NICE National Institute for Health and Care Excellence

NICE guideline

Cardiovascular disease: risk assessment and reduction, including lipid modification

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

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This guideline replaces CG181.

This guideline is the basis of QS5, QS100, QS208 and QS209.

Overview

This guideline covers identifying and assessing risk of cardiovascular disease (CVD) in adults without established CVD. It covers lifestyle changes and lipid-lowering treatment (including statins) for primary and secondary prevention of CVD, and includes guidance for people who also have diabetes or chronic kidney disease.

For people with familial hypercholesterolaemia, see the NICE guideline on familial hypercholesterolaemia.

Who is it for?

- Healthcare professionals
- Adults who are at risk of CVD or who have CVD

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Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Identifying and assessing cardiovascular disease risk for people without established cardiovascular disease

Identifying people for full formal risk assessment

1.1.1 For the primary prevention of cardiovascular disease (CVD) in primary care, use a systematic strategy to identify people who are likely to be at high risk of CVD. **[2008, amended 2014]**

1.1.2 Prioritise people based on an estimate of their CVD risk before doing a full formal risk assessment. Estimate their CVD risk using CVD risk factors already recorded in primary care electronic medical records. **[2008]**

1.1.3 Review estimates of CVD risk on an ongoing basis for people over 40. **[2008]**

1.1.4 Prioritise people for a full formal risk assessment if their estimated 10-year risk of CVD is 10% or more. **[2008, amended 2014]**

1.1.5 Discuss the process of risk assessment with the person identified as being at risk, including the option of declining any formal risk assessment. **[2008]**

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1.1.6 Do not use opportunistic assessment as the main strategy in primary care to identify CVD risk in unselected people. **[2008]**

Full formal risk assessment

1.1.7 Use the QRISK3 tool to calculate the estimated CVD risk within the next 10 years for people aged between 25 and 84 without CVD. **[May 2023]**

1.1.8 Use the QRISK3 tool for people with type 2 diabetes aged between 25 and 84. **[May 2023]**

Until electronic clinical systems in which QRISK2 is embedded are updated with QRISK3, it may be necessary to use QRISK2.

When assessing risk for people taking corticosteroids or atypical antipsychotics or people with systemic lupus erythematosus, migraine, severe mental illness or erectile dysfunction, use QRISK3 because QRISK2 does not take these risk factors into account and may underestimate the 10-year CVD risk in these populations.

1.1.9 Do not use a risk assessment tool for people who are at high risk of CVD, including people with:

- type 1 diabetes (see the section on primary prevention of CVD for people with type 1 diabetes)
- an estimated glomerular filtration rate less than 60 ml per minute per 1.73 m^2 and/or albuminuria (see the section on primary and secondary prevention of CVD for people with chronic kidney disease [CKD])
- familial hypercholesterolaemia (see NICE's guideline on familial hypercholesterolaemia) or other inherited disorders of lipid metabolism. **[May 2023]**

1.1.10 Recognise that CVD risk tools may underestimate risk in certain groups of people, including but not limited to:

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- people treated for HIV
- people already taking medicines to treat CVD risk factors
- people who have recently stopped smoking
- people taking medicines that can cause dyslipidaemia, such as immunosuppressant drugs
- people with severe mental illness
- people with autoimmune disorders, and other systemic inflammatory disorders. **[May 2023]**

1.1.11 Consider people aged 85 or older to be at increased risk of CVD because of age alone, particularly people who smoke or have raised blood pressure. **[May 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on full formal risk assessment.

Full details of the evidence and the committee's discussion are in evidence review A: CVD risk assessment tools: primary prevention.

Communication about risk assessment, lifestyle changes and treatment

1.1.12 Follow the recommendations on communication in NICE's guidelines on patient experience in adult NHS services and shared decision making. **[2014]**

1.1.13 Set aside adequate time during the consultation to provide information on risk assessment and to answer any questions. Arrange for further consultation if needed. **[2008, amended May 2023]**

1.1.14 Document the discussion relating to the consultation on risk assessment and the person's decision. **[2008]**

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1.1.15 Offer people information about their absolute risk of CVD and the absolute benefits and harms of any intervention over a 10-year period. **[2008]**

1.1.16 Consider using a lifetime risk tool such as QRISK3-lifetime to inform discussions on CVD risk and to motivate lifestyle changes, particularly for people with a 10-year QRISK3 score less than 10%, and people under 40 who have CVD risk factors. **[May 2023]**

1.1.17 To encourage the person to participate in reducing their CVD risk:

- find out what, if anything, the person has already been told about their CVD risk and how they feel about it
- explore the person's beliefs about what determines future health (this may affect their attitude to changing risk)
- assess their readiness to make changes to their lifestyle (diet, physical activity, smoking and alcohol consumption), to undergo investigations and to take long-term medication
- assess their confidence to make changes to their lifestyle, undergo investigations and take medication
- inform them of potential future management options based on current evidence and best practice
- involve them in developing a shared management plan
- check that they have understood what has been discussed. **[2008, amended 2014]**

1.1.18 If the person's CVD risk is at a level where treatment is recommended but they decline the offer of treatment, advise them that their CVD risk should be reassessed in the future. Record their choice in their medical records. **[2008, amended 2014]**

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For a short explanation of why the committee made the 2023 recommendation and how it might affect practice, see the rationale and impact section on communication about risk assessment, lifestyle changes and treatment.

Full details of the evidence and the committee's discussion are in evidence review A: CVD risk assessment tools: primary prevention.

1.2 Aspirin for primary prevention of cardiovascular disease

1.2.1 Do not routinely offer aspirin for primary prevention of CVD. **[January 2023]**

For guidance on using aspirin to prevent venous thromboembolism in over 16s in hospital, see NICE's guideline on venous thromboembolism in over 16s: reducing the risk of hospital-acquired deep vein thrombosis or pulmonary embolism.

NICE's surveillance team reviewed the evidence about aspirin for the primary prevention of CVD. Based on the review, NICE decided to add a do not routinely offer recommendation about this. For full details, see the January 2023 exceptional surveillance report.

1.3 Lifestyle changes for the primary and secondary prevention of cardiovascular disease

Behaviour change

1.3.1 Advise and support people at high risk of or with CVD to achieve a healthy lifestyle in line with NICE's guideline on behaviour change: general approaches. **[2014, amended May 2023]**

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Healthy eating

For advice on healthy eating, see the NHS eat well guide.

Cardioprotective diet

1.3.2 Advise people at high risk of or with CVD to eat a diet in which total fat intake is 30% or less of total energy intake, saturated fats are 7% or less of total energy intake, and where possible saturated fats are replaced by mono-unsaturated and polyunsaturated fats. **[May 2023]**

1.3.3 Advise people at high risk of or with CVD to:

- reduce their saturated fat intake
- increase their mono-unsaturated fat intake with olive oil, rapeseed oil or spreads based on these oils and to use them in food preparation. **[2014]**

1.3.4 Take account of a person's individual circumstances, for example, drug treatment, comorbidities and other lifestyle changes, when giving dietary advice. **[2014]**

For a short explanation of why the committee made the 2023 recommendation and how it might affect practice, see the rationale and impact section on cardioprotective diet.

Full details of the evidence and the committee's discussion are in evidence review B: dietary cholesterol strategies.

Physical activity

1.3.5 Advise people at high risk of or with CVD to do aerobic and muscle-strengthening activities in line with the UK Chief Medical Officers' physical activity guidelines. **[2008, amended 2014]**

1.3.6 Encourage people who are unable to perform moderate intensity physical activity

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because of comorbidity, medical conditions or personal circumstances to exercise at their maximum safe capacity. **[2008, amended 2014]**

1.3.7 Advice about physical activity should take into account the person's needs, preferences and circumstances. Agree goals and provide the person with written information about the benefits of activity and local opportunities to be active, in line with recommendation 2 of NICE's guideline on physical activity: brief advice for adults. **[2008]**

1.3.8 Follow recommendation 8 of NICE's guideline on walking and cycling, and recommendation 2 of NICE's guideline on exercise referral schemes. **[2008]**

Weight management

1.3.9 Offer people at high risk of or with CVD who are overweight or obese appropriate interventions in line with NICE's guideline on overweight and obesity management. **[2008]**

Alcohol consumption

1.3.10 For advice on how to keep the health risks from drinking alcohol to a low level, see the UK Chief Medical Officer's alcohol consumption guidelines. **[2008]**

Smoking cessation

1.3.11 Advise and support all people who smoke to stop, in line with the recommendations on treating tobacco dependence in NICE's guideline on tobacco. **[2008]**

Plant stanols and sterols

1.3.12 Do not advise any of the following to take plant stanols or sterols to prevent CVD:

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- people being treated for primary prevention
- people being treated for secondary prevention
- people with CKD
- people with type 1 diabetes
- people with type 2 diabetes. **[2014]**

1.4 Initial lipid measurement and referral for specialist review

1.4.1 Measure both total blood cholesterol and high-density lipoprotein (HDL) cholesterol to achieve the best estimate of CVD risk. **[2008]**

1.4.2 Use clinical findings, a full lipid profile and family history to judge the likelihood of a familial lipid disorder, rather than using strict lipid cut-off values alone. **[2014, amended December 2023]**

1.4.3 Exclude possible common secondary causes of dyslipidaemia (such as excess alcohol intake, uncontrolled diabetes, hypothyroidism, liver disease and nephrotic syndrome) before referring for specialist review. **[2014]**

1.4.4 Use the recommendations in NICE's guideline on familial hypercholesterolaemia to determine whether to suspect, and how to treat, familial hypercholesterolaemia. **[2014, amended May 2023]**

1.4.5 Arrange for specialist assessment of people with a total blood cholesterol level of more than 9.0 mmol per litre or a non-HDL cholesterol level of more than 7.5 mmol per litre even in the absence of a first-degree family history of premature coronary heart disease. **[2014]**

1.4.6 Refer for urgent specialist review if a person has a triglyceride level of more than 20 mmol per litre that is not a result of excess alcohol intake or poor glycaemic control. **[2014]**

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1.4.7 In people with a triglyceride level between 10 mmol and 20 mmol per litre:

- repeat the triglyceride measurement with a fasting test (after an interval of 5 days, but within 2 weeks) **and**
- review for potential secondary causes of hyperlipidaemia **and**
- seek specialist advice if the triglyceride level remains at more than 10 mmol per litre. **[2014]**

1.4.8 In people with a triglyceride level between 4.5 mmol and 9.9 mmol per litre:

- be aware that the CVD risk may be underestimated by risk assessment tools **and**
- optimise the management of other CVD risk factors present **and**
- seek specialist advice if non-HDL cholesterol level is more than 7.5 mmol per litre. **[2014]**

1.5 Discussions and assessment before starting statins

Discuss risks and benefits of statins

1.5.1 Make decisions about starting statin treatment after an informed discussion between the clinician and the person about the risks and benefits of statins. **[May 2023, amended December 2023]**

1.5.2 Take into account potential benefits from lifestyle changes, the person's preferences, the presence of any comorbidities, whether they are on multiple medications, whether they are frail and their life expectancy. (See also NICE's guideline on multimorbidity.) **[May 2023, amended December 2023]**

1.5.3 Advise people who are being offered a statin that the risk of muscle pain, tenderness or weakness associated with statin use is small and the rate of severe muscle adverse effects (rhabdomyolysis) because of statins is extremely low.

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[May 2023]

Discuss possible interactions between statins and other substances

1.5.4 Advise people who are being treated with a statin:

- that other drugs, some foods (for example, grapefruit juice) and some supplements may interfere with statins **and**
- to always consult the patient information leaflet, a pharmacist or prescriber for advice when starting other drugs or thinking about taking supplements. **[May 2023]**

Perform baseline blood tests and clinical assessment

1.5.5 Before starting statins perform baseline blood tests and clinical assessment. Include all of the following in the assessment:

- smoking status
- alcohol consumption
- blood pressure (see NICE's guideline on hypertension in adults)
- BMI or other measure of obesity (see NICE's guideline on overweight and obesity management)
- full lipid profile
- diabetes status
- renal function
- transaminase level (alanine aminotransferase or aspartate aminotransferase)
- thyroid-stimulating hormone level in people with symptoms of underactive or overactive thyroid. **[May 2023, amended December 2023]**

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1.5.6 Do not routinely exclude from statin treatment people who have liver transaminase levels that are raised but are less than 3 times the upper limit of normal. **[May 2023]**

1.5.7 Before offering a statin, ask the person if they have had persistent generalised unexplained muscle symptoms (pain, tenderness or weakness), whether associated or not with previous lipid-lowering treatment. If they have, measure creatine kinase levels. If creatine kinase levels are:

- more than 5 times the upper limit of normal, re-measure creatine kinase after 7 days; if creatine kinase levels are still 5 times the upper limit of normal, do not start statin treatment (see the section on treatment if statins are contraindicated or not tolerated)
- raised but less than 5 times the upper limit of normal, start statin treatment at a lower dose. **[May 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on discussions and assessment before starting statins.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

Choice of drug based on clinical trials

1.5.8 Be aware that when deciding on lipid-lowering treatment to prevent CVD, drugs are preferred for which there is evidence in clinical trials of a beneficial effect on CVD morbidity and mortality. **[2008]**

Statins and pregnancy

1.5.9 Be aware that statins are contraindicated in pregnancy because of the risk to the unborn child of exposure to statins. **[2014, amended May 2023]**

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1.5.10 Explain that:

- statins should be stopped if pregnancy is a possibility
- statins should be stopped 3 months before attempting to conceive
- statins should not be restarted until breastfeeding is finished. **[2014, amended May 2023]**

1.6 Lipid-lowering treatment for primary prevention of cardiovascular disease

There is a NICE patient decision aid to support discussions about statin treatment to reduce the risk of heart disease and stroke for people without CVD. Also see the sections on optimising statin treatment and assessing response to treatment.

Lipid target for people taking statins

1.6.1 For primary prevention of CVD aim for a greater than 40% reduction in non-HDL cholesterol. **[May 2023]**

Optimising lifestyle changes

1.6.2 Before offering statin treatment for primary prevention, discuss the benefits of lifestyle changes and optimise the management of all other modifiable CVD risk factors if possible. **[May 2023]**

1.6.3 Recognise that people may need support to change their lifestyle. To help them do this, refer them to programmes such as exercise referral schemes or weight management services. (See NICE's guidelines on behaviour change: individual approaches, physical activity: exercise referral schemes and overweight and obesity management.) **[May 2023]**

1.6.4 Offer people the opportunity to have their risk of CVD assessed again after they have tried to change their lifestyle. **[May 2023]**

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1.6.5 If lifestyle change is ineffective or inappropriate offer statin treatment. **[May 2023]**

Treating comorbidities and secondary causes of dyslipidaemia

1.6.6 Before starting statins, treat comorbidities and secondary causes of dyslipidaemia. **[May 2023]**

Statin treatment for people with and without type 2 diabetes

1.6.7 Offer atorvastatin 20 mg for the primary prevention of CVD to people who have a 10-year QRISK3 score of 10% or more. **[May 2023]**

1.6.8 Do not rule out treatment with atorvastatin 20 mg for the primary prevention of CVD just because the person's 10-year QRISK3 score is less than 10% if they have an informed preference for taking a statin or there is concern that risk may be underestimated. **[May 2023]**

1.6.9 For people aged 85 and older consider treatment with atorvastatin 20 mg. Be aware of factors that may make treatment inappropriate (see recommendations 1.5.1 and 1.5.2). **[May 2023]**

Statin treatment for people with type 1 diabetes

1.6.10 Offer statin treatment for the primary prevention of CVD to adults with type 1 diabetes who:

- are older than 40 years **or**
- have had diabetes for more than 10 years **or**
- have established nephropathy **or**
- have other CVD risk factors. **[May 2023]**

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1.6.11 Consider statin treatment for the primary prevention of CVD for people aged 18 to 40 with type 1 diabetes, including those who have had diabetes for 10 years or less. **[May 2023, amended December 2023]**

1.6.12 When starting treatment with a statin for adults with type 1 diabetes, use atorvastatin 20 mg. **[May 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on lipid-lowering treatment for primary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

Optimising statin treatment

See the section on optimising statin treatment.

Assessing response to treatment

See the section on assessing response to treatment.

Escalating treatment for people on statins

1.6.13 Ezetimibe, co-administered with a statin, is recommended as an option in NICE technology appraisal guidance for treating primary hypercholesterolaemia in some adults who have started statin therapy when serum total or low-density lipoprotein (LDL) cholesterol concentration is not appropriately controlled. For full details, see the guidance on ezetimibe (TA385, 2016).

1.7 Lipid-lowering treatment for secondary prevention of cardiovascular disease

These recommendations apply to people with and without type 1 and 2 diabetes. Also see

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the sections on optimising statin treatment and assessing response to treatment.

Lipid target for people taking lipid-lowering treatments

1.7.1 For secondary prevention of CVD, aim for LDL cholesterol levels of 2.0 mmol per litre or less, or non-HDL cholesterol levels of 2.6 mmol per litre or less. **[December 2023]**

For a short explanation of why the committee made this recommendation and how it might affect practice, see the rationale and impact section on lipid target for secondary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review D: escalation of lipid-lowering treatment for secondary prevention of CVD.

As part of the December 2023 update, a new NICE indicator was developed to support quality improvement in managing cholesterol levels for people with CVD. This NICE indicator is suitable for inclusion in local and national general practice measurement frameworks, including those underpinned with financial incentives:

IND278: The percentage of patients with cardiovascular disease (CVD) in whom the last recorded LDL or non-HDL cholesterol level (measured in the preceding 12 months) is 2.0 mmol per litre or less for LDL cholesterol or 2.6 mmol per litre or less for non-HDL cholesterol.

Initial treatment

1.7.2 Offer atorvastatin 80 mg to people with CVD, whatever their cholesterol level, unless the person meets the criteria in recommendation 1.7.3. **[May 2023, amended December 2023]**

1.7.3 Offer a lower dose of atorvastatin if any of the following apply:

- it could react with other drugs

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- there is a high risk of adverse effects
- the person would prefer to take a lower dose. **[May 2023, amended December 2023]**

  In December 2023, this was an off-label use of atorvastatin. See NICE's information on prescribing medicines.

1.7.4 Do not delay statin treatment for secondary prevention of CVD but discuss lifestyle changes at the same time if appropriate. **[May 2023, amended December 2023]**

1.7.5 If a person has acute coronary syndrome, do not delay statin treatment. Measure full lipid profile on admission and at 2 to 3 months after starting treatment. **[May 2023, amended December 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on statins for secondary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

Treating comorbidities and secondary causes of dyslipidaemia

1.7.6 Treat comorbidities and secondary causes of dyslipidaemia at the same time as starting statin treatment. **[December 2023]**

Optimising statin treatment

See the section on optimising statin treatment.

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Escalating treatment for people on statins

1.7.7 Make decisions about escalating lipid-lowering treatment after an informed discussion between the clinician and the person about the risks and benefits of additional lipid-lowering treatments. **[December 2023]**

1.7.8 Take into account the person's preferences, the presence of any comorbidities, whether they are on multiple medications, whether they are frail and their life expectancy. (See also NICE's guideline on multimorbidity.) **[December 2023]**

1.7.9 If the person is taking the maximum tolerated dose and intensity of statin but the lipid target for secondary prevention of CVD is not met (see recommendation 1.7.1), consider additional lipid-lowering treatments recommended as options in NICE's technology appraisal guidance on:

- alirocumab (TA393, June 2016)
- evolocumab (TA394, June 2016)
- ezetimibe (TA385, February 2016)
- inclisiran (TA733, October 2021).

See the relevant NICE technology appraisal guidance for full details. **[December 2023]**

1.7.10 Consider ezetimibe in addition to the maximum tolerated intensity and dose of statin to reduce CVD risk further, even if the lipid target for secondary prevention of CVD is met (see recommendation 1.7.1). **[December 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on lipid target for secondary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review D: escalation of lipid-lowering treatment for secondary prevention of CVD.

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Assessing response to treatment

See the section on assessing response to treatment.

1.8 Statins for primary and secondary prevention of cardiovascular disease in people with chronic kidney disease

See NICE's guideline on chronic kidney disease for CKD classification. People on renal replacement therapy are outside the scope of this guideline.

1.8.1 Offer atorvastatin 20 mg for the primary or secondary prevention of CVD to people with CKD. **[May 2023]**

1.8.2 If the lipid target for primary or secondary prevention of CVD (see recommendation 1.6.1 and recommendation 1.7.1) is not met and eGFR is 30 ml per minute per 1.73 m^2 or more, increase the dose of atorvastatin. **[May 2023, amended December 2023]**

1.8.3 Agree the use of higher doses with a renal specialist if eGFR is less than 30 ml per minute per 1.73 m^2. **[May 2023]**

Optimising statin treatment

See the section on optimising statin treatment.

Assessing response to treatment

See the section on assessing response to treatment.

1.9 Optimising statin treatment

1.9.1 If the lipid target for primary or secondary prevention of CVD (see recommendation 1.6.1 and recommendation 1.7.1) is not met:

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- discuss adherence and timing of statin dose with the person
- encourage them to continue improvements to their diet and lifestyle, and to make further changes if appropriate
- consider increasing the statin intensity/dose if the person is not currently taking a high-intensity statin at the maximum tolerated dose. **[May 2023, amended December 2023]**

1.9.2 If the person reports adverse effects when taking a high-intensity statin, discuss the following strategies with them:

- stopping the statin and trying again when the symptoms have resolved to check if the symptoms are related to the statin
- changing to a different statin in the same intensity group (rosuvastatin if already receiving atorvastatin)
- reducing the dose
- changing to a lower-intensity statin. **[2014, amended May 2023 and December 2023]**

1.9.3 If a person is not able to tolerate a high-intensity statin, aim to treat with the maximum tolerated intensity and dose of statin. **[2014, amended December 2023]**

1.9.4 Advise the person that any statin at any dose reduces CVD risk. **[2014, amended May 2023 and December 2023]**

For a short explanation of why the committee made the 2023 recommendation and how it might affect practice, see the rationale and impact section on optimising statin treatment.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

1.10 Treatment if statins are contraindicated or not

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tolerated

Also see the section on assessing response to treatment.

Primary prevention of cardiovascular disease

1.10.1 Ezetimibe is recommended as an option in NICE technology appraisal guidance for treating primary hypercholesterolaemia in adults if statins are contraindicated or not tolerated. For full details, see the guidance on ezetimibe (TA385, 2016).

1.10.2 Bempedoic acid with ezetimibe is recommended as an option in NICE technology appraisal guidance for treating primary hypercholesterolaemia or mixed dyslipidaemia if statins are contraindicated or not tolerated, and ezetimibe alone does not control LDL cholesterol well enough. For full details, see the guidance on bempedoic acid with ezetimibe (TA694, 2021).

Secondary prevention of cardiovascular disease

1.10.3 Offer ezetimibe instead of a statin to people for whom statins are contraindicated or, if after documented discussion of the strategies outlined in recommendations 1.9.2 and 1.9.3, it is recognised the person cannot tolerate statins of any intensity or dose. This applies whatever the person's cholesterol level.

Ezetimibe is recommended as an option in NICE technology appraisal guidance for treating primary hypercholesterolaemia in adults if statins are contraindicated or not tolerated. For full details, see the guidance on ezetimibe (TA385, 2016). **[December 2023]**

1.10.4 If the person is taking ezetimibe but the lipid target for secondary prevention is not met (see recommendation 1.7.1), consider alternative or additional lipid-lowering treatments recommended as options in NICE's technology appraisal guidance on:

- alirocumab (TA393, June 2016)

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- bempedoic acid with ezetimibe (TA694, April 2021)
- evolocumab (TA394, June 2016)
- inclisiran (TA733, October 2021).

See the relevant NICE technology appraisal guidance for full details. **[December 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on lipid target for secondary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review D: escalation of lipid-lowering treatment for secondary prevention of CVD.

Assessing response to treatment

See the section on assessing response to treatment.

1.11 Assessing response to treatment

When to repeat blood tests

1.11.1 Measure liver transaminase and full lipid profile at 2 to 3 months after starting or changing lipid-lowering treatment. **[May 2023, amended December 2023]**

1.11.2 Measure liver transaminase at 12 months, but not again unless clinically indicated. **[May 2023, amended December 2023]**

When to measure creatine kinase

1.11.3 Advise people who are being treated with a statin to seek medical advice if they develop unexplained muscle symptoms (pain, tenderness or weakness). If this

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occurs, measure creatine kinase. **[May 2023]**

1.11.4 If people report muscle pain, tenderness or weakness while taking a statin and have a creatine kinase level less than 5 times the upper limit of normal, reassure them that their symptoms are unlikely to be due to the statin and explore other possible causes. **[May 2023]**

1.11.5 Do not measure creatine kinase levels in asymptomatic people who are being treated with a statin. **[May 2023]**

Increase in blood glucose or HbA1c

1.11.6 Do not stop statins because of an increase in blood glucose level or HbA1c. (See the recommendations on assessing for risk of diabetes mellitus in NICE's guideline on preventing type 2 diabetes.) **[May 2023]**

Restarting statins

1.11.7 Remind the person to restart the statin if they stopped taking it because of drug interactions or to treat intercurrent illnesses. **[May 2023]**

Annual medication review

1.11.8 Provide annual medication reviews for people on lipid-lowering treatment. **[May 2023, amended December 2023]**

1.11.9 Offer an annual full lipid profile to inform discussions about secondary prevention of CVD. **[May 2023, amended December 2023]**

1.11.10 Consider an annual full lipid profile to inform discussions about primary prevention of CVD. **[May 2023, amended December 2023]**

1.11.11 During the annual medication review:

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- discuss and encourage medicines adherence, if the shared decision is to continue with lipid-lowering treatment
- discuss and encourage dietary and lifestyle changes if appropriate
- address CVD risk factors. **[May 2023, amended December 2023]**

1.11.12 Discuss with people who are stable on a low-intensity statin or medium-intensity statin the likely benefits and potential risks of changing to a high-intensity statin when they have a medication review and agree with the person whether a change is needed. **[May 2023]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on assessing response to treatment.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

1.12 Lipid-lowering treatments that should not be used or not used routinely

These recommendations apply to primary and secondary prevention of CVD, including people with diabetes and CKD.

They do not apply to people with familial hypercholesterolaemia. For guidance on using fibrates, bile acid sequestrants and combination treatment for this population group, follow the recommendations on drug treatment in NICE's guideline on familial hypercholesterolaemia.

Adherence to statin treatment

1.12.1 Do not offer coenzyme Q10 or vitamin D to increase adherence to statin treatment. **[2014]**

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Fibrates

1.12.2 Do not routinely offer fibrates to prevent CVD. **[2014, amended December 2023]**

Nicotinic acid

1.12.3 Do not offer nicotinic acid (niacin) to prevent CVD. **[2014, amended December 2023]**

Bile acid sequestrants (anion exchange resins)

1.12.4 Do not offer a bile acid sequestrant (anion exchange resin) to prevent CVD. **[2014, amended December 2023]**

Omega 3 fatty acid compounds

1.12.5 Do not offer omega 3 fatty acid compounds to prevent CVD.

Icosapent ethyl is an exception to this if used as described in NICE's technology appraisal guidance on icosapent ethyl with statin therapy for reducing the risk of cardiovascular events in people with raised triglycerides (TA805, 2022). **[2014, amended December 2023]**

1.12.6 Tell people that there is no evidence that omega 3 fatty acid compounds help to prevent CVD, except use of icosapent ethyl as described in NICE's technology appraisal guidance on icosapent ethyl with statin therapy for reducing the risk of cardiovascular events in people with raised triglycerides (TA805, 2022). **[2014]**

Combination treatment

1.12.7 To prevent CVD, do not offer the combination of a statin with:

- a bile acid sequestrant (anion exchange resin), a fibrate or nicotinic acid **or**

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- an omega 3 fatty acid compound, except icosapent ethyl as described in NICE's technology appraisal guidance on icosapent ethyl with statin therapy for reducing the risk of cardiovascular events in people with raised triglycerides (TA805, 2022). **[2014, amended December 2023]**

Terms used in this guideline

This section defines terms that have been used in a particular way for this guideline.

Full lipid profile

This involves taking a blood sample to measure total cholesterol, HDL cholesterol and triglyceride levels and then calculating non-HDL cholesterol and LDL cholesterol (a fasting sample is not mandated). LDL cholesterol results may not be reported in participants with triglyceride levels more than 4.5 mmol per litre or 9 mmol per litre depending on the formula used by local laboratories.

High-intensity statin

The following doses for statins are high intensity, based on the percentage reduction in LDL cholesterol they can produce:

- atorvastatin: 20 mg to 80 mg
- rosuvastatin: 10 mg to 40 mg.

Medium-intensity statin

The following doses for statins are medium intensity, based on the percentage reduction in LDL cholesterol they can produce:

- atorvastatin: 10 mg
- fluvastatin: 80 mg
- rosuvastatin: 5 mg

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- simvastatin: 20 mg to 40 mg.

Low-intensity statin

The following doses for statins are low intensity, based on the percentage reduction in LDL cholesterol they can produce:

- fluvastatin: 20 mg to 40 mg
- pravastatin: 5 mg to 40 mg
- simvastatin: 10 mg.

Severe mental illness

A diagnosis of schizophrenia, bipolar disorder or other psychoses. (In line with the criteria for severe mental health conditions used in the NHS annual health check for people with severe mental health conditions.)

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Recommendations for research

The guideline committee has made the following key recommendations for research.

1 Simplifying risk assessment

What is the effectiveness of age alone and other routinely available risk factors compared with the formal structured multifactorial risk assessment to identify people at high risk of developing CVD? **[2014]**

2 Statin treatment for older people

What is the effectiveness of statin treatment in older people? **[May 2023, amended December 2023]**

For a short explanation of why the committee made this recommendation for research, see the rationale section on lipid-lowering treatment for primary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

3 Lipid-lowering treatment for people with type 1 diabetes

What is the effectiveness of statins and/or other lipid-lowering treatment in people with type 1 diabetes? **[May 2023, amended December 2023]**

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For a short explanation of why the committee made this recommendation for research, see the rationale section on lipid-lowering treatment for primary prevention of CVD.

Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

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Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice.

Full formal risk assessment

Recommendations 1.1.7 to 1.1.11

Why the committee made the recommendations

The committee agreed that the evidence suggested QRISK3 performed best among tools evaluated in a UK population to assess the risk of a person without established CVD having a CVD event within the next 10 years. They agreed that no tool is very good at accurately discriminating between who will and who will not have a CVD event, but that tools are useful for guiding decisions about interventions to prevent CVD based on estimated risk.

A small amount of evidence suggested that the additional fields included in QRISK3 (such as severe mental illness, regular corticosteroid use and atypical antipsychotic use) enabled the tool to perform better than QRISK2 at predicting CVD events for people with these risk factors. Use of QRISK3 should, therefore, result in more people within these groups being appropriately considered for risk reduction approaches including statin treatment.

It was noted that the group of people with severe mental illness used to develop and validate QRISK3 included a high proportion of people with severe and moderate depression. This is reflected in the definition of severe mental illness in QRISK3 but does not reflect the definition used in electronic clinical systems in primary care. The committee agreed, informed by their clinical experience and expert opinion, that people with moderate to severe depression are not considered to have as great an increased risk of CVD as people with schizophrenia, bipolar disorder and other psychoses. By using data that grouped these conditions together, QRISK3 may underestimate CVD risk for people with schizophrenia, bipolar disorder and other psychoses. Despite this the committee agreed to recommend use of the tool for people with severe mental illness (however defined), but clinical judgement should inform interpretation.

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The committee was aware that the NHS Health Check best practice guidance states that gender should be recorded as reported by the individual. If the individual discloses gender reassignment, they should be provided with CVD risk calculations based on both genders and advised to discuss with their GP which calculation is most appropriate for them as an individual. They agreed that healthcare professionals are expected to follow this guidance when undertaking formal risk assessments.

An age range is given for QRISK3 because it is only intended for people aged between 25 and 84 years (inclusive).

The committee agreed that the use of a risk tool remains appropriate in people with type 2 diabetes to support shared decision making. They agreed, based on the evidence, that QRISK3 performed better than QRISK2 for the population as whole and so should be used for people with type 2 diabetes.

The committee agreed to remove a 2014 recommendation to complete as many fields of the risk assessment tool as possible because QRISK3 explains that the tool can overestimate risk if fields are left blank. They also noted that BMI, ethnicity and family history of CVD should be recorded in people's medical records, so the committee agreed that the 2014 recommendation on recording this information was no longer needed.

Evidence on the performance of QRISK3 was not considered sufficient to suggest changing the 2014 recommendations against using a CVD risk tool in people with type 1 diabetes or CKD as it had not been validated in a separate population from that in which the tool was developed. The committee agreed these groups should be considered high risk, as should people with familial hypercholesterolaemia.

Based on their clinical experience, the committee identified a list of factors for which all CVD risk tools underestimate risk. They highlighted the importance of using clinical judgement to interpret risk scores. As risk scores are used to guide decisions about interventions to prevent CVD, the committee agreed it was particularly important to ensure people are not incorrectly considered to be at low risk.

The 2014 recommendation to consider people aged 85 and older to be at increased risk of CVD was retained as the committee agreed with this statement and there are still no tools for this age group. The committee highlighted it is important that this group be considered for interventions to prevent CVD even though a formal risk assessment would not be carried out.

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The evidence for lifetime risk tools was not considered sufficient to recommend their use instead of 10-year risk tools. However, the committee agreed they can have value in communication of risk. See the section on communication about risk assessment, lifestyle changes and treatment.

How the recommendations might affect practice

QRISK2 is currently integrated into electronic clinical systems, so 10-year CVD risk assessments can be generated using data already available in a person's electronic records. At the time of development, the committee was aware of ongoing discussions about continuation of the inclusion of QRISK in electronic clinical systems.

Using QRISK3 instead of QRISK2 will require clinical systems to be updated by software developers for the impact on practice to be minimised. Public Health England issued guidance in August 2021 on using QRISK3 in NHS health checks and how to deal with the transition period (responsibility for the NHS Health Check programme has transferred to the Office for Health Improvement and Disparities, but the guidance produced by Public Health England remains current).

QRISK3 requires some additional clinical information that was not required for QRISK2. However, if integrated into electronic clinical systems, QRISK3 is not likely to require additional resources over QRISK2. There may be some implementation costs as healthcare professionals become familiar with the additional information included in QRISK3 and in managing the transition period.

Return to recommendations

Communication about risk assessment, lifestyle changes and treatment

Recommendation 1.1.16

Why the committee made the recommendation

The committee agreed that the evidence did not support using lifetime CVD risk assessment tools to guide decisions on the need for statin treatment because their accuracy could not be reliably assessed.

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However, the committee noted that the usefulness of lifetime risk tools is primarily in communicating risk. They agreed by consensus that lifetime risk tools should be considered to help inform discussions about risk and motivate lifestyle changes. The committee highlighted that these tools may underestimate the ongoing benefit of lipid-lowering treatments as they do not predict risk reduction from taking medicines, and noted this should be considered when interpreting the results. They agreed lifetime risk calculation would not be necessary for everyone, but it may be particularly useful for people with a QRISK3 score less than 10% or under 40s who have CVD risk factors.

How the recommendation might affect practice

Lifetime risk tools are not routinely used in current clinical practice. The committee noted that there may be resource implications for calculating lifetime risk score estimates because lifetime risk tools are not currently embedded into electronic clinical systems, so scores are not automatically generated. There may also be implementation costs related to educating healthcare professionals about lifetime risk calculators. It is not clear if use of lifetime risk tools will result in longer consultations.

The committee agreed that the online calculators for lifetime risk tools such as QRISK-lifetime were easy to complete and provided some interpretation of the risk scores to aid discussions, but acknowledged that lifetime risk assessment would not be done for everyone.

The committee believe that using lifetime risk tools may have a long-term benefit in encouraging people to participate in lifestyle changes or engage in treatment, if appropriate. Given this, any additional time costs were considered likely to improve management of CVD risk and reduce future CVD events.

Return to recommendation

Aspirin for primary prevention of cardiovascular disease

Recommendation 1.2.1

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Why NICE made the recommendation

NICE's surveillance team reviewed the evidence about aspirin for the primary prevention of CVD. Based on the review, NICE decided to add a do not routinely offer recommendation about this. For full details see the January 2023 exceptional surveillance report.

Return to recommendation

Cardioprotective diet

Recommendation 1.3.2

Why the committee made the recommendation

There was no available evidence comparing the effectiveness of dietary cholesterol strategies with normal diets for adults with and without CVD, so the committee updated the 2014 recommendation based on their clinical experience and expert opinion. They removed the reference to restricting dietary cholesterol intake.

Only evidence on dietary cholesterol was in scope for review and therefore the guidance on total fat intake and proportion of saturated fat versus unsaturated fat was not changed.

How the recommendation might affect practice

The committee agreed healthcare professionals already better understand the lack of a relationship between dietary cholesterol and CVD risk, so the new recommendation reflects current practice. The committee agreed there should be no change in practice or resource impact to the NHS because of this updated recommendation.

Return to recommendation

Discussions and assessment before starting statins

Recommendations 1.5.1 to 1.5.7

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Why the committee made the recommendations

New evidence on adverse effects while on statins supported the 2014 recommendation. Evidence on the risk of muscle pain and rhabdomyolysis with statin use demonstrated a real effect, but the large body of evidence showed this was a very small increased risk when compared with similar populations not on statins; that is, when using high-intensity statins approximately 16% of people reported experiencing muscle pain, but of these cases only around 1 in 12 were likely to be due to the statin.

The committee agreed to strengthen the recommendation to reassure people that the risk of these adverse effects occurring is low.

The evidence supported the other 2014 recommendations, so they were retained. The committee agreed a full lipid profile should be provided before starting statins and amended the recommendation on lipid measures accordingly. See the section on assessing response to treatment for further details.

How the recommendations might affect practice

The recommendation on adverse effects has been strengthened to emphasise the low risk of experiencing severe muscle adverse effects because of statin treatment. It is not expected to have an impact on resource use as discussions on adverse effects are already an important part of current practice in prescribing and monitoring statins.

Return to recommendations

Lipid-lowering treatment for primary prevention of cardiovascular disease

Recommendations 1.6.1 to 1.6.12

Why the committee made the recommendations

Evidence on both the effectiveness and adverse effects of statins showed high-intensity statins are clinically effective and cost effective compared to no statins, low-intensity statins, or medium-intensity statins for preventing CVD in people without CVD.

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The committee agreed to retain 20 mg as the recommended starting dose for all people starting atorvastatin for primary prevention of CVD. Although there was committee consensus that higher doses have a greater effect, they agreed that starting at the lowest effective dose was likely to be preferable to people, but that up-titration of the dose should be considered as appropriate, following recommendation 1.9.1.

The evidence supported the 2014 recommendations on optimising lifestyle changes and treating comorbidities and secondary causes of dyslipidaemia before starting statins, so they were retained.

The committee agreed to retain the following recommendations for research because there is still a lack of direct evidence in these areas:

- statin treatment for older people
- lipid-lowering treatment for people with type 1 diabetes.

Statins and QRISK score

Evidence showed that statins are cost effective for people with 10-year CVD risk scores less than 10%.

The committee agreed that if more people took statins there would be a greater reduction in CVD events. However, they also recognised that practical considerations needed to be taken into account.

They agreed that risk scores are an important aid to shared decision making on statins. National audit data (CVDPREVENT) suggests that 60% of people without CVD and a QRISK score of 20% or more are prescribed lipid-lowering treatment, compared with 50% for people with scores of 10% or more. Therefore, the committee consensus was that an even smaller proportion of people with scores less than 10% may choose to take statins.

The committee agreed that focusing on increasing uptake among people with the most potential to benefit would have more impact than lowering the statin treatment threshold. The 10% 10-year QRISK score was therefore retained as the threshold for offering statins. Although QRISK3 is specified in the recommendations, it is acknowledged that QRISK2 may be used in some circumstances until QRISK3 is embedded in electronic clinical systems (see the panel after recommendation 1.1.8 for details). The 10% threshold applies whether QRISK2 or 3 is used.

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Despite this, the committee agreed that a more person-centred approach should be adopted and recommended atorvastatin 20 mg as an option for people who want to take statins, irrespective of their QRISK3 score, or where clinical judgement suggests the person may be at high risk of CVD (for example, if the person has CVD risk factors not covered by QRISK3).

How the recommendations might affect practice

Most recommendations about statin treatment have been retained from the 2014 update of the guideline and so should not require a change in practice.

National audit data suggests that about half of people with a QRISK score of 10% or more are on lipid-lowering treatment. It is unclear if people are not being offered treatment or if they are declining or stopping treatment.

The recommendation to consider starting atorvastatin 20 mg for people with QRISK3 scores less than 10% is a change in practice. The impact on medication and monitoring costs and workload will depend on the level of uptake. For details of the impact of an increase in statin use, see the impact section on lipid target for secondary prevention of CVD.

Return to recommendations

Statins for secondary prevention of cardiovascular disease

Recommendations 1.7.2 to 1.7.5

Why the committee made the recommendations

Evidence on both the effectiveness and adverse effects of statins showed high-intensity statins are clinically effective and cost effective compared to no statins, low-intensity statins, or medium-intensity statins for preventing CVD in people with CVD.

The evidence supported the 2014 recommendations on initial treatment with statins and so they were retained. The recommendation on acute coronary syndromes was amended to clarify that a full lipid profile is needed on admission to hospital and 2 to 3 months after

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starting treatment. See the section on assessing response to treatment for further details.

How the recommendations might affect practice

These recommendations are in line with current practice and therefore will not have a resource impact.

Return to recommendations

Optimising statin treatment

Recommendation 1.9.1

Why the committee made the recommendation

The committee amended the 2014 consensus recommendation on what to do if someone taking statins does not reach their lipid target to apply to both the existing primary prevention target and the new secondary prevention target. The recommended actions remain the same.

How the recommendation might affect practice

The recommendation is in line with current practice and therefore will not have a resource impact.

Return to recommendation

Lipid target for secondary prevention of cardiovascular disease

Recommendation 1.7.1, recommendations 1.7.7 to 1.7.10 and recommendations 1.10.3 and 1.10.4

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Why the committee made the recommendations

Lipid target

The committee agreed LDL cholesterol and non-HDL cholesterol levels should be reduced as much as possible in people with CVD. However, people respond differently to statins and other lipid-lowering treatments, and it is not cost effective to offer the full range of treatments to everyone with CVD.

The clinical evidence consisted of 34 randomised control trials (RCTs). Clinically significant reductions in LDL cholesterol and non-HDL cholesterol levels compared to placebo were seen for all 4 lipid-lowering treatments covered by the clinical trials: alirocumab, evolocumab, ezetimibe and inclisiran. The majority of people in the trials were also taking statins.

Modest reductions in major CVD events such as myocardial infarction, stroke and related deaths were also seen for all 4 medicines. The committee recognised that some of the trials involved short follow-up periods of 1 year or less, so these medicines are likely to have a bigger impact on CVD events over the long term. There was no clinically important increased risk of adverse events. Injection site reactions were more frequent with alirocumab, evolocumab and inclisiran than with placebo but these were mild and not persistent.

An economic model was developed using estimates of the impact of lipid-lowering treatments on LDL cholesterol (from a network meta-analysis of the 34 RCTs), combined with estimates of the impact of LDL cholesterol reduction on major cardiovascular events (from a published meta-analysis of statin RCTs). The economic model calculated, for all possible baseline LDL cholesterol levels, the reduced admissions to hospital for stroke, myocardial infarction and cardiovascular procedures and the associated life expectancy increases, quality of life improvements and treatment cost savings as a result of taking lipid-lowering treatments. This was offset against the cost of lipid-lowering treatments and associated monitoring costs. The data for the 2 PCSK9 inhibitors (alirocumab and evolocumab) were combined and were not analysed separately because treatment effects were found to be the same in the network meta-analysis.

The model estimated the absolute LDL cholesterol target at which it was cost effective to escalate treatment for people on a high-intensity statin. The analysis explored different combinations of lipid-lowering treatments.

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Escalation of treatment was cost effective for people on statins with LDL cholesterol levels of more than 2.2 mmol per litre. There was a little more uncertainty about the cost effectiveness of escalating treatment for people with LDL cholesterol levels between 2.0 mmol and 2.2 mmol per litre. An LDL cholesterol target of 1.8 mmol per litre was not cost effective. The committee decided that 2.0 mmol per litre was likely to be cost effective and would allow more people to be treated than 2.2 mmol per litre.

Even though the main economic analysis was based on the impact of lipid-lowering treatment on LDL cholesterol levels, the committee recognised the need to identify a non-HDL cholesterol target for use when LDL cholesterol levels have not been requested or calculated.

Using the distribution of LDL cholesterol levels for the population with CVD and on a statin in the clinical practice research datalink (CPRD) dataset, 42% of people had LDL cholesterol levels of 2.0 mmol per litre or more. Using the same data, the threshold for non-HDL cholesterol that would produce an identical number of people being escalated for treatment was 2.6 mmol per litre. An alternative approach would be to use the Friedewald equation and insert the mean triglyceride level of 1.4 mmol per litre along with the LDL cholesterol of 2.0 mmol per litre. This approach also indicates a non-HDL cholesterol target of 2.6 mmol per litre.

Both target measures are slightly higher than other national and international targets because, unlike other targets, the LDL cholesterol target is based on the cost effectiveness of treatment escalation. However, the committee thought it was sufficiently similar and, because it was more affordable, was more likely to be implemented.

Statin plus ezetimibe

In a separate analysis, escalation with statin plus ezetimibe (but no injectable treatment) was evaluated at different LDL cholesterol levels. Ezetimibe was cost effective regardless of LDL cholesterol, so the committee agreed that it could be considered for people with lipid levels below the agreed target. They noted that the trade-off between further reducing risk and increasing medication should be taken into account. These should be considered and fully discussed with the person as part of informed shared decision making. Furthermore, the committee agreed that adherence may be lower for people on 2 pills rather than 1, especially if they are below the target.

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Statins are contraindicated or not tolerated

The committee did not review the evidence for the clinical effectiveness of lipid-lowering treatments in people who are statin intolerant or for whom statins are contraindicated but based their recommendations on NICE's technology appraisal guidance on alirocumab, bempedoic acid, evolocumab, ezetimibe and inclisiran.

The committee emphasised that statin treatment is known to be the most effective method of reducing the risk of CVD events and that this should be the main treatment for most people. They highlighted the importance of reviewing statin medication in response to adverse effects before deciding someone is statin intolerant.

An economic analysis estimated the absolute LDL cholesterol target at which it was cost effective to escalate treatment for people on ezetimibe who are statin intolerant. The analysis explored different combinations of lipid-lowering treatments.

The committee discussed whether the lipid target should be different because of the different treatment options and associated costs. However, it was noted that this may introduce inequality regarding access to lipid-lowering treatment. Also, the target at which escalation of lipid-lowering treatment is cost effective did not change when the statin intolerant population was included in the economic model alongside the statin tolerant population, largely because the prevalence of statin intolerance is relatively low. Therefore, the committee agreed that the target for people who cannot take statins should be the same as for those who can take them.

They recommended offering ezetimibe to people who cannot take statins (in line with NICE's technology appraisal guidance on ezetimibe) and, if this does not achieve the lipid target in this guideline, to offer alternative or additional lipid-lowering treatments (in line with other technology appraisal guidance).

How the recommendations might affect practice

It is expected that recommending a specific lipid target for secondary prevention of CVD will lead to an increased use of lipid-lowering treatments. The committee was aware that NHS England had recently introduced a target as part of the Quality and Outcomes Framework (QOF). The target recommended in this guideline is similar to the 2023/24 QOF, although data showed that, in many people, the QOF target is not being met. In June 2023, the CVDPREVENT audit reported that 28.7% were meeting the target.

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Increased uptake of statins, ezetimibe and other lipid-lowering treatments will result in higher medication and monitoring costs to the NHS. It will also contribute to an increased workload in primary care, including for GP practices and pharmacies, and in laboratories that process lipid profile and liver function tests. The committee agreed that increased uptake of lipid-lowering treatments is necessary for an overall improvement in population health, but that the extra cost of lipid-lowering treatment would be partly offset by savings due to a reduction in CVD events (including hospital admissions for stroke, heart disease and cardiovascular procedures).

Return to recommendation 1.7.1

Return to recommendations 1.7.7 to 1.7.10

Return to recommendations 1.10.3 and 1.10.4

Assessing response to treatment

Recommendations 1.11.1 to 1.11.12

Why the committee made the recommendations

The committee agreed that more flexibility in the timing of blood tests to measure lipid levels after starting high-intensity statins was reflective of actual clinical practice and recommended a timeframe of 2 to 3 months, rather than at 3 months of treatment as recommended in the 2014 guideline. They also recommended blood tests should be done 2 to 3 months after changing treatment.

They agreed that blood tests should provide a full lipid profile and that LDL cholesterol levels can be calculated rather than measured directly. They recommended that a full lipid profile should be done to inform annual medication reviews about secondary prevention of CVD, and considered for reviews about primary prevention of CVD.

These changes were also applied to the recommendations on baseline blood tests before starting statins and statin treatment after an acute coronary syndrome.

The evidence supported the 2008 and 2014 recommendations on when to measure creatine kinase, not stopping statins because of an increase in blood glucose or HbA1c and restarting statins if stopped because of drug interactions or illness, so they were retained.

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How the recommendations might affect practice

The requirement to check lipid levels after changing lipid-lowering treatment, as well as after starting treatment, will result in higher monitoring costs. However, calculating LDL cholesterol as well as non-HDL cholesterol should not add to the cost per test.

Return to recommendations

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Context

Cardiovascular disease (CVD) is the leading cause of death worldwide, accounting for almost 18 million deaths each year (over 30% of all global deaths). Around 7 million people in the UK have CVD.

Over 70 million prescriptions for statins are dispensed in England each year, costing the NHS around £100 million. The total healthcare cost of CVD in England is estimated to be £7.4 billion.

Despite the weight of conclusive research and consistent national and international guidelines, many people at significant risk of CVD do not receive lipid-lowering treatment, or they receive inadequate treatment. Anxieties about the safety of statins may mean healthcare professionals are reticent about offering them, and people are reluctant to start or continue statin treatment. Depending on statin intensity, 30% to 50% of people stop taking statins within 6 years.

Over the past 5 years, more evidence has become available on the benefits and adverse effects of statins.

Ways to estimate and explain CVD risk have also improved, and healthcare professionals now have more varied and accurate approaches available for individualised risk assessment. This can empower patients and professionals to discuss interventions to reduce short-term and long-term CVD risk.

Increasing awareness of elevated lipids (including cholesterol) as a risk factor for CVD, so that appropriate intervention can be provided, is critical to the delivery of the NHS Long Term Plan. By 2029, the ambition in England is for at least 45% of people aged 40 to 74 with a 20% or greater risk of developing CVD in the next 10 years to be on appropriate lipid-lowering treatment. Local achievement of this ambition can be monitored using the CVDPREVENT audit.

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Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on cardiovascular conditions.

For full details of the evidence and the guideline committee's discussions, see the evidence reviews. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

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Update information

December 2023: This guideline updates and replaces NICE guideline CG181 (July 2014). We reviewed the evidence and made a new recommendation on the target lipid level for secondary prevention of CVD for adults on lipid-lowering treatment. New recommendations are marked **[December 2023]**. We also restructured the guideline to provide better navigation. Some of the existing recommendations have been amended to be consistent with the new recommendations or for clarification because of the restructure.

Recommendations marked **[date 1, amended date 2]** had an evidence review in date 1.

May 2023: We reviewed the evidence and made new recommendations on risk assessment tools for primary prevention of CVD, cardioprotective diets and statin treatment for primary prevention of CVD. Recommendations for chronic kidney disease and initial treatment with statins for secondary prevention of CVD were not changed.

February 2023: We added a new recommendation on aspirin for primary prevention of CVD. This is based on a 2023 surveillance decision.

July 2014: This guideline updates and replaces NICE guideline CG67 and NICE technology appraisal guidance 94.

Minor changes since publication

October 2025: We have removed the reference to the online version of QRISK3 because it should not be used for direct patient care by healthcare professionals.

September 2025: We added links to relevant technology appraisal guidance in the sections on lipid-lowering treatment for primary prevention of CVD, lipid-lowering treatment for secondary prevention of CVD, treatment if statins are contraindicated or not tolerated and lipid-lowering treatments that should not be used or not used routinely.

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