

Review of MBS Health Assessment Services

Appendix A – Evidence summaries

Prepared for the Department of Health and Aged Care by the Institute for Evidence-Based Healthcare, Bond University, Australia, 2022

1. The Health Assessment component: Cardiovascular risk

Background and Description

Cardiovascular disease (CVD) risk scores, such as the Framingham Risk Score, combine a set of individual risk factors such as: age, sex, smoking status, blood pressure (and whether the patient is on antihypertensive medication), diabetes, LDL cholesterol and HDL cholesterol. Combining these risk factors provides a predicted 5- or 10-year risk of a cardiovascular event such as myocardial infarction or stroke for an individual.

Most international guidelines now advocate an absolute CVD risk approach, and increasingly recommend starting therapy to lower blood pressure or cholesterol guided by an individual's absolute risk of cardiovascular disease. Prior to the use of the absolute CVD risk approach, treatment of the individual risk factors was based on values of those risk factors alone (rather than the absolute risk of CVD obtained from combining multiple risk factors).

Evidence of Effectiveness

There are few randomized trials which compare the effect of using a cardiovascular risk assessment with usual care on mortality or morbidity. A 2016 Cochrane systematic review identified 9 randomised trials which include assessment of CVD risk factors, but not necessarily combining these into an absolute risk assessment and all but 1 pre-dated the statin era (1). They found some reduction in individual risk factors, such as total cholesterol and systolic blood pressure, but not in CVD events: cardiovascular mortality (RR 1.0, 95% CI 0.90 to 1.11; 2 studies, 43,955 participants) non-fatal coronary heart disease (RR 0.98, 95% CI 0.89 to 1.09; 2 studies, 43,955 participants), total stroke (RR 0.99, 95% CI 0.90 to 1.10; 2 studies, 79,631 participants), and non-fatal stroke (RR 1.17, 95% CI 0.94 to 1.47; 1 study, 20,015 participants).

However, the absolute cardiovascular risk approach was developed to direct treatment to those most likely to benefit, because it:

- a) reduces overtreatment of people who have a single elevated risk factor but who have low overall risk of a cardiovascular disease (CVD) event;
- b) reduces undertreatment of people with multiple risk factors, each one of which is only slightly abnormal, but who have high overall risk of a CVD event

Table 1.1 illustrates the imperfect association between the standard risk factors and absolute CVD risk: as we move from risk factors being both low to both high, the fraction with high CVD risk increases (ratio column). However, some of the population have "high" blood pressure and/or cholesterol but have low CVD risk (yellow shading) and may not warrant current treatment. There are also some of the populations who have "low" blood pressure and "low" cholesterol but who are at high CVD risk (green shading) because of other factors and might warrant intervention.

Table 1.1: CVD risk classification of people as having neither, either, or both elevated blood pressure (> 140 mmHg) or high cholesterol. Data from AUSDIAB study (2).

Risk factors	% Low CVD risk	% High CVD risk	Ratio low: high
A. Low BP; low cholesterol	64%	2%	32
B. Low BP; high cholesterol	22%	1%	22
C. High BP; low cholesterol	6%	1%	6
D. High BP; high cholesterol	3%	2%	1.5
Total	94%	6%	

As the populations treated by both approaches overlap considerably, the evidence for treatment is based on the individual risk factors. That is, there is evidence for the value of detecting and treating high blood pressure, elevated lipids, smoking, and diabetes. In addition, there is evidence for the benefits of treating individuals based on absolute risk without specific risk factors (such as the “polypill” studies which treated patients with high cardiovascular risk with a combination of blood pressure and cholesterol lowering medications) (3).

Starting and Stopping Ages

There are no trials that randomized the population to different starting ages of CVD risk assessment. Instead, recommendations about starting age have been based on the increasing CVD risk with age. Most single risk factors, and the combined risk of CVD, increase with age. Figure 1.1 below shows the risk stratification by age, based on an Australian study (4) which included 8505 participants aged 18 or older from the Australian Bureau of Statistics Australian Health Survey who provided biomedical data between March 2011 and September 2012. The risk of a cardiovascular event for participants without prior CVD was estimated using the National Vascular Disease Prevention Alliance CVD risk assessment tool and categorised as low (<10%), moderate (10-15%), or high risk (>15%).

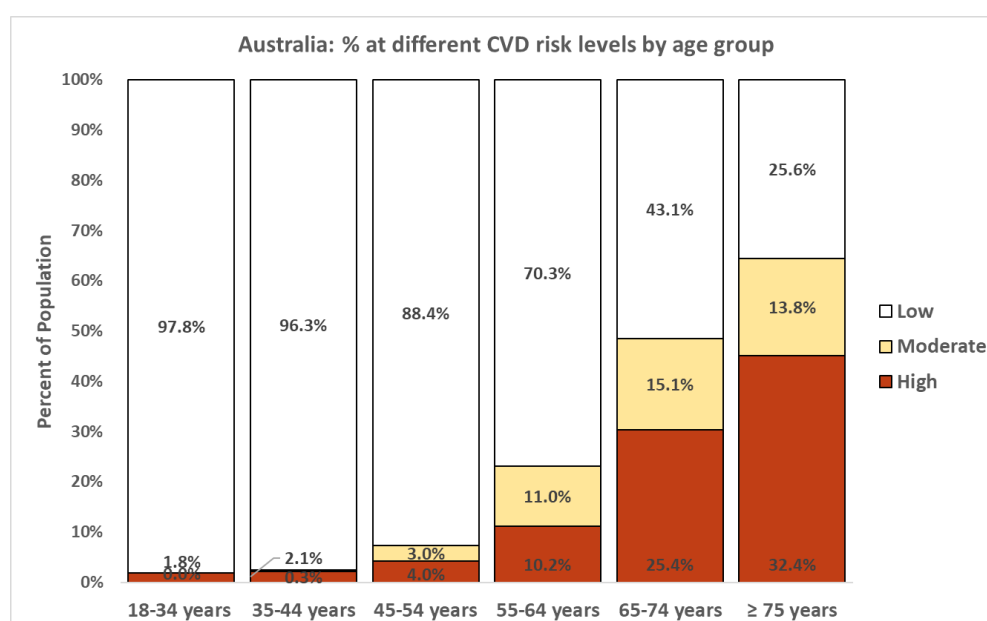


Figure 1.1. 5-year CVD event risk by age. Absolute risk in the Australian cohort was categorised as low (<10%); moderate (10-15%); high (>15%) (4)

Some, if not most, of the young “high risk” patients will be detected because of a single risk factor, such as smoking, diabetes, familial dyslipidemia, or an incidental blood pressure measurement. Hence most recommendations for CVD risk assessment start in the 40s or later.

This approach, which is based on *current* level of CVD risk, assumes no “legacy” effect of starting at an earlier age which might reduce later risk. Reviews of trials comparing earlier with later starting have found no such “legacy” effects for blood pressure or cholesterol lowering treatments (5-6).

Interval for Assessment

No trials have compared different intervals of CVD risk assessment. However, a few studies (6-7) have examined the likely impact of assessment intervals by modelling different intervals within a cohort of patients having repeated assessments. The study by Lindbohm used data from 6964 participants in the British Whitehall II study (mean of 50 years, range 40–64 years at baseline between 1991 and 1993) who had repeated biomedical screenings at 5-year intervals and had linked follow up data to 2015 (mean follow-up of 22 years) (7).

Participants’ 10-year risk of a major cardiovascular event (fatal coronary heart disease, non-fatal myocardial infarction, and fatal or non-fatal stroke) was estimated using the revised Atherosclerotic Cardiovascular Disease (ASCVD) calculator. The investigators interpolated the impact of 21 alternative screening regimes which varied the assessment interval on progression rates from low and intermediate risk categories to the high-risk category. The results of 3 assessment schedules are shown in the Table 1.2. **Compared with the 5-5-5 schedule, the 10-5-2 schedule (assessments 10 yearly for low risk; 5 yearly for intermediate-low risk; 2 yearly for intermediate-high risk) prevents more CVD events (0.38 additional CVD events prevented per 100 people) but using fewer CVD assessments (342 assessments per 100 people compared to 363 assessments per 100 people with the 5-year screening intervals).** Hence, risk-adaptive schedules are more effective and cost-effective than a uniform schedule.

Table 1.2: Consequences of two risk category specific screening intervals (10-5-2 and 7-4-1) compared with the 5 yearly screening interval (5-5-5) for everyone. Numbers derived from (7).

	Years between assessments for 3 levels of risk of major cardiovascular event: low (<2.5%), Intermediate risk (2.5-4.9%), high risk (5-7.5%)			Comments
<i>Schedule used (low-intermediate-high)</i>	<i>5-5-5</i>	<i>10-5-2</i>	<i>7-4-1</i>	<i>3 of 21 assessment schedules modelled</i>
Number of assessments/100 people	363	342	547	Over 20 years
Number of years undetected as high CVD risk/100 people	120	82	45	Average less than 1 year undetected
Additional CVD events prevented/100 people compared to 5-5-5 schedule	0.0 (Reference)	0.38	0.75	Both alternatives better than 5-5-5 yearly screening interval

Another study estimated the probability of becoming high risk for cardiovascular disease for people at low and intermediate risk untreated for high blood pressure or lipid levels using data from two cohorts: 13,757 participants of the Tokyo health check-up study (aged 30-74 years) who had annual check-ups (and were screened at least 4 times), and 3,855 participants of the Framingham studies aged 30-74 years who had check-ups between 8 and 19 years after baseline assessment (8).

At baseline most of the participants in both studies had a very low risk of cardiovascular events (<5% 10-year risk or 5-<10% 10-year risk). The proportion of participants crossing a >20% 10-year risk treatment threshold at 3, 8, and 19 years is shown in Table 1.3. The proportion crossing the risk threshold at 3 years was low (less than 1%). The proportion also differed by initial risk: the low-risk group rate at 8 years (0.5%) was similar to the intermediate group at 3 years (0.7%). This illustrates the need for shorter assessment intervals as risk increases.

Table 1.3. Proportion of participants crossing threshold stratified by baseline risk

Baseline risk	Proportion of participants crossing a >20% 10-year risk treatment threshold (%)		
	Years of follow-up		
	3 years	8 years	19 years
Low risk (<5% 10-year risk)	0.05%	0.5%	6.8%
Intermediate risk (5-10% 10-year risk)	0.7%	9.1%	40%

Both studies illustrate that a full CVD risk assessment every 3-5 years is reasonable (rather than yearly), but that the interval should shorten as CVD risk increases.

Subpopulations

The CVD risk stratification by age shown in Figure 1.1 above is for the overall population. However, this is different for different ethnicities, and might suggest an earlier start for the higher risk groups (or a later start age for the lower risk groups). Other subpopulations? that might be considered for early starting are known smokers and women with maternal conditions such as pre-eclampsia and gestational diabetes. Figure 1.2 below is a risk stratification by age for Aboriginal and Torres Strait Islander adults based on biomedical data provided for the National Aboriginal and Torres Strait Islander Health Measures Survey (NATSIHMS) component of the Australian Bureau of Statistics (ABS) 2012-13 Australian Aboriginal and Torres Strait Islander Health Survey (AATSIHS). Note that this is not exactly comparable to the Figure 1.1 above as different CVD risk equations are used. However, there is clearly a higher risk in the aboriginal and Torres Strait islander population, corresponding approximately to having the equivalent CVD risk about 10 years earlier. That suggests CVD health assessment should occur 10 years earlier also.

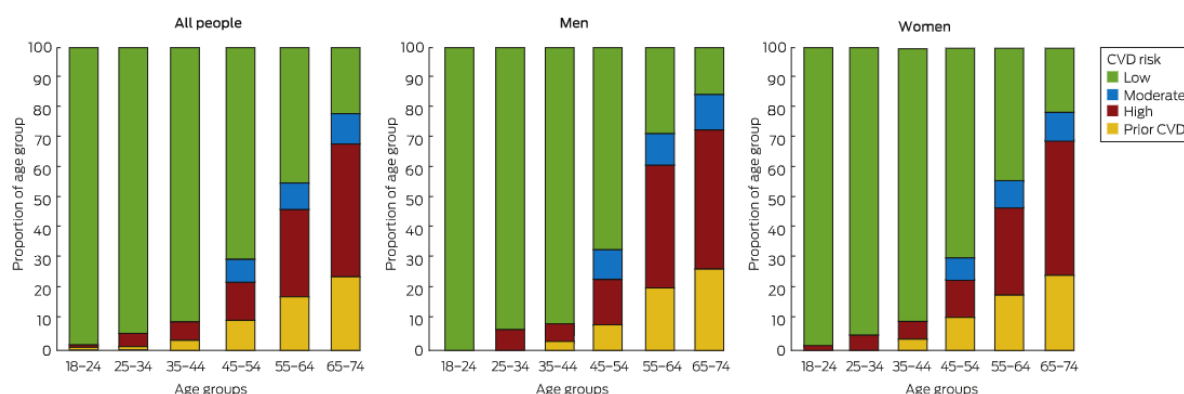


Figure 1.2. Estimated weighted distribution of 5-year absolute cardiovascular disease risk categories for Aboriginal and Torres Strait Islander adults aged 18-74 years, by sex and age group (9).

Comments

Assessment of CVD risk with the combined risk factors, using a CVD risk score, are clearly helpful in making decisions about the value of treatments for risk factors. Some assessments will be triggered by the detection of an individual risk factor, such as high blood pressure, but otherwise a full CVD risk assessment appears warranted based on an individual's age.

Conclusion

In middle aged and older adults, a CVD risk assessment appears warranted as part of a general health assessment. The frequency should depend on the initial level of risk, but for the low risk every 3 to 10 years is reasonable.

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2. The Health Assessment component: Blood pressure measurement

Background and Description

Elevated blood pressure has been known as a key risk factor for stroke and ischaemic heart disease since at least the 1950s: the risk of cardiovascular events rises approximately 1-2% per 1 mm Hg increase in the systolic blood pressure. However, until the advent of diuretics in the late 1950's treatments were limited. The Veterans Affairs (VA) co-operative trial, published in 1970, demonstrated that detection of, and treatment for, hypertension could reduce the risk of cardiovascular events (1). Since the VA trials dozens of randomized trials have refined and extended that finding.

Office assessment has become simple and universal – usually now with automated machines. Virtually all professional bodies, including the RACGP recommends regular screening of adults for hypertension, but this would mostly be done opportunistically as part of a consultation for another reason.

Evidence of Effectiveness

The 2021 USPSTF review (AMSTAR rating 7/11) addressed several key questions on detection and treatment of high blood pressure (2). On the question of detection, they found no trials that examined the effectiveness of BP screening alone versus no screening. However, they found that screening and treatment substantially reduce CVD events based on two bodies of evidence:

Direct evidence: 1 large cluster RCT (CHAP) - conducted in participants ≥ 65 years, community pharmacy setting, multicomponent intervention. One community-based cluster RCT (n=140,642) of a multicomponent CVD health promotion trial reported a 9% relative reduction in the number of CVD-related hospital admissions (rate ratio 0.91, 95% CI 0.86 to 0.97) but no difference in all-cause mortality.

Linked evidence: An individual patient meta-analysis of randomized trials of blood pressure lowering (with 344 716 participants from 48 randomised clinical trials; median 4.15 years' follow-up) by the BP Trialists collaboration (3) found about a 10% relative risk reduction in major cardiovascular event for each 5 mm Hg of systolic blood pressure (hazard ratio 0.91, 95% CI 0.89 to 0.94 for participants without previous cardiovascular disease). As shown in Table 2.1, the reductions in risk are consistent across different age categories.

Table 2.1. Impact of blood pressure reduction at different ages, with no prior CVD

	Intervention	Comparator	RRR	ARR%
	Event/ Total	Event/ Total	(95% CI)	(95% CI)
BP lowering: effect on major cardiovascular events per 5 mm Hg reduction				
Age Group				
< 55 years	6.9%	8.4%	18.2% (12%-24%)	1.5% (1%-2%)
55-64 years	9.4%	10.5%	9.9% (5%-12%)	1.0% (0.7%-1.4%)
65-74 years	12.4%	14.1%	11.5% (5%-12%)	1.6% (1.2%-2%)
75-84 years	15.5%	17.9%	13.5% (4%-13%)	2.4% (1.7%-3.1%)

RRR = Relative Risk Reduction; ARR = Absolute Risk Reduction

Starting and Stopping Ages

In the BP Trialists study – data from 358 707 participants from 51 randomised clinical trials (4), the age of participants at randomisation ranged from 21 years to 105 years (median 65 years [IQR 59–75]), with 12.0% participants younger than 55 years, 36% aged 55–64 years, 36% 65–74 years, 15% 75–84 years, and 1% 85 years and older. The hazard ratios for the risk of major cardiovascular events per 5 mm Hg reduction in systolic blood pressure for each age group are shown in the Table 2.1 above, and as a forest plot below (Figure 2.1).

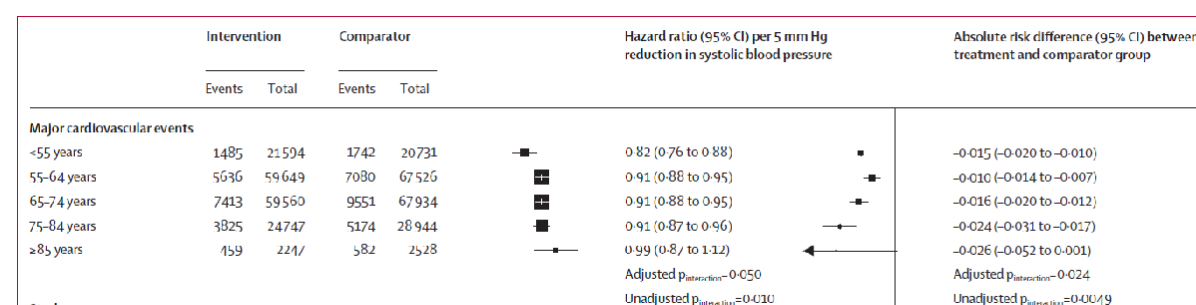


Figure 2.1. Forest plot of hazard ratios for the risk of major cardiovascular events per 5mm Hg reduction in blood pressure for different age groups (adjusted p for interaction=0.050) similar effects at different ages (but fewer folk in the < 55 age band as HT less common).

The risks of hypertension increase steadily in adulthood, so the numbers detected increase with increase starting age. The trials mentioned above include some patients down to the age of 21, but most evidence is for the over 55 years of age. The RACGP and other key bodies recommend blood pressure measurement from the young adulthood.

Interval for Assessment

The current RACGP guidelines suggest re-measurement of blood pressure every 2 years. Few studies have directly addressed the question of appropriate interval. Examination of

the changes in blood pressure over time in a large Japanese cohort (5) suggested that the optimal interval should be:

- (a) 3 years or more for those with SBP<130 mm Hg and
- (b) 2 years for those with SBP $\geq$ 130 mm Hg.

For simplicity, using the 2-year option seems appropriate, which is similar to that for patients with stable treated hypertension (6).

Subpopulations

The BP Trialists individual patient meta-analysis has analysed population subgroups on a variety of factors – including age, prior cardiovascular disease, cardiovascular risk score and others - and not identified any important differences in the relative risk reduction – that is the relative effects of treatment are similar across all population subgroups. Thus, the main consideration for different assessments in subpopulations is the absolute cardiovascular risk. For example, Aboriginal and Torres Strait Islander populations have a higher CVD risk and hence would warrant assessment at an earlier age.

Conclusion

There is strong evidence that detecting and treating high blood pressure in adulthood reduces cardiovascular events, and the assessment every 2-3 years is reasonable.

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3. The Health Assessment component: Cholesterol

Background and Description

Abnormal levels of blood lipids are one of the key modifiable risk factors for cardiovascular disease and diabetes. Over 8.5 million (63%) Australian adults have abnormal levels of blood lipids such as cholesterol. Regular assessment for the presence of abnormal blood lipids may allow earlier identification and management and hence reduce subsequent cardiovascular events. Lipid tests such as cholesterol blood tests is a simple low-cost test to assess the presence of abnormal blood levels. Cardiovascular risk assessment equations usually use either the Total/HDL cholesterol ratio or the non-HDL cholesterol as more accurate predictors than total cholesterol (1-2).

Evidence of Effectiveness

In 2016, USPSTF published evidence review (AMSTAR rating 7) that addressed several key questions on the benefits and harms of statins therapy for the prevention of cardiovascular disease (CVD) in adults in primary care (3).

Direct Evidence: The 2016 USPSTF review and its previous versions (2008 and 2001) could not identify any RCTs that directly evaluated the benefits and harms of cholesterol assessment in primary care (4-5). Therefore, the main evidence underpinning the recent 2016 USPSTF recommendations derived from *the* indirect or '*linked*' evidence on the effectiveness of treating screened adults to reduce CVD in primary care.

Linked Evidence: The Cholesterol Treatment Trialists' Collaboration individual patient meta-analysis of 27 RCTs of lipid lowering medications included 174,000 participants mostly detected through screening or regular assessment with a median of 4.9 years of follow-up duration. This meta-analysis found that lipid lowering treatment is associated with a statistically significant reduction of 21% in major cardiovascular events per 1.0 mmol/L LDL cholesterol reduction (rate ratio [RR] 0.79, 95%CI 0.77 to 0.81; $p < 0.0001$). The relative risk reductions in major cardiovascular events were consistent across different cardiovascular risk and previous history of CVD at baseline (**Table 3.1**). They also found a 10% relative risk reduction in all-cause mortality per 1.0 mmol/L reduction in LDL (RR 0.90, 95%CI 0.87 to 0.93; $p < 0.0001$). Of note is the increase in the absolute risk reduction across the 4 baseline CVD risk strata.

Table 3.1. Summary of the evidence of the benefits and harms of lipid lowering medications in primary care ('linked evidence')

	Intervention (Statin or more intensive)	Comparator (Control or less intensive)	RRR % (95% CI)	ARR % at 4.9 years
Overall All-cause mortality	8370 (2.3%)	9087 (2.5%)	9% (7% - 12%)	0.2%
Overall Major cardiovascular events	11284 (3.3%)	13673 (4.0%)	21% (19% - 23%)	0.7%
Major cardiovascular events by subgroups				
Gender				
Men	8943 (3.5%)	10979 (4.4%)	22% (19% - 25%)	0.9%
Women	2341 (2.6%)	2694 (3.0%)	16% (9% - 22%)	0.4%
Age groups*				
≤65	6056 (3.7%)	7455 (3.6%)	22% (20% - 26%)	0.1%
>65 to ≤75	4032 (3.7%)	4908 (4.6%)	22% (17% - 26%)	0.9%
>75	885 (4.8%)	987 (5.4%)	16% (3% - 27%)	0.6%
Baseline estimated 5-yr CVD risk				
<10%	773 (0.8%)	1101 (1.1%)	32% (26% - 38%)	0.3%
≥10%-<20%	3615 (3.0%)	4195 (3.5%)	21% (16% - 25%)	0.5%
≥20%-<30%	4109 (4.7%)	4919 (5.8%)	19% (15% - 22%)	1.1%
≥30%	2787 (7.6%)	3458 (9.8%)	21% (17% - 25%)	2.2%
History of CVD				
No known history of CVD	1906 (1.4%)	2425 (1.8%)	25% (20% - 29%)	0.4%
History of CVD	9348 (4.4%)	11248 (5.4%)	21% (18% - 23%)	1.0%

RRR = Relative Risk Reduction; ARR = Absolute Risk Reduction

*evidence from the Cholesterol Treatment Trialists' (CTT) Collaboration, Baigent C, Blackwell L, et al. Efficacy and safety of more intensive lowering of LDL cholesterol: a meta-analysis of data from 170,000 participants in 26 randomised trials. Lancet. 2010;376(9753):1670-1681. doi:10.1016/S0140-6736(10)61350-5

Starting and Stopping Ages

The proportion of adults with abnormal blood lipids increases with age—from 34% among 18–24-year-olds to 81% among 65–74-year-olds. The mean age of the participants included in the meta-analysis mentioned above was 62.7 years (95% CI 62.6 to 62.7). Table 3.1 shows similar relative effects across different age groups (fewer participants in >75 years age group) but highest absolute reduction was in 55–65-year age group. For the <65-year group, about 1,000 people needed to be treated for 4.9 years to prevent one major CVD event (6–7). The RACGP and other key bodies recommend blood lipid measurement commencing at 45 years of age.

Interval for Assessment

The current RACGP guidelines suggest measurement of blood lipids every 3 years. Few studies have directly addressed the question of appropriate interval. Evaluation of the optimal interval for blood lipid assessment and the long-term true variations in blood lipid levels (signal') and short-term within-person variation ('noise') over 4 years in a cohort of 15,810 apparently healthy adults in Japan suggested that the optimal interval with a weak signal-to-noise ratios of standard blood lipid measures (e.g., LDL) is over 3 years (8).

Subpopulations

The Cholesterol Treatment Trialists' Collaboration individual patient meta-analysis has evaluated the effect of lipid lowering medications on sub-population across a variety of factors including age, gender, history of CVD, and baseline risk of CVD. They did not identify any important differences in the relative risk reductions. However, absolute risk difference was higher in people with higher baseline CVD risk (table 3.1).

Although, Australian National Health Survey showed no important differences in the proportion of adults with abnormal blood lipids between Aboriginal and Torres Strait Islander populations and non-indigenous subpopulation, Aboriginal and Torres Strait Islander populations have a higher baseline CVD risk. Therefore, cholesterol assessment (as part of CVD risk assessment) is warranted at an earlier age for Aboriginal and Torres Strait Islander populations (at 35 years).

Conclusion

There is evidence that detection and management of abnormal blood lipids in adult reduces the risk of all-cause mortality and major cardiovascular events. Assessment every 3 years is reasonable and should start at earlier age among Aboriginal and Torres Strait Islander populations.

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4. The Health Assessment component: Diabetes Mellitus

Background and Description

Almost 5% of the total Australian population have diabetes – with almost 1.2 million hospitalisations associated with diabetes in 2019-20. Over \$3.0 billion were spent on diabetes related expenditure in the Australian health system (1).

Diabetes is a major risk factor for cardiovascular disease. It is associated with an increased risk of chronic kidney disease and blindness. Regular assessment for the presence of diabetes among asymptomatic adults may allow earlier identification, diagnosis, and management, thus reducing diabetic complications. The usual assessments are a fasting plasma glucose and a HbA1c, which are both simple common blood tests.

Evidence of Effectiveness

Direct Evidence: In 2021, USPSTF published an evidence review (AMSTAR rating 6/11) that addressed several key questions on the benefits and harms of the detection and management of diabetes and prediabetes in primary care (2). The review identified 2 large RCTs that evaluated invitations to an assessment for diabetes:

- (1) *Anglo-Danish-Dutch Study of Intensive Treatment In People with Screen Detected Diabetes in Primary Care (ADDITION)-Cambridge* (a cluster RCT of 33 general practices and included 20,184 participants, aged 40 to 69 years, at high risk of diabetes). This RCT used a stepwise approach starting with a random glucose test (3); and
- (2) 13-year follow up of Ely cohort (a parallel-group RCT included 4,936 participants, aged 40 to 65 years, without known diabetes) assessed participants with oral glucose tolerance test every 5 years (4).

Benefits: Neither RCTs found any statistically significant differences between screening and control groups for total deaths or cause-specific deaths at 10 years. There was no statistically significant reduction in self-reported CVD events seen in both trials. However, data from most participants for outcomes other than mortality were missing, thus, findings should be interpreted with caution.

Harms: Both RCTs reported no statistically significant differences between screening and control groups for anxiety, depression, worry, or self-reported health. One trial reported a statistically significant short-term increase in anxiety (at 6 weeks) among persons screened and diagnosed with diabetes compared to those not diagnosed (State-Trait Anxiety Inventory scores: 46.7 vs. 37.0; $p=0.03$) (Table 4.1).

Table 4.1. Summary of the evidence on the benefits and harms of the detection of diabetes among asymptomatic adults in primary care

	ADDITION-Cambridge	Ely
Benefits		
Mortality	• All-cause mortality: RR 1.06 (0.90 to 1.25) • CVD mortality RR 1.02 (0.75 to 1.38) • Diabetes-related mortality RR 1.26 (0.75 to 2.10)	• All-cause mortality RR 0.96 (0.77 to 1.20) • CVD mortality Number of events: 41 vs. 74 (p-value >0.05) • Diabetes-related mortality Not reported
CVD events	• MI or stroke (self-reported) 12.4% vs. 13.5%; Odds Ratio 0.90 (0.71 to 1.15)	• MI (self-reported) RR 0.57 (0.22 to 1.49) • Stroke (self-reported) RR 0.39 (0.10 to 1.58)
Quality of life	• Health-related quality of life (EQ-5D score) Mean (SD) 87% (16) vs. 87% (15) (p-value >0.05) • SF-8 physical health score Mean (SD) 48% (10) vs. 48% (10) (p-value >0.05) • SF-8 mental health score Mean (SD) 52% (9%) vs. 52% (8) (p-value >0.05)	• Health-related quality of life (EQ-5D score) Mean (95% CI) 78% (65-85) vs. 80% (60-88) (p-value =0.68) • SF-36 physical health score Mean (SD) 67% (29) vs. 70% (31) (p-value =0.64) • SF-36 mental health score Mean (SD) 78% (17) vs. 80% (16) (p-value =0.47)
Harms		
Anxiety	• State-Trait Anxiety score* Mean (95%CI) at 6 weeks 37 (12) vs. 34 (12) (p-value =0.015) But not statistically significant at 12-15 months (p-value=0.52)	• Prescribed anxiolytic at 13 years Percentage 0.5% vs. 0.6% (p-value= 0.8)
Depression	• Hospital Anxiety and Depression Scale Between group difference at 12-15 months 0.22 (95%CI; -0.31 to 0.74) (p-value=0.44)	• Prescribed antidepressant at 13 years Percentage 6% vs. 5% (p-value= 0.4)

Scale ranges from 0 to 100 for each score. *Scale ranges from 20 to 80

Linked evidence: The United Kingdom Prospective Diabetes Study evaluated the long-term impact of intensive glucose control with sulfonylureas or insulin among participants recently diagnosed with diabetes. They found a statistically significant reduction on all-cause mortality (relative risk [RR], 0.87 [95% CI 0.79 to 0.96]), diabetes-related mortality (RR, 0.83 [95% CI, 0.73 to 0.96]), and myocardial infarction (RR, 0.85 [95% CI 0.74 to 0.97]) at 20 years (5). For screen-detected diabetes, a single cluster RCT, which compared the effect of controlling diabetes among 3,057 screen-detected adults, found no differences in all-cause mortality, cardiovascular-related mortality, cardiovascular events, or other health outcomes at 5 and 10 years (6).

Starting and Stopping Ages

The risk of diabetes increases with age (Figure 4.1) but is low among people younger than 40 (7). Both RCTs from the evidence reviews above included participants aged 40 years or older. The Red book recommends starting general diabetes assessment at 40 years of age and calculating risk of diabetes using Australian Type 2 Diabetes Risk assessment (AUSDRISK) tool starting from 45 years of age.

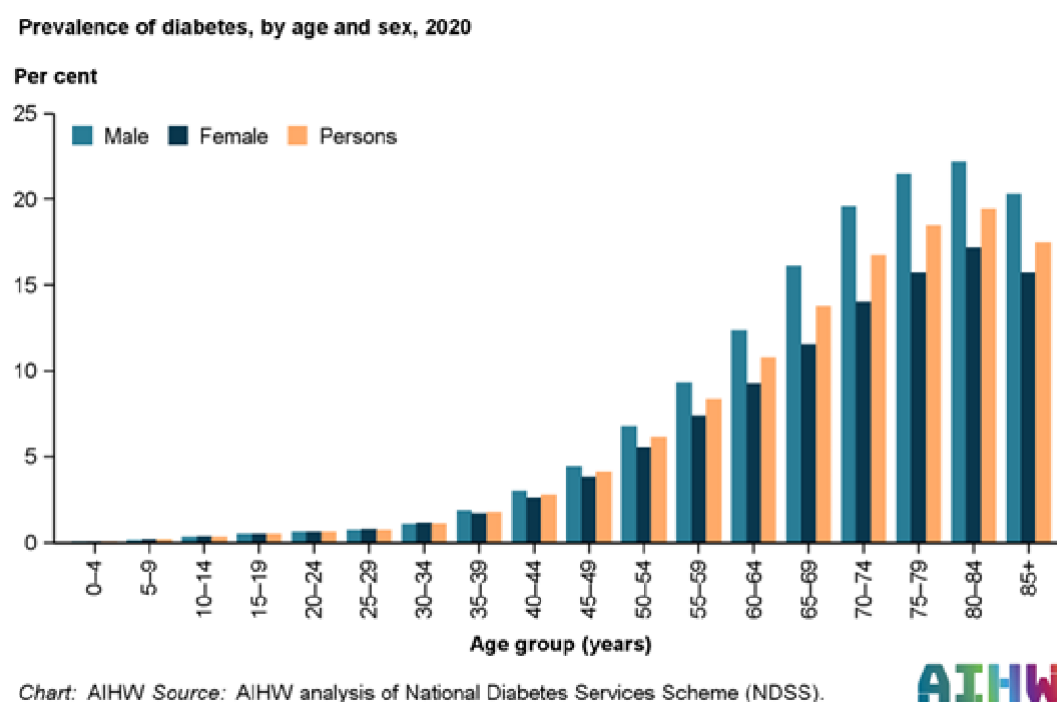


Figure 4.1. Prevalence of diabetes in Australia by age and sex, 2020

Interval for Assessment

The current RACGP guidelines suggest re-measurement of blood glucose every 3 years. Few studies have directly addressed the question of appropriate interval. Examination of the changes in glycated haemoglobin (HbA1c) over 5 years in a retrospective cohort of 5,084 participants suggested that the optimal interval differs according to the baseline risk of developing diabetes (i.e., include baseline HbA1c, family history, smoking, BMI, age) (8):

- (a) people with high risk of diabetes: 8 months;
- (b) people with intermediate risk of diabetes: optimal interval for assessment is 3 years;
- (c) people with low risk of diabetes: optimal interval for assessment is 5 years;

Subpopulations

The USPSTF review did not identify any evidence that the effect of the assessment of diabetes is different for subgroups defined by age, sex, socioeconomic status, or race ethnicity. Aboriginal and Torres Strait Islander populations have a higher risk of developing diabetes – approximately a 3-fold increase in risk of diabetes and a 5-fold risk of dying from diabetic complications (1); thus, diabetes assessment should be started at earlier age (18 years of age and older).

Conclusion

There is mixed evidence that earlier detection and management of diabetes in adult reduces the risk of all-cause mortality, cause-specific mortality, cardiovascular events, or other diabetic complications. Assessment every 3 years is reasonable and should start at earlier age among Aboriginal and Torres Strait Islander populations.

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5. The Health Assessment component: Detection and advice on Smoking cessation

Background and Description

Smoking has been declining steadily in Australia, but, with around 15% of adults still being regular smokers, remains a significant problem. The health implications are substantial: data from the NSW 45 and Up study concluded that up to two-thirds of deaths in current smokers can be attributed to smoking, who each lose on average 10 years of life.

Most smokers make multiple attempts to quit before they finally succeed long-term, GPs have an important role to play with brief advice to quit. For example, the three-step brief intervention model consists of: (i) Ask and record smoking status; (ii) Advise all people who smoke to quit and on the most effective methods; (iii) help by offering to arrange referral, encourage use of behavioural intervention and use of evidence-based smoking cessation pharmacotherapy.

Such checks and brief advice should be part of ongoing primary care but are also a component of intermittent and more comprehensive health assessments.

Evidence of Effectiveness

No systematic reviews for the effect of screening for smoking on future morbidity and/or mortality were identified. Linked evidence for the effect of interventions once smoking is detected is provided by a) a network meta-analysis of the effect of the provision of brief advice to quit smoking on quit rate in the short and b) studies of varying designs reporting on the impact of smoking cessation with health outcomes.

Linked Evidence: *a) The effect of brief advice to quit smoking on quit rates.*

There is high quality evidence that brief advice to quit smoking increases the quit rate. A Cochrane network meta-analysis found that (based on 194 randomized trials, $n = 72,273$) the provision of counselling increased the quit rate by 44% (OR 1.44, 95% credibility interval (CrI) 1.22 to 1.70) (1). Counselling included a wide range of interventions. Specifically relevant to this health assessment component they noted that a 2013 Cochrane Review (AMSTAR rating 9/11) of 42 trials reported that compared with usual care or no advice, brief advice from a physician increased cessation rates by 76% (RR 1.76, 95% CI 1.58 to 1.96; $I^2 = 40\%$; 26 studies, $n = 22,239$) (2). Of the 42 studies, only one study determined the effect of smoking advice on mortality, which found no statistically significant differences in death rates at 20 years follow-up.

The extent of the impact on long-term quit rates and disease reduction is less clear. Table 5.1 below shows the longer-term (5 to 9 years) quit rate in four large studies of smoking cessation which looked at CVD and lung cancer outcomes (*See section on direct evidence*). The reductions in smoking are modest but important given the importance of smoking as a risk factor.

Table 5.1: Number of participants who quit smoking in the long-term trials

Study ID	Intervention	Usual care	Quit Rate
	% (Numbers)	%	Difference
<i>Smoking cessation alone vs usual care</i>			
Lung Health study- 5 years	22% (432/1962)	5% (98/1964)	17%
Whitehall study- 9 years	55% (393/714)	No data	?
<i>Multicomponent vs usual care</i>			
MRFIT- 6 years	27% (1734/6428)	16% (1009/6438)	11%
Oslo study- 5 years	24% (145/604)	17% (107/628)	7%

b) The effect of smoking cessation on health outcomes

There are two elements of linked evidence to suggest impacts on health outcomes: (i) observational studies, and (ii) trials in those with established disease.

(i) Observational studies: Observational studies show a strong association with reduced cardiovascular risk. For example, an individual participant meta-analysis of 25 cohorts (in the CHANCES consortium) with 503,905 participants aged 60 and older found cardiovascular mortality was doubled (HR 2.1, 95% CI 1.8 to 2.4) for current smokers and increased by almost 50% (HR 1.47, 95% CI 1.25 to 1.49) for former smokers compared with never smokers (3). The excess risk in smokers increased with increasing cigarette consumption and decreased with time since smoking cessation in former smokers. A 2003 Cochrane review (4) of 20 observational studies found a 36% reduction in relative risk (RR) of mortality for those who quit smoking (RR 0.64, 95% CI 0.58 to 0.71), and a 32% reduction in non-fatal myocardial infarctions (RR 0.68, 95% CI 0.57 to 0.82). Similarly, a meta-analysis of cohort studies of smoking cessation (5) after myocardial infarction found a 46% relative risk reduction (95% CI 54% to 38%) from successful quitting.

(ii) Trials in those with established disease: Compared to the observational studies, there are few randomized trials with the long-term follow up needed to assess the health outcomes from smoking cessation. One randomized trial of intensive smoking cessation (sessions over 12 weeks with pharmacotherapy) in patients with cardiovascular disease achieved a rate of 33% long-term (2 year) abstinences and found a significant 44% relative risk reduction in mortality with an NNT of 11 (6).

Direct Evidence: Trials of smoking cessation with long term follow-up

We could not identify a systematic review of the long-term health outcomes of smoking cessation advice but did identify several long term trials (in-house systematic review in progress). Although certainty is low, smoking cessation programs offered as a stand-alone intervention may modestly reduce cardiovascular disease mortality (RR 0.78, 95% CI 0.55 to

1.08, with no heterogeneity; Table 5.2) There is no to little evidence that smoking cessation offered as part of multicomponent interventions would reduce CVD mortality (RR 0.79, 95% CI 0.47 to 1.32, with moderate heterogeneity) compared to usual care. A pooled analysis indicated that there was a non-significant reduction in CVD mortality for smoking cessation interventions compared to usual care (RR 0.84, 95% CI 0.69 to 1.03, no heterogeneity).

Similarly, compared to usual care, there is no to little evidence that smoking cessation-alone interventions (RR 0.95, 95% CI 0.78 to 1.16, with no heterogeneity) and multicomponent interventions (RR 0.87, 95% CI 0.56 to 1.35, with high heterogeneity) would reduce all-cause mortality. The pooled analysis of both interventions yielded non-significant reductions (RR 0.97, 95% CI 0.86 to 1.10, no heterogeneity) when compared to the control group.

Table 5.2: Summary of primary outcomes for smoking cessation versus usual care at 5 to 10 years post intervention

<u>Intervention</u>						
Outcome	RCTs (people)	Anticipated absolute effects (per 1000)+		Relative Risk (95%CI)	GRADE Quality	Comments
		Smoking Cessation	Usual care			
<i>Smoking cessation alone</i>						
All-cause mortality	2 (5,371)	66	63	RR 0.95 (0.78 to 1.16)	LOW	May slightly reduce mortality; NNTB= 250
CVD mortality	2 (5,371)	27	21	RR 0.78 (0.55 to 1.08)	LOW	May slightly reduce mortality; NNTB= 167
<i>Multi-component intervention</i>						
All-cause Mortality	2 (14,098)	41	36	RR 0.87 (0.56 to 1.35)	VERY LOW	Little or no difference; NNTB= 1000
CVD mortality	2 (14,098)	20	16	RR 0.79 (0.47 to 1.32)	LOW	Little or no difference; NNTB= 500

Starting and Stopping Ages

Most smokers begin during their teenage and young adult years, with peak prevalence currently in the 40-49 age group (Figure 5.1). There is a lag of several years between quitting smoking and the reduction in health risk, but with variation in the risk reduction for different health conditions, such as CVD, lung cancer, and COPD. Hence detecting smoking and implementing interventions for smoking cessation is important at any age, and one of the most common health issues that should be identified in a health assessment.

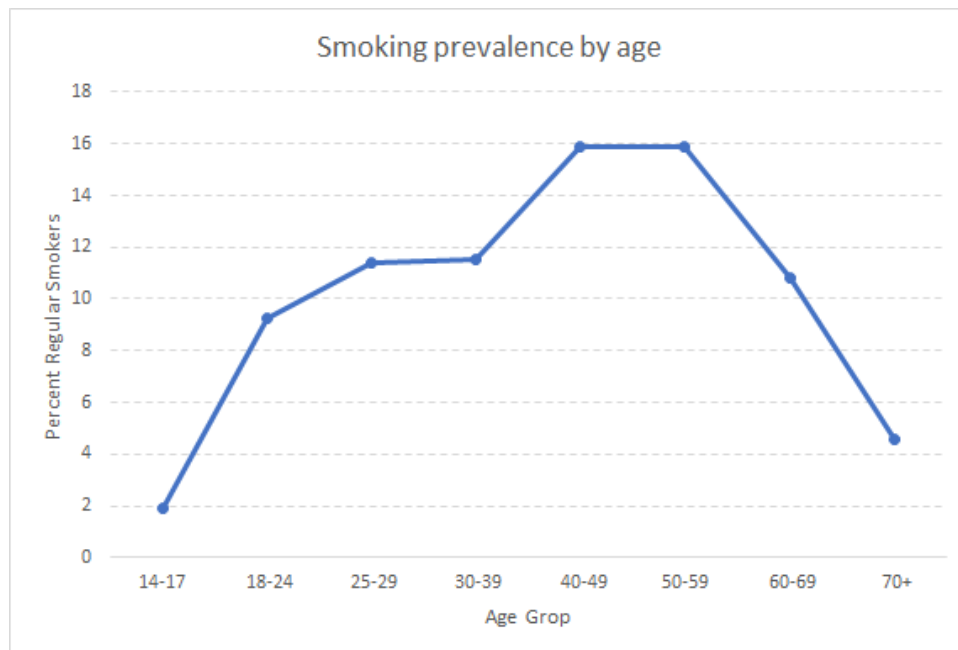


Figure 5.1: Prevalence of smokers in Australia at different ages. (from 2019 National Drug Strategy Household Survey) (7)

Interval for Assessment

Given the impact of smoking on health, identifying smokers, and offering brief advice and support is valuable as part of a health assessment. However, smoking should also be addressed opportunistically at consultations for other reasons. Hence there is no clear single interval for smoking cessation but would be advisable to include as part of the schedule of other health assessment components.

Subpopulations

In 2018–19, 39% of the combined Aboriginal and Torres Strait Islander population aged 15 and over were daily smokers – about 3 times the rest of the Australian population - although there is considerable variation in tobacco use rates by location, age group, and gender smoking accounts for 37% of deaths (8) and 12.1% of the burden of disease (9) among Aboriginal and Torres Strait Islander peoples - more than any other risk factor.

Conclusion

Identifying and offering brief advice and support to smokers is an important clinical activity. There is strong evidence that it increases quit rates long term. There is less direct evidence, but reasonable linked evidence that it reduces the health impacts of smoking such as CVD events and lung cancer.

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6. The Health Assessment component: Alcohol use

Background and Description

Current Australian alcohol guidelines outline the levels of alcohol consumption that minimise risk of harm from alcohol related disease or injury (1). However, in 2020-2021, 1 in 4 Australians (25%) over 18 years exceeded the Australian Adult Alcohol Guideline. Men were more likely than women to exceed the guideline (33.6% vs 18.5%) and people born in Australia were almost twice as likely as those born overseas to exceed the guideline (30% v 17%) (2).

Drinking more than the recommended amount of alcohol can have short- and long-term effects on health including accidental injury, family, domestic and sexual violence, mental health issues, increased risk of weight gain, diabetes, cancers, cardiovascular issues, cirrhosis of the liver, and liver failure. For pregnant women or women planning pregnancy or breastfeeding, any amount of alcohol consumption can harm the fetus or baby. Alcohol consumption costs the Australian community approximately \$66.8 billion per year in health, workplace, and other costs (3).

Australia's current Guidelines for preventive activities in general practice recommends patients from 15 years of age should be asked about the quantity and frequency of alcohol intake with those with at-risk patterns of consumption offered brief advice on the risk of drinking. The guideline suggests the Alcohol Use Disorder Identification Test-Consumption (AUDIT-C) tool can be used to assess this.

Evidence of Effectiveness

Direct Evidence: In 2018, the USPSTF reviewed the evidence for screening and nonpharmacologic interventions to reduce unhealthy alcohol use (AMSTAR rating 10/11) (4). This review found there were no trials examining the effect of screening for unhealthy alcohol use on alcohol use, health, social or legal outcomes or harms. No randomised trials of screening for unhealthy alcohol use published after the USPSTF review were identified.

Linked evidence for the effect of screening for unhealthy alcohol use is provided by: a) evidence on the effect of interventions in those detected with unhealthy alcohol use is available from a systematic review conducted by the USPSTF and b) evidence of the effect of reducing alcohol consumption on cardiovascular events and CVD risk factors from two other systematic reviews.

a) Evidence on the effect of counselling interventions in screen detected unhealthy alcohol use.

The 2018 USPSTF review finds moderate quality evidence for adults and low-quality evidence for adolescents of the effects of counselling interventions (with or without referral) to reduce unhealthy alcohol use in people detected on screening to be engaged in unhealthy alcohol use (4). Most counselling interventions comprised 1-2 sessions and provided at least general feedback such as how the participants drinking fit with recommended limits, and how to reduce alcohol use. Trial participants receiving counselling

interventions reduced their alcohol consumption by 1.6 drinks per week compared to the control group at 6-12 months follow-up but the difference between groups was not statistically significant (WMD between groups in change from baseline -1.59 drinks per week 95% CI -2.2 to 1.0; 32 trials). There was a 40% reduction in the odds of exceeding recommended drinking limits at follow-up (OR 0.60 95% CI 0.53 to 0.67 indicating the reduction may be as small as 33% and as large as 47%; 16 trials) among participants receiving counselling and a 33% reduction in the odds of reporting an episode of heavy use (OR 0.67, 95% CI 0.58 to 0.77 indicating the reduction may be as small as 22% and as large as 42%; 8 trials).

Maintenance of the effect of counselling interventions varied in the trials with multiple follow-up assessments. In 4 trials, treatment benefits were maintained through 24-48 months, the effect disappeared in 1 trial between 12-48 months and 2 trials found no difference between intervention and treatment groups at 24 and 36 months of follow-up. Among pregnant women receiving counselling interventions, the odds of abstinence were doubled compared to the control group (OR 2.3 95% CI 1.43 to 3.56 indicating a statistically significant increase in odds; 5 trials). (Table 6.1)

Intervention counselling resulted in a statistically significant, very small standardised mean difference in change between groups in alcohol-related problems or consequences (SMD -0.04 95% CI -0.09 to -0.01; 18 trials; standardised mean differences between 0 and 0.2 are generally interpreted as representing a small effect) but no statistically significant difference between counselling and control groups in mortality (OR 0.64, 95% CI 0.34-1.19; 8 trials). No studies reported increased risk of harms including unexpected paradoxical increases in alcohol use with counselling interventions, though few studies reported this outcome.

Table 6.1. Summary of the evidence on the effects of counselling interventions in screen-detected adults and adolescents (O'Connor, 2018 – USPSTF report)

Outcome	Number of trials	Participants	Strength of evidence	Results (95% CI)
Alcohol use (drinks/week)	32	n=15,974	Low (adolescents)	WMD 1.59 (-2.15 to -1.03)
Exceeding recommended drinking limits	16	n=9760	Moderate (adults)	OR 0.60 (0.53 to 0.67)
Heavy use episode	14	n=8108		OR 0.67 (0.58 to 0.77)
Pregnant women reporting abstinence	5	n=796		OR 2.26 (1.43 to 3.56)
Alcohol related problems or consequences	18		Insufficient [#] (adolescents)	SMD -0.04 (-0.09 to -0.01)*
Mortality	9	n=4533	Low (adults)	OR 0.64 (0.34 to 1.19)

WMD -weighted mean difference between groups in change from baseline; OR – odds ratio; SMD – standardised mean difference *small effect typically considered to be 0.0 to 0.2 [#]current evidence insufficient to assess the balance of benefits and harms of screening and brief behavioural counselling interventions for alcohol use in primary care settings in adolescents aged 12-17 years of age

b) Evidence of the effect of alcohol restriction on CVD events, all-cause mortality and blood pressure

One systematic review of randomised controlled trials (AMSTAR rating 10/11) has assessed the effect of interventions to reduce alcohol intake compared to control or no intervention on blood pressure, mortality and CVD events in people who consume alcohol and have hypertension (5). Low or very low-quality evidence (subgroup data from 1 trial) found interventions produced a statistically significant reduction in alcohol intake at 24 months follow-up (MD -191 g difference between baseline and current consumption 95% CI -85g to -297g). There was no statistically significant difference between intervention and control groups in overall mortality (RR 0.72 95%CI 0.16 to 3.17), cardiovascular events (RR 0.80 95% CI 0.36 to 1.79), and in blood pressure reduction (SBP MD -0.9, 95% CI -5.7 to 3.8, P=0.70, very low-quality evidence; DBP MD 1.0, 95%CI -1.7 to 3.7, P=0.47, low quality evidence) (Table 6.2).

A second systematic review of randomised controlled trials (AMSTAR 8/11) has assessed the effect of interventions to reduce alcohol consumption on changes in blood pressure in adults of mixed hypertension statuses (hypertensive, normotensive, mixed) (6). Low quality evidence has found that on average, reduced alcohol consumption resulted in a statistically significant reduction in systolic blood pressure and diastolic blood pressure (SBP MD -3.1 mmHg 95%CI -3.9 to -2.3; DBP MD -2.0 mmHg 95%CI -2.7 to -1.4) though heterogeneity between studies was high. Analysis according to baseline consumption found the more alcohol participants consumed at baseline, the more substantial the blood pressure lowering effect.

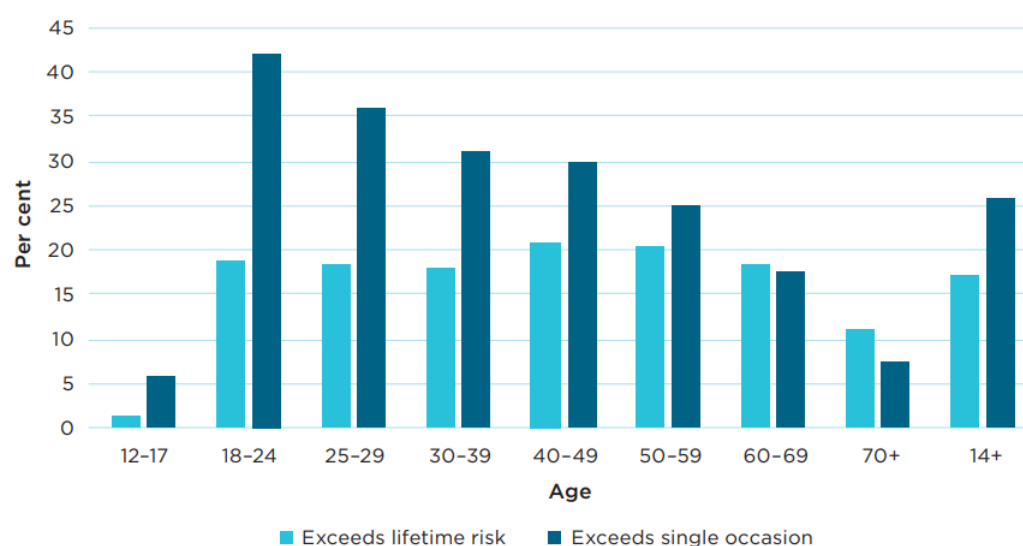
Table 6.2: Summary of outcomes for alcohol restriction versus control for patients with hypertension from the reviews of Acin et al, 2020 and Roereck et al, 2017

Outcomes	RCTs (people)	Absolute effects (per 1000)		Effect estimate (95% CI)	Quality of Evidence GRADE*	Comments
		CBT	Control			
Study 1 – Acin 2020, CVD Events						
All-cause mortality	1 (269)	22/1000	30/1000	RR 0.7 (0.2 to 3.2)	LOW	No significant difference (P=0.67), CI wide
CVD events	1 (269)	73/1000	91/1000	RR 0.8 (0.36 to 1.79)	VERY LOW	No significant difference (P=0.59), CI wide
Study 2 – Roerecke 2017, Blood pressure reductions						
Decrease in SBP (mmHg) – all	34 (2850)	NR	NR	MD -3.1 (-3.9 to -2.3)	**	Significant reduction
Decrease in DBP (mmHg) - all	32 (2210)	NR	NR	MD -2.0 (-2.7 to -1.4)	**	Significant reduction

RR = Risk ratio; MD = mean difference; CI = confidence interval; CVD = cardiovascular; SBP = systolic blood pressure; DBP = diastolic blood pressure; *Downgraded for risk of bias, imprecision, inconsistency; ** Not GRADED because of the significant heterogeneity explained by baseline intake

Starting and Stopping Ages

In Australia, the risk of exceeding the single occasion risk guideline decreases with age, with 18 to 24 year-olds most likely to exceed the guideline at least once a month (7). Those who exceeded the lifetime risk guideline were most likely to be aged 40-59 years (Figure 6.1). Australia's Guidelines for preventive activities in general practice recommend all patients aged >15 years are asked about the quantity and frequency of alcohol intake.



Notes

Lifetime risk: On average, had more than 2 standard drinks per day

Single occasion risk: Had more than 4 standard drinks at least once a month

Figure 6.1. Proportion of Australians exceeding the NHMRC 2009 lifetime and single occasion risk guidelines 2016 (AIHW, 2017)

Interval for Assessment

Australia's Guideline for preventive activities in general practice recommends all patients aged >15 years have their alcohol intake assessed every 2 to 4 years with those at increased risk (children and adolescents, older people, young adults who have a higher risk of accidents and injuries, people with family history of alcohol dependence, individuals participating in or supervising risky activities, people with physical condition or mental health problem made worse by alcohol, people taking multiple medications) be assessed opportunistically for at risk drinking. Women who are pregnant or planning pregnancy should be assessed at each antenatal visit.

Subpopulations

Aboriginal and Torres Strait Islander peoples are less likely to drink alcohol than other Australians, but those that do drink are more likely to drink at dangerous levels (over lifetime and single occasion) and go to hospital for alcohol related complications (7). Prevalence of risky drinking varies greatly within and between Indigenous Australian communities (8).

Conclusion

There is no direct evidence of the effect of screening for unhealthy alcohol use, but linked evidence has found that counselling interventions in people who screen positive for unhealthy alcohol use are associated with reductions in use (moderate certainty evidence for adults and low certainty evidence for adolescents), and that reduction in alcohol intake reduces cardiovascular risk, though the evidence for this is of low or very low certainty.

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7. The Health Assessment component: Physical activity

Background and Description

Physical activity and exercise guidelines outline how much physical activity Australians of all ages should do each day and the maximum amount of time that should be spent sitting or lying down (1). However, more than half (55%) of Australian adults and 70% of children aged 2-17 do not meet these guidelines (2). Low levels of physical activity are a major risk factor for all-cause and cardiovascular mortality, breast and prostate cancer, falls, cognitive decline, Alzheimer's disease, and depression in older adults (3). There is also strong evidence for a direct association between insufficient physical activity and CVD, stroke, type 2 diabetes, and osteoporosis in adults (4). In children and adolescents, physical inactivity contributes to elevated body mass index with increased risk for cardiovascular disease in adulthood (5). Physical inactivity was responsible for 2.6% of the total disease burden in Australia in 2011 (6).

The Red book currently recommends assessment of patients' physical activity by comparing patients self-report of their current level of activity against the current guidelines (1). For Aboriginal and Torres Strait Islander people, national guidelines recommend current levels of physical activity and sedentary behaviours be assessed against the Australian age-appropriate recommendations and suggest the UK General Practice Physical Activity Questionnaire (GPPAQ) be used in this assessment.

(<https://www.gov.uk/government/publications/general-practice-physical-activity-questionnaire-gppaq>)

Evidence of Effectiveness

No systematic reviews for the effect of screening for physical inactivity on future morbidity and/or mortality were identified.

Linked evidence for the effect of interventions once physical inactivity is detected is provided by (a) a randomised controlled trial of the effect of supervised exercise training (high or moderate intensity) over 5 years on all-cause mortality (10), (b) overviews of systematic reviews and a systematic review evaluating the effects of exercise on surrogate markers for cardiovascular disease, blood pressure and HDL cholesterol (7-9), and (c) a systematic review with network meta-analysis evaluating the effects of interventions including exercise for preventing falls in older adults (11).

(a) All-cause mortality. The randomised controlled trial evaluated the effect of supervised exercise training over 5 years on all-cause mortality in 1567 older adults (70-77 years) who reported high levels of physical activity at baseline in Norway. The trial found no difference in all-cause mortality between combined high and moderate intensity exercise groups and a control group following recommended physical activity guidelines (HR 0.92, 95% CI 0.58 to 1.47; confidence interval crossing 1 implies no difference between the exercise and control groups). All-cause mortality was 37% lower after high intensity interval exercise compared

with controls and 49% lower when high intensity interval exercise was compared with moderate intensity continuous training, but these differences were not statistically significant (10).

(b) Blood pressure. The overview of systematic reviews and pooled analyses of randomised controlled trials examined the relationship between exercise training and blood pressure among adults with normal blood pressure, prehypertension, and hypertension (as defined by the JNC 7 BP criteria) who were physically inactive at baseline. (8) Of the 7 meta-analyses of trials in adults with normal blood pressure, 3 reported a statistically significant reduction in blood pressure and 1 reported a statistically significant increase. Six of these 7 meta-analyses reported a statistically significant reduction in diastolic blood pressure. The blood pressure reduction ranged from 2-3.2mmHg for SBP and 1-3.2mmHg for DBP (Table 7.1). Of the 5 meta-analyses involving adults with pre-hypertension, all reported a statistically significant reduction in SBP and 4 reported a statistically significant reduction in DBP (Table 7.1). A systematic review of 15 randomised trials in adults with hypertension reported an average reduction in 24-hour systolic blood pressure of -5.4mmHg (95% CI -9.2 to -1.6 indicating the average reduction may be as small as 1.6 mmHg or as large as 9.2 mmHg) (9). The exercise interventions in these trials lasted 8-24 weeks (3-5 sessions/week) and only aerobic exercise was found to provide significant benefit.

Table 7.1: Characteristics and results of meta-analyses of randomised controlled trials of the blood pressure response to an exercise training intervention

Population	Number of meta-analyses of RCTs (range); Quality of meta-analyses rated on AMSTAR	Exercise interventions (number of meta-analyses)	Range of statistically significant reductions in systolic blood pressure	Range of statistically significant reductions in diastolic blood pressure
Normal blood pressure	7 (9 to 93) Quality: 1 Poor 4 Moderate 2 High	Isometric resistance training (1) Dynamic resistance training (3) Aerobic training (2) Concurrent training (1)	2.0 – 3.2 mmHg*	.09 – 3.2 mmHg [#]
Pre-hypertension	5 (28 to 105) Quality: 3 Moderate 2 High	Dynamic resistance training (2) Aerobic training (2) Concurrent training (1)	2.9 – 4.7 mmHg ^{\$}	1.5 – 3.6 mmHg [~]

*Range of reductions in SBP from 2 meta-analyses reporting statistically significant reductions in systolic blood pressure (1 meta-analyses reported no difference between exercise versus control; 2 meta-analyses reported non statistically significant reductions in SBP; 1 meta-analysis including both randomised trials and cross-sectional studies reported a statistically significant reduction in SBP of 7.8 mmHg; 1 meta-analysis reported a statistically significant increase in SBP)

[#]Range of reductions in DBP from 6 meta-analyses reporting statistically significant reductions in DBP (1 meta-analysis reported a non-statistically significant reduction in DBP)

^{\$}Range of reductions in SBP from 5 meta-analyses reporting statistically significant reductions in SBP

[~]Range of reductions in DBP from 4 meta-analyses reporting statistically significant reductions in DBP (1 meta-analysis reported a non-statistically significant reduction in DBP)

The overview of 23 systematic reviews of RCTs evaluating the effects of varying types and intensities of exercise on HDL cholesterol levels in health adults or adults at risk of cardiovascular disease reported small improvements in HDL cholesterol levels ranging from 0.27 to 5.41 mg/dl (0.007 to 0.14 mmol/l) compared with no exercise, but the majority of systematic reviews were at high risk of bias (7).

(c) Falls Prevention. The effect of exercise for falls prevention was assessed in a systematic review of randomised trials in older (>65 years) community dwelling adults (11). This review and network meta-analysis of interventions to prevent falls and fall-related fractures found that exercise as a single intervention was associated with three statistically and clinically significant reductions: 17% reduction in number of fallers (risk ratio 0.83, 95% CI 0.77 – 0.89), 21% reduction in falls rate (risk ratio 0.79, 95% CI 0.73 to 0.86), and 38% reduction in number of fall-related fractures (risk ratio 0.62, 95%CI 0.42 to 0.90) when compared to usual care. Exercise was also a common component of multiple interventions associated with a reduction in number of fallers and falls rate.

Starting and Stopping Ages

The Red book recommends asking about patients' current level of physical activity and sedentary behaviour to begin at age 10 (1).

Interval for Assessment

The rate of insufficient physical activity generally increases with age (6) (Figure 7.1). The RACGP recommend asking questions regarding current level of activity and sedentary behaviour for assessment against current guidelines opportunistically for children aged 5-17 years of age and every two years for adults aged 18 years and older. For those at higher risk of physical inactivity/sedentary behaviour (teenage girls, older adults, office workers, Aboriginal and Torres Strait Islander peoples and people from low socio-economic and non-English speaking backgrounds) the RACGP recommends asking questions about current level of physical activity at least 2 yearly and opportunistically (1). The RACGP National guide to a preventive health assessment for Aboriginal and Torres Strait Islander people recommends screening all Aboriginal and Torres Strait Islander people's current level of physical activity and sedentary behaviours against the Australian age-appropriate recommendations opportunistically and as part of an annual health assessment (12).

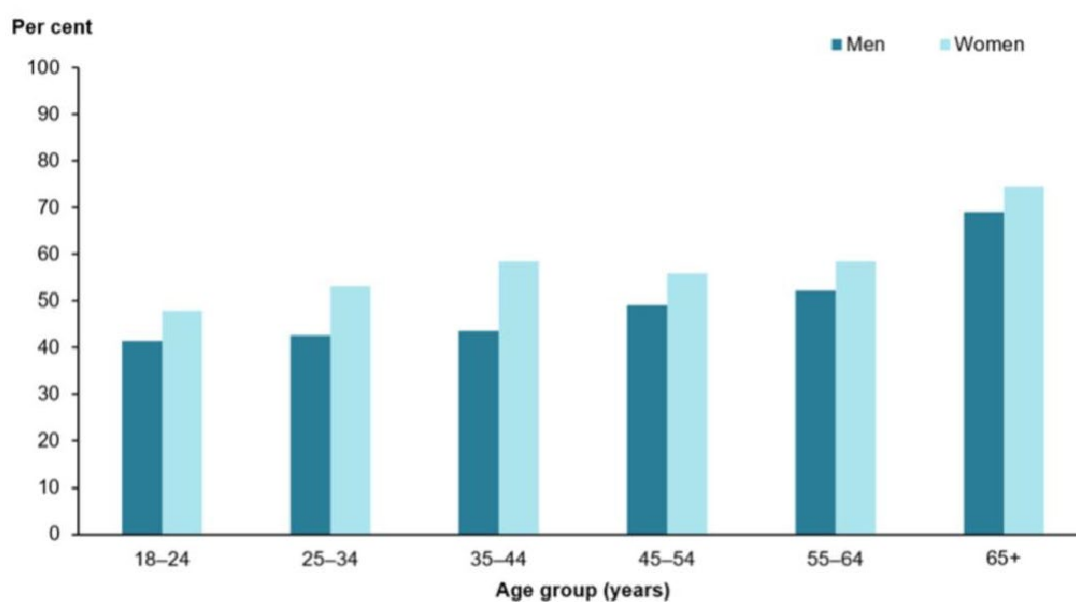


Figure 7.1. Prevalence of insufficient physical activity among Australian adults by age and sex 2017-18 (AIHW analysis of ABS 2019 data)

Subpopulations

The RACGP advises the following groups are at higher risk of physical inactivity and sedentary behaviour; teenage girls, older adults, office workers, Aboriginal and Torres Strait Islander peoples, people from low socioeconomic and non-English speaking backgrounds (1).

Conclusion

There is evidence that exercise provides modest reductions in blood pressure across the range of baseline blood pressures, results in small improvements in HDL cholesterol in healthy adults or adults at risk of cardiovascular disease and reduces falls and falls related fractures.

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8. The Health Assessment component: Overweight and obesity

Background and Description

Greater body mass is associated with increased risk of death with progressively greater mortality as body mass increases. The risk profile appears as a J-shaped curve with progressively greater mortality as BMI increases above 25 kg/m² (1). In a meta-analysis of over 30 million individuals, both obesity and overweight were associated with an increased risk of all-cause mortality (2). In addition to increased mortality, overweight, obesity, and increased central adiposity are associated with increased morbidity including hypertension, hypercholesterolemia, diabetes mellitus, heart disease, stroke, and cancer (3-4). Excess body weight contributed to four million deaths globally in 2015 (5).

The Red book currently recommends measurement and recording of body mass index (BMI) and waist circumference every two years with recommendation that patients who are overweight or obese be offered individual lifestyle education and skills training (6).

Evidence of Effectiveness

In 2015, the Canadian Task Force on Preventive Health Care reviewed the evidence for screening for weight issues and behavioural and pharmacologic interventions to manage overweight and obesity in adults in primary care (AMSTAR rating 11/12) (7).

Direct Evidence. The CTFPHC review found no trials examining the effect of screening for weight issues in primary care (7). A search for systematic reviews and randomised trials of screening for overweight and obesity published subsequent to the Canadian Task Force review located a single randomised trial evaluating the effect of screening with opportunistic intervention among adults with obesity consulting primary care physicians in England (8). In this trial, individuals consulting a primary care physician were screened for obesity and individuals with BMI >30 kg/m² (or 25 kg/m² for individuals of Asian ethnicity) and raised body fat percentage randomised to one of two 30 second interventions; (i) referral to a weight management programme with appointment made and follow-up support offered or (ii) advice the patients' health would benefit from weight loss. The primary outcome was weight change at 12 months.

Of 8403 patients screened, 1882 were obese and included in the trial. Of the individuals randomised to the weight management program, 77% (722/940) agreed to attend and 40% attended (379/940). Mean weight change at 12 months was 2.43 kg with the weight management program and support intervention and 1.04 kg with the advice intervention. The difference between study groups was not statistically significant (adjusted difference 1.43 kg, 95% CI 0.89 to 1.97). (Table 8.1) There was no difference in patients' thoughts about the appropriateness or helpfulness of discussing their weight when visiting their primary care physician for other reasons and only 4 participants (<1%) thought the intervention was inappropriate and unhelpful (8).

Table 8.1. The effects of screening and brief intervention for obesity in primary care in a randomised controlled trial (Aveyard et al, 2016)

Outcome	Interventions		Difference in mean weight change at 12 months (adjusted)
	Referral to weight management program and support	Advice	
Mean weight change at 12 months (kg)	2.43	1.04	1.43 95% CI 0.89 to 1.97

Linked evidence for the effect of screening for overweight and obesity is provided by a) evidence on the effect of behavioural interventions in adults who are overweight or obese (BMI 25-39.9) from a systematic review conducted by the Canadian Task Force on Preventive Health Care and b) evidence of the effect of weight reducing diets on all-cause and CVD mortality, adverse events and changes in weight and blood pressure in people with hypertension from a Cochrane systematic review.

a) Evidence on the effect of behavioural interventions in adults who are overweight or obese.

The 2015 Canadian Task Force on Preventive Health Care review finds moderate quality evidence for the effects of behavioural interventions (diet, exercise and/or lifestyle components) on weight loss, BMI, waist circumference and physiological measures in adults (7). No trials reporting on the effect of behavioural interventions on mortality were found. Meta-analysis of randomised trials including participants with and without diabetes and other chronic conditions found that participants receiving behavioural interventions found a statistically significant reduction in weight (mean difference -3.1 kg, 95% CI -3.9 to -2.4; 33 trials), BMI (mean difference 1.1, 95% CI 1.4 to 0.8; 22 trials) and waist circumference (mean difference 3.0 cm, 95% CI 3.9 to 2.2; 22 trials) compared to controls (Table 8.2). There were small but statistically significant reductions in levels of total and LDL cholesterol, fasting glucose, and blood pressure with behavioural interventions compared to controls. No significant difference in frequency of any adverse event, serious adverse event, or withdrawal due to adverse events was reported between intervention groups and controls.

Table 8.2. Summary of the evidence for the effects of behavioural interventions in overweight and obese adults (Canadian Task Force on Preventive Health Care, 2015)

Outcome	Trials	Certainty of evidence (GRADE)	Mean difference (95% CI)
Weight (kg)	33	Moderate	-3.1 (-3. to -2.)
BMI	22		-1.1 (-1.4 to -0.8)
Waist circumference (cm)	22		-3.0 (-3.9 to -2.2)
Total cholesterol (mmol/L)	18	Low	-0.1 (-0.2 to -0.0)
LDL cholesterol (mmol/L)	15	Moderate	-0.1 (-0.3 to 0.0)
Fasting glucose (mmol/L)	15		-0.1 (-0.2 to -0.0)
Systolic blood pressure (mm Hg)	22		-1.8 (-2.6 to -0.9)
Diastolic blood pressure (mm Hg)	22		-1.6 (-2.3 to -0.9)

b) Evidence of the effect of weight reducing diets in people with hypertension

A Cochrane systematic review has assessed the long-term effects of weight reducing diets on all-cause mortality, CVD mortality, CVD morbidity, adverse events and changes in weight and blood pressure in people with hypertension (9). None of the trials included in the review assessed mortality as a pre-specified outcome but 3 trials reported no deaths in either diet group during follow-up. (Table 8.3) Only one trial reported cardiovascular morbidity outcomes as a combined endpoint (recommencing antihypertensive therapy and severe cardiovascular complications) and found a statistically significant reduction in the composite endpoint with the weight reducing diet compared to usual care (Hazard ratio 0.70, 95% CI 0.57 to 0.87). Moderate certainty evidence from 5 trials found that dietary interventions to reduce weight were significantly more effective than no diet/usual care (Mean difference -4.0 kg, 95% CI -4.8 to -3.2kg) and low certainty evidence found that weight reducing diets reduce systolic blood pressure (Mean difference 4.5mmHg 95% CI -7.5mmHg to -1.8mmHg) and diastolic blood pressure (Mean difference -3.2mmHg 95% CI -4.8mmHg to -1.5mmHg) more than control diets (Table 8.3).

Table 8.3. Summary of the evidence for the effects of weight reducing diets versus control diet for people with hypertension (9)

Outcomes	RCTs (number of people)	Absolute effects		Effect estimate (95% CI)	Certainty of Evidence GRADE**	Comments
		Weight loss diet	Comparator			
All-cause mortality	3 (845)	0	0	-	VERY LOW	No deaths in any eligible studies
Cardiovascular morbidity*	1 (294)	21	57^	HR 0.70 (0.57 to 0.87)	VERY LOW	Total 145 CVD events in 4 arm trial, no statistical difference between groups (p =0.35) ^^
Adverse events	-	-	-	-	-	No data available
Changes in SBP	3 (731)	NR	NR	MD -4.5 (-7.2 to -1.5)	LOW	Small, statistically significant change
Changes in DBP	3 (731)	NR	NR	MD -3.2 (-4.8 to -1.5)	LOW	Small, statistically significant change
Changes in body weight	5 (880)	NR	NR	MD -4.0 (-4.8 to -3.2)	MODERATE	Small, statistically significant change

*Measured as a combined endpoint of necessity of reinstating anti-hypertensive therapy and severe cardiovascular complications at 30 months; **Downgraded for risk of bias and imprecision; ^Comparator reported is usual care group. ^^Other interventions in this study include weight loss, weight loss + sodium, sodium, and usual care. No statistically significant difference when comparing interventions including or excluding a weight loss component. HR = hazard ratio; MD = mean difference

Starting and Stopping Ages

Obesity and overweight affect Australians of all ages. In 2017-18 25% of Australian children and adolescents aged 2-17 years of age were overweight (~16%) or obese (~9%) (10). Sixty-seven percent (67%) of Australians aged 18 years or over were obese or overweight in 2017-18, equating to 12.5 million adults (10). Across age groups for men, the proportion who were overweight or obese increased with age from 52% in those aged 18-24 years to 83% in those aged 45-75 then decreased to 65% in men aged 85 years and over. For women, the proportion overweight or obese increased with age from 40% in those aged 18-24 to 73% of women aged 65-74 then decreased to 61% in women aged 85 and older (11). (Figure 8.1) The proportion of adults with a waist circumference associated with a substantially increased risk of chronic conditions was higher in women (46%) than men (36%) with risk increasing with age (peaking at 57% of men aged 65-74 and 65% of women aged 75-84).

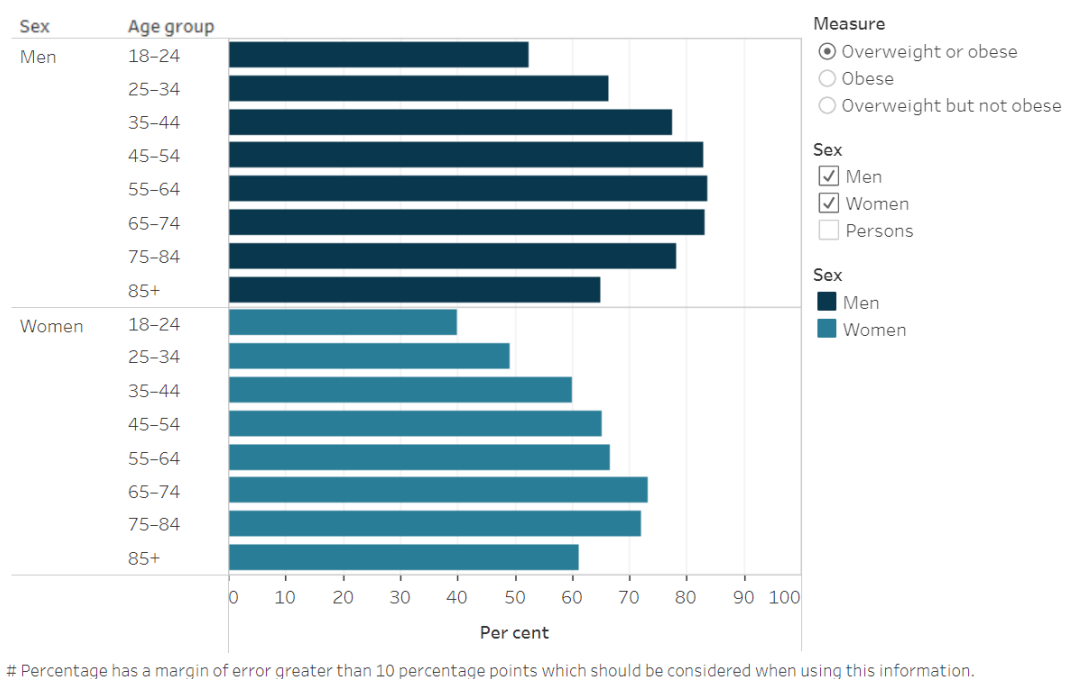


Figure 8.1. Proportion of overweight and obese Australians aged 18 and over by age group and sex, 2017-18 (ABS, 2018)

Interval for Assessment

The Red book recommends the BMI and waist circumference of all adults and weight and height (using age-specific BMI charts) of all adolescents to be assessed every two years. The weight and height (using age-specific BMI charts) of children >2 years of age and growth monitoring (using WHO growth charts) of children aged <2 should be assessed at times of child health surveillance or immunisation (6).

In groups at increased risk of obesity-related complications (Aboriginal and Torres Strait Islander peoples and people from the Pacific Islands and patients with existing diabetes or cardiovascular disease, stroke, gout, or liver disease), BMI and waist circumference in adults should be assessed every 12 months. In adults and children who are overweight or obese, assessment should be conducted every six months (6).

Subpopulations

Overweight and obesity rates differ across socioeconomic and remoteness areas. Lower rates of overweight and obesity are found in major cities as opposed to regional and remote areas, and highest rates of overweight and obesity are seen in lowest socioeconomic areas compared to highest socioeconomic areas (12). Prevalence of overweight and obesity is higher in indigenous children, adolescents, and adults than non-indigenous counterparts. Thirty-eight (38%) of Aboriginal and Torres Strait Islander children and adolescents aged 2-17 and 74% of Aboriginal and Torres Strait Islander adults aged 18 years and over were overweight or obese in 2018-19 (12).

Conclusion

Direct evidence of the effect of screening for overweight and obesity is limited to a single randomised trial of behavioural interventions for adults attending primary care who are found to be obese. In this trial a brief intervention led to weight loss and was acceptable to patients. Linked evidence has found that behavioural interventions to manage overweight and obesity in adults in primary care reduce weight, BMI, and waist circumference (moderate certainty evidence), and that weight reducing diets for people with hypertension reduce cardiovascular morbidity (very low certainty evidence), blood pressure (low certainty evidence) and body weight (moderate certainty evidence).

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9. The Health Assessment component: Falls risk

Background and Description

In Australia in 2019-2020, over half (59%) of all fall-related hospitalisations and 94% of all fall-related deaths occurred in older people aged 65+ years, with larger representation of women (1). As one in 3 adults in this age group report a fall in the past year, assessment of falls risk in primary care or residential aged care is recommended as a combined measure designed for the patient's usual doctor (or other nominated health professional) to identify falls history and (physical/mental/ cognitive/social/environmental) risk factors so a preventive intervention and care plan can be formulated (2). Clinical practice guidelines strongly recommend a risk stratification assessment that uses a short questionnaire but restrict mobility testing for those deemed at higher risk of falls. This review aims to determine the effectiveness of those falls risk assessments – with or without subsequent intervention – in preventing single or repeat falls and fractures.

Evidence of Effectiveness

We found a 2021 systematic review (SR) and two RCTs published after completion of the SR search. Combined findings of these three publications were consistent and corroborated some from an earlier (2018) review of the US Preventive Services taskforce, as summarised below (Table 9.1).

Indirect evidence: Dautzenberg's et al., 2021 (AMSTAR rating 8) was the key systematic review of trials published up to 2019 with network meta-analysis (a statistical technique to separate out the independent effects of individual components in a multicomponent intervention) (3). They identified 220 randomised controlled trials of falls prevention initiatives targeting 98,388 older (>65 years, 69% >75 years) community dwelling adults. One in five studies had follow-up periods of >12 months. Overall, basic falls risk assessment (named "brisk" in Table 9.1) either alone or in combination with other strategies, except for exercise, did not significantly reduce the fall rates, fracture rates or the number of fall-related fractures. Exercise alone without falls risk assessment was found to be more effective in reducing the three outcomes of interest.

Indirect evidence: The US Preventive Services Taskforce (USPST) 2018 was an update from the 2010 work investigating effectiveness of [mostly] multifactorial falls prevention interventions of 6-36 months follow-up covering 62 identified trials including 35,058 individuals (4). The outcomes of interest were falls including minor or major fall-related injuries among adults >65 years at average risk and high risk. While there was some overlap with Dautzenberg 2021 in included studies, the findings from multifactorial interventions including risk assessment indicate that, particularly those including exercise, lead to a 21% reduction in incident falls with wide variation in effect sizes across studies (RR 0.79, 95% CI 0.68 to 0.91; 17 trials). However, no statistically significant effect was observed on numbers of people experiencing a fall or fall-related fractures (24 trials, estimated 5% reduction but the effect ranged from 11% reduction to a 1% increase).

Direct Evidence: Subsequent to both these reviews, two large cluster-randomized trials have assessed the impact of falls risk assessment

Lamb et al., 2020 was a three-arm cluster RCT conducted on 9,803 community-dwelling older people (aged >70 years) with or without history of falls attending 63 general practices in England (5). They compared the effectiveness of (a) Mailed booklet on falls prevention advice on falls prevention alone (no risk screening), (b) mailed falls risk assessment questionnaire + targeted exercises + mailed advice, and (c) mailed falls risk assessment questionnaire + multifactorial falls prevention in addition to mailed advice. No reduction in falls (39% in all groups) or fractures at 18 months was achieved with either risk screening combined with exercise or multifactorial falls prevention intervention, so the effect was deemed equivalent to mailed advice booklet alone without falls risk screening.

Bhasin et al., 2020 et al. conducted a pragmatic cluster randomised trial of multifactorial risk assessment followed by individualised management plans and compared to enhanced usual care (pamphlet) (6). The sample was 5,451 community-dwelling adults aged 70+ years registered to 86 general practices deemed at high risk of falls due to history of falls or fear of falling associated with poor walking balance. Risk assessment took the form of a self-administered postal questionnaire, with only people at risk of falls invited to participate in an intervention delivered by nurses. Falls risk factors were re-assessed by the nurses as part of the intervention. The intervention did not lead to a significant reduction of verified serious fall injuries than the control group over the 44-month follow-up.

Starting and Stopping Ages

No articles addressed this clinical question, but the two large trials were both in adults in the community over 75 years of age, as the risk of consequential falls increases with age.

Interval for Assessment

A recent Canadian cohort study of 571 older adults (>75 years) with chronic conditions in primary care (7) examined the potential gain from frailty screening with gait speed and grip strength done annually compared with screening every 2 years. They found small benefit in annual screening given that 40% of patients were at low-risk of deteriorating at the subsequent annual assessment (i.e., only 5.7% of low-risk participants had frailty at the second assessment). They recommended to reduce the frequency of frailty risk assessment to biennially, since the frailty at subsequent assessment was <1% for people in the high fall risk categories.

Subpopulations

All studies had over 50% female participants, with some in Dautzenberg's review including only women, hence no gender sub-group analysis was reported.

Table 9.1. Summary of findings table in descending chronological order

Author/Year & Study Design	Outcome description	Effect details Risk Ratio (95%CI)	Conclusions
Dautzenberg's 2021 Systematic review	Falls rates	- Basic falls risk (<i>brisk</i>) assessment alone vs usual care as primary result: 0.88 (0.71 – 1.09) - independent brisk effect as part of multicomponent intervention vs. usual care - NMA result RR 0.99 (0.90 – 1.09) - Range of <i>brisk</i> effects from various component combinations: - RR 0.42 (0.30 – 0.58) to 0.96 (0.80 – 1.16)	The independent effect of basic falls risk assessment is no better than its effect as part of a multicomponent intervention. Neither reduce falls rates significantly.
	Fracture rates	- No studies comparing <i>brisk</i> alone vs usual care reported this outcome - Basic falls risk as part of multicomponent interventions vs. usual care - - Range of basic falls risk effects as part of multicomponent intervention: RR 2.56 (0.85 – 7.78)	Basic falls risk assessment as part of a multicomponent intervention does not prevent or reduce fracture rates
	Number of fall-related fractures	<i>brisk</i> assessment alone vs usual care as primary result: 0.60 (0.39 – 0.94) - independent brisk effect as part of multicomponent intervention vs. usual care - NMA result RR 0.88 (0.61 – 1.26) - Range of <i>brisk</i> effects from various component combinations: - RR 0.14 (0.10 – 3.02) to 3.09 (0.67 – 14.21)	The independent effect of basic falls risk alone in reducing the number of fall-related fractures disappears when part of a multicomponent intervention.
Lamb 2020 RCT	Number of falls/100 person-years	- Exercise vs. mailed advice (RR 0.99, 95%CI 0.86 to 1.14) - Multifactorial intervention (RR 1.313, 95% CI 0.98 to 1.30)	No difference in prevention of falls at 18 months when compared to mailed advice
	Number of fracture episodes*/100 person-years	- Exercise vs. mailed advice (adjusted rate ratio 1.10, 95%CI 0.85 to 1.43) - Multifactorial intervention vs. mailed advice (adjusted rate ratio 1.26, 95%CI 0.98 to 1.62).	No difference in prevention of fracture episodes at 18 months when compared to mailed advice
	Number of fractures/100 person-years	- Exercise alone vs. mailed advice (adj RR 1.20, 95%CI 0.91 to 1.59) - Multifactorial intervention (adj RR 1.30, 95%CI 0.99 to 1.71)	No difference in reduction of number of fractures when compared to mailed advice
Bhasin 2020 cRCT	No. first serious fall with injury /100 person-years of follow-up	4.9 events in intervention group and 5.3 in control group - Hazard ratio 0.92; 95%CI 0.80 to 1.06	A nurse-driven multifactorial intervention that incorporated risk assessment and individualised plans in primary care did not lower rates of falls or fractures over 44 months
	Rate of all serious fall injury	5.2 in intervention group and 5.6 in control group - Hazard ratio 0.94, 95%CI 0.81 to 1.10	
	Rate of all fall injury	35.8 in intervention group and 38.0 in control group - Hazard ratio 0.96, 95%CI 0.89 to 1.03	
	Rate of any fall-related fracture	6.9% in the intervention and 7.7% in control group (significance NR)	

* **Bolded numbers** indicate statistical significance

brisk=basic falls risk assessment

NR=not reported

Comments

Dautzenberg's defined Basic falls risk assessment as cardiovascular examination (vital signs, ECG, pacemaker check), medication review (modification, deprescribing), and/or fracture risk screening (bone mineral density) which is more comprehensive than would be common in general practice health assessments. The USTPST Definitions of high risk were heterogeneous but largely based on at least history of falls in the past 3-12 months. Bhasin's RCT assessed strength/gait impairment, medication review, visual impairment, feet, and environmental hazards.

Conclusion

The bulk of recent evidence strongly suggests that, for adults in the community, comprehensive falls risk assessment alone or as part of a multicomponent intervention does not significantly reduce incidence of falls or fractures or time to first event (fall or fracture) when compared to usual care. In fact, multicomponent interventions indicate that exercise alone (cross-reference physical activity component summary) or exercise advice even in the absence of a falls risk assessment or intervention is the most effective strategy to reduce falls.

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10. The Health Assessment component: Osteoporosis

Background and Description

Osteoporosis (defined as bone mineral density T-score of ≤ -2.5) is a major risk factor for fractures, and hence causes significant pain, distress and disability, family burden and generates substantial healthcare costs. In 2017, self-reported ABS surveys revealed that almost one million Australians were diagnosed with osteoporosis or osteopenia (1), with women being more likely than men to report being diagnosed (29% vs 10% of those aged ≥ 75 years). Others have projected that 6.2 million Australians aged ≥ 50 years will have osteoporosis or osteopenia by 2022 (2). A similar increase in the rate of fracture to 183,105 in 2022 has been anticipated unless improvements in diagnosis and treatment of osteoporosis are in place.

In Australia, RACGP recommends fracture risk assessment in older women (≥ 45 years) and men (≥ 50 years) with minimal trauma fracture, and in people aged ≥ 70 years without history of minimal trauma fracture (3). However, the high cost, potential harms, and evidence for initiation of this practice has been subsequently considered insufficient in the international literature to support the community-wide activity. Several calls for updated guidelines have been made in the past decade by clinical societies given the advent of new clinical assessment tools and bone density measuring technology, the new medications available, and conflicting evidence up to 2017.

Evidence of Effectiveness

This section aims to evaluate the current evidence for effectiveness of risk assessment in reducing osteoporosis-related fractures, based on a key systematic review and two recent RCTs.

Indirect evidence: Merlijn et al., 2019 conducted a systematic review (AMSTAR 7) of **three** trials specifically answering the question of fracture prevention through osteoporosis risk screening in women with at least bone densitometry (4). Three community-based trials from Denmark, The Netherlands and the UK, met the inclusion criteria, with a total of 42,120 women aged 65+ years in the former two and aged 70-85 in the latter (5-7). Follow-up periods for outcomes of interest were substantial and varied from 3.7 to 5 years. While the authors found that osteoporosis risk assessment did not reduce overall fracture rates (aggregated reduction across 3 studies was a 5% reduction but the effect ranged from 11% reduction to 2% increased risk) or similar estimates for overall osteoporotic fractures, meta-analysis demonstrated a significant and clinically important reduction in major osteoporotic fractures (pooled effect was 9% reduction ranging from 2% to 16% across studies) and hip fractures (overall effect was 20% reduction, ranging from 9% to 29% across studies). Details of individual studies are shown in the summary of findings table below (Table 10.1).

Direct evidence: Rapp et al., 2022 conducted a cluster randomised trial of community-living people with or without history of fragility fractures in the past 5 years (8). The intervention (conducted between 2015 and 2018) had testing bone density assessment (DXA) followed

by exercise class and safety advice on the living environment (n=9,599) and the comparison group were people in the same age group (70-85 years) living in the control Districts and receiving usual care (n=27,318). Overall, the incidence of fractures did not differ between groups, but there was a reduction of femoral fractures in the intervention group after one year of follow-up.

Direct evidence: Osaki et al., 2021 conducted a small (n=163) randomised trial to prevent re-fractures in older (aged ≥ 50 years) men and postmenopausal women in Japan (between 2015 and 2017) (9). Both study arms received a fracture risk assessment (FRAX), but patients in the intervention group in addition received bone density assessment and were assigned a liaison intervention coordinator. During the two years of follow-up, there were no significant differences in fracture incidence rates between the two groups at 3, 6, 12 or 24 months.

Overall, the results of the two recent trials confirmed the lack of effect of osteoporosis risk assessment on fractures found by the initial 3 trials in the meta-analysis. After adding the 2 new trials the pooled estimate changed from 5% to 2% reduction, but neither was statistically significantly different from the control group not having the risk assessment; see updated forest plot (Figure 10.1) and overall summary table (Table 10.1).

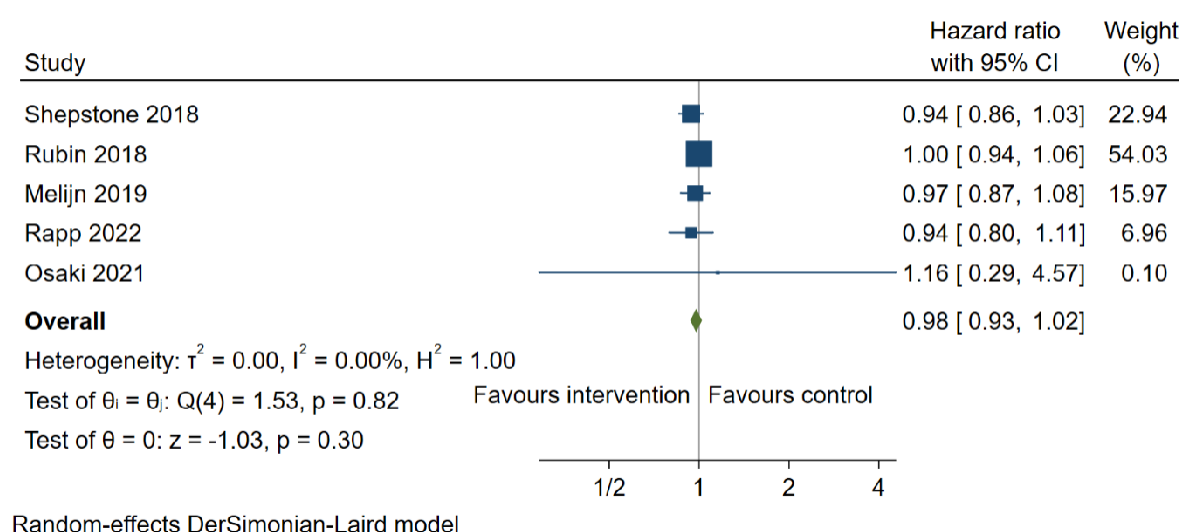


Figure 10.1. Impact of osteoporosis risk assessment on fracture risk. N=5 studies (3 reviews + 2 new trials)

Starting and Stopping Ages

The impact of starting (and stopping) at different ages was not addressed in the studies, but a US simulation study of cost-effectiveness for men (12) reported that an initiation of routine screening at ages 60 years with osteoporosis self-assessment + DXA for high-risk patients, or at 50 years with osteoporosis risk assessment including age, femoral bone mineral density and vertebral fracture assessment (VFA) were clinically and cost-effective in preventing lifetime osteoporotic fractures. Stopping ages were not mentioned in the modelling the latter more costly than the former.

Table 10.1. Summary of key studies on effect of osteoporosis risk assessment on fracture outcomes

Outcome description	Author/Year & follow-up time	Effect details Risk Ratio (95%CI)	Conclusions
Incidence rates of all clinical fractures	Shepstone 2018 at 5-year follow-up	15.3% in multicomponent intervention vs. 16.0% in control; - HR, 0.94 (95% CI, 0.86-1.03) p=0.18	Risk assessment in multicomponent intervention is no better than usual care in overall prevention of clinical fractures
	Rubin 2018	13.1% in intervention vs. 13.0% in control; p=0.82 - Adjusted sHR 1.0 (0.95-1.06), p=0.91	Screening with FRAX +DXA in women does not reduce overall fracture rates
	Merlijn 2019 At 3 year follow-up	11.2% in intervention vs. 11.6% in control; - Adjusted HR 0.97 (95%CI 0.87 – 1.08)	Screening followed by treatment did not show a statistically significant reduction on fractures of any type
Overall fracture rates combined	Rapp 2022 at 1+ year follow-up	34.6% in intervention vs. 38.6% in control; HR at 1 year, 0.94 (95% CI, 0.80 -1.11) - Effect any time from 1-3 years: HR 1.04 (95%CI 0.91 – 1.19)	Osteoporosis risk assessment + comprehensive intervention does not reduce overall fracture rates compared to usual care
Fracture incidence rates	§ Osaki 2021 up to 2 years follow-up	12 mths: intervention 4.5%, control 8.8% 24 mths: intervention 8.6%, control 7.5%	Osteoporosis risk assessment with or without bone density does not prevent fractures overall
Osteoporotic fracture rates	Shepstone 2018 at 5-year follow-up	12.9% in multicomponent intervention group vs. 13.6% in control; - HR, 0.94 (95% CI, 0.85-1.03) p=0.18	Risk assessment is no better than usual care in preventing women's osteoporotic fractures
	Merlijn 2019 At 3-year follow-up	Adjusted HR s 0.91 (95% CI 0.81–1.03)	screening followed by treatment did not reduce osteoporotic fractures
	Rubin 2018	9.9% in intervention vs. 10.0% in control; p=0.83 Adjusted sHR 0.98 (0.92-1.06), p=0.68	Screening with FRAX +DXA in women does not reduce women's osteoporotic fractures
Hip fracture rates	Shepstone 2018 at 5-year follow-up	2.6% in multicomponent interventions vs 3.5% in control; HR, 0.72 (95% CI, 0.59-0.89), p=0.002	Osteoporosis risk assessment significantly reduces incidence of hip fractures
	Merlijn 2019 At 3-year follow-up	Adjusted HR 0.91 (95%CI 0.71 – 1.15)	Risk screening + treatment did not reduce hip fractures
	Rubin 2018	3.1% in intervention vs. 3.1% in control; p=0.89 - Adjusted sHR 1.0 (0.89-1.13), p=0.972	Screening with FRAX +DXA in women does not reduce hip fractures overall
Femoral fractures	Rapp 2022 at 1+ year follow-up	- Effect at 1 year: intervention 9.9%, control 13.6%; - HR, 0.76 (95% CI, 0.59-0.99)	Osteoporosis risk assessment + comprehensive intervention reduces femoral fractures

Bolded results indicate statistical significance § differences reported as not statistically significant (small sample size)

FRAX: Fracture risk assessment

DXA: dual x-ray absorptiometry

sHR=subgroup Hazard ratio

Interval for Assessment

Increasingly, the precision of minimal changes in bone deterioration has gained attention to flag people at risk of fractures. Assessing postmenopausal women with high resolution CT scan to detect changes exceeding the least significant margin has been proposed at intervals of every 2 years at the distal radius and every 1 year at the distal tibia based on a small study of 33 women aged 77±7 years in Canada (10). A simulation study of post-menopausal women aged 55+ years in the US found that the lifetime risk of hip fractures was reduced from 18.7% without screening to 12.8% for women screened for osteoporosis with a combination of quantitative CT and DXA every 5 years (11). The Nayak 2016 simulation study for men recommended an interval of 5 year for self-assessment + DXA and every 10 years for composite risk assessment using DXA+VFA (assuming willingness to pay \$50,000 per QALY for 10-year intervals, or \$100,000 per QALY if 5-year intervals) (12).

Subpopulations

No difference in fracture rates were observed by age, sex, or history of falls in Rapp 2022 RCT (8). However, subpopulations of different risk levels at baseline were investigated. Rubin 2018 concluded that osteoporosis risk assessment was useful in preventing hip or all osteoporotic fractures in women at high baseline risk (DXA ≥15%) (Table 10.2).

Table 10.2. Size of effect of fracture prevention (data from Rapp 2022)

Fracture type	Subgroup Hazard ratios	Conclusion
All fractures	10.8% in interventions vs 12.1% in control; p=0.04; adjusted sHR 0.89 (0.80- 0.99) , p=0.038	Screening with FRAX +DXA in women significantly reduces overall, osteoporotic and hip fractures in women at high risk (DXA ≥15%)
Osteoporotic fractures	8.1% in interventions vs 9.3% in control; p=0.03; adjusted sHR 0.87 (0.77- 0.99) , p=0.028	
Hip fractures	1.9% in interventions vs 2.6% in control; p=0.01; adjusted sHR 0.74 (0.58- 0.95) , p=0.002	

FRAX: Fracture risk assessment

DXA: dual x-ray absorptiometry

sHR=subgroup Hazard ratio

Comments

The Merlijn's systematic review investigated the three most cited trials in the literature. The estimates from the two new trials made no substantial difference to their findings.

Conclusion

Osteoporosis risk assessment in community dwelling individuals (predominantly women) with or without an intervention does not reduce incident fractures overall but may benefit women and men at high baseline risk. There is no agreement on the frequency of osteoporosis risk assessment although 5–10-year intervals are considered cost-effective based on simulations studies.

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11. The Health Assessment component: Hearing

Background and Description

Hearing loss or a reduced ability to hear is a major public health issue estimated to affect 7.8 million people by 2060 in Australia, mostly driven by age-related changes (1). Hearing loss can significantly affect people's quality of life due to difficulty with communication that impacts relationships, employment and educational opportunities, mental health, and independent living. Even mild hearing loss is associated with increased social isolation (Odds Ratio 3.5, 95% CI 1.9-6.4); increased cognitive impairment (OR 1.2 95% CI 1.2-4.7); increased depressive symptoms (OR 1.8 95% CI 1.2-2.8) and higher rates of hospitalizations and mortality (2).

Identifying hearing loss can be challenging as individuals take time to recognise and accept that they have a difficulty. In people aged 55 to 74 years there is an average 10-year delay in seeking help for their hearing loss (3, 4). Furthermore, only third of adults who report hearing loss gets referred and get hearing aid, and the rest are advised to wait until the symptoms get worse (5, 6).

Currently, Australian GPs are assessing hearing annually starting at age 65, as recommended by the RACGP Guidelines for Preventive Activities in General Practice (the "Red Book") using whisper test and or a single question about hearing difficulty (7).

Evidence of Effectiveness

In 2021 USPSTF reviewed (AMSTAR rating 8) the evidence for screening for age-related hearing loss in primary care settings and addressed several key questions on detection and treatment of hearing loss (2).

Direct Evidence: On the question of detection, they found one RCT, the Screening for Auditory Impairment—Which Hearing Assessment Test (SAI-WHAT) trial conducted in 2010 (n=2,305; 94% male, mean age 61; 74% reported perceived hearing loss at baseline) (8). The trial compared 3 different screening strategies (AudioScope; 10-item Hearing Handicap Inventory for the Elderly-Screening (HHIE-S) questionnaire; and combination of the two) with a non-screened control group. Screening was associated with greater hearing aid use (its primary outcome) at 1 year compared with no screening. However, there was no statistically significant difference in hearing-related QOL compared with no screening at 1 year. (Please note that this study participants were all eligible to receive free hearing aid through the Veterans Affairs Medical Center.)

Linked Evidence: For treatment of screen-detected or recently detected, untreated age-related hearing loss, the USPSTF found 6 trials (reported in 8 studies) that evaluated benefits of amplification (hearing aid) compared with no amplification over 6 weeks to 4 months. Four out of five trials found statistically significant benefit in favour of hearing aids. One fair-quality RCT found that hearing aids resulted in near normalization of hearing-

related QOL and function (measured by the HHIE) among veterans identified by screening, based on >40 dB hearing loss using a handheld audiometric device. Because this trial was conducted in a VA center and almost exclusively enrolled white males eligible for free hearing aids, its generalizability to other settings may be limited. A 2017 Cochrane review that included three of these studies also concluded that hearing aids significantly improve hearing-specific health-related QoL measured by the HHIE compared with the unaided/placebo condition (9).

The USPSTF also assessed diagnostic accuracies of commonly used screening tools (Table 11.1) (the range in square brackets are not pooled results). It shows that simple screening tools (single question screening and whispered voice test) are more accurate than multi-question screening and AudioScope.

Table 11.1. Comparison of screening tool accuracies

Screening tools	For mild hearing loss (>20-25dB)		For moderate hearing loss (>35-40 dB over 2-4 frequencies)	
	Sensitivity	Specificity	Sensitivity	Specificity
Clinical tests (whispered voice test)	94%	87%	[30-60%]	[80-98%]
Single question screening (Do you have difficulty hearing?)	66%	76%	80%	74%
Screening questionnaire (10-item HHIE-S)	[34-58%]	[76-95%]	68%	78%
Handheld or Mobile-Based Audiometric Devices (AudioScope)	[64-93%]	[70-91%]	[94-100%]	[24-80%]

The USPSTF did not find any studies on the harms associated with screening for hearing loss in adults and treatment with hearing aid.

Starting and Stopping Ages

Hearing impairment affects around 14% of adults (20-69 years of age) with highest prevalence in adults aged 60-69 years (39%). The SAI-WHAT trial of screening (described above) conducted post hoc analyses of hearing-related function for subpopulations defined by age. There were no differences between screened and non-screened groups in the proportion who experienced improvement on the Inner Effectiveness of Aural Rehabilitation scale when groups were stratified by age (50-64 years vs. ≥65 years) and by whether they had perceived hearing loss at baseline.

Interval for Assessment

Current US guideline for hearing assessment recommends assessment once a decade until 60 years of age and then 3 yearly checks. However, it is not based on clear evidence. Combined with the Red book guidance, hearing assessment is recommended at least every 2-3 years over the age of 60.

Subpopulations

Aboriginal and Torres Strait Islander children have a significantly higher rate of ear disease, which result in hearing loss much earlier, more persistently and more severely than the rest of the population. In 2019, Department of Health and Aged Care has published a strategic

Roadmap for Hearing Health, which sets out the short to long term goals to close this gap in hearing health for Aboriginal and Torres Strait islander people (10). Main actions of the roadmap focus on reducing ear infections in early childhood, equitable access to primary and specialised health services and hearing aids. The RACGP Red Book recommends that hearing assessment should start 10-years earlier than general population for Aboriginal and Torres Strait Islander people.

Conclusion

Given the impact hearing loss can have on the health and quality of life of the aging population, our findings suggest that assessing hearing with a single question or whisper test every 2-3 years starting at age 60 and referring to hearing aid could help preserve quality of life in the elderly population.

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12. The Health Assessment component: Vision

Background and Description

With each decade of life after 40 years, age eye disease and visual impairment increase three-fold. Of the half a million people in Australia who are vision impaired or blind, more than 70% are over the age of 65 (1). Approximately 80% of blindness and vision impairment is preventable or treatable if detected early. The top five causes of vision impairment are: (1) uncorrected refractive error (62%), (2) cataract (42%), (3) age-related macular degeneration (30%), (4) diabetic retinopathy (16%), and (5) glaucoma (16%) – the latter three also causing most blindness in people over 65. Smoking (current or previous) increases the risk of age-related macular degeneration (2). Family history plays important role in visual impairment; such history should be sought.

Some people with visual impairment are unaware of their problems. More than half of participants of National Eye Health Survey 2016 who were found to have an eye condition did not know they had that condition before the survey (3). Vision impairment also contributes to isolation, depression, and poorer social relationships, and is strongly associated with falls and hip fractures (4). Hence assessments might determine whether the patient is wearing up-to-date prescription spectacles, and whether there is a possibility of falls because the patient is no longer capable of managing a bifocal, trifocal, or multifocal prescription.

Currently, Australian GPs are assessing vision annually starting at age 65 if symptomatic or when requested by patients, as recommended by the RACGP Guidelines for preventive activities in general practice (the Red Book) using Snellen chart (5). There is also mandatory health assessment for people over 75 to maintain driver's licence in ACT, SA, QLD, NSW, and WA, which includes vision checks.

Evidence of Effectiveness

In 2022 USPSTF reviewed (AMSTAR rating 8) the evidence for screening for impaired visual acuity in asymptomatic older adults (6). "Asymptomatic" individuals are defined as those without known impaired visual acuity (based on current corrected vision) who have not sought care for evaluation of vision problems. Impaired visual acuity has been defined as visual acuity of worse than 20/405 or 20/506 but better than 20/200 (the threshold for legal blindness). The review focused on uncorrected refractive error, cataract, age-related macular degeneration (AMD), but not diabetic retinopathy, which is a part of diabetes follow up.

The USPSTF found one new RCT (n=188) to add to the previous evidence summary. Four trials (n=4,819) found no differences in visual acuity or other clinical outcomes between screening in primary care-applicable settings compared with no screening, usual care, or delayed screening of older adults. In all trials, vision screening was part of a larger, multicomponent health screen for older adults including other assessments (e.g., hearing, mobility, cognition); however, effects of vision screening compared with no screening were

evaluated separately. In the largest (n=3,249) trial, universal vision screening identified about 10 times as many patients with impaired visual acuity and correctable impairment compared with targeted screening, but at 3- to 5-year follow up there was no difference in the likelihood of visual acuity worse than 20/60 (relative risk [RR], 1.07 [95% confidence interval [CI], 0.84 to 1.36]). All trials were rated fair quality.

Compared with a complete examination by an ophthalmologist, visual acuity tests (3 studies; n=6,493) were associated with suboptimal diagnostic accuracy for identifying visual conditions (sensitivity 0.27 to 0.75 and specificity 0.51 to 0.87); evidence on other screening tests was limited.

Three studies (n=5,203) found that a screening question was not accurate for identifying older persons with impaired visual acuity compared with a visual acuity eye chart (sensitivity 0.17 to 0.81 and specificity 0.19 to 0.84).

No trial comparing screening with no screening, usual care, or delayed screening reported harms.

Starting and Stopping Ages

Vision impairment and blindness increases significantly with advanced age: more than 37% of Australians aged ≥ 90 years had bilateral vision loss, 27% of those aged 80-89 years had unilateral vision loss and 42% of those aged ≥ 80 years had NVI. These proportions were 7.5, 3.4 and 2.9-fold higher, respectively, than for participants aged 50-59 years. The age-related increases in Indigenous Australians were similarly pronounced, with those aged 80-89 years having a prevalence of bilateral vision loss of 56%, those aged 70-79 years having a prevalence of unilateral vision loss of 34%, and those aged ≥ 70 years having a prevalence of NVI of 53%, which were 7.8, 4.3 and 1.7 times higher than those aged 40-49 years. This significant upward trend in the prevalence of vision loss with age suggests that both Indigenous and non-Indigenous Australians should receive more frequent eye examinations as they age (7).

Interval for Assessment

A 2006 Cochrane review (5 trials, n=3494) concluded that there is no evidence that community-based screening of asymptomatic older people results in improvements in vision two to four years after screening compared to elderly people who were not screened (8). In one of the included studies, the risk of having visual impairment in either eye was similar with universal and targeted screening, three to five years after screening. For glaucoma patients, based on intraocular pressure readings, there was not sufficient data to determine the optimal follow up interval. However, the findings also suggest that there is no clear benefit from intensive monitoring (9). For diabetic retinopathy, a simulation model predicted that for type 2 diabetic patients without evidence of diabetic retinopathy implementing a 2-year screening interval does not increase their risk of vision loss (10).

Subpopulations

According to the National Eye Health Survey 2016, the prevalence of blindness and vision impairment is almost three times higher in indigenous Australians than non-indigenous Australians (17.7% and 6.4%) (11). Vision impairment further increases among indigenous people from more remote geographical areas.

Conclusion

Vision assessment in asymptomatic people does not appear to improve longer term vision outcomes. However, given the steep increase in vision impairment with advanced age and the impact that delay in detecting vision impairment and blindness can have on the health and quality of life of the aging population, our findings suggest that assessing vision every 2-3 years starting at age 65 and referring to vision services could help preserve quality of life in the elderly population.

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