their Outcomes. Int J Environ Res Public Health. 2020;17(21).
61. Kazemi DM, Troutman-Jordan M, Whitfield JE, Pappa EV. Effectiveness of eHealth Technology–Based Interventions in Reducing Substance Misuse Among Older Adults: A Systematic Review. Journal of Gerontological Nursing. 2021;47(10):23-9.
62. Mowbray O, Quinn A. A Scoping Review of Treatments for Older Adults with Substance Use Problems. Research on Social Work Practice. 2016;26(1):74-87.
63. Andersen K, Behrendt S, Bilberg R, Bogenschutz MP, Braun B, Buehringer G, et al. Evaluation of adding the community reinforcement approach to motivational enhancement therapy for adults aged 60 years and older with DSM-5 alcohol use disorder: a randomized controlled trial. Addiction. 2020;115(1):69-81.
64. Oslin DW, Grantham S, Coakley E, Maxwell J, Miles K, Ware J, et al. PRISM-E: comparison of integrated care and enhanced specialty referral in managing at-risk alcohol use. Psychiatr Serv. 2006;57(7):954-8.
65. Fink A, Kwan L, Osterweil D, Van Draanen J, Cooke A, Beck JC. Assessing the Usability of Web-Based Alcohol Education for Older Adults: A Feasibility Study. JMIR Res Protoc. 2016;5(1):e11.
66. Lin JC, Karno MP, Tang L, Barry KL, Blow FC, Davis JW, et al. Do Health Educator Telephone Calls Reduce At-risk Drinking Among Older Adults in Primary Care? Journal of General Internal Medicine. 2010;25(4):334-9.
67. Outlaw FH, Marquart JM, Roy A, Luellen JK, Moran M, Willis A, et al. Treatment Outcomes for Older Adults Who Abuse Substances. Journal of Applied Gerontology. 2012;31(1):78-100.
68. Rao T. The role of community nursing in providing integrated care for older people with alcohol misuse. British Journal of Community Nursing. 2014;19(2):80-4.
69. Schonfeld L, King-Kallimanis BL, Duchene DM, Etheridge RL, Herrera JR, Barry KL, et al. Screening and brief intervention for substance misuse among older adults: the Florida BRITE project. Am J Public Health. 2010;100(1):108-14.

70. Gordon AJ, Conigliaro J, Maisto SA, McNeil M, Kraemer KL, Kelley ME. Comparison of consumption effects of brief interventions for hazardous drinking elderly. Subst Use Misuse. 2003;38(8):1017-35.
71. Coulton S, Bland M, Crosby H, Dale V, Drummond C, Godfrey C, et al. Effectiveness and Cost-effectiveness of Opportunistic Screening and Stepped-care Interventions for Older Alcohol Users in Primary Care. Alcohol and Alcoholism. 2017;52(6):655-64.
72. Cucciare MA, Weingardt KR, Ghaus S, Boden MT, Frayne SM. A randomized controlled trial of a web-delivered brief alcohol intervention in Veterans Affairs primary care. J Stud Alcohol Drugs. 2013;74(3):428-36.
73. Hansen AB, Becker U, Nielsen AS, Grønbaek M, Tolstrup JS. Brief alcohol intervention by newly trained workers versus leaflets: comparison of effect in older heavy drinkers identified in a population health examination survey: a randomized controlled trial. Alcohol Alcohol. 2012;47(1):25-32.
74. Watson JM, Crosby H, Dale VM, Tober G, Wu Q, Lang J, et al. AESOPS: a randomised controlled trial of the clinical effectiveness and cost-effectiveness of opportunistic screening and stepped care interventions for older hazardous alcohol users in primary care. Health Technol Assess. 2013;17(25):1-158.
75. Ettner SL, Xu H, Duru OK, Ang A, Tseng CH, Tallen L, et al. The effect of an educational intervention on alcohol consumption, at-risk drinking, and health care utilization in older adults: the Project SHARE study. J Stud Alcohol Drugs. 2014;75(3):447-57.
76. Fink A, Elliott MN, Tsai M, Beck JC. An Evaluation of an Intervention to Assist Primary Care Physicians in Screening and Educating Older Patients Who Use Alcohol. Journal of the American Geriatrics Society. 2005;53(11):1937-43.
77. Fleming MF, Manwell LB, Barry KL, Adams W, Stauffacher EA. Brief physician advice for alcohol problems in older adults: a randomized community-based trial. J Fam Pract. 1999;48(5):378-84.
78. Kuerbis AN, Yuan SE, Borok J, LeFevre PM, Kim GS, Lum D, et al. Testing the initial efficacy of a mailed screening and brief feedback intervention to reduce at-risk drinking in middle-aged and older adults: the comorbidity alcohol risk evaluation study. J Am Geriatr Soc. 2015;63(2):321-6.
79. Lee HS, Mericle AA, Ayalon L, Areán PA. Harm reduction among at-risk elderly drinkers: a site-specific analysis from the multi-site Primary Care Research in Substance Abuse and Mental Health for Elderly (PRISM-E) study. Int J Geriatr Psychiatry. 2009;24(1):54-60.
80. Duru OK, Xu H, Moore AA, Mirkin M, Ang A, Tallen L, et al. Examining the Impact of Separate Components of a Multicomponent Intervention Designed to Reduce At-Risk Drinking Among Older Adults: The Project SHARE Study. Alcoholism: Clinical and Experimental Research. 2015;39(7):1227-35.
81. Moore AA, Blow FC, Hoffing M, Welgreen S, Davis JW, Lin JC, et al. Primary care-based intervention to reduce at-risk drinking in older adults: a randomized controlled trial. Addiction. 2011;106(1):111-20.
82. Barnes AJ, Xu H, Tseng CH, Ang A, Tallen L, Moore AA, et al. The Effect of a Patient-Provider Educational Intervention to Reduce At-Risk Drinking on Changes in Health and Health-Related Quality of Life Among Older Adults: The Project SHARE Study. J Subst Abuse Treat. 2016;60:14-20.
83. Boumans J, van de Mheen D, Crutzen R, Dupont H, Bovens R, Rozema A. Understanding How and Why Alcohol Interventions Prevent and Reduce Problematic Alcohol Consumption among Older Adults: A Systematic Review. Int J Environ Res Public Health. 2022;19(6).
84. Hoy N, Newton N, Kochan NA, Sunderland M, Baillie A, Chapman C, et al. Rethink My Drink: study protocol for a 12-month randomised controlled trial comparing a brief internet-delivered intervention to an online patient information booklet in reducing risky alcohol consumption among older adults in Australia. Addiction. 2022;117(3):815-25.
85. Grigg J, Manning V, Lockie D, Giles M, Bell R, Stragalinos P, et al. A Brief Intervention for Improving Alcohol Literacy and Addressing Harmful Alcohol Use Among Women Attending an Australian Breast Screening Service (Health4her): Protocol for a Hybrid Effectiveness-Implementation Trial. JMIR Res Protoc. 2023;12:e44867.
86. Gunillasdotter V, Andréasson S, Jirwe M, Ekblom Ö, Hallgren M. Effects of exercise in non-treatment seeking adults with alcohol use disorder: A three-armed randomized controlled trial (FitForChange). Drug Alcohol Depend. 2022;232:109266.
87. Cole JA, Gonçalves-Bradley DC, Alqahtani M, Barry HE, Cadogan C, Rankin A, et al. Interventions to improve the appropriate use of polypharmacy for older people. Cochrane Database of Systematic Reviews. 2023(10).
88. Janine AC, Cathal AC, Susan MP, Ngaire K, Marie CB, Cristín R, et al. Interventions to improve the appropriate use of polypharmacy in older people: a Cochrane systematic review. BMJ Open. 2015;5(12):e009235.
89. Page AT, Clifford RM, Potter K, Schwartz D, Etherton-Beer CD. The feasibility and effect of deprescribing in older adults on mortality and health: a systematic review and meta-analysis. British Journal of Clinical Pharmacology. 2016;82(3):583-623.

90. Rankin A, Cadogan CA, Patterson SM, Kerse N, Cardwell CR, Bradley MC, et al. Interventions to improve the appropriate use of polypharmacy for older people. Cochrane Database of Systematic Reviews. 2018(9).
91. Tecklenborg S, Byrne C, Cahir C, Brown L, Bennett K. Interventions to Reduce Adverse Drug Event-Related Outcomes in Older Adults: A Systematic Review and Meta-analysis. Drugs & Aging. 2020;37(2):91-8.
92. Ulley J, Harrop D, Ali A, Alton S, Fowler Davis S. Deprescribing interventions and their impact on medication adherence in community-dwelling older adults with polypharmacy: a systematic review. BMC Geriatrics. 2019;19(1):15.
93. Sutherland R, Chrzanowska A, Prael G, Peacock A. Substance Use and Related Harms Among Australians Aged 50 years and older 2001-2021. Sydney: National Drug and Alcohol Research Centre, UNSW Sydney; 2024.
94. Tian F, Chen Z, Zeng Y, Feng Q, Chen X. Prevalence of Use of Potentially Inappropriate Medications Among Older Adults Worldwide: A Systematic Review and Meta-Analysis. JAMA Network Open. 2023;6(8):e2326910-e.
95. Scharner V, Hasieber L, Sönnichsen A, Mann E. Efficacy and safety of Z-substances in the management of insomnia in older adults: a systematic review for the development of recommendations to reduce potentially inappropriate prescribing. BMC Geriatr. 2022;22(1):87.
96. Diaz-Gutierrez MJ, Martinez-Cengotitabengoa M, Saez de Adana E, Cano AI, Martinez-Cengotitabengoa MT, Besga A, et al. Relationship between the use of benzodiazepines and falls in older adults: A systematic review. Maturitas. 2017;101:17-22.
97. Pétursson H. The benzodiazepine withdrawal syndrome. Addiction. 1994;89(11):1455-9.
98. Panel BtAGSBCUE. American Geriatrics Society 2023 updated AGS Beers Criteria® for potentially inappropriate medication use in older adults. Journal of the American Geriatrics Society. 2023;71(7):2052-81.
99. Gnjidic D, Ong HMM, Leung C, Jansen J, Reeve E. The impact of in hospital patient-education intervention on older people's attitudes and intention to have their benzodiazepines deprescribed: a feasibility study. Ther Adv Drug Saf. 2019;10:2042098618816562.
100. Martin P, Tamblyn R, Ahmed S, Tannenbaum C. A drug education tool developed for older adults changes knowledge, beliefs and risk perceptions about inappropriate benzodiazepine prescriptions in the elderly. Patient Education and Counseling. 2013;92(1):81-7.
101. Martin P, Tamblyn R, Benedetti A, Ahmed S, Tannenbaum C. Effect of a Pharmacist-Led Educational Intervention on Inappropriate Medication Prescriptions in Older Adults: The D-PRESCRIBE Randomized Clinical Trial. Jama. 2018;320(18):1889-98.
102. Martin P, Tannenbaum C. Use of the EMPOWER brochure to deprescribe sedative-hypnotic drugs in older adults with mild cognitive impairment. BMC Geriatr. 2017;17(1):37.
103. Amagai M, Ozone M, Utsumi T, Hotchi A, Iwashita M, Yamadera W, et al. Effect of a short video on patients' motivation for dose reduction or cessation of hypnotics. Sleep and Biological Rhythms. 2023;21(3):299-308.
104. Sandlund C, Hetta J, Nilsson GH, Ekstedt M, Westman J. Improving insomnia in primary care patients: A randomized controlled trial of nurse-led group treatment. International Journal of Nursing Studies. 2017;72:30-41.
105. Blom K, Tarkian Tillgren H, Wiklund T, Danlycke E, Forssén M, Söderström A, et al. Internet-vs. group-delivered cognitive behavior therapy for insomnia: A randomized controlled non-inferiority trial. Behaviour Research and Therapy. 2015;70:47-55.
106. Sato D, Yoshinaga N, Nagai E, Nagai K, Shimizu E. Effectiveness of Internet-Delivered Computerized Cognitive Behavioral Therapy for Patients With Insomnia Who Remain Symptomatic Following Pharmacotherapy: Randomized Controlled Exploratory Trial. J Med Internet Res. 2019;21(4):e12686.
107. Casault L, Savard J, Ivers H, Savard M-H. A randomized-controlled trial of an early minimal cognitive-behavioural therapy for insomnia comorbid with cancer. Behaviour research and therapy. 2015;67:45-54.
108. Pigeon WR, Funderburk JS, Cross W, Bishop TM, Crean HF. Brief CBT for insomnia delivered in primary care to patients endorsing suicidal ideation: a proof-of-concept randomized clinical trial. Translational behavioral medicine. 2019;9(6):1169-77.
109. Bothelius K, Kyhle K, Espie CA, Broman JE. Manual-guided cognitive–behavioural therapy for insomnia delivered by ordinary primary care personnel in general medical practice: A randomized controlled effectiveness trial. Journal of sleep research. 2013;22(6):688-96.
110. Tannenbaum C, Martin P, Tamblyn R, Benedetti A, Ahmed S. Reduction of inappropriate benzodiazepine prescriptions among older adults through direct patient education: the EMPOWER cluster randomized trial. JAMA Intern Med. 2014;174(6):890-8.
111. Vicens C, Bejarano F, Sempere E, Mateu C, Fiol F, Socias I, et al. Comparative efficacy of two interventions to discontinue long-term benzodiazepine use: cluster randomised controlled trial in primary care. Br J Psychiatry. 2014;204(6):471-9.

112. Kuntz JL, Kouch L, Christian D, Hu W, Peterson PL. Patient Education and Pharmacist Consultation Influence on Nonbenzodiazepine Sedative Medication Deprescribing Success for Older Adults. Perm J. 2019;23:18-161.
113. Navy HJ, Weffald L, Delate T, Patel RJ, Dugan JP. Clinical pharmacist intervention to engage older adults in reducing use of alprazolam. The Consultant Pharmacist®. 2018;33(12):711-22.
114. Lichstein KL, Nau SD, Wilson NM, Aguillard RN, Lester KW, Bush AJ, et al. Psychological treatment of hypnotic-dependent insomnia in a primarily older adult sample. Behaviour research and therapy. 2013;51(12):787-96.
115. Moloney ME, Martinez AI, Badour CL, Moga DC. Internet-based cognitive behavioral therapy for insomnia in appalachian women: a pilot study. Behavioral sleep medicine. 2020;18(5):680-9.
116. Taylor HL, Rybarczyk BD, Nay W, Leszczyszyn D. Effectiveness of a CBT Intervention for Persistent Insomnia and Hypnotic Dependency in an Outpatient Psychiatry Clinic. Journal of Clinical Psychology. 2015;71(7):666-83.
117. Park KM, Kim TH, Kim WJ, An SK, Namkoong K, Lee E. Cognitive behavioral therapy for insomnia reduces hypnotic prescriptions. Psychiatry investigation. 2018;15(5):499.
118. Davidson JR, Dawson S, Krsmanovic A. Effectiveness of group cognitive behavioral therapy for insomnia (CBT-I) in a primary care setting. Behavioral Sleep Medicine. 2019;17(2):191-201.
119. Jung H-J, Yu E-S, Kim J-H. Combined program of cognitive-behavioral therapy for insomnia and medication tapering in cancer patients: A clinic-based pilot study. Behavioral sleep medicine. 2019.
120. Kaldo V, Bothelius K, Blom K, Lindhe M, Larsson M, Karimi K, et al. An open-ended primary-care group intervention for insomnia based on a self-help book - A randomized controlled trial and 4-year follow-up. J Sleep Res. 2020;29(1):e12881.
121. Wilson MG, Lee TC, Hass A, Tannenbaum C, McDonald EG. EMPOWERing hospitalized older adults to deprescribe sedative hypnotics: A pilot study. Journal of the American Geriatrics Society. 2018;66(6):1186-9.
122. Mercier J, Ivers H, Savard J. A non-inferiority randomized controlled trial comparing a home-based aerobic exercise program to a self-administered cognitive-behavioral therapy for insomnia in cancer patients. Sleep. 2018;41(10):zsy149.
123. Fernandes M, Neves I, Oliveira J, Santos O, Aguiar P, Atalaia P, et al. Discontinuation of chronic benzodiazepine use in primary care: a nonrandomized intervention. Family Practice. 2021;39(2):241-8.
124. Darker CD, Sweeney BP, Barry JM, Farrell MF, Donnelly-Swift E. Psychosocial interventions for benzodiazepine harmful use, abuse or dependence. Cochrane Database of Systematic Reviews. 2015(5).
125. Denis C, Fatseas M, Lavie E, Auriacombe M. Pharmacological interventions for benzodiazepine mono-dependence management in outpatient settings. Cochrane Database of Systematic Reviews. 2013(6).
126. Schutte-Rodin S, Broch L, Buysse D, Dorsey C, Sateia M. Clinical guideline for the evaluation and management of chronic insomnia in adults. Journal of clinical sleep medicine. 2008;4(5):487-504.
127. Wilson S, Anderson K, Baldwin D, Dijk D-J, Espie A, Espie C, et al. British Association for Psychopharmacology consensus statement on evidence-based treatment of insomnia, parasomnias and circadian rhythm disorders: An update. Journal of Psychopharmacology. 2019;33(8):923-47.
128. Riemann D, Baglioni C, Bassetti C, Bjorvatn B, Dolenc Groselj L, Ellis JG, et al. European guideline for the diagnosis and treatment of insomnia. Journal of sleep research. 2017;26(6):675-700.
129. Parr JM, Kavanagh DJ, Cahill L, Mitchell G, Young RM. Effectiveness of current treatment approaches for benzodiazepine discontinuation: a meta-analysis. Addiction. 2009;104(1):13-24.
130. Pottie K, Thompson W, Davies S, Grenier J, Sadowski CA, Welch V, et al. Deprescribing benzodiazepine receptor agonists: Evidence-based clinical practice guideline. Canadian Family Physician. 2018;64(5):339-51+e209-e24.
131. Takaesu Y, Utsumi T, Okajima I, Shimura A, Kotorii N, Kuriyama K, et al. Psychosocial intervention for discontinuing benzodiazepine hypnotics in patients with chronic insomnia: A systematic review and meta-analysis. Sleep Medicine Reviews. 2019;48:101214.
132. Sweetman A, Putland S, Lack L, McEvoy RD, Adams R, Grunstein R, et al. The effect of cognitive behavioural therapy for insomnia on sedative-hypnotic use: A narrative review. Sleep Med Rev. 2021;56:101404.
133. MacLeod S, Musich S, Kraemer S, Wicker E. Practical non-pharmacological intervention approaches for sleep problems among older adults. Geriatric Nursing. 2018;39(5):506-12.
134. Vowles KE, McEntee ML, Julnes PS, Frohe T, Ney JP, van der Goes DN. Rates of opioid misuse, abuse, and addiction in chronic pain: a systematic review and data synthesis. Pain. 2015;156(4):569-76.
135. Lawal OD, Gold J, Murthy A, Ruchi R, Bavry E, Hume AL, et al. Rate and Risk Factors Associated With Prolonged Opioid Use After Surgery: A Systematic Review and Meta-analysis. JAMA Network Open. 2020;3(6):e207367-e.
136. Brummett CM, Waljee JF, Goesling J, Moser S, Lin P, Englesbe MJ, et al. New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults. JAMA Surg. 2017;152(6):e170504.

137. Carew AM, Comiskey C. Treatment for opioid use and outcomes in older adults: a systematic literature review. Drug Alcohol Depend. 2018;182:48-57.
138. Compton P, Chang YP. Substance Abuse and Addiction: Implications for Pain Management in Patients With CancerClin J Oncol Nurs. 2017;21(2):203-9.
139. Langford S, Hunter E. Interventions to Reduce Opioid Use for Pain Management in the Older Adult Population: A Systematic Review. Journal of Applied Gerontology. 2021;40(11):1637-48.
140. Zullo AR, Danko K, Adam G, Balk E, Beaudoin F, Carr DB, et al. Prevention, diagnosis, and management of opioids, opioid misuse and opioid use disorder in older adults. Journal of the American Geriatrics Society. 2020;68(SUPPL 1):S177.
141. Cheesman Q, DeFrance M, Stenson J, Weekes D, Feldman J, Abboud J, et al. The effect of preoperative education on opioid consumption in patients undergoing arthroscopic rotator cuff repair: a prospective, randomized clinical trial—2-year follow-up. Journal of Shoulder and Elbow Surgery. 2020;29(9):1743-50.
142. Chen Q, Hsia H-L, Overman R, Bryan W, Pepin M, Mariano ER, et al. Impact of an Opioid Safety Initiative on Patients Undergoing Total Knee Arthroplasty: A Time Series Analysis. Anesthesiology. 2019;131(2):369-80.
143. Harden P, Ahmed S, Ang K, Wiedemer N. Clinical Implications of Tapering Chronic Opioids in a Veteran Population. Pain Med. 2015;16(10):1975-81.
144. Cochran G, Chen Q, Field C, Seybert AL, Hruschak V, Jaber A, et al. A community pharmacy-led intervention for opioid medication misuse: A small-scale randomized clinical trial. Drug Alcohol Depend. 2019;205:107570.
145. DeBar L, Mayhew M, Benes L, Bonifay A, Deyo RA, Elder CR, et al. A Primary Care-Based Cognitive Behavioral Therapy Intervention for Long-Term Opioid Users With Chronic Pain : A Randomized Pragmatic Trial. Ann Intern Med. 2022;175(1):46-55.
146. Fischer B, Robinson T, Bullen C, Curran V, Jutras-Aswad D, Medina-Mora ME, et al. Lower-Risk Cannabis Use Guidelines (LRCUG) for reducing health harms from non-medical cannabis use: A comprehensive evidence and recommendations update. International Journal of Drug Policy. 2022;99:1-21.
147. Moore AA, Lake JE, Glasner S, Karlamangla A, Kuerbis A, Preciado D, et al. Establishing the feasibility, acceptability and preliminary efficacy of a multi-component behavioral intervention to reduce pain and substance use and improve physical performance in older persons living with HIV. J Subst Abuse Treat. 2019;100:29-38.
148. Washburn M, Hagedorn A, Moore S. Creating Virtual Reality Based Interventions for Older Adults Impacted by Substance Misuse: Safety and Design Considerations. Journal of Technology in Human Services. 2021;39(3):275-94.
149. Van Orden KA, Lutz J. Peer Support for Older Adults. In: Avery JD, editor. Peer Support in Medicine: A Quick Guide. Cham: Springer International Publishing; 2021. p. 115-29.
150. Oslin DW, Sayers S, Ross J, Kane V, Ten Have T, Conigliaro J, et al. Disease management for depression and at-risk drinking via telephone in an older population of veterans. Psychosom Med. 2003;65(6):931-7.
151. Harari D, Iliffe S, Kharicha K, Egger M, Gillmann G, von Renteln-Kruse W, et al. Promotion of health in older people: a randomised controlled trial of health risk appraisal in British general practice. Age Ageing. 2008;37(5):565-71.
152. Vrdoljak D, Marković BB, Puljak L, Lalić DI, Kranjčević K, Vučak J. Lifestyle intervention in general practice for physical activity, smoking, alcohol consumption and diet in elderly: a randomized controlled trial. Arch Gerontol Geriatr. 2014;58(1):160-9.
153. Benza AT, Calvert S, McQuown CB. Prevention BINGO: Reducing medication and alcohol use risks for older adults. Aging & Mental Health. 2010;14(8):1008-14.
154. Copeland LA, Blow FC, Barry KL. Health Care Utilization by Older Alcohol-Using Veterans: Effects of a Brief Intervention to Reduce At-Risk Drinking. Health Education & Behavior. 2003;30(3):305-21.
155. Eliason MJ, Skinstad AH. Drug & alcohol intervention for older women: a pilot study. J Gerontol Nurs. 2001;27(12):18-24; quiz 40-1.
156. Han BH, Masukawa K, Rosenbloom D, Kuerbis A, Helmuth E, Liao DH, et al. Use of web-based screening and brief intervention for unhealthy alcohol use by older adults. Journal of Substance Abuse Treatment. 2018;86:70-7.
157. Quinn A, Mowbray O. Effective Treatments for Older Adult Baby Boomers with Alcohol-Use Disorders: A Literature Review. Journal of Social Work Practice in the Addictions. 2018;18(4):389-410.
158. Kermel-Schiffman I, Afuta M, Zur A, Gavriel-Fried B. Recovery from Alcohol Use Disorder among Older Adults: A Scoping Review. Journal of Applied Gerontology. 2023;42(5):1137-50.
159. Vicens C, Sempere E, Bejarano F, Socias I, Mateu C, Fiol F, et al. Efficacy of two interventions on the discontinuation of benzodiazepines in long-term users: 36-month follow-up of a cluster randomised trial in primary care. Br J Gen Pract. 2016;66(643):e85-91.

160. Sweetman A, Putland S, Lack L, McEvoy R, Adams R, Grunstein R, et al. The effect of cognitive behavioural therapy for insomnia on sedative-hypnotic use: A narrative review. Sleep Medicine Reviews Vol 56, 2021, ArtID 101404. 2021;56.
161. Pasquale MK, Sheer RL, Mardekian J, Masters ET, Patel NC, Hurwitch AR, et al. Educational intervention for physicians to address the risk of opioid abuse. J Opioid Manag. 2017;13(5):303-13.
162. Shayegani R, Pugh MJ, Kazanis W, Wilkening GL. Reducing coprescriptions of benzodiazepines and opioids in a veteran population. Am J Manag Care. 2018;24(8):e265-e9.
163. Chang Y-P, Cassalia J, Warunek M, Scherer Y. Motivational interviewing training with standardized patient simulation for prescription opioid abuse among older adults. Perspectives in Psychiatric Care. 2019;55(4):681-9.
164. Sandhu HK, Booth K, Furlan AD, Shaw J, Carnes D, Taylor SJC, et al. Reducing Opioid Use for Chronic Pain With a Group-Based Intervention: A Randomized Clinical Trial. JAMA. 2023;329(20):1745-56.
165. Vowles KE, Witkiewitz K, Cusack KJ, Gilliam WP, Cardon KE, Bowen S, et al. Integrated Behavioral Treatment for Veterans With Co-Morbid Chronic Pain and Hazardous Opioid Use: A Randomized Controlled Pilot Trial. J Pain. 2020;21(7-8):798-807.
166. Garland EL, Hanley AW, Riquino MR, Reese SE, Baker AK, Salas K, et al. Mindfulness-oriented recovery enhancement reduces opioid misuse risk via analgesic and positive psychological mechanisms: A randomized controlled trial. J Consult Clin Psychol. 2019;87(10):927-40.
167. Garland EL, Hanley AW, Nakamura Y, Barrett JW, Baker AK, Reese SE, et al. Mindfulness-Oriented Recovery Enhancement vs Supportive Group Therapy for Co-occurring Opioid Misuse and Chronic Pain in Primary Care: A Randomized Clinical Trial. JAMA Internal Medicine. 2022;182(4):407-17.

Table 2. Search terms

Database	Drug	Intervention	Age
Medline	exp drug misuse exp non-prescription drugs prescription drugs amphetamines benzodiazepines Hypnotics and sedatives narcotics designer drugs medical marijuana exp illicit drugs medication adherence inappropriate prescribing polypharmacy exp Substance-Related Disorders exp Drinking Behavior deprescriptions	telemedicine exp preventive health services treatment outcome exp psychotherapy internet-based intervention exp Communications media	middle aged aging exp aged
CINAHL – subject headings	Drug, non-prescription Prescription drug misuse Antianxiety agents, benzodiazepine Designer drugs Street drugs Medication compliance Medication errors Polypharmacy exp Substance Use Disorders Drinking Behavior	Health education Health literacy Telemedicine Health promotion Treatment outcomes Psychotherapy Internet-based intervention Communications media Social media	Middle age Aging Aged, 80 and over Aged
PsycINFO	Drug abuse/ Prescription drug misuse/ Nonprescription drugs/ Methamphetamine/	Health education Health literacy Health promotion	Aging Middle adulthood Older adulthood

	Benzodiazepines/ Hypnotic drugs/ Sedatives/ Designer drugs/ Polypharmacy/ Drinking behavior	Preventive health services Telemedicine Treatment outcomes Psychotherapy Communications media Social media	
Embase	Exp drug dependence/ substance abuse/ exp drug abuse/ benzodiazepine/ methamphetamine/ cocaine/ exp polypharmacy/ potentially inappropriate medication / deprescription/ non-prescription drug/ illicit drug/ exp drug overdose alcohol abstinence/ drinking behavior	health literacy/ health education/ health promotion/ patient education/ psychoeducation/ self care education/ harm reduction/ exp mass communication/ evaluation study/ practice guideline/ treatment outcome/ psychotherapy/ web based intervention/ prevention/ telehealth/ evidence based medicine	pensioner/ exp aged/ middle aged/ aging/
Keywords (consistent across all databases - title, abstract)	amphetamine* opioid* cannabis benzo* alcohol* (title only) marijuana “substance abuse” “substance misuse” “substance use” “substance dependence” “drug abuse”	“health promotion” education* “harm minimi*” “harm reduction” prevent* intervention* evaluat*	"older person*" "older people*" "older adult*" "older *patient*" geriatric* pension* retire* elder*

	"drug misuse" "drug use" "drug dependence"		

Table 3. Interventions to reduce alcohol consumption/harms among older adults

Author, country and age range	Demographic characteristics of sample	Intervention group/s	Comparator group	Outcome measure & follow-up period	Findings
Gordon et al., 2003[a,b,c,] (70) **USA** **≥65**	Comparison of elderly and non-elderly Average age not given; 69% white, 13% female	Motivational Enhancement (n=18) – Included feedback, goal setting and consequences. First session lasted ~ 60 min, with two booster sessions of ~10–15 mins Brief Advice (n=12) – 1 x 10–15 min session	Control group (usual care; n=12) - Alcohol discussions between patients and physicians were not discouraged	Quantity and frequency of alcohol consumption Baseline, 1, 3, 6, 9 and 12 months	All three groups showed decreases in alcohol consumption measures over time, but no significant difference between groups.
Hansen et al., 2011[a,b,c,e,f,g,] (73) **Denmark** **RCT** ***Not exclusively those 50+** **Ages of participants 48-65 (median age 59)**	49% women Non-treatment-seeking heavy drinkers	Brief motivational interviewing (n=391) – conversation based on principles of motivational interviewing (~10 mins), designed to motivate behaviour change through open ended questions. Were also given an information sheet with information about local alcohol treatment and a brief telephone booster 4 weeks later	Control group (n=381) received same leaflets about alcohol and local treatment. A 'pure' control group was not included	Drinks per week Baseline, 6 and 12 months	No significant intervention effect on drinks per week, although both groups decreased consumption.
Kuerbis et al., 2015[a,b,c,] (78) **USA**	At-risk drinkers (CARET; comprehensive, 5-factor risk	Intervention Group (n=44) – received personalised mailed feedback outlining risks specific to their alcohol use. Also received the	Control group (n=42) – did not receive anything	Alcohol risk score (Comorbidity Alcohol Risk	CARET risk score reduced in both groups, but intervention group

Pilot RCT **≥50**	definition, drawing in frequency, quantity, combining with medications, and more); mean age 64.7; 34% female, 88% non-Hispanic white	NIH *Rethinking Drinking: Alcohol and Your Health* booklet		Evaluation Tool; CARET) Baseline, 3 months	demonstrated statistically significant reduction compared to those in control group Intervention group had significant reductions in binge drinking, alcohol use with a medical or psychiatric condition and alcohol with symptoms of a medical or psychiatric condition
Fleming et al., 1999[a,b,c,e,g] (77) **USA** **Multi-site, single-blind RCT; community-based primary care settings** **≥65**	Patients aged 65 or older who were problem drinkers (per CAGE); 34% female	Intervention (n=87) – received booklet on general health and were scheduled to see their doctors. Used BI protocol including a workbook containing feedback on individual's behaviours and other educational resources. Had 2 × 10-15 min appointments, one month apart, consisting of intervention and then reinforcement session	Control group (usual care; n=71) – only received a general health booklet	Drinks per week, levels of binge drinking and excessive alcohol use. Baseline, 3, 6 and 12 months.	Intervention group maintained lower levels of drinking throughout and reduced their weekly alcohol use. They also self-reported reduced amounts of binge drinking and excessive levels of drinking. These findings statistically significant
Ettner et al., 2014[a,b,c,d,f] (75) **USA** **Cluster RCT; 31 primary**	At-risk drinkers (per CARET); mean age 70.95; 97.27% white; 34.32% female	Intervention group (n=546) – Project SHARE (Senior Health and Alcohol Risk Education), which included personalised reports, education material, telephone counselling and physician advice	Control group (usual care, n=640) – TAU. Alcohol-related discussions between patients and physicians were not discouraged	Alcohol risk score (CARET), drinks per week Baseline, 3, 6, 12 months	Statistically significant greater declines in at-risk drinking (56% vs. 67%; $p \leq .01$) and alcohol consumption (-2.19 drinks per week; $p \leq .01$), in intervention

care providers and their 60+ patients; community-based practice with 7 clinics **≥60**					group as compared to control (although declines noted in both groups)
Moore et al., 2011[a,b,c,d,f,g] (81) **USA** **RCT; 3 primary care sites** **≥55**	At –risk drinkers (per CARET). Mean age 68.4. 29% female. 87% non-Hispanic white	Intervention group (n=310) = multi-faceted intervention: personalised report, booklet on alcohol and ageing, a diary to log levels of drinking, advice and telephone counselling	Control group (n=321) = only received booklet on healthy behaviours	Primary outcome: at-risk drinking (CARET). Secondary: number of drinks consumed in past 7 days, heavy drinking (4+ drinks) in past 7 days, alcohol risk score Baseline, 3, 12 months	At 12 months, intervention group did not have lower levels of at-risk drinking, but did have lower levels in number of drinks in past 7 days
Fink et al., 2005[a,b,c,e,g] (76) **USA** **Prospective**	Mean age 76.6; 53% female. 88% non-Hispanic white	Experimental group 1 – doctor and patients received reports on the patients' alcohol use, risks and problems. They also received personalised educational tools Experimental group 2 – Only patients received the aforementioned reports (doctors	Control group (usual care) – not informed of their individual risks, nor did they receive any educational tools Random allocation	Hazardous and harmful drinking (CARPS) Baseline and 12 months	Both experimental groups had lower risk drinking compared to control Patient-only report issuing led to reduced harmful drinking and less hazardous drinking.

comparison study **≥65**		did not). They also received the personalised educational tools			Issuing reports to both patients and doctors only decreased total consumption.
Coulton et al., 2017[c] (71) **UK** **Multi-centre, pragmatic RCT in primary care** **≥55**	Avg. age 63; 20% female	Stepped-care intervention (n=266) (referred to next step if still drinking at hazardous levels 4 weeks post previous intervention) Step 1: a 20-min session of MI behavioural change counselling Step 2: 3 x 40-min sessions on a weekly basis. MET Step 3: referral to specialist alcohol treatment service	Control group, minimal intervention (n=263) - Brief advice (5 mins) and feedback, self-help booklet	Alcohol consumption (AUDIT-C) Baseline, 6 and 12 months	Both groups reduced alcohol consumption at 12 months but difference between groups was small and not significant
Lee et al., 2009[c,e,g] (79) **USA** **Site-specific secondary data analysis of primary care substance use data** **≥65**	At-risk drinkers n=34; 41.2% female. Mean age: 72.9. 50% non-Hispanic white	n=14 Integrated care: motivational interviewing over three sessions	n=20 Control group: enhanced referral to 8-week, non-residential peer-oriented program for adults over age 55, based on 12-step model of abstinence	Access to treatment: defined as attendance at an appointment with amental health/substance abuse provider – number and type of services. No. of drinks in past 7 days and number binge drinking	Those in integrated care condition showed a significant decrease in number of drinks in past week and number of binge drinking episodes in past 3 months. No significant changes in these outcomes among at-risk drinkers in enhanced referral condition

				episodes past 3 months Baseline and six months	
Oslin et al., 2003[c,e] (150) **USA** **RCT**	Veteran population with depression and /or risky drinking. Mean age 61.6. 4.1% female, 49.5% white	Telephone disease management (n=46) – telephone calls 1, 3, 6, 9, 12, 18, and 24 weeks after initial clinical assessment; 45 mins each	Control – treatment as usual (n=51). Referred to outpatient behavioural health clinic within same building, formulated a treatment plan to be performed in primary care, or seek consultation from behavioural health	Response to treatment defined as dichotomous outcome based on remission of depression (HDRS score ≤10)/at least a 50% reduction in depressive symptoms and/or reduction in drinking below study-entry criteria (more than 21 standard drinks per week [14 for women or those older than age 65] or binge drinking >3 binges in 3 months). Baseline, 4 months	Overall response rates favoured those assigned to TDM compared with those assigned to usual care (39.1% responded vs. 17.6%, p = 0.022). Response rates within the separate diagnostic groups also favoured TDM, but this was only significant for depressive disorders

Oslin et al., 2006[b,c,e] (64) **USA** **Multi-site RCT; primary care setting** **≥65**	At-risk drinkers; 8% female; 70% white. Mean age 72	**Group 1:** Integrated care (n=280): three 20-30 min brief alcohol intervention counselling sessions **Group 2:** Enhanced specialty referral (n=280): referral from primary care and provides mental health or substance abuse services in a specialty mental health or substance abuse clinic	N/A (comparison of treatment models)	Number and frequency of drinks in past 7 days, number of binge episode in past 3 months Baseline, 3 and 6 months	Significant reductions in both quantity and frequency of drinking and binge drinking over six months. No difference between treatment models
Cucciare et al., 2013[b,g] (72) **USA** **Web-delivered RCT** ***Not exclusively those 50+**	Veterans in primary care screening positive for alcohol misuse (per AUDIT-C); average age 59.25; 22% female, 69.05% white	Intervention (n=78): Brief web-delivered intervention using normative feedback, plus TAU	Comparator (n=89): TAU	Quantity, frequency, alcohol-related problems Baseline, 3 and 6 months	Veterans in both study conditions showed a significant reduction in alcohol consumption quantity and frequency, and alcohol-related problems at 6-month follow-up, but no significant differences between groups for any alcohol outcome at any timepoints
Schonfeld et al., 2010[b,d,e,g] (69) **USA** **3-year pilot program; only alcohol data from this**	Older adults flagged for substance misuse; 69.46% female, 76.18% white; average age 74.86	Intervention (n=102): Brief intervention: advice, education and motivational interviewing; future goals, health habits	No control group (i.e., before/after study)	Mean SMAST-G (Short Michigan Alcoholism Screening Test, Geriatric Version) score. Baseline, 1, and 3 months	Significant change from baseline to discharge, but no significant change from discharge to 30-day follow-up

publication used					
Watson et al., 2013[b,d,e] (74) **Multi-centre pragmatic, two-armed RCT; primary care setting, opportunistic approach** **≥55**	Older hazardous alcohol users (per AUDIT); Mean age 62.83; 19.7% female	Intervention (n=266): Stepped care: behavioural change counselling (~20 mins), with referral to step 2 (motivational enhancement therapy) and step 3 (local specialist alcohol services) if indicated	Comparator:(n=263) Brief minimal advice intervention (5 mins), including feedback of screening results	Average drinks per day Secondary: AUDIT-C score, alcohol-related problems (Drinking Problems Index), SF-12 score. Baseline, 6, and 12 months	Both groups decreased alcohol consumption, but no significant differences in average drinks/day between groups at 6 or 12 months Stepped care does not confer an advantage over minimal intervention in terms of reduction in alcohol consumption at 12 months post intervention when compared with a 5-minute brief (minimal) intervention
Harari et al., 2008[b] (151) **UK** **RCT; general practice setting** **>65**	Mean age 74.45; 54.45% female	Intervention (n=940): Multi-domain health promotion study targeting a wide range of behaviours (including alcohol use) using a mailed health risk appraisal followed by computer-generated, individualised written feedback to participants and GPs	Comparator (n=1,066): No intervention	Health Risk Appraisal for Older Persons (HRA-O) Baseline and 12 months	Intervention did not result in statistically significantly greater likelihood of participants reporting 'no or moderate' alcohol use at 1-year follow up

Vrdoljak et al., 2014[b,d,f] (152) **Croatia** **RCT; general practice setting** **≥65+**	Mean age 72.3; 61.4% women	Intervention (n=371): Lifestyle intervention, delivered by GPs, targeting a range of health behaviours: physical activity, smoking, alcohol; Included educational leaflets for their detected cardiovascular risk factors; follow-up appointment	Comparator (n=367): GP usual care	Quantity of alcohol per day Baseline, and 18 months.	No significant difference between groups for alcohol consumption at the end of intervention
Lin et al., 2010[d,f,g] (66) **USA** **Secondary analysis of RCT data collected in primary care settings** **≥55**	Older adults with at-risk drinking; Average age 68.7. 48.4% women. 88% non-Hispanic white	Intervention (n=310): Received booklet about alcohol and aging, a personalized feedback report about risks associated with alcohol use, advice from physicians to reduce risks, and up to three telephone calls from a health educator	No control group	'Risky drinking' (scale unclear) Baseline, 3 and 12 months	Telephone-based intervention delivered by a health educator was moderately efficacious in reducing at-risk drinking at 3 months after enrolment among older adults receiving a multi-faceted intervention in primary care settings; however, effect was not sustained at 12 months
Andersen et al., 2019[d] (63) **Denmark, USA, Germany** **Single-blind, multi-centre,**	DSM-5 AUD older patients	Intervention 1: Motivational Enhancement Therapy (MET; (n=351): four sessions (60-90 mins) consisting of motivational interviewing; functional analysis; involvement of significant other in last session (if possible) and development of a personal change plan	No control group	Treatment success: defined as a BAC ≤0.05% at all times in past 30 days, including total abstinence Secondary outcomes	Adding CRA-S to MET did not increase probability of treatment success, although drinking days and binge drinking days decreased in both treatment groups. Increasing age was associated with

multi-national RCT **≥60**		MET + Community Reinforcement Approach for Seniors CRA-S (n=342): up to eight additional sessions (1 hour weekly) covering coping with craving; mood management training, building a sober network, and social/recreational counselling		included measurements of change in drinks per week, change in number of binge drinking days and quality of life Baseline, and 26 weeks	increased probability of treatment success, Odds of success did not differ across groups. Sensitivity analyses involving alternative approaches to missing values did not alter results
Duru et al., 2015[d] (80) **USA** **Observational data analysis from larger multi-component cluster RCT** **≥60**	At-risk drinkers (per CARET); 34.95% female; Average age unclear. Only age distribution by 5-year block given. Greater than 95% white	Intervention (SHARE; same intervention used by Ettner) (n=546): personalized reports; educational materials; drinking diaries; in-person physician advice; telephone counselling by health educators (HE)	Usual care (n=640)	At risk drinking (CARET score). Baseline, 6, 12 months	At 6 months, there was no association of at-risk drinking with having had a physician–patient discussion. Compared to having had no HE call, odds of at-risk drinking at 6 months were lower if an agreement was made or patients reported keeping a diary, or if an agreement was made and patients reported keeping a diary. At 12 months, a physician–patient discussion or an agreement and reported use of a diary were associated with

					lower odds of at-risk drinking
Fink et al., 2016 (76) **USA** **Feasibility study** **≥55**	69.8% female; 89.6% white. Average age: 70	Intervention (n=49): Web-based education program (nine sections) that aims to teach older adults how to balance benefits and risks of drinking (*A Toast to Health in Later Life! Wise Drinking as We Age*)	Control (n=47): none (participants offered access to site after completion of trial)	Quantity and frequency of drinking; drinking above recommended levels; harmful/ hazardous drinking (Alcohol-Related Problems Survey); and whether participants report changing their drinking amount in past 4 weeks. Baseline, 4 weeks	At 4-week follow-up there was no difference in quantity and frequency of alcohol consumption, adherence to recommended weekly alcohol limits, or change in drinking risk, although intervention group *perceived* that they were drinking less at the 4 week follow-up
Outlaw et al., 2012[e,g] (67) **USA** **Community behavioural health centre** **≥55**	33% female, 54% white; Mean age 58.5	Intervention (n=199): 18 session program based on cognitive-behavioural and self-management treatment approaches	No control group (pre/post)	Alcohol use, binge drinking, prescription medicine use	Significant time effects were noted in participants' decreased use of alcohol and binge drinking, reduced stress, fewer emotional problems, a decrease in having to reduce important activities, and increased prescription

					of medication for psychological problems
Rao 2014[e] (53) **UK** **≥65+**	Adults 65+ with alcohol misuse	Intervention: Targeted community nursing service (n=50)	No control group	Alcohol consumption	19 patients (38%) had achieved abstinence from alcohol or controlled drinking at 6-month follow up 38%

Note: [a] Identified in review by Armstrong-Moore, Haighton (55), [b] Identified in review by Kelly, Olanrewaju (56), [c] Identified in review by Kelly, Olanrewaju (56), Purser and Lemieux (58), [d] Identified in review by Megherbi-Moulay, Igier (57), [e] Identified in review by Hafford-Letchfield, McQuarrie (60), [f] Identified in review by Bhatia, Nadkarni (59), [g] identified in review by Mowbray and Quinn (62). Several studies identified in these reviews omitted because they did not explicitly measure changes in consumption include (82, 153-156). Further, review of 'Effective Treatment for Older Adult Baby Boomers with Alcohol-Use Disorders' (157) did not yield any studies specific to people aged ≥50 years. Although pharmacological treatments were outside the scope of this review, it is worth noting that Kermel-Schiffman, Afuta (158) conducted a scoping review of 'recovery' from alcohol use disorder among older adults. Many of the included studies did not meet the inclusion criteria of the current report (i.e., were either qualitative or focused on pharmacological interventions), however six studies, examined 'holistic programs' that included group therapy, family-oriented therapy, and relapse prevention. These programs also offered counselling with a physician, pharmacological treatment, and individual meetings, upon request. Most of these interventions reported positives outcomes, suggesting that 'holistic interventions' may be effective for older adults with alcohol use disorder.
Abbreviations: CARET= Comorbidity Alcohol Risk Evaluation Tool, HDRS = Hamilton Depression Rating Scale, TAU = treatment as usual, BAC= blood alcohol concentration, CARPS= Computerised Alcohol Related Problems Survey, AUDIT-C= Alcohol Use Disorders Identification Test for Consumption, SHARE = senior health and alcohol risk education ; CRA-S = community reinforcement approach for seniors; MET = motivational enhancement therapy; AUD = alcohol use disorder; TDM = telephone disease management; DSM-5 = Diagnostic and Statistical Manual [of Mental Disorders], fifth edition

Table 4. Interventions to reduce BZD/BZDRA consumption/harms among older adults: Education-based interventions

Citation	Demographics	Intervention	Control group	Relevant outcomes	Findings
Tannenbaum 2014 (110) **Two-armed cluster RCT; 6-month follow-up** **All participants 50+** **Canada**	n=303; long-term BZD users (3+ consecutive months); average age 74.8, 69% women	n=148 Direct-to-consumer, 8-page mailed educational booklet focused on patient empowerment with BZD risks self-assessment component, 'peer champion' story, advice about alternative options, 21-week sample gradual tapering program	n=155 UC	Complete cessation of BZD within 6 months of randomisation	At 6 months, 27% of the intervention group had discontinued benzodiazepine use compared with 5% of the control group (risk difference, 23% [95% CI, 14%-32%]; intra cluster correlation, 0.008; number needed to treat, 4). Dose reduction occurred in an additional 11% (95% CI, 6%-16%). In multivariate sub analyses, age greater than 80 years, sex, duration of use, indication for use, dose, previous attempt to taper, and concomitant polypharmacy (10 + medications per day) did not have a significant interaction effect with benzodiazepine therapy discontinuation.
Gnjidic 2019 (99) **Feasibility RCT** **All participants 50+** **Australia**	n=42; average age 71.5, 54.8% women. 90.5% white	n=20 Patient empowerment booklet (EMPOWER booklet as used in **Tannenbaum 2014** study)	n=22 UC	Withdrawal of BZD at 1 month	No significant difference between intervention and control groups in withdrawal of BZD at 1 month (p>0.05). Baseline: 65.0% of participants (53.0% intervention, 86.0% control) unconcerned about potential BZD side effects. Among 22 participants (11 intervention and 11 control) discharged on BZD, 13 (59.1%) had ceased BZD at 1-month follow up [46.2% (*n* = 6) intervention; 53.8% (*n* = 7) control]. In intervention group, 33.3% (*n* = 5) of participants had initiated discussion with doctor/pharmacist about stopping BZD compared with 35.7% (*n* = 5) in control group

Martin 2018 (101) **All participants 50+** **Canada**	n= 489; average age 75, 66% women. At baseline, 262 were SH users	n=248 Pharmacists encouraged to send patients educational deprescribing brochure, sent patients' physicians evidence-based deprescribing recommendation	n=241 UC (pharmacist)	Discontinuation of prescriptions for inappropriate medication at 6 months (determined using pharmacy medication renewal profiles)	In intervention group, 79% of SH users discussed deprescribing with physician/pharmacist after receiving intervention. Seventy-seven SH users (53%) initiated tapering; 58 (75%) subsequently discontinued their prescription. Compared with usual care, intervention resulted in greater discontinuation of prescriptions for inappropriate medication after 6 months, including for SHs
Vicens 2014 (111) **3-armed cRCT; 6-, 12-, and 36-month* follow up** **Spain** **Age data only given as median and IQR** ***36-month follow-up data contained in a separate 2016 publication (159)**	(patient portion of study) n=532. Median age: 64; 72% women	**Group 1:** structured educational intervention with in-person follow-up consultation; during consultation, GP provided info about long-term risks of BZD/BZDRA use, reassurance about reducing, leaflet about sleep quality for those with insomnia, GDR at follow-up appointments **Group 2:** education as above, but written follow-up	**Group 3:** UC	BZD discontinuation at 12 months, assessed in personal interview (defined as self-declared non-consumption or consumption of <4 doses in previous month. Consumption was reviewed and confirmed by prescription claims in clinical records (primary) BZD discontinuation at 6 months (secondary)	Both interventions led to significant reductions in long-term BZD use in patients without severe comorbidity, compared to the control group, however, however there was no significant difference between the intervention groups At 12 months, 76 of 168 (45%) patients in group 2 and 86 of 191 (45%) in group 1 had discontinued BZD versus 26 of 173 (15%) in control group. After adjusting by cluster, relative risks for BZD discontinuation were 3.01 in group 2 and 3.00 in group 1
Navy 2018 (113)	n=346; mean age 73; alprazolam users	n=153; Participants received letter from clinical pharmacist	UC (n=173)	Composite rate of 1) no alprazolam	Composite rate equivalent between intervention (34.0%) and control (35.3%) groups (P = 0.822).

Two-armed RCT; 6-month follow-up **All participants 50+ (age 65 was minimum)**		about risks of long-term alprazolam use and were advised to call pharmacist to discuss alprazolam reduction/alternative options. Individualised GDR plans developed with pharmacist; follow-up calls done		dispensing, 2) an alprazolam dose reduction, or 3) interchange to an alternative medication during the six-month follow-up	In sub analyses, composite rate was higher among intervention patients who did vs. those who did not call clinical pharmacist (77.8% vs. 27.6%; *P* < 0.001).
Kuntz 2018 (112) **3-armed RCT; 6-month follow-up** **USA**	n=150; average age 70. 67% women	**Group 1 (n=50):** educational intervention; letter from prescriber about z-drug use, educational brochure about pharmacological and non-pharmacological alternatives, tapering schedule, self-assessment quiz about risks **Group 2 (n=49):** educational intervention and follow-up phone call	UC (n=50)	Discontinuation of Z-drugs during 6-month follow-up, defined as patient not receiving a Z-drug dispensing from pharmacy during that time	Patients who received education only or education plus pharmacist consultation significantly more likely to discontinue Z-drug use than those who received UC (28/50 of those who received education only and 27/49 of those who received education plus consultation vs 13/50 patients who received UC). After controlling for various factors, receiving either education (adjusted odds ratio = 4.02) or education and a pharmacist call (adjusted odds ratio = 4.10) was associated with greater odds of discontinuing Z-drug use than receiving UC.
Amagai 2023 (103) **Age range widely distributed** **<50: 24.7%: ≥50: 75.2%** **Japan**	n=609 (for survey respondents, not viewers overall; 369 respondents were hypnotic users); average age 57. 53.3% women	10-minute educational video focused on sleep education, and guidance/motivational content about reducing hypnotic use; survey was then administered to determine effectiveness of video and identify factors associated with intention to reduce hypnotic use	None	Intentions to reduce medication use before and after viewing the video	Before viewing video: 122 (31.4%) responses of "strongly agree," 169 (43.6%) "agree," 34 (8.8%) "neither," 37 (9.5%) "disagree," and 26 (6.5%) "strongly disagree." This indicated that 75.0% of respondents already intended to reduce their medication before viewing the video. After viewing the video, there were 199 (52.1%) responses of "strongly agree," 133 (34.8%) "agree," 32 (8.4%) "neither," 15 (3.9%) "disagree," and three (0.8%) "strongly disagree." More respondents [332 (86.9%)] intended to reduce

					their medication use after viewing the video. Significant improvement in intention to reduce medication use observed among 52 (82.5%) participants initially averse to reduction, i.e., those who disagreed or strongly disagreed to reduce medication use before they saw the video.
Martin 2013 (100) **Canada**	N=144 BZD users; average age 74.9. 73% female	Written educational tool aimed at knowledge acquisition and belief change in patients, in order to change their BZD risk perception	6-month waitlist group		Post-intervention, 65 (45.1%) participants had increased risk perception regarding BZDs, found to be due to better knowledge acquisition and a change in beliefs (cognitive dissonance). Self-efficacy for tapering, (mean change score 31.2, 95% CI (17.9, 44.6), and intent to discuss cessation of BZD with doctor were higher among participants who perceived increased risk (83.1% vs 44.3%, p < 0.001)
Wilson 2018 (121) **Canada** **All participants 50 or older** **Pilot study**	n=62; Median age 79; 42% women. Chronic, regular sedative users in hospital at time of study initiation	EMPOWER patient brochure as in Tannenbaum 2014, plus encouragement to speak to treating team if interested in sedative cessation	Control cohort without intervention	Short-term sustained cessation 30 days after discharge	BZDs deprescribed in 32 of 50 (64%) participants who received EMPOWER brochure, which was significantly higher than 'historical rate' of 21% (p<.001)
Martin 2017 (102) **Canada** **All participants 50 or older**	n=261. Average age 74.4 years. 71.6% female Post-hoc analysis of Tannenbaum 2014 data, comparing	EMPOWER patient brochure as per Tannenbaum 2014 (above)	As per Tannenbaum 2014 (above)	As per Tannenbaum 2014 (above)	Participants with mild cognitive impairment had the same capacity for knowledge acquisition, belief change, self-efficacy to taper, and willingness to discuss the intervention with a care provider

	normal participants with mild cognitive impairment participants.				

BZD = benzodiazepine; BZDRA = benzodiazepine receptor agonist; GDR= gradual dose reduction; UC = usual care; SH = sedative hypnotic; EMPOWER = Eliminating Medications Through Patient Ownership of End Results.

Table 5. Interventions to reduce BZD/BZDRA consumption/harms among older adults: Insomnia-focused CBT interventions

First author, year, country	Demographic characteristics of sample	CBTi	Gradual dose reduction? If so, how defined?	Control group	Relevant outcomes	SH-related findings
Digital CBTi						
Blom 2015 (105) **Sweden** **Non-inferiority RCT**	n=48; **30 used SHs at baseline.** Mean age = 54; 47.75% women	n=24 Guided, internet-delivered CBTi vs group-delivered CBTi	Within CBTi "Information about sleep medication and how to discontinue - cold turkey or tapering"	n=24 group CBTi	Sleep medication usage (secondary)	70% of SH users had ceased use by post-treatment. No significant between-group differences at 6-month follow up
Moloney 2020 (115) **USA** **Pilot, single group, mixed methods study**	n = 46; **11 used SHs at baseline.** Mean age = 55, 100% women, rural	Internet-delivered CBTi; 6 x once-weekly modules of internet-based CBTi	No	None	Sleep medication use (secondary)	55% of participants ceased SH use after CBTi (11 participants [30%] using pre-intervention vs 5 [13.5%] using post-intervention). Odds of reporting sleep medication use post-intervention significantly lower than pre-intervention (OR 0.28 [95% CI 0.11–0.74]).

Sato 2019 (106) **Japan** **RCT**	n = 23; SH-resistant insomnia patients. Mean age = 50; 78% women	5-session program	No	TAU	N/A	No between-group difference
Multi-component in-person CBTi						
Lichstein 2013 (114) **All participants 50 or older** **USA** **3-armed RCT**	n=70. Mean age = 64; 71% female Hypnotic-dependent patients	CBT group (n=24): 10 sessions	Initiated after 8 CBT sessions completed (or straight away, for group 3)	Group 2 (n=23): Placebo biofeedback + GDR	Group 3 (n=23): GDR only	Greater cessation in combined CBTi + GDR group (85%) than in either CBTi (54%) or GDR (48%) groups by post-treatment. At 12 months, no between-group differences in SH cessation (42–70%)
Park 2018 (117) **South Korea** **Chart review**	n=41. Mean age =52 (range: 20-84); 76% female	5 sessions (n=41)	No	Case-matched TAU (n=100)		By post-treatment, 30% of CBTi group ceased SH use, vs. 2% of controls
CBTi administered in primary care						
Bothelius 2013 (109) **Sweden** **Effectiveness RCT**	n=66. **At baseline, 20 using SHs.** Mean age=51; 86% women	n=32 5 nurse-administered sessions	Within CBTi program "Methods for medication tapering"	n=34 Waitlist	Daily usage of prescribed sleep medication	No group x time interaction effect on SH use

			section in manual			
Sandlund 2017 (104) **Sweden** **RCT in group treatment format**	n=165; **130 using sedative hypnotics at baseline.** Mean age = 54 (range 20-90); 73% women	n=90 7 x 2-hour sessions administered by nurse	Within CBTi program "Stepwise reduction of hypnotic drugs" section in program	n=75 TAU	Frequency of hypnotic drug use	Greater reduction in self-reported frequency of medication use in CBTi group (48% reduction) vs control (12% increase). CBTi group maintained reduction at 12-month follow-up
Davidson 2019 (118) **Canada** **Group-delivered, waitlist-controlled trial**	n=81; **51 using SHs at baseline.** Mean age = 57; 86.4% female	6 x 2-hour sessions of 3-11 people, with nurse/psychologist	(Pre-established) Hypnotic Withdrawal Program offered to regular users, prior to CBTi entry	Waitlist	Number of nights/week sleep medication taken	59% of patients using SHs at baseline ceased by post-treatment. In subset of patients assigned to waitlist group, SH use decreased by 7% during the waitlist period, and a further 37.5% following CBTi.
Self-administered CBTi audio/reading materials						
Kaldo 2020 (120) **Sweden** **RCT; 4-year follow-up**	n = 40; **19 used prescription sleeping drugs at baseline.** Primary care insomnia patients of mean age 55; 70% women	n=20 233-page insomnia self-help book with full CBTi program; additional open-ended, 45-85 min support group with therapist & peers (6 sessions in 8 weeks)	Tapering advice included in book	n=20 Waitlist + TAU - but group also later received book only (i.e. no invitation to group)	N/A	Among the 19 patients in treatment group, 6 patients had reduced/stopped sleep medications post-treatment (67% of those initially using sleep medications), none had increased use/started, 13 (68%) remained unchanged. In waitlist/UC group, two patients stopped using sleep medication (20% of those initially using medications), five (29%) had

						increased/started using, 10 (59%) remained unchanged. Post-intervention between-group differences in sleep medication use statistically significant
Special populations						
Comorbidities						
Casault 2015 (107) **Canada** **RCT**	n=38. Mean age=57 (range 33-75). Cancer patients with insomnia; **12 used hypnotics at baseline;** 92% female	n=20 Early, self-administered minimal CBTi (6 booklets, 3 phone consultations with psychologist, 6-wk duration)	N/A	n=20 No intervention		No significant group x time interactions on frequency of hypnotic consumption, average dosage, or proportion of users. A priori comparison indicated significant reduction in hypnotic dosage between pre- and post-treatment in CBT group only. No significant changes between post-treatment & follow-up for hypnotic-related variables in both groups
Mercier 2018 (122) **Canada** **Non-inferiority RCT**	n=41 cancer patients. Mean age = 57; **19 hypnotic/anxiolytic users at baseline**; 78.1% female	n=21 6-week self-administered CBTi via DVD, with 6 booklets of reading material that coordinated with video segments; weekly phone calls in case participants wanted to ask questions/to encourage adherence	N/A	n=20 6-week home-based aerobic exercise program: 3-5 20–30-minute sessions, building to 150 minutes (individualised to baseline physical condition). One phone call in	Secondary outcomes included Pittsburgh Sleep Quality Index, which has medication use reporting	No significant group × time interaction was found, nor time or group effects. CBTi patients reduced use of hypnotics/anxiolytics from pretreatment to posttreatment as indicated by a superior effect size in CBTi

				3rd week to discuss any difficulties. Single page document about program		
Taylor 2015 (116) **USA** **RCT**	n=23 hypnotic-dependent psychiatric outpatients with insomnia; average age 50.1; 94% women; 55.3% white	n=11 5 sessions individual CBTi	Optional medication reduction module offered to active group in 1st & 2nd CBTi sessions	n=8 TAU Also, additional n=4 comprised a crossover group	N/A	CBTi produced sleep improvements, but no patient discontinued hypnotics. No participants agreed to receive optional medication reduction module. Some reported that they may be interested in reducing medication use at a later point, but were not willing to do so during study
Jung 2020 (119) **South Korea** **Pilot study** **BZDs and Z-drugs included**	n=32. Mean age 57.75; 84.4% women, cancer patients. 56.2% on 2 or more hypnotics	CBT-I; weekly group psychotherapy, 6 x 2-hour sessions with clinical psychologist	Medication tapering program (psychiatrist-supervised)	None	Changes in medication status at two timepoints (secondary)	By end of 6 weeks CBTi, 22 (68.8%) discontinued hypnotics, 5 (15.6%) reduced intake by half, 3 (9.4%) reduced the frequency of medication taking. Only 2 (6.2%) show no improvement in medication dosage from pre-CBTi to post-CBTi. Of those who had discontinued at week 6, by follow-up 4 weeks later, 18 (81.8%) successfully maintained discontinuation, 3 (13.6%) used medication as required, and 1 (4.5%) resumed taking medication
Veterans						
Pigeon 2019 (108) **USA**	n=50; average age 54.8; 20% women, MDD or PTSD patients with insomnia & suicidal ideation; **12 used**	n=24 Brief CBTI. 4 individual sessions; weekly for first 3 weeks, with 2	No	n=26 TAU	N/A	No change in self-reported use of sleep medications

Proof-of-concept RCT	**sleeping medications at baseline**	weeks between 3rd & 4th sessions				

Abbreviations: CBTi= cognitive behavioural therapy for insomnia; TAU= treatment as usual; SH= sedative hypnotic; UC = usual care; MDD = major depressive disorder; PTSD = post-traumatic stress disorder. Table in part derived from Sweetman et al. 2021 (160).

Table 6. Interventions to reduce opioid consumption/harms among older adults

First author, year, country	Demographic characteristics of sample	Intervention	Control	Relevant outcomes	Findings
Clinician-targeted interventions					
Chen 2019 (142) **USA** **Time series analysis** **Target: doctors** **All patient participants 50+** **Guideline dissemination + audit + feedback**	Orthopaedic (knee) surgery patients; average age 64; 6.8% women. 78% white	n=31,547 Opioid Safety Initiative (OSI): Veterans Health Administration program for reduction of high-dose opioid prescribing to veterans. Academic detailing approach that included dissemination of multidisciplinary expert prescribing guidelines and computerised data dashboard aggregating electronic medical record data, visually tracking opioid prescriptions at national, regional, facility, and provider level of opioid prescription (allowing facility leaders to audit data and provide feedback)	n=28,509 Pre-OSI intervention trends	Chronic postoperative opioid use (defined as continued prescriptions for more than 3 months in a 6-month window)	Statistically significant decrease in opioid use. Fewer patients with chronic postoperative opioid use in intervention group (26.9% pre–OSI vs. 14.1% post–OSI). Sensitivity analysis: Proportion of patients with chronic postoperative opioid use (per 1000 surgeries) decreased every month in both groups, but significant & sustained decline post-OSI occurred in preoperatively opioid-naïve population. OSI led to 265 [95% CI: 76 to 453] fewer preoperatively naive patients becoming chronic postoperative opioid users
Pasquale 2019 (161) **USA** **RCT** **Doctor-targeted education**	4,353 opioid-prescribing doctors 2,391 patients at risk of opioid misuse	Doctors allocated to: • Arm 1: patient information • Arm 2: links to educational materials for diagnosis/management of pain • Arm 3: both patient information & links to educational materials, or	Arm 4: no communication	Opioid and pain prescriptions Chronic, high dose opioid use Uncoordinated opioid use Opioid-related ED visits	No significant impact of interventions on numbers of opioid or pain medications filled, chronic high-dose opioid use, uncoordinated opioid use, ED visits, or rate of diagnosed opioid abuse

		• Arm 4			
Shayegani 2018 (162) **USA** **Pharmacist - retrospective chart review** **Opioid-BZD co-prescription**	n=61. Veterans, long –term BZD-opioid users; average age 61. 10% female, 79% white	Chart review, then psychiatric pharmacist left note for alternatives to BZD. Responsiveness of care providers to notes measured 30 days later	N/A	Acknowledgement of chart review notes, and initiation of tapering schedules	47.5% of pharmacists' chart review notes acknowledged within 30 days. 11.5% of prescriptions were tapered by providers. Mental health clinicians were less likely to sign off on chart review notes ($\chi 2$ = 4.62, df = 1, P = .0316; Fisher exact test, P = .0215) or to initiate taper schedules ($\chi 2$ = 5.51, df = 1, P = .0189; Fisher exact test, P = .0410) compared to primary care clinicians
Chang 2019 (163) **USA** **Single group (pretest, post-test)** **Target: nursing postgraduate students**	n=31 doctoral nursing students	MI educational intervention with lecture, role-playing exercise, standardised patient simulation	N/A	Confidence, knowledge, and skills in motivational interviewing in the context of prescription opioid misuse	Significant increase in students' knowledge and confidence regarding MI at both post tests compared with baseline.
Patient-targeted education					
Cheesman 2020 (141) **USA** **RCT** **Target: patients**	Orthopaedic (rotator cuff) surgery patients; n=140; 32.2% female; average age 58.05	Pre-operative, formal opioid education (recommended postoperative opioid use, side effects, dependence, addiction) + 2-minute computer-based presentation about opioid abuse + paper summary of key presentation points	Standard preoperative education, discussion of risks/ benefits. No formal education on opioid use, dependence, addiction	Risk of opioid dependence two years post-surgery	Pre-operative opioid education independently protective against opioid dependence (P = .03; odds ratio, 0.37). Intervention patients had lower rate of opioid dependence (11.4%, 8/50) than control patients (25.7%, 18/0) (P = .05). Compared to control

Opioid use associated with surgery					patients, fewer prescriptions were filled by study patients than control patients, fewer pills & fewer morphine milligram equivalents were consumed by study patients
Sandhu 2023 (164) **Britain** **Multi-centre RCT** **Users of prescription opioids for pain**	Pain (chronic, non-malignant) patients using strong opioids. n=608; average age of participants 61, 60% female; 96% white	n=305 3-day-long group sessions that emphasized skill-based education, 1-on-1 support delivered by a nurse & layperson for 12 months	n=303 UC	Proportion of patients reporting no opioid use (primary) Proportion of patients who reduced opioids by 50% from baseline (secondary)	12-month follow-up: 29% of people in intervention group (vs 7% in UC group) discontinued opioids (p<0.001)
Pharmacist-led interventions for prescription opioids					
Cochran 2019 (144) **USA** **RCT**	n=32. Average age 51.9; 56.3% female, 71.9% white	Community pharmacy-led. Standard medication counselling (SMC) + brief motivational interviewing (BMI) + medication therapy management (MTM)	SMC alone	Opioid medication misuse as measured with the Prescription Opioid Misuse Index	In multivariable models, BMI-MTM participants less likely than SMC patients to report continued misuse at 3 months
Harden 2015 (143) **USA** **Retrospective and prospective chart review**	n=50; veterans, chronic pain, avg age 54 (range 25-71); 12% female, 60% white	Chart review, then gradual taper of pharmaceutical opioids	N/A	Percent reduction in morphine milligram equivalents over 12 months (primary) Percent reduction of morphine milligrams equivalents over 3 and 6 months (secondary)	Average percentage opioid dose reduction across 12 months was 46%, **but no significance testing undertaken.**
Psychological interventions for prescription opioid use					
DeBar 2022 (145) **USA** **Pragmatic cluster RCT**	n=850. Average age 60.3; 67.4% women, 77% white	n=433 Primary care-based CBT for long-term opioid users with chronic pain	n=417 UC	Opioid and BZD use based on electronic health data (secondary)	Opioid use not significantly different across groups

Primary care-based CBT					
Vowles 2019 (165) **USA** **Pilot RCT**	n=28 Average age 50.5. 14% female, 51.4% white	Behavioural treatment study in veterans with chronic pain & confirmed opioid misuse. 12 sessions Acceptance & Commitment Therapy & Mindfulness-Based Relapse Prevention	UC	Risk of hazardous opioid use (using Current Opioid Misuse Measure; primary) Morphine milligram equivalent dose per day (secondary)	Integrated intervention found feasible and superior to control. Current Opioid Misuse Measure dropped in intervention group to a greater extent than in UC
Garland 2019 (166) **USA** **RCT**	n=95. Average age: 56.8; 66% female, 89.5% white	n=50 Mindfulness-Oriented Recovery Enhancement (MORE) in pain patients with long-term opioid use histories	n=45 Active control comparator was a support group	3-month assessment of opioid misuse risk as 'proximal outcome'	MORE participants reported significantly greater reductions in opioid misuse risk at 3-month follow-up (p=.03) than SG participants. Increases in positive psychological health predicted decreased opioid misuse risk at follow-up (p=.02)
Garland 2022 (167) **USA** **RCT**	n=250. Average age: 51.8; 63.7% women , 87.2% white. Opioid misuse + chronic pain	n=129 MORE in pain patients with long-term opioid use histories; In both intervention and control groups, participants received 8 x weekly 2-hour sessions in groups of 6-12 people. MORE group asked to engage in daily 15-minute audio-guided mindfulness, reappraisal, & savouring, practice 3 minutes of mindfulness before taking opioids to clarify whether use was due to craving or need for pain relief	n=121 Active control – supportive psychotherapy group. Discussions about coping with pain, the adverse effects of opioids, and the use of opioids to alleviate negative emotions. Supportive psychotherapy group asked to write on weekly session topics in a journal for 15 minutes per day	Opioid misuse as assessed via Drug Misuse Index (self-report, interview, urine screen; primary) Opioid dose, opioid craving (secondary)	Overall odds ratio for reduction in opioid misuse across 9-month follow-up period in MORE group compared with supportive psychotherapy group was 2.06 (95% CI, 1.17-3.61; P = .01). 45.0% of participants receiving MORE were no longer misusing opioids after 9 months of follow-up vs 24.4% of participants receiving supportive group psychotherapy

Abbreviations: UC= usual care; RCT = randomised controlled trial; MI = motivational interviewing; BZD = benzodiazepines
: MORE= Mindfulness-Oriented Recovery Enhancement; UC = usual care; CBT = cognitive behavioural therapy