

# BNSSG lipid guidelines on the diagnosis and management of lipid disorders

Developed in partnership between:



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# Contents

This guideline acts a repository of all the relevant guidelines for the diagnosis and management of lipid disorders locally within the Bristol, North Somerset, South Gloucestershire Integrated Care Board (BNSSG ICB).

Guidelines have been collated from national management pathways available publicly online and local pathways created by local lipid specialists in collaboration with relevant specialities. *Patients reviewing this guideline should be mindful that local clinicians are able to use these guidelines at their discretion and in light of factors individual to you.*

Each box below is a hyperlink to the relevant guideline

NHS England AAC  
Statin intolerance  
management pathway

NHS England AAC  
Lipid management  
pathway

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Lipid profile requesting  
+  
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measurement and  
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# NHS England Accelerated Access Pathway

These are the national agreed guidelines for the management of lipids across primary and secondary prevention, including the use of injectable medications

Author: Dr Rani Khatib & Dr Dermot Neely on behalf of the AAC Clinical Subgroup. March 2024. Review date: Mar 2026.  
<https://www.england.nhs.uk/aac/wp-content/uploads/sites/50/2020/04/lipid-management-pathway-v7.pdf>

# Summary of National Guidance for Lipid Management for Primary and Secondary Prevention of CVD

**INITIAL CONSIDERATIONS:**

- Measure non-fasting **full lipid profile** (total cholesterol, HDL-C, non-HDL-C, triglycerides) and HbA1c as part of an initial baseline assessment.
- Consider secondary causes of hyperlipidaemia and manage as needed.
- Ensure appropriate baseline and follow up tests as detailed on page 2. Measure BMI.
- Identify and exclude people with contraindications/drug interactions
- If non-fasting triglyceride above 4.5mmol/L see page 2.

**PRIMARY PREVENTION**  
Offer lifestyle changes and consider statin therapy for adults who do not have established CVD but fall into the categories below. Use QRISK risk assessment tool where appropriate (see page 2. 'Primary Prevention Risk Assessment')

|   |   |   |  |   |
|---|---|---|--|---|
| Age $\leq$ 84 & QRISK $\geq$ 10% over next 10 years | Type 2 diabetes & QRISK $\geq$ 10% over next 10 years | Type 1 diabetes, if they have one or more of the following:<br>• Over 40 years<br>• Had diabetes for >10 years<br>• Have established nephropathy<br>• Have other CVD risk factors | CKD eGFR < 60 mL/min/1.73m <sup>2</sup> and/or albuminuria | Age $\geq$ 85 years if appropriate consider co-morbidities, frailty & life expectancy |
|---|---|---|--|---|

Discuss the benefits of lifestyle changes and identify and address all modifiable risk factors - smoking, diet, obesity, alcohol intake, physical activity, blood pressure and HbA1c. Offer people the opportunity to have their risk of CVD assessed again after they have tried to change their lifestyle (where applicable)

Consider additional risk factors, if present, together with QRISK score (treated for HIV, severe mental illness, taking medicines that cause dyslipidaemia, systemic inflammatory disorder (e.g. SLE), impaired fasting glycaemia, recent change in risk factors)

**PRIMARY PREVENTION**  
If lifestyle modification is ineffective or inappropriate, discuss the risks and benefits of statins, and offer treatment based on an informed shared-decision.  
**Atorvastatin 20mg daily**

- Measure full lipid profile again after 2-3 months (non-fasting).
- High intensity statin treatment should achieve reduction of non-HDL-C > 40% from baseline. If not achieved after 2-3 months;
  - Discuss treatment adherence, timing of dose, diet and lifestyle
  - If at higher risk (based on comorbidities, risk score or clinical judgement – see page 2 'Additional Risk Factors') consider increasing the dose every 2-3 months up to a maximum dose of atorvastatin 80mg daily.
  - For how to increase in people with CKD see 'Special Patient Populations' (page 2).

- If patients on a high-intensity statin have side effects, offer a lower dose or an alternative statin (see page 2 'Extent of lipid lowering with available therapies')
- If maximum tolerated dose of statin does not achieve non-HDL-C reduction > 40% of baseline value after 2-3 months consider adding Ezetimibe 10mg daily (NICE TA385)
- If statin treatment is contraindicated or not tolerated;
  - See AAC Statin Intolerance Algorithm for advice regarding adverse effects ([click here](#))
  - Ezetimibe 10mg monotherapy may be considered. Assess response after 2-3 months.
  - Ezetimibe 10mg/bempedoic acid 180 mg combination may be considered when ezetimibe alone does not control non-HDL-C/LDL-C well enough (NICE TA694).

If non-HDL-C reduction remains < 40% of baseline despite maximal tolerated lipid lowering therapy (including people with intolerances and contraindications) consider referral to specialist lipid management clinic according to local arrangements

**SEVERE HYPERLIPIDAEMIA**  
If TC>7.5mmol/L and/or LDL-C >4.9mmol/L and/or non-HDL-C >5.9mmol/L, a personal and/or family history of confirmed CHD (<60 years) and with no secondary causes: suspect familial hypercholesterolaemia (possible heterozygous FH) Do not use QRISK risk assessment tool

**DIAGNOSIS AND REFERRAL**  
Take fasting blood for repeat lipid profile to measure LDL-C. Use the **Simon Broome or Dutch Lipid Clinic Network (DLCN)** criteria to make a **clinical diagnosis of FH**. 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. Refer to Lipid Clinic for further assessment if **clinical diagnosis of FH** or if TC>9.0mmol/L and/or LDL-C >6.5mmol/L and/or non-HDL-C >7.5mmol/L or Fasting triglycerides > 10mmol/L (regardless of family history) (page 2)

**TREATMENT TARGETS IN FH**  
If clinical diagnosis of FH and/or other risk factors present follow the recommended treatment management pathway for primary or secondary prevention as for non-FH, **BUT Aim to achieve at least a 50% reduction of LDL-C (or non-fasting non-HDL-C) from baseline.** Consider specialist referral for further treatment and/or consideration of PCSK9i therapy IF - they are assessed to be at very high risk of a coronary event\*\* - OR therapy is not tolerated - OR LDL-C remains >5mmol/L (primary prevention) - OR LDL-C remains >3.5mmol/L (secondary prevention) despite maximal tolerated statin and ezetimibe therapy. \*\*defined as any of the following:  
• Established coronary heart disease  
• Two or more other CVD risk factors

**SECONDARY PREVENTION**  
Offer statin therapy to adults with CVD, this includes CHD, angina, Acute Coronary Syndrome (MI or unstable angina), revascularisation, stroke or TIA, or symptomatic peripheral arterial disease. Do not delay statin treatment if a person has acute coronary syndrome. Take a lipid sample on admission (within 24 hours).

Identify and address all modifiable risk factors - smoking, diet, obesity, alcohol intake, physical activity, blood pressure and HbA1c.

**SECONDARY PREVENTION**  
Do not delay statin treatment in secondary prevention while managing modifiable risk factors. Prescribe a high intensity statin: **Atorvastatin 80mg daily**  
Use a lower dose of atorvastatin if there is a potential drug interaction, high risk of or experiencing adverse effects, or patient preference. Offer atorvastatin 20mg if CKD (people with GFR< 60 mL/min/1.73m<sup>2</sup>).

- Measure full lipid profile again after 2-3 months (non-fasting).
- Aim for an LDL-C of  $\leq$  2.0 mmol/L, or non-HDL-C of  $\leq$  2.6 mmol/L
- LDL and non-HDL-C levels should be reduced as much as possible. Personalise targets based on clinical judgement and an informed discussion with patient. See **Titration Thresholds / Targets (page 2)**
- If high intensity statin treatment does not achieve expected reduction (see table on page 2) after 2 to 3 months
  - Discuss treatment adherence, timing of dose, diet and lifestyle measures
  - If started on less than atorvastatin 80mg and the person is judged to be at higher risk (based on co-morbidities or clinical judgment), consider increasing to 80mg atorvastatin or maximally tolerated dose. For how to increase in people with CKD see 'Special Patient Populations' (page 2).
  - If patients on a high-intensity statin have side effects, offer a lower dose or an alternative statin (see page 2 'Extent of lipid lowering with available therapies')

**Escalating lipid lowering treatment**  
If maximum tolerated dose of statin does not control non-HDL-C/LDL-C well enough after 2-3 months confirm statin adherence, then consider the following escalation of treatment options based on shared decision making with the patient.  
• Ensure an informed discussion between the clinician and the person about the risks and benefits of additional lipid-lowering treatments.  
• Take into account the person's preferences, the presence of any comorbidities, whether they are on multiple medications, whether they have frailty and their life expectancy.  
• Do not routinely de-escalate lipid lowering therapies when levels are lower than NICE target, except if clinically indicated or based on the person's needs or preferences

**If recommended statin treatment is contraindicated or not tolerated - follow AAC Statin Intolerance Algorithm for advice regarding adverse effects ([click here](#)).**

- If statin intolerance is confirmed, consider:
- Ezetimibe 10mg monotherapy. Assess response after 3 months (TA385)
  - Ezetimibe 10mg/bempedoic acid 180 mg combination when ezetimibe alone does not control non-HDL-C sufficiently. (NICE TA694)

**If non HDL-C remains > 2.6mmol/L despite other lipid lowering therapies consider injectable therapies - arrange a fasting blood test and assess eligibility criteria (TA393/394, TA733)**

**Ezetimibe 10mg daily** (NICE TA385). Reassess after three months. If non-HDL-C remains > 2.6mmol/L; consider **injectable therapies** arrange a fasting blood test and assess eligibility

**Injectable therapies\*\***  
If non-HDL-C > 2.6mmol/L; Arrange fasting blood test to measure LDL-C to assess eligibility:  
- **Inclisiran** - if fasting LDL-C  $\geq$  2.6mmol/L despite maximum tolerated lipid lowering therapy (TA733)  
OR  
- **PCSK9i** - see overleaf for LDL-C thresholds. (TA393/4)  
If eligibility criteria not met, consider **ezetimibe 10mg daily** (if not previously considered)

\*\* Inclisiran and PCSK9i should not be prescribed concurrently

**Additional CV risk reduction considerations** - check fasting triglycerides levels and consider icosapent ethyl. See triglycerides section overleaf.

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. (NG238)

## MANAGEMENT

This guidance applies to new patients and may also be taken into consideration for those already on statins at their annual review. If 40% reduction of non-HDL-C, or target levels are not achieved, offer high intensity statins. Discuss with people who are stable on a low- or medium-intensity statin the likely benefits and potential risk of side effects if changed to a high-intensity statin when they have a medication review and agree with the person whether a change is needed.

Ezetimibe, alicumab, evolocumab or inclisiran can be added when patients' LDL-C levels are not lowered enough with the maximally tolerated dose of statins. If statins are contraindicated or not tolerated and ezetimibe alone does not control LDL-C well enough, bempedoic acid with ezetimibe is an option. Do not offer a fibrate, nicotinic acid, bile acid binder or omega-3 fatty acids alone or in combination with statin, for the prevention of CVD (check NICE NG238 and TA805 for exceptions).

## PRIMARY PREVENTION RISK ASSESSMENT

Use [QRISK3](#) version of the calculator (or QRISK2 if not available).

- Do not use this risk assessment tool for people with established CVD or those who are already at high risk of developing CVD because of FH or other inherited disorders of lipid metabolism.

- Do not use a risk assessment tool to assess CVD risk in people with type 1 diabetes, or eGFR < 60 mL/min/1.73 m<sup>2</sup> and/or albuminuria (as already at high risk of developing CVD).

- Consider people aged ≥ 85 at increased risk of CVD because of age alone particularly people who smoke or have raised BP.

- If QRISK <10% over next 10 years, do not rule out treatment if there is an informed preference for taking a statin or a concern that risk may be underestimated.

- Consider a lifetime risk tool (e.g. [QRISK3-lifetime](#)) to inform discussions on CVD risk and to motivate lifestyle changes, particularly for people with a 10-year score < 10%, and people < 40 who have CVD risk factors.

### Additional Risk Factors

Note, standard CVD risk scores including QRISK may underestimate risk in people who have additional risk because of underlying medical conditions or treatments. These include, but not limited to the following group of people;

- obesity increases CVD risk (NICE CG189)
- treated for HIV
- severe mental illness
- taking medicines that can cause dyslipidaemia such as antipsychotic medication, corticosteroids or immunosuppressant drugs
- already taking medicines to treat CVD risk factors
- autoimmune disorders such as SLE, and other systemic inflammatory disorders
- non-diabetic hyperglycaemia
- significant hypertriglyceridaemia (fasting triglycerides 4.5-9.9mmol/L)
- recent risk factor changes e.g. quit smoking, BP or lipid treatment

Consider socio-economic status as an additional factor contributing to CVD risk (if not already in the risk calculator).

## SPECIAL PATIENT POPULATIONS

### Type 1 Diabetes

While NICE recommends offering statins to patients with Type 1 diabetes as detailed in the algorithm, it also states to consider statins in those aged 18 to 40 with type 1 diabetes, including those who have had diabetes for ≤ 10 years

### Chronic Kidney Disease

Offer atorvastatin 20mg for the primary or secondary prevention of CVD to people with CKD (eGFR less than 60 mL/min/1.73m<sup>2</sup> and/or albuminuria)

Increase the dose if target is not achieved and eGFR is 30 mL/min/1.73m<sup>2</sup> or more.

Agree the use of higher doses with a renal specialist if eGFR is less than 30 mL/min/1.73m<sup>2</sup>

### Statins in Pregnancy and Lactation

Statins should be stopped 3 months before attempting to conceive and not be restarted until breastfeeding is finished. Stop statins if pregnancy is a possibility.

## ABBREVIATIONS

|   |   |
|---|---|
| <b>ALT:</b> alanine aminotransferase              | <b>non-HDL-C:</b> non-high density lipoprotein cholesterol                            |
| <b>AST:</b> aspartate aminotransferase            | <b>PCSK9i:</b> proprotein convertase subtilisin kexin 9 monoclonal antibody inhibitor |
| <b>CHD:</b> coronary heart disease                | <b>QoF: Quality and Outcomes Framework</b>  |
| <b>CKD:</b> chronic kidney disease                | <b>SLE:</b> systemic lupus erythematosus  |
| <b>CVD:</b> cardiovascular disease                | <b>SPC:</b> summary of product characteristics  |
| <b>FH:</b> familial hypercholesterolaemia         | <b>JBS:</b> Joint British Societies   |
| <b>JBS:</b> Joint British Societies               | <b>TC:</b> total cholesterol  |
| <b>LDL-C:</b> low density lipoprotein cholesterol |   |

## References

JBS3. 2014. [www.jbs3.nhs.uk/pages/01.htm](#)  
 Kristen et al. 2005. Hospital Pharmacy 40(8):687-692  
 Navarese et al. 2015. Annals of internal medicine 163(1):40-51  
 Sun Jon Hong et al. 2018. Clinical therapeutics 40(2): 226-241.e4  
 NICE 2016. TA385 [www.nice.org.uk/guidance/ta385](#)  
 NICE 2016. TA393 [www.nice.org.uk/guidance/ta393](#)  
 NICE 2016. TA394 [www.nice.org.uk/guidance/ta394](#)

## EXTENT OF LIPID LOWERING WITH AVAILABLE THERAPIES

| Statin dose mg/day            | Approximate reduction in LDL-C |     |     |     |     |
|-------------------------------|--------------------------------|-----|-----|-----|-----|
|                               | 5                              | 10  | 20  | 40  | 80  |
| Fluvastatin                   |                                |     | 21% | 27% | 33% |
| Pravastatin                   |                                | 20% | 24% | 29% |     |
| Simvastatin                   |                                | 27% | 32% | 37% | 42% |
| Atorvastatin                  |                                | 37% | 43% | 49% | 55% |
| Rosuvastatin                  | 38%                            | 43% | 48% | 53% |     |
| Atorvastatin + Ezetimibe 10mg |                                | 52% | 54% | 57% | 61% |

**Low intensity statins** will produce an LDL-C reduction of 20-30%

**Medium intensity statins** will produce an LDL-C reduction of 31-40%

**High intensity statins** will produce an LDL-C reduction above 40%

**Simvastatin 80mg** is not recommended due to risk of muscle toxicity

- **Rosuvastatin** may be used as an alternative to atorvastatin if compatible with other drug therapy. Some people may need a lower starting dose (see BNF).
- Low/medium intensity statins should only be used if intolerance or drug interactions.
- **Ezetimibe** when combined with any statin is likely to give greater reduction in non-HDL-C or LDL-C than doubling the dose of the statin.
- **PCSK9i** (NICE TA393, TA394) alone or in combination with statins or ezetimibe produce an additional LDL-C reduction of approximately 50% (range 25-70%).
- **Bempedoic acid** when combined with ezetimibe (TA694) produces an additional LDL-C reduction of approximately 28% (range 22-33%).
- **Inclisiran** (TA733) alone or in combination with statins or ezetimibe produces an additional LDL-C reduction of approximately 50% (range 48-52%) but no clinical outcome evidence is currently available.

## MONITORING

### Baseline Measurements

In addition to full lipid profile, measure renal, thyroid and liver profiles (including albumin) and HbA1c to exclude secondary causes and co-morbidities.

Measure baseline liver transaminase (ALT or AST) before starting a statin.

Measure CK if unexplained muscle pain before starting a statin.

CK should not be measured routinely especially if a patient is asymptomatic.

|            | Primary prevention  |            | Secondary prevention |            |
|------------|---|------------|----------------------|------------|
|            | Lipid Profile   | ALT or AST | Lipid Profile        | ALT or AST |
| Baseline   | ✓   | ✓          | ✓                    | ✓          |
| 2-3 months | ✓   | ✓          | ✓                    | ✓          |
| 6-9 months | If targets are not met, and up-titration is agreed, repeat full lipid profile and ALT or AST within 2-3 months of each up-titration of statin dose or addition of ezetimibe as required |            |                      |            |
| 12 months  | ✓   | ✓          | ✓                    | ✓          |
| Yearly     | ✓   | ✓          | ✓                    | ✓          |

Provide annual medication reviews for people taking statins to discuss effectiveness of therapy, medicines adherence, lifestyle modification and address CVD risk factors.

**\*Offer in secondary prevention, and consider in primary prevention an annual non-fasting full lipid profile to inform the discussion around effectiveness of lipid lowering therapy and any medicines non-adherence.**

### Monitoring

Repeat full lipid profile is non-fasting.

Do not stop statins because of an increase in blood glucose level or HbA1c

Advise that the risk of muscle pain, tenderness or weakness associated with statins is small and the rate of severe muscle adverse effects (rhabdomyolysis) is extremely low.

### Liver Transaminases

Measure liver transaminase within 3 months of starting treatment and then within 2-3 months of every additional up titration and then again at 12 months, but not again unless clinically indicated.

If ALT or AST are greater than 3 times the upper limit of normal then do not initiate a statin or discontinue statin therapy already prescribed and repeat the LFTs in a month.

If ALT or AST are **elevated** but are less than 3 times the upper limit of normal then:

- Do not routinely exclude from statin treatment
- Continue the statin and repeat in a month.
- If they remain elevated but are less than 3 times the upper limit of normal then continue statin and repeat again in 6 months.

## TITRATION THRESHOLD / TARGETS

|                      | NICE titration threshold / QoF   | JBS3**                                  |
|----------------------|--|---|
| Primary prevention   | Escalate lipid lowering therapy if non-HDL-C reduction from baseline ≤ 40%                 | non-HDL-C <2.5mmol/L (LDL-C <1.8mmol/L) |
| Secondary Prevention | Aim for an LDL-C of ≤ 2.0 mmol/L, or non-HDL-C of ≤ 2.6 mmol/L at least*                   |   |
| FH                   | Optimise lipid lowering therapy to achieve at least 50% reduction in LDL-C (or non-HDL-C.) |   |

\*Consider ezetimibe to reduce CVD risk further, even if the NICE lipid target for secondary prevention of CVD is met.

\*\*LDL-C and non-HDL-C levels should be reduced as much as possible in people with CVD. Consider a personalised target, as clinically indicated, e.g. JBS3 consensus recommendation

**Non-HDL-C** = TC minus HDL-C **LDL-C** = non-HDL-C minus (Fasting triglycerides\*2.2)

\* valid only when fasting triglycerides are less than 4.5 mmol/L

## SPECIALIST SERVICES

Scope of specialist service available locally may include; lipid clinic, PCSK9i clinic (offering initiation and subsequent follow up), FH genetic diagnosis and cascade testing, lipoprotein apheresis service. NICE eligibility criteria for PCSK9i and fasting LDL-C thresholds are summarised below.

| NICE TA393 Alirocumab<br>NICE TA394 Evolocumab | Without CVD        | With CVD               |                             |
|--|--------------------|------------------------|-----------------------------|
|  |                    | High risk <sup>1</sup> | Very high risk <sup>2</sup> |
| Primary non-FH or mixed dyslipidaemia          | Not recommended    | LDL C > 4.0 mmol/L     | LDL C > 3.5 mmol/L          |
| Primary heterozygous-FH                        | LDL C > 5.0 mmol/L | LDL C > 3.5 mmol/L     |                             |

<sup>1</sup> History of any of the following: ACS; coronary or other arterial revascularisation procedures; CHD, ischaemic stroke; PAD. <sup>2</sup> Recurrent CV events or CV events in more than 1 vascular bed (that is, polyvascular disease).

Bempedoic acid/ezetimibe and inclisiran are available in primary care and do not require initiation by specialist services. PCSK9i may be available for prescribing in primary care: see local initiation pathways.

## TRIGLYCERIDES

| Triglyceride concentration | Action   |
|----------------------------|--|
| Greater than 20mmol/L      | <b>Refer to lipid clinic for urgent specialist review</b> if not a result of excess alcohol or poor glycaemic control. At risk of acute pancreatitis.  |
| 10 - 20mmol/L              | Repeat the TG measurement with a fasting test (after an interval of 5 days, but within 2 weeks) and review for potential secondary causes of hyperlipidaemia. Seek specialist advice if the TG concentration remains > 10mmol/litre. At risk of acute pancreatitis   |
| 4.5 - 9.9mmol/L            | If non-fasting triglycerides are greater than 4.5mmol/L, repeat with a fasting TG measurement. Be aware that the CVD risk may be underestimated by risk assessment tools, optimise the management of other CVD risk factors present and seek specialist advice if non-HDL-C concentration is > 7.5 mmol/litre. |

### Icosapent ethyl (TA805)

- Check fasting triglycerides levels.
- Manage secondary causes of hypertriglyceridaemia.
- Consider icosapent ethyl (TA805) if patient has established cardiovascular disease (secondary prevention) **and**
  - on statins and fasting TG ≤ 1.7mmol/L and LDL-C\* between 1.04<sup>2</sup> and ≤2.6mmol/L
- See table above and refer as appropriate.

\* LDL-C cannot be calculated using Friedewald's formula if TG >4.5. Discuss with your lab. Consider using an alternative equation (eg Sampson, doi: 10.1001/jamcardio.2020.0013) or beta-quantification. <sup>2</sup> lbs don't report calculated LDL-C beyond one decimal point

## STATIN INTOLERANCE

Statin intolerance is defined as the presence of clinically significant adverse effects from statin therapy that are considered to represent an unacceptable risk to the patient or that may result in adherence to therapy being compromised.

For people who are intolerant of the recommended statin treatment see the NHSE AAC statin intolerance algorithm, available on the NHSE AAC page ([Click here](#))

Authors: Dr Rani Khatib & Dr Dermot Neely on behalf of the AAC Clinical Subgroup. Updated by NHSE Cholesterol Expert Advisory Group. March 2024. Review date: March 2026.

*"This summary accurately reflects NICE guidance and JBS3 recommendations", NICE March 2024*

# National statin intolerance management pathway

This NHS England agreed pathway outlines the management of statin intolerance to be implemented across primary or secondary care

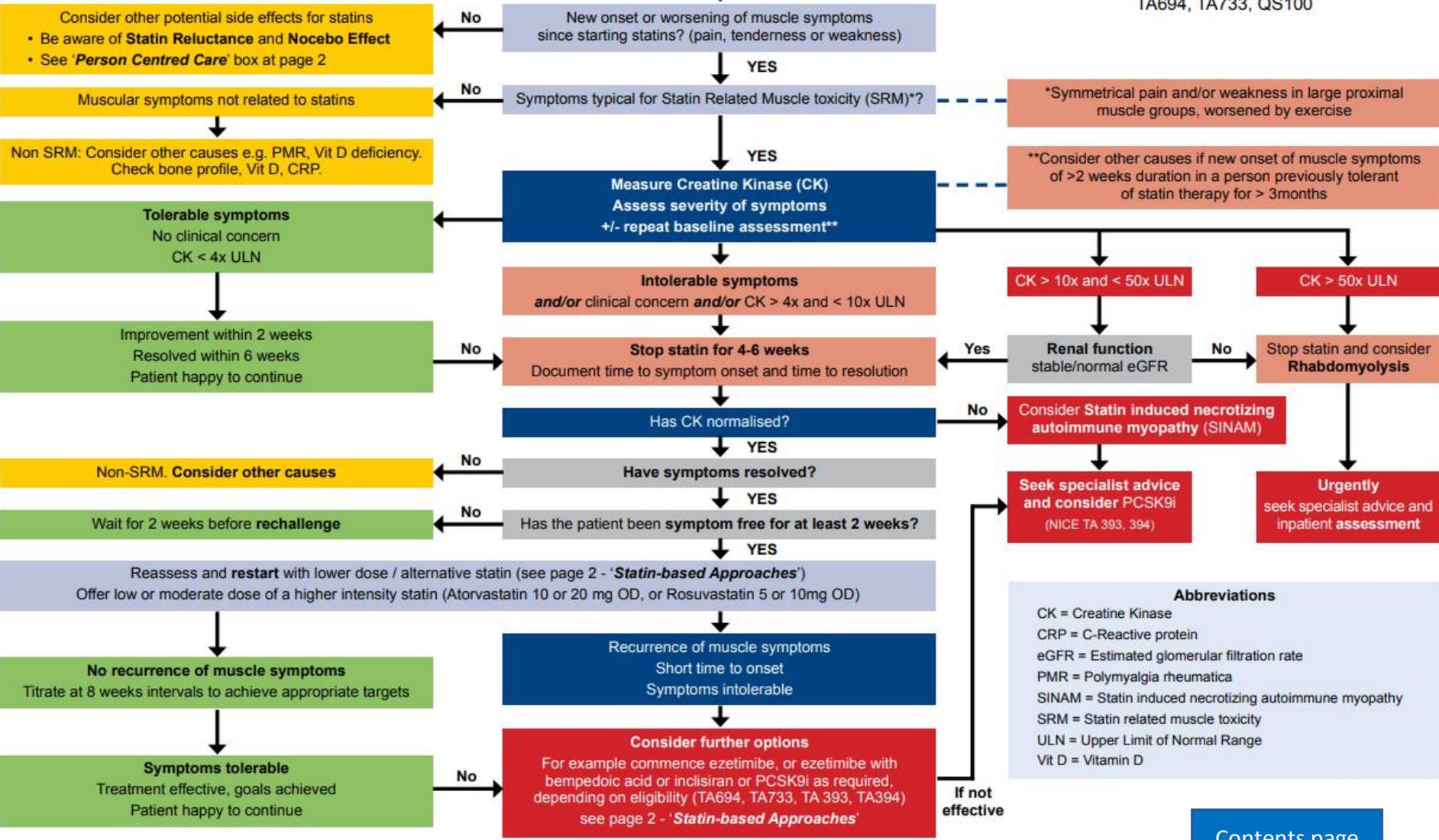
Author: Dr Rani Khatib & Dr Dermot Neely on behalf of the AAC Clinical Subgroup. Jan 2022. Review date: Jan 2024.

<https://www.england.nhs.uk/aac/wp-content/uploads/sites/50/2020/04/statin-intolerance-pathway-v2.pdf>

# Statin Intolerance Pathway

This resource relates to NICE guidance:  
CG181, CG71, TA385, TA393/394,  
TA694, TA733, QS100

Person at high CVD risk reports potential intolerance to recommended high intensity statin treatment



\*Symmetrical pain and/or weakness in large proximal muscle groups, worsened by exercise

\*\*Consider other causes if new onset of muscle symptoms of >2 weeks duration in a person previously tolerant of statin therapy for > 3months

**Abbreviations**

CK = Creatine Kinase  
CRP = C-Reactive protein  
eGFR = Estimated glomerular filtration rate  
PMR = Polymyalgia rheumatica  
SINAM = Statin induced necrotizing autoimmune myopathy  
SRM = Statin related muscle toxicity  
ULN = Upper Limit of Normal Range  
Vit D = Vitamin D

## Introduction

- Statins are the cornerstone for prevention and treatment of cardiovascular (CV) disease with a substantial evidence of reduction of morbidity and mortality. Refer to Lipid Management Pathway and related NICE guidelines (CG181, CG71) for guidance on initiation, titration and monitoring of statin therapy.
- In clinical trials, statins were found to be largely well tolerated (often with a similar adverse effect (AE) profile to placebo), however this is not reflected in clinical practice where up to 75% of people started on a statin will discontinue treatment within 2 years.
- Stopping statin therapy is associated with an increased risk of major CV events and there is growing concern that clinicians are labelling patients as 'statin intolerant' too quickly. Indeed statin discontinuation is significantly associated with negative media coverage.

## Definition of Statin Intolerance

- Intolerance to initial statin therapy is defined by NICE as the presence of clinically significant adverse effects that represent an unacceptable risk to the patient or that may reduce compliance with therapy.
- Other definition: any adverse event (AEs) considered unacceptable by the patient, and/or some laboratory abnormalities, both attributed to statin treatment and leading to its discontinuation.

## Statin-associated muscle symptoms (SAMS)

- SAMS are one of the principal reasons for statin non-adherence and/or discontinuation. However, not all such symptoms should lead to a label of 'statin intolerance' as they may not be truly statin related muscle toxicity (SRM) as demonstrated by resolution on de-challenge and recurrence with re-challenge.

## Non-Statins related musculoskeletal symptoms (Non SRM)

- If patients report symptoms that are not typical of SRM (e.g. asymmetric distribution, failure to resolve with de-challenge despite normal CK) consider other musculoskeletal disorders, metabolic, degenerative or inflammatory e.g. Vitamin D deficiency, polymyalgia rheumatica. Check Bone profile, Vit D, CRP.

## Considerations when starting a statin to reduce risk of SRM

- Check baseline thyroid, liver and renal function, any potential drug interactions, and avoid the highest doses in at risk groups (See "Risk Factors" below).
- Ask the person if they have had persistent generalised unexplained muscle pain, whether associated or not with previous lipid-lowering therapy. If they have, measure CK. If CK levels are > 4x ULN do not start statin - investigation required.

### Do not measure CK if person is asymptomatic.

- Warn patients about AEs, specifically muscle symptoms. Advise people who are being treated with a statin to seek medical advice if they develop muscle symptoms (pain, tenderness or weakness). If this occurs, measure CK (see page 1).

## Risk factors for SRM and statin intolerance

### Endogenous factors

- Female gender
- Advanced age (> 75 yrs)
- Frailty (reduced lean body mass)
- History of muscle disorder or high CK
- Impaired renal or hepatic function
- Personal or family history of intolerance to lipid-lowering therapies.
- Hypothyroidism

### Exogenous Factors

- Excessive alcohol intake
- High intensity exercise
- Dehydration
- Drug interactions with statins (including herbal medicines)
- Vitamin D deficiency

## Classification of statin related muscle toxicity (SRM)

Alfrevic A. et. al. Clin Pharm Ther. 2014; 96:470-476

| SRM   | Phenotype  | Incidence                          | Definition  |
|-------|--|------------------------------------|---|
| SRM 0 | CK elevation <4x ULN                             | 1.5-26%                            | No muscle symptoms  |
| SRM 1 | Myalgia, tolerable                               | 190/100,000 Patient-years; 0.3-33% | Muscle symptoms without CK elevation  |
| SRM 2 | Myalgia, intolerable                             | 0.2-2/1,000                        | Muscle symptoms, CK <4x ULN, complete resolution on dechallenge   |
| SRM 3 | Myopathy   | 5/100,000 Patient-years            | CK elevation >4x ULN <10x ULN ± muscle symptoms, complete resolution on dechallenge   |
| SRM 4 | Severe myopathy                                  | 0.11%                              | CK elevation >10x ULN <50x ULN, muscle symptoms, complete resolution on dechallenge   |
| SRM 5 | Rhabdomyolysis                                   | 0.1-8.4/100,000                    | CK elevation >10x ULN with evidence of renal impairment + muscle symptoms or CK >50x ULN  |
| SRM 6 | Autoimmune-mediated necrotizing myositis (SINAM) | ~2/million per year                | Detection of HMGCR antibodies, HMGR expression in muscle biopsy showing autoimmune myositis, incomplete resolution on dechallenge |

HMGR = 3-hydroxy-3-methylglutaryl coenzyme A reductase ULN = upper limit of normal

- SRM is a spectrum from myalgia to severe myopathy
- SRM 0 - does not preclude statin therapy, consider reducing starting dose
- SRM 1-3 manage according to pathway
- When SRM4 is suspected, without evidence of impaired renal function, discontinue statin therapy immediately and refer for outpatient assessment. Assess and treat possible contributory factors and re-assess the need for a statin. Intensify lifestyle modifications and consider alternative lipid lowering regimens.
- If rhabdomyolysis (SRM5) is suspected, immediately stop statins, urgently refer to inpatient assessment and management including intravenous rehydration as required to preserve renal function. Do not wait for measurement of urinary myoglobin. Post recovery, manage as for SRM4.
- Statin induced necrotizing autoimmune myositis (SINAM) (SRM6) should be suspected in patients with progressive muscle weakness and ongoing CK elevation despite statin withdrawal. Requires immunosuppressive treatment and avoidance of re-exposure to statins. Re-assess the need for lipid lowering therapy - may be eligible for treatment with PCSK9 inhibitor (NICE TA 393, 394).

## Non-muscle related statin side effects

May vary between different statins. In clinical trials some side effects often associated with statins are not statistically different from placebo.

**Most commonly reported:** gastrointestinal disturbance and asymptomatic increases in hepatic transaminases (ALT or AST). May affect up to 1 in 10 statin users.

**Rarer side effects include:** Hepatotoxicity, new onset Type 2 Diabetes (benefits outweigh risk, do not stop statin), Renal insufficiency, proteinuria, Neurocognitive and neurological impairments (no apparent link from RCTs), Intracranial haemorrhage (conflicting evidence, benefit outweigh possible harm), Interstitial lung disease, Pancreatitis, Skin disorders including alopecia, Lupus-like reaction, Sleep disturbance, headache, dizziness, fatigue, depression, sexual dysfunction.

**Management:** If symptoms appear statin related, consider de-challenge and re-challenge or change to a different statin (e.g. hydrophilic instead of lipophilic).

Liver enzyme abnormalities - minor increases in liver enzymes (<2x ULN) may be seen within the first three months of statin therapy; temporary discontinuation and further assessment is warranted if levels exceed 3x ULN. Several studies have confirmed that the cardiovascular benefits of statin treatment in high-risk populations outweigh the rare adverse effects, such as rhabdomyolysis.

**Authors:** Dr Rani Khatib & Dr Dermot Neely on behalf of the AAC Clinical Subgroup. Jan 2022. Review date: Jan 2024. Pathway endorsed by NICE Dec 2021. Please refer to the [Lipid Management Pathway](#) and [Full List of References](#) (click here).

## Person-centred approach to address statin intolerance

### Initial Consultation

- Be aware of 'nocebo effect'<sup>1</sup> and 'statin reluctance'<sup>2</sup>
- Reinforce healthy lifestyle habits (e.g. exercise, reducing weight)
- Listen to the concerns of each patient.
- Explain LDL-C targets and strategies to lower LDL-C/non-HDL-C
- Discuss options to reduce LDL-C/ non-HDL-C with pros and cons
- Explain the benefits of statins
- Evaluate and identify any risk factors and address (e.g. drug interactions)
- Work with patients to identify and agree best options and next steps

### Follow up

- Follow up on agreed plan and address any issues/concern.
- Advise patients to contact you if they experience muscle symptoms
- Ongoing patient education and regular review helps addressing concerns around medicine safety and underline the importance of adherence.

(1) **Nocebo effect** is negative expectations of the patient regarding a treatment leading to reporting more negative effects even if they are prescribed a placebo.

(2) **Statin reluctance** is an attitudinal state of aversion to taking statins (often without prior exposure).

## Statin-based approaches to manage muscle symptoms

- Adopt person-centred approach as described above.
- Therapy with a lower dose statin is preferred to no statin
- Apply a repetitive "De-Challenge" - "Re-Challenge" approach to establish if symptoms are caused by a statin(s) and the best statin regimen for each patient.
- Switch to a different statin or re-challenge with the same statin using a lower dose or frequency (intermittent dosages)
- Patients who do not tolerate statins on a daily basis, alternate day or twice-weekly dosing is a good option.
- Rosuvastatin and atorvastatin have longer half-lives, permitting their use on a non-daily regime.
- Adding ezetimibe to a lower dose statin may be better tolerated with robust reduction of LDL-C / non-HDL-C.
- Once a new regime is tolerated, dose / frequency can be up-titrated slowly to achieve LDL-C / non-HDL-C goals with minimal or no muscle complaints.

*It is important to note that cardiovascular benefits have not been proven for all the above approaches but any reduction of LDL-C / non-HDL-C is beneficial.*

## LDL-C lowering options for patients with genuine statin intolerance

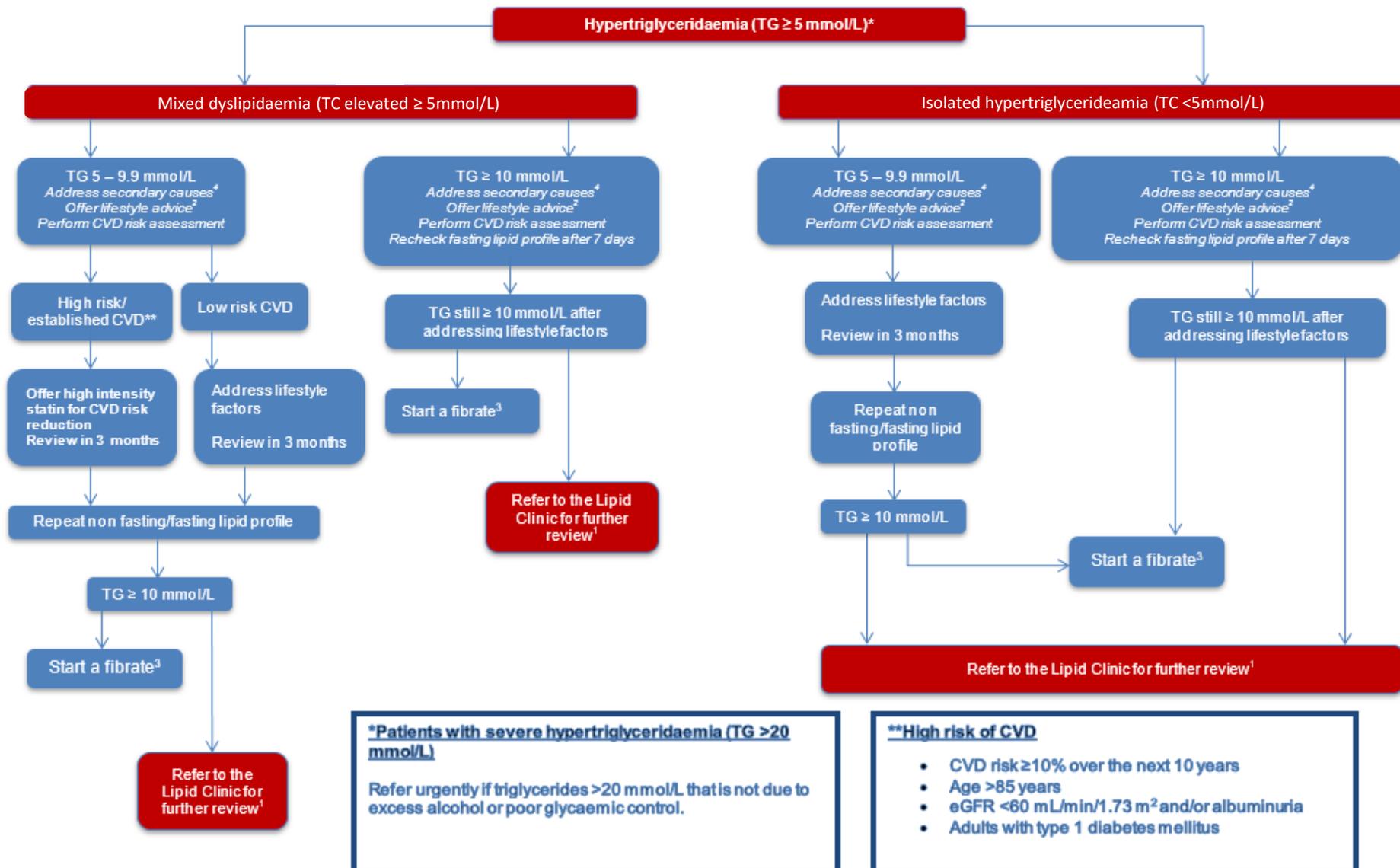
- Refer to the AAC Lipid Management Algorithm. ([click here](#))
- Consider ezetimibe, (NICE TA 385) therapy as per algorithm
- Consider ezetimibe combined with bempedoic acid (NICE TA 694) as per algorithm
- Consider inclisiran if eligible for treatment according to NICE TA 733
- Consider PCSK9i if eligible for treatment according to NICE TA 393, 394

# Hypertriglyceridemia management pathway

This local pathway outlines the management of hypertriglyceridaemia and hypertriglyceridaemia induced pancreatitis within the BNSSG ICB applicable in primary and secondary care

Author: Dr Kofi Antwi, Dr Naveen Setty. Version 1, August 2021. Review date: August 2026

# Management of Hypertriglyceridaemia in primary care/outpatient setting



# Management of Hypertriglyceridaemia in acute/inpatient care setting

Contents page

Identify secondary causes of hypertriglyceridaemia  
Beta HCG in ALL females of childbearing age  
Stop offending drugs if possible  
Check glucose/HbA1c, LFTs, U&Es, TSH

Severe hypertriglyceridaemia [HTG] (TG  $\geq$  11 mmol/L)

Exclude acute pancreatitis

If present, perform initial management and assess severity of acute pancreatitis. Discuss severe cases with ICU. **Note: Propofol should not be used in patients with HTG**

Diet restriction and oral therapy

Reduce fat intake to 10-15% of total calorie intake  
Start Fenofibrate if no contraindications

**Acute pancreatitis in patient with confirmed FCS**

Insulin infusion unlikely to be beneficial

Discuss with the Clinical Biochemistry team.  
See contacts page

Start plasma exchange as first line therapy

If plasma exchange is not readily accessible, start insulin infusion at 0.05 units/kg/hr

**Acute pancreatitis in patient without confirmed FCS**

Insulin infusion likely to be beneficial and first line

Start insulin infusion as first line therapy

Start fixed rate insulin infusion at 0.05 units/kg/hr (0.1 units/kg/hr in patients with severe acute pancreatitis)  
Increase the fixed rate insulin infusion to 0.1 units/kg/hr if triglycerides do not start resolving after 24 hours  
Patients with acute hyperglycaemia/on subcutaneous insulin will require a higher insulin rate  
Use standard fixed rate insulin infusion (UHBW Intravenous Insulin Prescription Chart, page 1)

Ongoing monitoring

Monitor capillary blood glucose (CBG) hourly  
Commence 10% dextrose 50-100 mL/hr if CBG is less than 14 mmol/L (Target CBG 6-10mmol/L, 4-12mmol/L is acceptable)  
Monitor triglycerides and electrolytes twice daily whilst on insulin infusion  
Patients with HTG pancreatitis (HTGP) not responding to 48 hours of conservative treatment +/- insulin infusion should be considered for plasma exchange

Recovery (TG  $<$  5 mmol/L)

**Post recovery management**

Continue fibrates to prevent recurrent acute pancreatitis episodes  
Recommend low fat diet and refer to the dietician  
Medications known to precipitate or cause hypertriglyceridaemia should be reviewed and stopped if possible  
Patients should be strongly counselled to avoid excessive alcohol consumption  
All patients presenting with HTGP should be referred to the Lipid Clinic at Bristol Royal Infirmary for review  
All patients presenting with diabetes and HTGP should be referred to the Diabetes team for inpatient review or outpatient follow up

**Patient without acute pancreatitis**

Treat any secondary causes  
Correct hyperglycaemia, hypothyroidism and stop offending drugs if possible  
Repeat triglycerides levels after treatment and if remains  $\geq$  11 mmol/L, consider insulin infusion

## FCS Definition

- Genetic disorder of HTG arising from Biallelic/Homozygous variants in causative genes (e.g. Lipoprotein Lipase [LPL]).
- Presents commonly in childhood, but can in adulthood, with recurrent pancreatitis and HTG  $>$ 10mmol/L without secondary causes
- MCS (Multifactorial Chylomicronaemia syndrome) is similar, but individuals are heterozygous for HTG causative gene variants
- See [here](#) for FCS screening score

## Lipid clinic referral criteria

Patients with severe hypertriglyceridaemia (Trigs >20 mmol/L or more than one result >10 mmol/L). Refer urgently if triglycerides >20 mmol/L that is not due to excess alcohol or poor glycaemic control.

### Before referral

- Consider advice and guidance request or telephone discussion with Lipid Clinic for advice
- [Advice & Guidance request via e-RS](#)
- For urgent advice telephone Dr Eloise Willis, Dr Andrew Day, Dr Paul Downie via UHB Clinical Biochemistry (Lipid Clinic) Secretary on 0117 3427708 or Dr Wycliffe Mbagaya WAHT secretary on 01934 881006

## Fibrate therapy

Start micronized Fenofibrate at 160 milligrams once daily in patients presenting with severe hypertriglyceridaemia unless there is a specific contraindication against their use.

- For patients with renal impairment (eGFR 30-59 mL/min), the maximum recommended dose is 67 milligrams once daily.
- Fibrates should not be used in those with severe renal impairment (eGFR less than 30 mL/min) or those with known gallstone disease.

Check serum creatinine at baseline, within 3 months of initiation of treatment and at least annually thereafter (more frequently if clinical indicated).

- Hold treatment if creatinine levels >1.5x ULN.
- Consider dose reduction if renal function declines in line with the BNF.

Monitor liver transaminase levels every 3 months during the first 12 months of treatment and periodically thereafter.

- Discontinue therapy if AST or ALT levels increase to more than 3x ULN.
- If symptoms indicative of hepatitis occur (e.g. jaundice, pruritus), and diagnosis is confirmed by laboratory testing, fenofibrate therapy should be discontinued.

Baseline CK should only be checked in those who may already be taking a medicine that will increase the risk of myopathy when used concomitantly with fibrate, such as statin therapy.

- Routine CK monitoring for asymptomatic individuals is not recommended.
- Monitor CK for patients with muscle weakness/pain to assess severity of muscle damage and aid the decision to continue treatment.

## Lifestyle advice

Lifestyle modifications to reduce triglyceride levels are similar to those recommended for individuals at high risk of cardiovascular disease<sup>1</sup> (full lifestyle advice published in NICE CG181)

- Restrict consumption of high glycaemic index/load foods as well as refined sugars, fruit juices, and high fructose drinks
- Increase consumption of oily fish (pregnant women should limit oily fish consumption to no more than 2 portions per week and to avoid marlin, shark and swordfish)
- Physical activity (at least 150 minutes of moderate intensity aerobic activity or 75 minutes of vigorous intensity aerobic activity)
- Weight management for those who are overweight or obese
- Avoid binge drinking and limit alcohol intake to national recommended limits
- Smoking cessation (primarily for CV protection)

## Secondary causes of Hypertriglyceridaemia

- Obesity, often in association with hypercholesterolaemia
- Poorly controlled diabetes mellitus
- Nephrotic syndrome, often in association with hypercholesterolemia, and renal failure
- Hypothyroidism, often in association with hypercholesterolemia
- Pregnancy
- Drug including;
  - Oral oestrogen replacement
  - Tamoxifen
  - Beta blockers
  - Immunosuppressive medications, such as glucocorticoids and cyclosporin
  - HIV antiretroviral regimens
  - Oral retinoids (e.g. isotretinoin)

## Investigations into causes of Hypertriglyceridaemia

- Urine ACR for nephrotic syndrome
- Full lipid profile (total cholesterol, HDL, non-HDL and triglycerides)
- Fasting glucose or HbA1c
- Renal function (U&Es)
- Thyroid function tests (TFTs)
- Liver function (LFTs)

# Lipid profile requesting and BNSSG Lipid clinic referral pathway

Requesting lipid profiles within BNSSG and  
the referral criteria for lipid clinic services across the greater BNSSG ICB catchment area

Author: Dr Eloise Willis, Dr Nathan Cantley. Version 1, August 2023. Review date: August 2023

# The BNSSG lipid profile

## HDL Cholesterol profile

| Analyte             | Measured or Calculated? |
|---------------------|-------------------------|
| Total Cholesterol   | Measured                |
| HDL Cholesterol     | Measured                |
| Non-HDL Cholesterol | Calculated              |

It is recognised that currently, NICE guidelines for primary prevention use Non-HDL for defining targets. **However**, in [secondary prevention](#) and those with FH, LDL-C is clinically necessary, both for treatment targets, and facilitating decisions on escalating to [injectable therapies](#). **Also**, using this profile can miss cases of clinically important [hypertriglyceridaemia](#) in all individuals, regardless of indication.

## Full lipid profile

| Analyte             | Measured or Calculated? |
|---------------------|-------------------------|
| Total Cholesterol   | Measured                |
| Triglyceride        | Measured                |
| HDL Cholesterol     | Measured                |
| LDL Cholesterol     | Calculated              |
| Non-HDL Cholesterol | Calculated              |

The full lipid profile is recommended to be used for the diagnosis and monitoring of lipid abnormalities and those on lipid lowering medications. Note: LDL-C is not always possible to calculate due to clinically significant Hypertriglyceridaemia (see box below).

## Calculating LDL Cholesterol

The Friedwald equation (below) is used to calculate LDL cholesterol using 3 measured parameters- HDL and Triglyceride (VLDL) represent 2 of the main lipoprotein fractions to allow calculation of the LDL. **However**, this equation and relative proportions only holds true where the Triglyceride concentration is <4.9mmol/L. Where there is clinically significant Hypertriglyceridaemia (TG >4.9mmol/L), LDL-C will not be calculated – advise reviewing guidelines on managing [Hypertriglyceridaemia](#).

$$\text{LDL-C} = [\text{Total Cholesterol}] - [\text{HDL Cholesterol}] - ( [\text{Triglyceride}] / 2.2 )$$

## Martin-Hopkins LDL-C calculator

Where the triglycerides are high enough to rule out LDL calculation on lab reports – the Martin-Hopkins calculator can be used to estimate LDL-C.:

- [Google Play store](#)
- [Apple App store](#)
- [Pubmed reference](#)

# Criteria for referral to lipid clinic

Contents page

## 1) Familial hypercholesterolaemia

Please see [Case finding and diagnosis - NICE CG 71](#) and ensure secondary causes have been excluded.

## 2) Statin intolerance

If the national intolerance pathway has already been followed. Please see [statin intolerance pathway](#)

## 3) Hypertriglyceridaemia

Once secondary causes have been identified and optimised. Please see [Hypertriglyceridaemia pathway](#).

## 4) Patients not reaching treatment target

Please follow [national lipid management pathway](#) first before referring. Please see [treatment targets guideline](#) for further information.

## 5) Elevated Lipoprotein(a)

Where a patient meets the criteria as set out in [Lp\(a\) guideline](#)

### Department contact details for known lipid patients

**Bristol Royal Infirmary**  
Consultants: Dr Paul Downie  
Dr Andrew Day  
Dr Eloise Willis  
Secretary: 01173427708

**Weston General Hospital**  
Consultant: Dr Wycliffe Mbagaya  
Secretary: 01934 881006

**FH Clinical Nurse Specialist**  
Lisa Gritzmacher 01173427835

All referrals to the Lipid clinic at BNSSG should be made through the electronic referrals service (eRS). A proforma should be completed ([available on eRS](#)) to collect the minimum dataset required for triaging the referral. An advice and guidance service is also available by this means to assist management decisions on known patients to the clinic, or appropriateness of making a clinical referral where one is being considered but does not meet the criteria above.

# Lipoprotein (a) guideline

This local pathway outlines the indications for Lipoprotein (a) measurement and management of abnormal results based on the Heart-UK consensus statement and local consensus from lipid specialists

Author: Dr Laura Hancox, Dr Andrew Day. Version 2, August 2023. Review date: August 2025

The scope of this guideline is to provide further information to aid the management of patients with raised Lipoprotein (a) (Lp(a)) and to facilitate testing in patients who's relatives are known to have high Lp(a).

Elevated Lipoprotein (a) is a known causal risk factor for cardiovascular disease.

### What is Lipoprotein(a)?

Lp(a) is an atherogenic LDL-like particle, consisting of a single apolipoprotein B100 (apoB), linked to a single apolipoprotein (a). The size of apolipoprotein (a) varies considerably; the smaller it is the higher the concentration of Lp(a).

### Lipoprotein(a) inheritance and risk of cardiovascular disease

Lp(a) is a major independent risk factor for coronary artery disease and stroke and promotes atherosclerosis. Lp(a) levels are predominantly genetically inherited in an autosomal co-dominant fashion. Cardiovascular risk conferred by serum Lp(a) depends on concentration, those with most severely elevated Lp(a) being at greatest risk.

Table 1: Classification of Lp(a) based on impact on CVD risk

| Lp(a) (nmol/L) | Population percentile                 | Impact on CVD risk                            |
|----------------|---------------------------------------|---|
| <90            | <80 <sup>th</sup>                     | Minor   |
| 90 – 200       | 80 <sup>th</sup> – 95 <sup>th</sup>   | Moderate                                      |
| 200 – 400      | 95 <sup>th</sup> – 99.8 <sup>th</sup> | High  |
| ≥400           | >99.8 <sup>th</sup>                   | Very high (CVD risk equiv to heterozygous FH) |

### Family Cascade Testing

Given the dominant inheritance of Lp(a) levels, the cascade testing of **first degree** relatives of an index case with a **Lp(a) >200nmol/L** is recommended. Relatives of an index case do not routinely require referral to a lipid clinic.

### Sample requirements

Lipoprotein(a) is measured on a serum sample. Ideally results should be expressed in nmol/L. Historically some labs have reported in mg/dL; to convert from mg/dL → nmol/L the approximate conversion factor is to multiply by 2.4.

### Secondary causes of raised Lipoprotein (a)

Secondary causes of high Lp(a) include CKD, nephrotic syndrome and hypothyroidism and these should be sought and corrected. There is currently no indication for repeating Lp(a) measurement unless possible secondary causes of raised concentrations are identified and treated.

### Other issues to be considered for individual patients with raised Lp(a)

- **Calcific aortic valve stenosis.** Elevated Lp(a) is a risk factor for calcific aortic valve stenosis.
- **Effect of racial origin.** Early studies of Lp(a) and CVD were mainly conducted in Caucasian populations. Lp(a) concentrations may be up to two times higher in people of black African descent. There are currently no ethnicity specific reference intervals.

### References

1. Cegla J et al. HEART UK consensus statement on Lipoprotein(a): A call to action. *Atherosclerosis* 291 (2019) p62-70.
2. Kronenberg F et al. Lipoprotein (a) in atherosclerotic cardiovascular disease and aortic stenosis: a European Atherosclerosis Society consensus statement. *European Heart Journal*. 43 (2022), p3925-3946

# Lipoprotein (a) Information for Primary Care

## Management of patients with raised Lp(a) (>90 nmol/L)

There are no treatments currently available that specifically lower Lp(a). The aim is to target residual cardiovascular risk through multiple risk factor intervention. As such attention should be given to other risk factors including diabetes risk, hypertension, smoking etc.

All patients with evidence of atherosclerotic CVD should be treated to secondary prevention lipid target regardless of Lp(a) concentration

In patients without atherosclerotic CVD, management of raised Lp(a) is dependent on their baseline cardiovascular risk estimate as well as the Lp(a) concentration.

*\* If QRISK3 is less than 5% and Lp(a) 200-400 nmol/L consider only treating to primary prevention target.*

|                     | 10y CVD risk <5%                                | 10y CVD risk 5-10%   | 10 CVD risk >10%   |
|---------------------|---|--|--|
| Lp(a) <90 nmol/L    | Lifestyle advice                                | Lifestyle advice   | Treat to primary prevention target   |
| Lp(a) 90-200 nmol/L | Lifestyle advice; risk assessment in five years | Treat to primary prevention target (i.e. 40% reduction in non HDL cholesterol) | Treat to secondary prevention target (i.e. non-HDL-cholesterol <2.5 mmol/L or LDL-cholesterol <1.8 mmol/L) |
| Lp(a) >200 nmol/L   | *Treat to secondary prevention target           | Treat to secondary prevention target   | Treat to secondary prevention target   |
| Lp(a) >400 nmol/L   | Consider referral to lipid clinic.              |  |  |

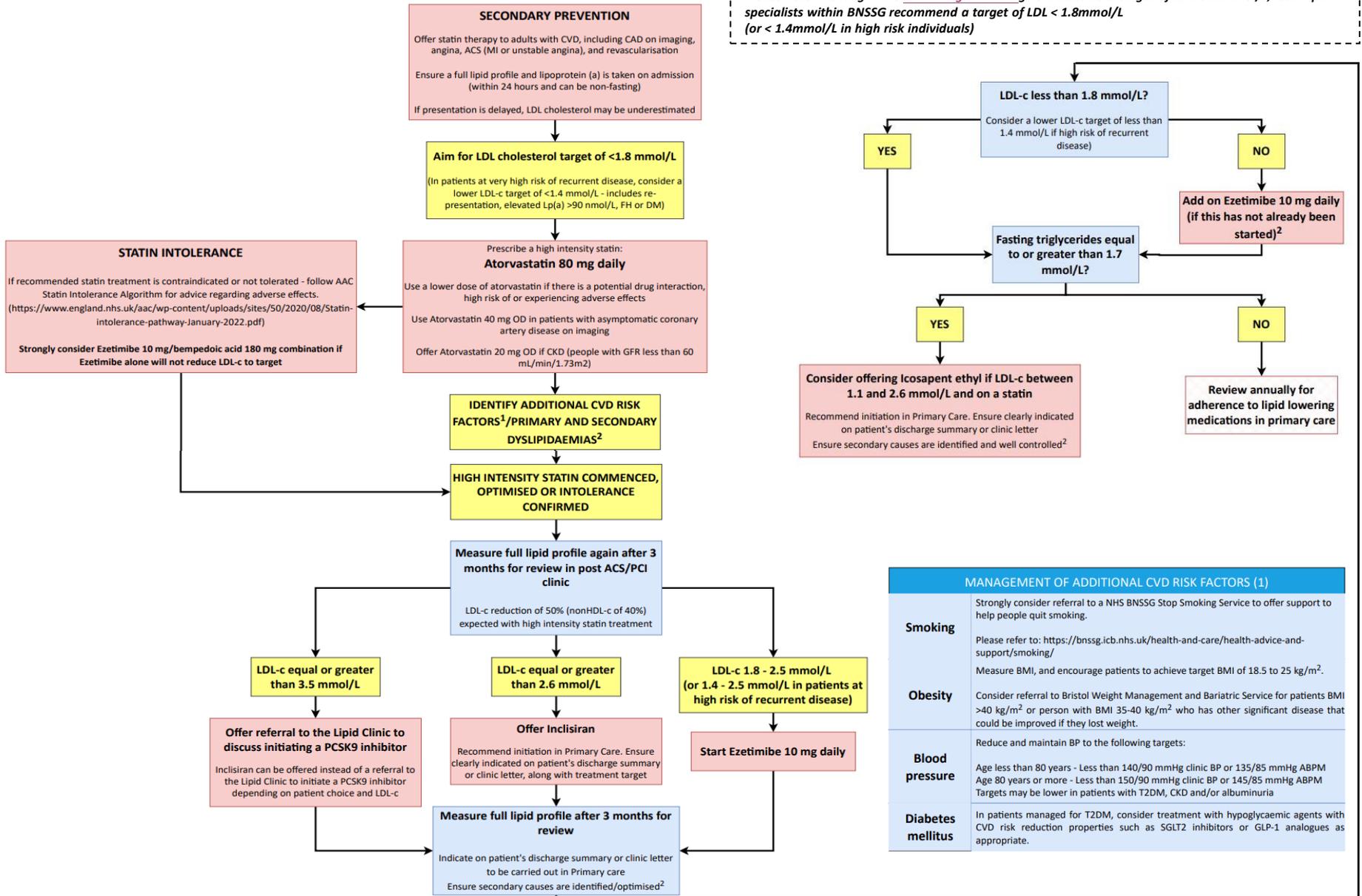
# BNSSG Secondary prevention pathway

This local pathway outlines the management of lipids across all facets of post acute-cardiovascular/cerebrovascular/elective cardiac surgery services in secondary care

Author: Dr Kofi Antwi, Dr Eloise Willis, Dr Nathan Cantley, Victoria Ruszala.  
Version 2, May 2024. Review date: May 2026

# Management of lipids in secondary prevention

Please note: Although AAC *national guidelines* give a treatment target of LDL-C  $\leq 2$ mmol/L, local lipid specialists within BNSSG recommend a target of LDL  $< 1.8$ mmol/L (or  $< 1.4$ mmol/L in high risk individuals)



| MANAGEMENT OF ADDITIONAL CVD RISK FACTORS (1) |   |
|---|---|
| <b>Smoking</b>                                | Strongly consider referral to a NHS BNSSG Stop Smoking Service to offer support to help people quit smoking.<br>Please refer to: <a href="https://bnssg.icb.nhs.uk/health-and-care/health-advice-and-support/smoking/">https://bnssg.icb.nhs.uk/health-and-care/health-advice-and-support/smoking/</a><br>Measure BMI, and encourage patients to achieve target BMI of 18.5 to 25 kg/m <sup>2</sup> . |
| <b>Obesity</b>                                | Consider referral to Bristol Weight Management and Bariatric Service for patients BMI >40 kg/m <sup>2</sup> or person with BMI 35-40 kg/m <sup>2</sup> who has other significant disease that could be improved if they lost weight.  |
| <b>Blood pressure</b>                         | Reduce and maintain BP to the following targets:<br>Age less than 80 years - Less than 140/90 mmHg clinic BP or 135/85 mmHg ABPM<br>Age 80 years or more - Less than 150/90 mmHg clinic BP or 145/85 mmHg ABPM<br>Targets may be lower in patients with T2DM, CKD and/or albuminuria  |
| <b>Diabetes mellitus</b>                      | In patients managed for T2DM, consider treatment with hypoglycaemic agents with CVD risk reduction properties such as SGLT2 inhibitors or GLP-1 analogues as appropriate.   |

# Non-statin/ezetimibe lipid management

This outlines the use of other technologies available for lipid management aside from statins and ezetimibe including indications, formulary status and contraindications

Author: Dr Nathan Cantley. Version 1, August 2023. Review date: August 2028

## Icosapent Ethyl

Formulary status : Blue

### Mechanism of action

- High dose EPA
- Reduces CVD risk by 26% (RRR) or NNT=28 for MI, CVA, CV death

### Indications

- Established CVD
- LDL 1.04-2.6mmol/L **AND** Triglyceride >1.7mmol/L

### Prescribing Information

- [BNF link](#), [formulary](#)
- 2 capsules twice daily
- No dose titration of monitoring

### Safety info/side effects

- Do not use in those with AF or high bleeding risk
- A/E: GI general effects

## Bempedoic Acid

Formulary status : Blue

### Mechanism of action

- ATP Citrate Lyase inhib
- Inhibit cholesterol synthesis but hepatic specific enzyme

### Indications

- 1<sup>ry</sup> or 2<sup>ry</sup> prevention
- Statin contraindicated/intolerance (partial or complete)
- Adjunct to Ezetimibe

### Prescribing Information

- [BNF link](#), [formulary](#)
- 180mg once daily
- No dose titration
- No additional monitoring

### Safety info/side effects

- Do not use in those with history of clinical gout
- Asymptomatic hyper-UA does not preclude use

## Inclisiran

Formulary status : Blue

### Mechanism of action

- Silencing RNA against PCSK9
- Sub-cutaneous injectable

### Indications

- Established CVD
- LDL  $\geq$ 2.6mmol/L despite high intensity statin therapy +/- Ezetimibe

### Prescribing Information

- [BNF link](#), [formulary](#)
- Injection loading doses at 0 and 3/12, 6/12 thereafter
- No dose titration

### Safety info/side effects

- Some injection site reaction possible
- No monitoring required
- If dose missed >1 month, re-loading required

## Evolocumab/Alirocumab

Formulary status : Red

### Mechanism of action

- Monoclonal antibody against PCSK9
- Sub-cutaneous injection

### Indications

- Established CVD and LDL-C >4.0mmol/L (unless very high risk or FH present – then LDL-C >3.5mmol/L)
- Non-CVD FH where LDL-C >5.0mmol/L

### Safety info/side effects

- Some injection site reaction possible
- Some nasopharyngeal dryness noted by some
- U&E, LFT, Lipid @ 3/12

### Prescribing Information

- BNF link: [Evo](#), [Aliro](#), [form](#)
- Secondary care only

# Summary treatment targets by indication

Summary of treatment guidelines as well as caveats for estimating cardiovascular risk

Author: Dr Nathan Cantley. Version 2, May 2024. Review date: May 2026

## Primary Prevention

NICE guideline CG181 on CVD primary prevention guideline has been updated May 2023. Where it is appropriate to manage lipids (QRISK2/3 >10%) by primary prevention:

- Aim for 40% reduction in Non-HDL Cholesterol

Primary prevention may also be appropriate even if QRISK is <10% if the patient is informed. QRISK2/3 can underestimate the risk of CVD if any of the following are present:

- Family history of CVD
- Presence of elevated Lp(a)
  - >90nmol/L where QRISK >10%
  - >200nmol/L
- Presence of genetic dyslipidaemia

If any are present, secondary prevention targets should be used.

## Evidence base update

Systematic reviews on cholesterol management highlight that CVD risk reductions from lowering LDL-C are cumulative for each mmol/L of LDL reduction. RRR per 1mmol/L reduction in LDL-C = 23% (RR=0.77 [95% CI – 0.75-0.79]).

Furthermore, in those who’s baseline LDL-C is high and likely to have been present for a number of years (e.g. in undiagnosed primary dyslipidaemia), data on cumulative LDL exposure indicates such individuals may have a higher associated CVD risk

Both papers work in favor of more intensive LDL targets than guidelines may suggest, and instigating lipid lowering therapy earlier in those with high-cumulative LDL exposure.

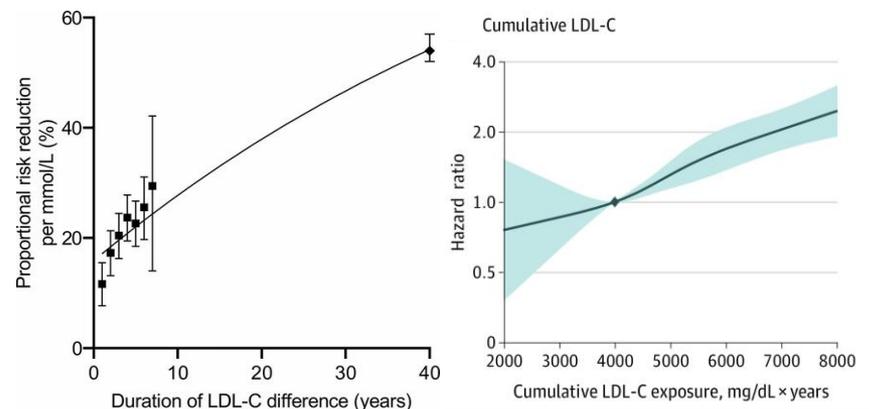
## Secondary Prevention

Please note: Although [AAC national guidelines](#) give a treatment target of LDL-C ≤ 2mmol/L, local lipid specialists within BNSSG recommend a target of LDL < 1.8mmol/L (or < 1.4mmol/L in high risk individuals)

|   | Following initial CVD | Very high risk or recurrent CVD |
|---|-----------------------|---------------------------------|
| Non-HDL-C (assuming normal triglycerides) | 2.5 mmol/L            | 2.2 mmol/L                      |
| LDL-C                                     | 1.8 mmol/L            | 1.4 mmol/L                      |

Reasons for classifying an individual as “very high risk”

- Disease in >1 vascular bed (e.g. peripheral vascular disease, cerebral vascular disease)
- Concurrent presence of other risk factors:
  - Lp(a) >200nmol/L
  - Genetic dyslipidaemia
  - Diabetes
- Note: The presence of subclinical/asymptomatic atherosclerotic disease diagnosed by CT coronary angiogram/other modalities does count as an eligibility criteria for purposes of injectable therapy and use of secondary prevention targets



## References

1. National Institute for Health and Care Excellence - Cardiovascular disease: risk reduction including lipid modification - Clinical Guideline CG181. NICE May 2023. Accessed September 2023. URL: <https://www.nice.org.uk/guidance/cg181/>
2. Wang N, Woodward M, Huffman MD, Rodgers A. Compounding Benefits of Cholesterol-Lowering Therapy for the Reduction of Major Cardiovascular Events: Systematic Review and Meta-Analysis. *Circ Cardiovasc Qual Outcomes*. 2022 Jun;15(6):e008552. doi: 10.1161/CIRCOUTCOMES.121.008552. Epub 2022 Apr 18. PMID: 35430872.
3. Wang N, Woodward M, Huffman MD, Rodgers A. Compounding Benefits of Cholesterol-Lowering Therapy for the Reduction of Major Cardiovascular Events: Systematic Review and Meta-Analysis. *Circ Cardiovasc Qual Outcomes*. 2022 Jun;15(6):e008552. doi: 10.1161/CIRCOUTCOMES.121.008552. Epub 2022 Apr 18. PMID: 35430872.
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