Cardiovascular disease: risk assessment and reduction, including lipid modification

Clinical 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.

Contents

This guideline replaces CG67 and TA94.

This guideline partially replaces CG87.

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

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]**

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. **[2023]**

1.1.8   Use the QRISK3 tool for people with type 2 diabetes aged between 25 and 84. **[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 (the online version of QRISK3, if necessary) because QRISK2 does not take these risk factors into account and so 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/min/1.73 m^2 and/or albuminuria (see the section on primary and secondary prevention of CVD for people with chronic kidney disease)

- familial hypercholesterolaemia (see NICE's guideline on familial hypercholesterolaemia) or other inherited disorders of lipid metabolism. **[2023]**

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

- 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. **[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. **[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 2023]**

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

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. **[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]**

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. **[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 2023]**

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. **[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 therapy, 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 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 obesity: identification, assessment and 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:

- 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 Lipid modification therapy for the primary and secondary prevention of cardiovascular disease

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

Initial lipid measurement and referral for specialist review

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

1.4.3 Before starting lipid modification therapy for the primary prevention of CVD, take at least 1 blood sample to provide a full lipid profile. Measure total cholesterol, HDL cholesterol, non-HDL cholesterol and triglyceride concentrations. A fasting sample is not needed. **[2014]**

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

1.4.5 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]**

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

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

1.4.8   Refer for urgent specialist review if a person has a triglyceride concentration over 20 mmol/litre that is not a result of excess alcohol intake or poor glycaemic control. **[2014]**

1.4.9   In people with a triglyceride concentration between 10 and 20 mmol/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 concentration remains over 10 mmol/litre. **[2014]**

1.4.10   In people with a triglyceride concentration between 4.5 and 9.9 mmol/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 concentration is over 7.5 mmol/litre. **[2014]**

Statins for preventing cardiovascular disease

There is a NICE patient decision aid to support discussions about statin therapy to reduce the risk of heart disease and stroke.

1.4.11   Decide whether to start statin therapy after an informed discussion between the clinician and the person about the risks and benefits of statin treatment, taking into account additional factors such as potential benefits from lifestyle changes, informed patient preference, comorbidities, polypharmacy, general frailty and life expectancy. (See

also NICE's guideline on multimorbidity.) **[2023]**

1.4.12　Before starting statin treatment perform baseline blood tests and clinical assessment, and treat comorbidities and secondary causes of dyslipidaemia. Include all of the following in the assessment:

- smoking status

- alcohol consumption

- blood pressure (see NICE's guideline on hypertension)

- BMI or other measure of obesity (see NICE's guideline on obesity: identification, assessment and management)

- total cholesterol, non-HDL cholesterol, HDL cholesterol and triglycerides

- diabetes status

- renal function

- transaminase level (alanine aminotransferase or aspartate aminotransferase)

- thyroid-stimulating hormone in people with symptoms of underactive or overactive thyroid. **[2023]**

Primary prevention

1.4.13　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. **[2023]**

1.4.14　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 weight management: lifestyle services for overweight or obese adults.) **[2023]**

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

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

Primary prevention for people with and without type 2 diabetes

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

1.4.18   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. **[2023]**

1.4.19   For people aged 85 and older consider treatment with atorvastatin 20 mg. Be aware of factors that may make treatment inappropriate (see recommendation 1.4.11). **[2023]**

See also the section on follow-up of people started on statin treatment.

Primary prevention for people with type 1 diabetes

1.4.20   Consider statin treatment for the primary prevention of CVD for adults with type 1 diabetes. **[2023]**

1.4.21   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. **[2023]**

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

See also the section on follow-up of people started on statin treatment.

Secondary prevention for people with and without type 1 or 2 diabetes

1.4.23   Start statin treatment in people with CVD with atorvastatin 80 mg. Use a lower dose of atorvastatin if any of the following apply:

- potential drug interactions

- high risk of adverse effects

- patient preference. **[2023]**

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

1.4.24   Do not delay statin treatment for secondary prevention of CVD but consider lifestyle changes at the same time if appropriate. **[2023]**

1.4.25   If a person has acute coronary syndrome do not delay statin treatment. Take a lipid sample on admission and about 3 months after the start of treatment. **[2023]**

    See also the section on follow-up of people started on statin treatment.

Primary and secondary prevention for people with chronic kidney disease

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

1.4.27   Increase the dose if a greater than 40% reduction in non-HDL cholesterol is not achieved (see recommendation 1.4.28) and eGFR is 30 ml/min/ 1.73 m^2 or more. **[2023]**

1.4.28   Agree the use of higher doses with a renal specialist if eGFR is less than 30 ml/min/1.73 m^2. **[2023]**

    See also the section on follow-up of people started on statin treatment.

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

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
preventing CVD.

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

Follow-up of people started on statin treatment

1.4.29   Measure total cholesterol, HDL cholesterol and non-HDL cholesterol in all
         people who have been started on high-intensity statin treatment (both
         primary and secondary prevention, including atorvastatin 20 mg for
         primary prevention) at 3 months of treatment. **[2023]**

1.4.30   Aim for a greater than 40% reduction in non-HDL cholesterol. **[2023]**

1.4.31   If a greater than 40% reduction in non-HDL cholesterol is not achieved:

   - discuss adherence and timing of dose

   - optimise adherence to diet and lifestyle measures

   - consider increasing the dose if started on less than atorvastatin 80 mg and the
     person is judged to be at higher risk because of comorbidities, risk score or
     using clinical judgement. **[2023]**

A partial update of this guideline to identify a specific treatment target for secondary
prevention of CVD is in progress. Further information can be found on the NICE
webpage for the next update of this guideline.

1.4.32   Provide annual medication reviews for people taking statins.

   - Use these reviews to discuss medicines adherence and lifestyle changes and
     address CVD risk factors.

   - Consider an annual non-fasting blood test for non-HDL cholesterol to inform
     the discussion. **[2023]**

1.4.33   Discuss with people who are stable on a low- 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. **[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 follow-up of
> people started on statin treatment.
>
> Full details of the evidence and the committee's discussion are in evidence review C:
> statins: efficacy and adverse effects.

Advice and monitoring for adverse effects

1.4.34   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. **[2023]**

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

1.4.36   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
therapy. 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 intolerance of statins, and for other
  treatment options, see the NICE technology appraisal guidance on our topic
  page on lipid disorders)

- raised but less than 5 times the upper limit of normal, start statin treatment at a lower dose. **[2023]**

1.4.37 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. **[2023]**

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

1.4.39 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. **[2023]**

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

1.4.41 Measure liver transaminase within 3 months of starting treatment (as well as at baseline, see recommendation 1.4.12) and at 12 months, but not again unless clinically indicated. **[2023]**

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

1.4.43 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.) **[2023]**

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

1.4.45 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 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 advice and monitoring for adverse effects.

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

Intolerance of statins

1.4.46　If a person is not able to tolerate a high-intensity statin aim to treat with the maximum tolerated dose. **[2014]**

1.4.47　Tell the person that any statin at any dose reduces CVD risk. If someone reports adverse effects when taking a high-intensity statin discuss the following possible 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 within the same intensity group

- changing the statin to a lower intensity group. **[2014, amended 2023]**

1.4.48　Seek specialist advice about options for treating people at high risk of CVD such as those with CKD, type 1 diabetes, type 2 diabetes or genetic dyslipidaemias, and those with CVD who are intolerant to 3 different statins. Seek advice by telephone, virtual clinic or referral. **[2014]**

Adherence to statin therapy

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

Fibrates for preventing cardiovascular disease

1.4.50   Do not routinely offer fibrates to prevent CVD to any of the following:

- people who are being treated for primary prevention

- people who are being treated for secondary prevention

- people with CKD

- people with type 1 diabetes

- people with type 2 diabetes. **[2014]**

    For people with familial hypercholesterolaemia, follow the recommendations on drug treatment in NICE's guideline on familial hypercholesterolaemia.

Nicotinic acid for preventing cardiovascular disease

1.4.51   Do not offer nicotinic acid (niacin) to prevent CVD to any of the following:

- people who are being treated for primary prevention

- people who are being treated for secondary prevention

- people with CKD

- people with type 1 diabetes

- people with type 2 diabetes. **[2014]**

Bile acid sequestrants (anion exchange resins) for preventing cardiovascular disease

1.4.52   Do not offer a bile acid sequestrant (anion exchange resin) to prevent

CVD to any of the following:

- people who are being treated for primary prevention

- people who are being treated for secondary prevention

- people with CKD

- people with type 1 diabetes

- people with type 2 diabetes. **[2014]**

For people with familial hypercholesterolaemia, follow the recommendations on drug treatment in NICE's guideline on familial hypercholesterolaemia.

Omega 3 fatty acid compounds for preventing cardiovascular disease

1.4.53 Do not offer omega 3 fatty acid compounds to prevent CVD to any of the following:

- people who are being treated for primary prevention

- people who are being treated for secondary prevention

- people with CKD

- people with type 1 diabetes

- people with type 2 diabetes.

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. **[2014]**

1.4.54 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. **[2014]**

Combination therapy for preventing cardiovascular disease

1.4.55   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

- an omega 3 fatty acid compound, except icosapent ethyl as described in NICE's technology appraisal guidance on icosapent ethyl with statin therapy. **[2014]**

  For people with familial hypercholesterolaemia, follow the recommendations on drug treatment in NICE's guideline on familial hypercholesterolaemia.

Other treatment options

For other treatment options, see the NICE technology appraisal guidance on our topic page on lipid disorders.

Terms used in this guideline

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

High-intensity statin

The following doses for statins are high intensity, based on the percentage reduction in low-density lipoprotein (LDL) cholesterol they can produce:

- atorvastatin: 20 mg to 80 mg

- rosuvastatin: 10 mg to 40 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.)

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 therapy for older people

What is the effectiveness of statin therapy in older people? [**2023**]

> For a short explanation of why the committee made this recommendation for research, see the rationale section on statins for preventing CVD.
>
> Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

3 Lipid modification therapy for people with type 1 diabetes

What is the effectiveness of statins and/or other low-density lipoprotein (LDL) cholesterol-lowering treatment in people with type 1 diabetes? [**2023**]

> For a short explanation of why the committee made this recommendation for research, see the rationale section on statins for preventing CVD.
>
> Full details of the evidence and the committee's discussion are in evidence review C: statins: efficacy and adverse effects.

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.

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.

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 rationale for 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 PHE 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.

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 and 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 so reduce future CVD events.

Return to recommendation

Aspirin for primary prevention of cardiovascular disease

Recommendation 1.2.1

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

Statins for preventing cardiovascular disease

Recommendations 1.4.11 to 1.4.28

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 or without CVD.

Most of the 2014 recommendations were retained, including recommendations on:

- how to discuss statin therapy with people and decide to start treatment

- the tests and assessments that should happen before treatment starts

- discussing lifestyle changes

- secondary prevention.

The recommendations state which high-intensity statin should be used initially, so the committee agreed that the recommendation to choose a high-intensity statin of low acquisition cost is no longer needed.

The definition of high intensity statins was updated to remove simvastatin 80 mg. This is no longer used in current practice because of the risk of myopathy and muscle symptoms.

Primary prevention of cardiovascular disease

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 suggests that 56% of people with a QRISK score of 20% or more take statins, compared with less than 50% for people with scores between 10% and 20%. 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 below recommendation 1.1.8 for details). The 10% threshold applies whether QRISK2 or 3 is used.

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).

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 patients, but that up-titration of the dose should be considered as appropriate, following recommendations in the section on follow-up of people started on statin treatment.

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

- statin therapy for older people

- lipid modification therapy for people with type 1 diabetes.

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 less than half of people with a QRISK score of 10% or more are on lipid-lowering therapy. It is unclear if people are not being offered statins or if they are declining or stopping treatment. Increased uptake of statins would result in higher medication and monitoring costs to the NHS. It would also contribute to workload burden in primary care GP practices and pharmacies and laboratories processing monitoring tests. The committee agreed this increase was necessary for downstream improvements in population health, and would be offset by savings due to a reduction in CVD events.

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. This will be offset by savings due to a reduction in CVD events and improvements in population health.

Return to recommendations

Follow-up of people started on statin treatment

Recommendations 1.4.29 to 1.4.33

Why the committee made the recommendations

The committee reviewed the 2014 consensus recommendations on follow-up and agreed they were still valid and should be retained.

How the recommendations might affect practice

Although these recommendations remain unchanged from 2014 so should reflect current practice, the committee acknowledged that any increase in statin use would result in an increase in follow-up activity, including cholesterol testing at 3 months of treatment, and in the number of annual medication reviews. This was considered when amending the recommendations on statins. For further details see the impact section for the recommendations on statins.

Return to recommendations

Advice and monitoring for adverse effects

Recommendations 1.4.34 to 1.4.45

Why the committee made the recommendations

New evidence on adverse effects while on statins supported the 2014 recommendations. 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 on advice and monitoring for adverse effects and so they were retained.

How the recommendations might affect practice

The recommendations have been strengthened to emphasise the low risk of experiencing severe muscle adverse effects because of statin treatment. They are 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

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 therapies, 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- and long-term CVD risk.

Understanding of the relationship between dietary cholesterol and lipid levels has also evolved suggesting recommendations in the 2014 guideline required updating.

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 who are at significant risk of developing CVD to be on appropriate lipid-lowering therapy. Local achievement of this ambition can be monitored using the CVDPREVENT audit.

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.

Update information

May 2023: We reviewed the evidence on risk assessment tools for primary prevention of CVD, cardioprotective diets and statin treatment for primary and secondary prevention of CVD. Recommendations are marked **[2023]** if the evidence has been reviewed. Recommendations for people with type 1 diabetes and chronic kidney disease, and for follow-up of people started on statin treatment, have 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. Recommendations marked **[2014]** had an evidence review in 2014. Recommendations marked **[2008]** or **[2008, amended 2014]** had an evidence review in 2008.

Minor changes since publication

July 2022: We updated our recommendations on omega 3 fatty acid compounds and combination therapy in line with NICE's technology appraisal guidance on icosapent ethyl with statin therapy for reducing the risk of cardiovascular events in people with raised triglycerides.

November 2021: We added a link to NICE's guideline on shared decision making.

October 2021: We added a link to NICE's technology appraisal guidance on lipid disorders.

November 2020: We added a link to the UK Chief Medical Officers' physical activity guidelines.

June 2020: We updated our advice on alcohol consumption in line with the UK Chief Medical Officers' alcohol consumption guidelines.

July 2016: We amended the advice on saturated and mono-unsaturated fat.

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