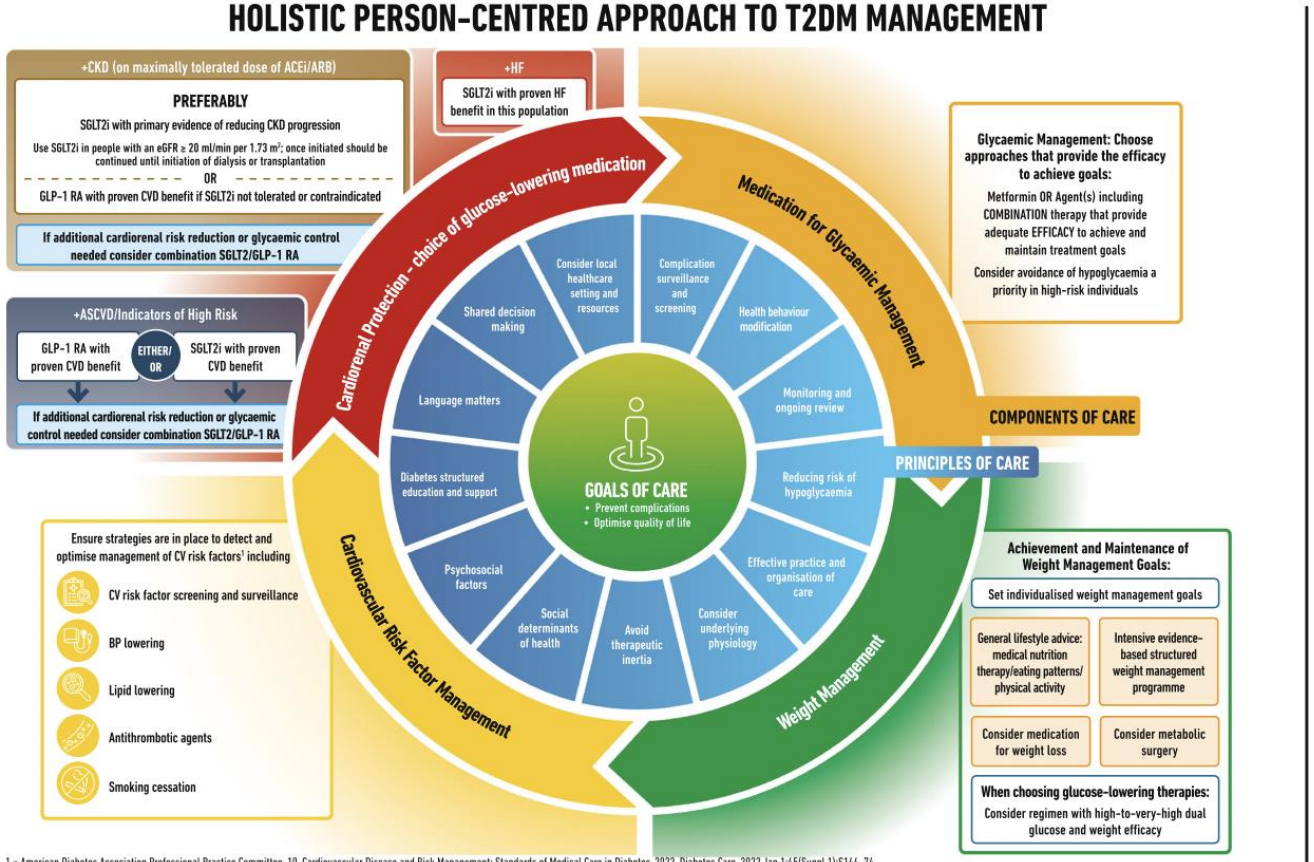
Type 2 Diabetes Management Pathways

Adapted from CoDES HCP Handbook
September 2022
(Next update due December 2022)



1 = American Diabetes Association Professional Practice Committee. 10. Cardiovascular Disease and Risk Management: Standards of Medical Care in Diabetes-2022. Diabetes Care. 2022 Jan 1;45(Suppl 1):S144–74.

ACEi, Angiotensin-Converting Enzyme Inhibitor; ARB, Angiotensin Receptor Blockers; ASCVD, Atherosclerotic Cardiovascular Disease; BP, Blood Pressure; CKD, Chronic Kidney Disease; CV, Cardiovascular; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes.

Fig. 4 Holistic person-centred approach to T2DM management

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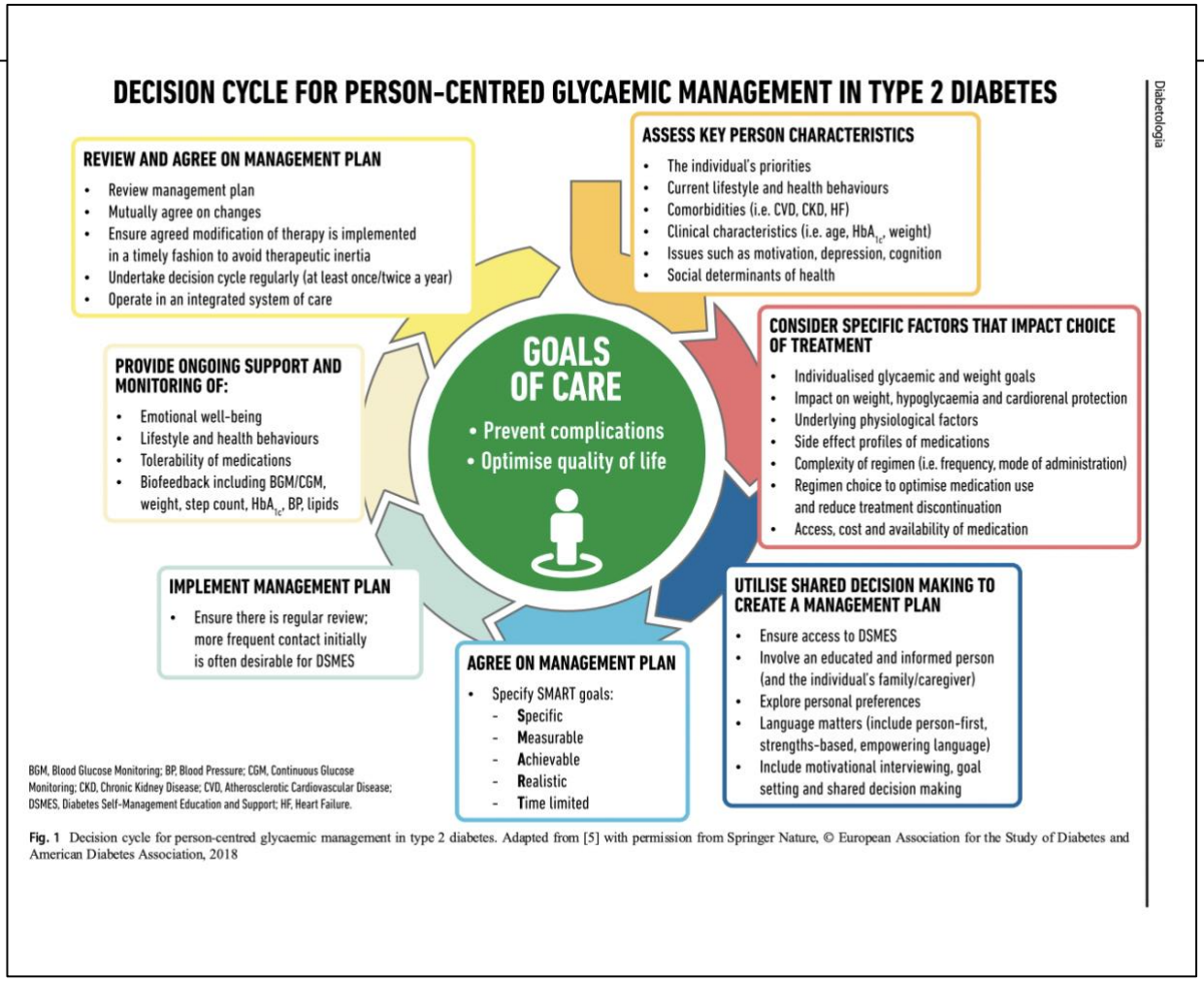


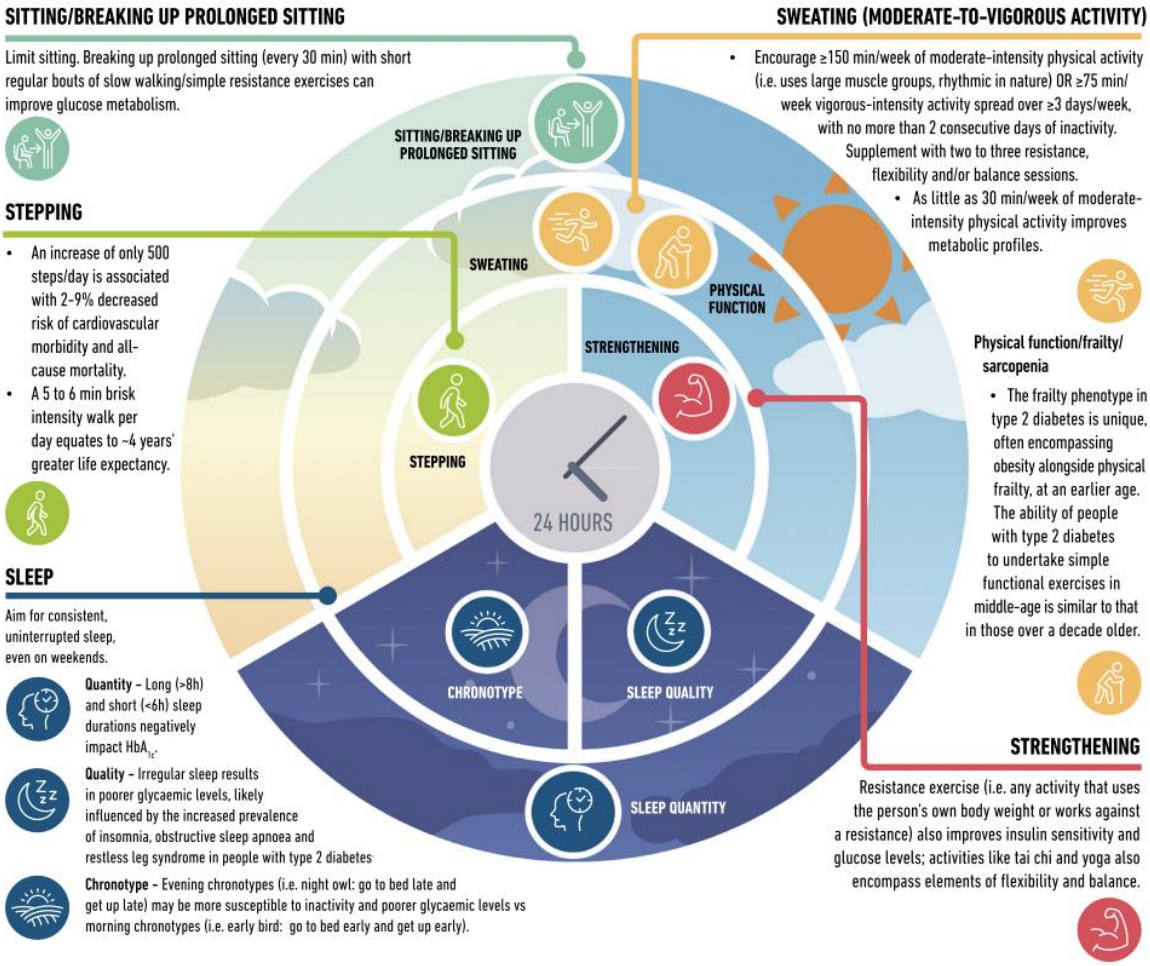
BGM, Blood Glucose Monitoring; BP, Blood Pressure; CGM, Continuous Glucose Monitoring; CKD, Chronic Kidney Disease; CVD, Atherosclerotic Cardiovascular Disease; DSMES, Diabetes Self-Management Education and Support; HF, Heart Failure.

Fig. 1 Decision cycle for person-centred glycaemic management in type 2 diabetes. Adapted from [5] with permission from Springer Nature, © European Association for the Study of Diabetes and American Diabetes Association, 2018

Diabetologia

https://diabetologia-journal.org/wp-content/uploads/2022/09/ADAEASDConsensusReport.pdf#page=9

IMPORTANCE OF 24-HOUR PHYSICAL BEHAVIOURS FOR TYPE 2 DIABETES



	Glucose/insulin	Blood pressure	HbA_{1c}	Lipids	Physical function	Depression	Quality of life
SITTING/BREAKING UP PROLONGED SITTING	↓	↓	↓	↓	↑	↓	↑
STEPPING	↓	↓	↓	↓	↑	↓	↑
SWEATING (MODERATE-TO-VIGOROUS ACTIVITY)	↓	↓	↓	↓	↑	↓	↑
STRENGTHENING	↓	↓	↓	↓	↑	↓	↑
ADEQUATE SLEEP DURATION	↓	↓	↓	↓	?	↓	↑
GOOD SLEEP QUALITY	↓	↓	↓	↓	?	↓	↑
CHRONOTYPE/CONSISTENT TIMING	↓	?	↓	?	?	↓	?

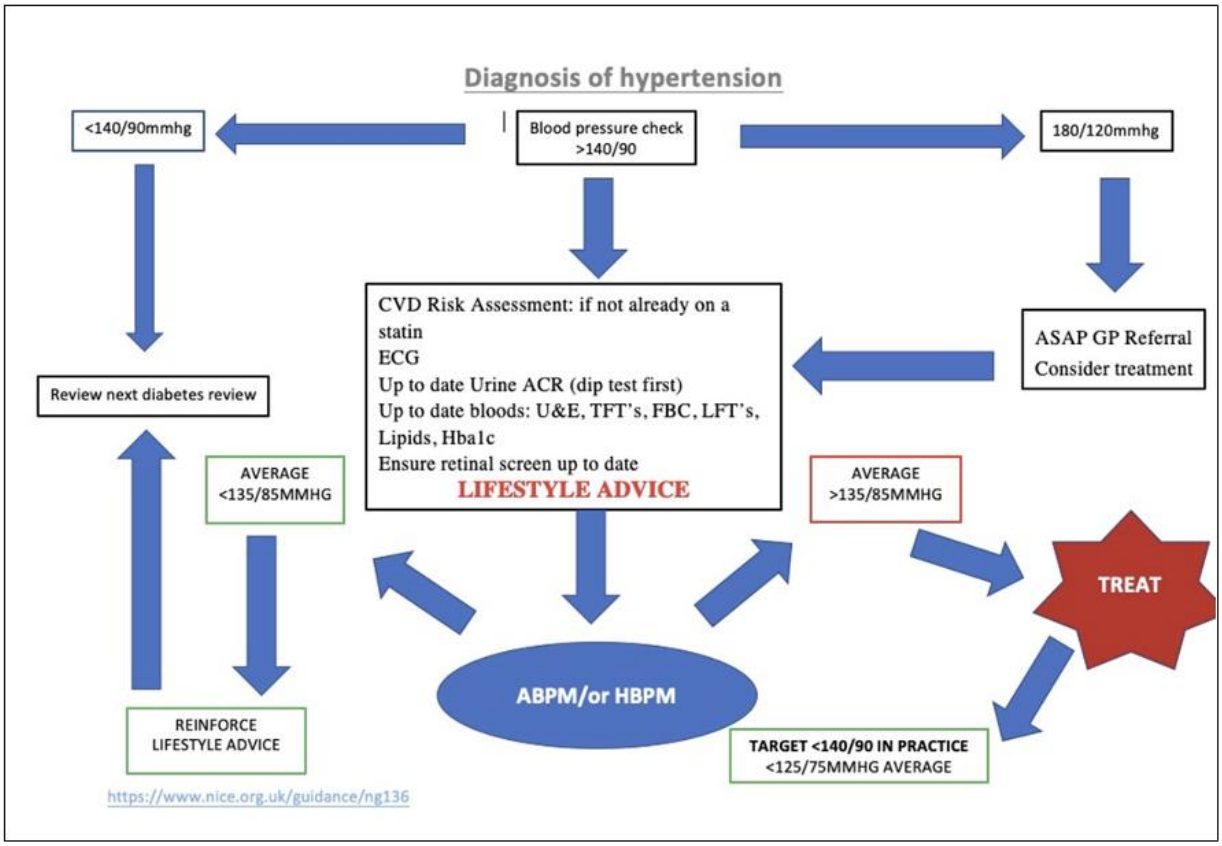
IMPACT OF PHYSICAL BEHAVIOURS ON CARDIOMETABOLIC HEALTH IN PEOPLE WITH TYPE 2 DIABETES

↑ **Higher levels/improvement** (physical function, quality of life); ↓ **Lower levels/improvement** (glucose/insulin, blood pressure, HbA_{1c}, lipids, depression); ? no data available;
↑ Green arrows = **strong evidence**; ↑ Yellow arrows = **medium strength evidence**; ↑ Red arrows = **limited evidence**.

Fig. 2 Importance of 24-hour physical behaviours for type 2 diabetes

https://diabetologia-journal.org/wp-content/uploads/2022/09/ADAEASDConsensusReport.pdf#page=9

Infographic of NICE NG 136:
Diagnosis of hypertension in Type 2 diabetes



NICE Guidance: NG136 advises, for a person with diabetes the preferred BP targets are:

- <80 years <140/90 mmHg
- ≥80 years <150/90 mmHg

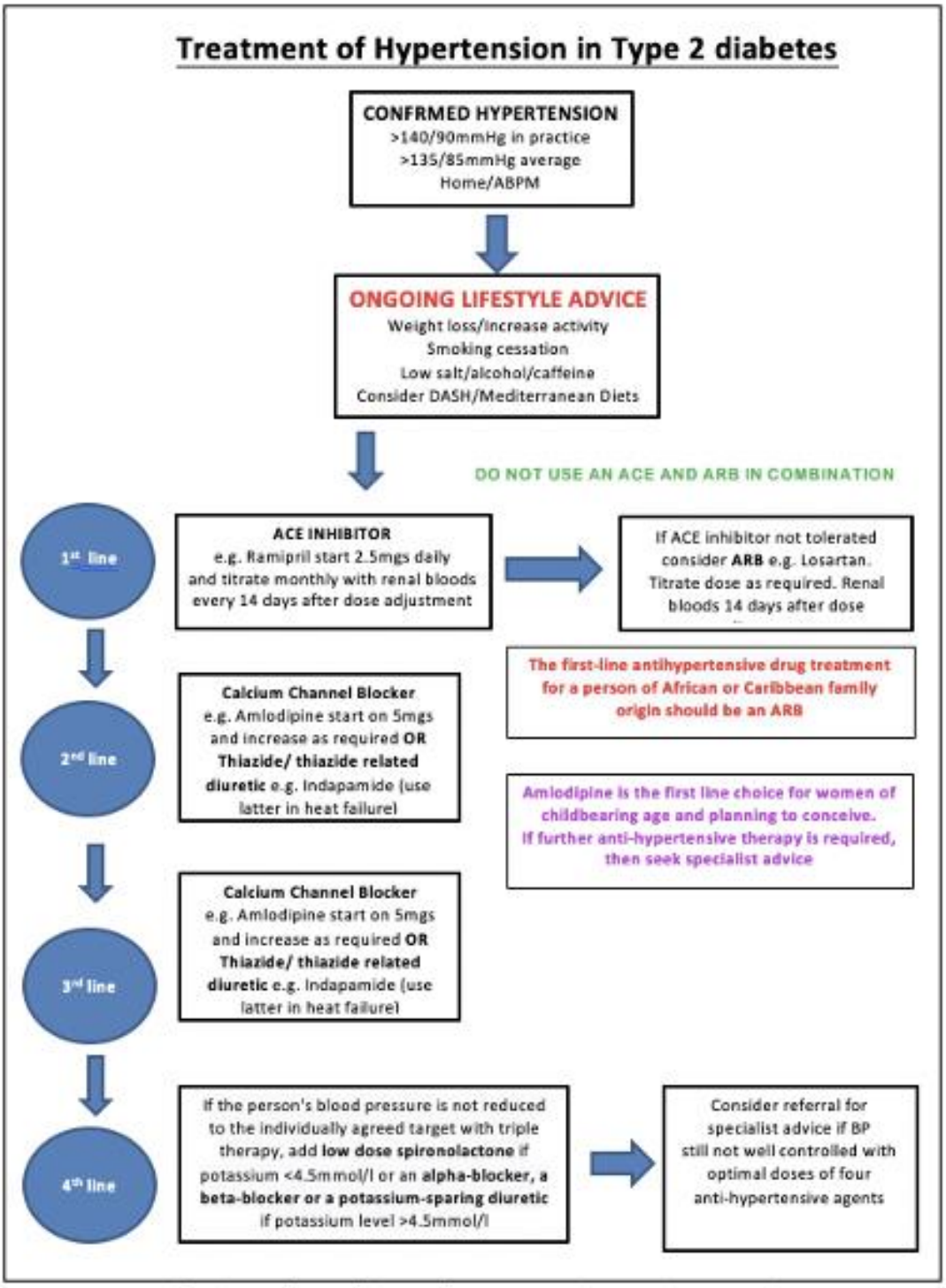
For those with diabetes and chronic kidney disease (CKD), refer to the recently updated NICE Chronic kidney disease: assessment and management (NG203). The preferred targets are:

- 120–139/<90 mmHg in an adult with CKD and ACR <70 mg/mmol
- 120–129/<80 mmHg in an adult with CKD and ACR ≥70 mg/mmol

https://www.nice.org.uk/guidance/ng136/chapter/Recommendations#diagnosing-hypertension

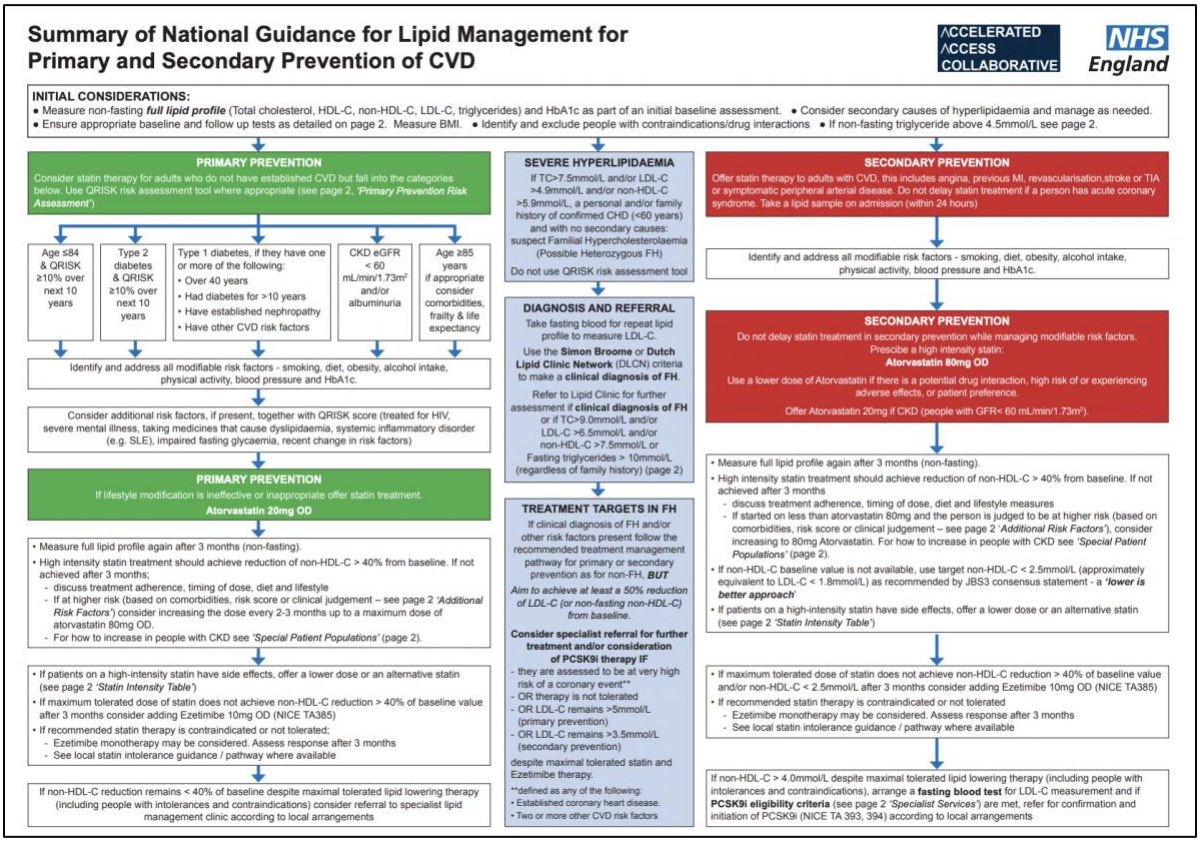
https://www.nice.org.uk/guidance/ng203

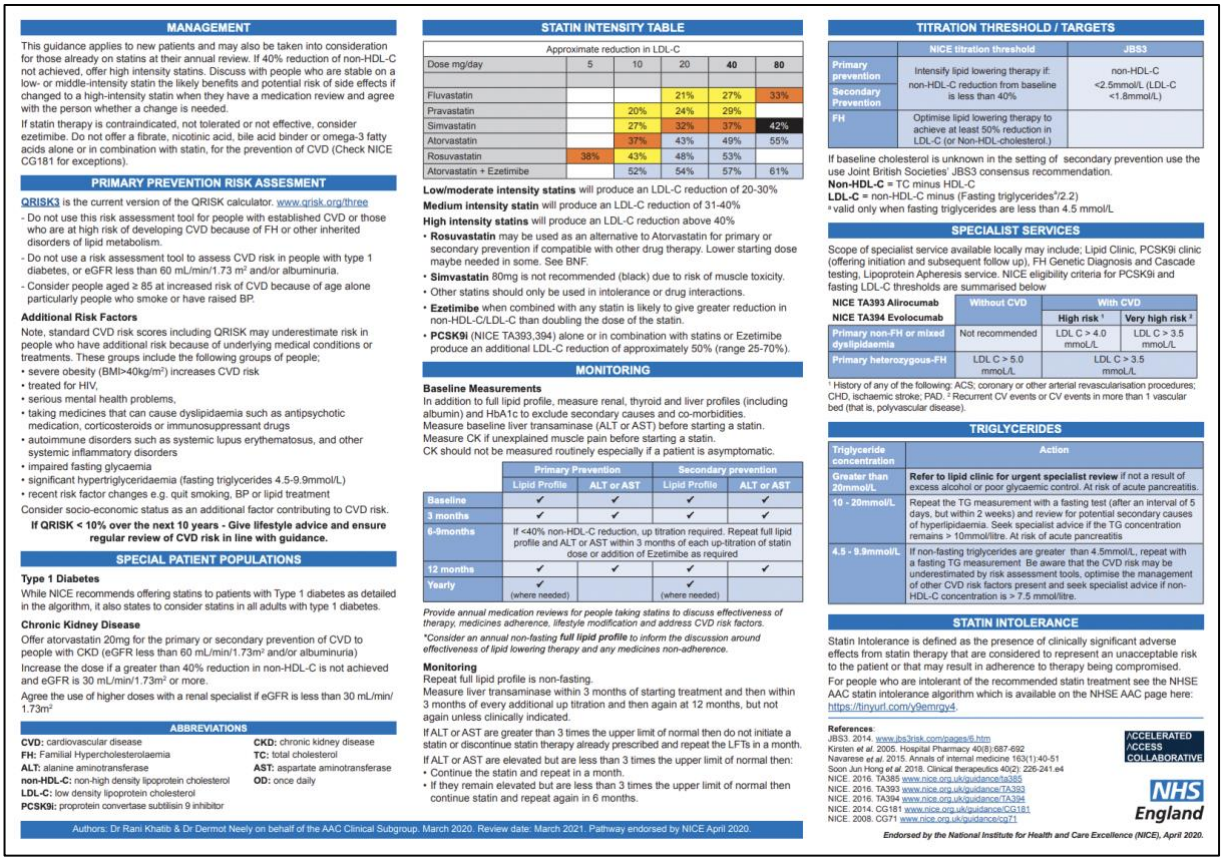
Infographic of NICE NG136:



https://www.nice.org.uk/guidance/ng136/chapter/Recommendations#diagnosing-hypertension

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





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 not achieved, offer high intensity statins. Discuss with people who are stable on a low- or middle-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.

If statin therapy is contraindicated, not tolerated or not effective, consider ezetimibe. 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 CG181 for exceptions).

PRIMARY PREVENTION RISK ASSESSMENT

QRISK3 is the current version of the QRISK calculator. www.qrisk.org/three

- Do not use this risk assessment tool for people with established CVD or those who are 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 less than 60 mL/min/1.73 m² and/or albuminuria.
- Consider people aged ≥ 85 at increased risk of CVD because of age alone particularly people who smoke or have raised BP.

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 groups include the following groups of people;

- severe obesity (BMI>40kg/m²) increases CVD risk
- treated for HIV,
- serious mental health problems,
- taking medicines that can cause dyslipidaemia such as antipsychotic medication, corticosteroids or immunosuppressant drugs
- autoimmune disorders such as systemic lupus erythematosus, and other systemic inflammatory disorders
- impaired fasting glycaemia
- 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 QRISK < 10% over the next 10 years - Give lifestyle advice and ensure regular review of CVD risk in line with guidance.

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 all adults with type 1 diabetes.

Chronic Kidney Disease

Offer atorvastatin 20mg for the primary or secondary prevention of CVD to people with CKD (eGFR less than 60 mL/min/1.73m² and/or albuminuria)

Increase the dose if a greater than 40% reduction in non-HDL-C is not achieved and eGFR is 30 mL/min/1.73m² or more.

Agree the use of higher doses with a renal specialist if eGFR is less than 30 mL/min/1.73m²

ABBREVIATIONS

CVD: cardiovascular disease
FH: Familial Hypercholesterolaemia
ALT: alanine aminotransferase
non-HDL-C: non-high density lipoprotein cholesterol
LDL-C: low density lipoprotein cholesterol
PCSK9i: proprotein convertase subtilisin 9 inhibitor
CKD: chronic kidney disease
TC: total cholesterol
AST: aspartate aminotransferase
OD: once daily

STATIN INTENSITY TABLE

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		52%	54%	57%	61%

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

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

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

- **Rosuvastatin** may be used as an alternative to Atorvastatin for primary or secondary prevention if compatible with other drug therapy. Lower starting dose maybe needed in some. See BNF.
- **Simvastatin** 80mg is not recommended (black) due to risk of muscle toxicity.
- Other statins should only be used in intolerance or drug interactions.
- **Ezetimibe** when combined with any statin is likely to give greater reduction in non-HDL-C/LDL-C than doubling the dose of the statin.
- **PCSK9i** (NICE TA393,394) alone or in combination with statins or Ezetimibe produce an additional LDL-C reduction of approximately 50% (range 25-70%).

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	✔	✔	✔	✔
3 months	✔	✔	✔	✔
6-9months	If <40% non-HDL-C reduction, up titration required. Repeat full lipid profile and ALT or AST within 3 months of each up-titration of statin dose or addition of Ezetimibe as required			
12 months	✔	✔	✔	✔
Yearly	✔ (where needed)		✔ (where needed)	

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

Consider 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.
Measure liver transaminase within 3 months of starting treatment and then within 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:

- 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	JBS3
Primary prevention	Intensify lipid lowering therapy if: non-HDL-C reduction from baseline is less than 40%	non-HDL-C <2.5mmol/L (LDL-C <1.8mmol/L)
Secondary Prevention		
FH	Optimise lipid lowering therapy to achieve at least 50% reduction in LDL-C (or Non-HDL-cholesterol.)	

If baseline cholesterol is unknown in the setting of secondary prevention use the use Joint British Societies' JBS3 consensus recommendation.
Non-HDL-C = TC minus HDL-C
LDL-C = non-HDL-C minus (Fasting triglycerides[a]/2.2)
[a] 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 / NICE TA394 Evolocumab	Without CVD	With CVD: High risk [1]	With CVD: Very high risk [2]
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	

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

TRIGLYCERIDES

Triglyceride concentration	Action
Greater than 20mmol/L	**Refer to lipid clinic for urgent specialist review** 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.

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 which is available on the NHSE AAC page here: https://tinyurl.com/y9emrgy4.

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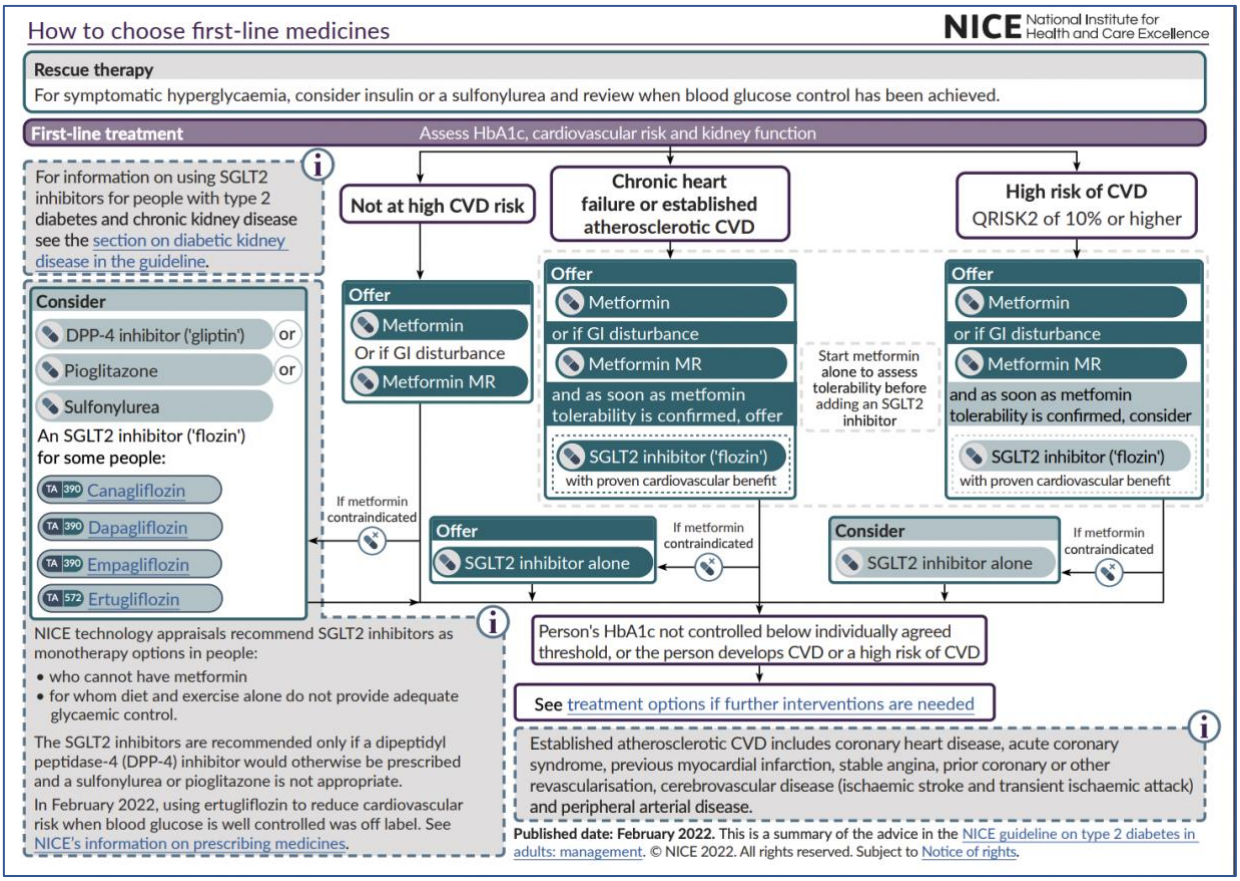
ACCELERATED ACCESS COLLABORATIVE
NHS England

Endorsed by the National Institute for Health and Care Excellence (NICE), April 2020.

Authors: Dr Rani Khatib & Dr Dermot Neely on behalf of the AAC Clinical Subgroup. March 2020. Review date: March 2021. Pathway endorsed by NICE April 2020.

https://www.england.nhs.uk/aac/publication/summary-of-national-guidance-for-lipid-management/

NICE NG28 updated March 2022



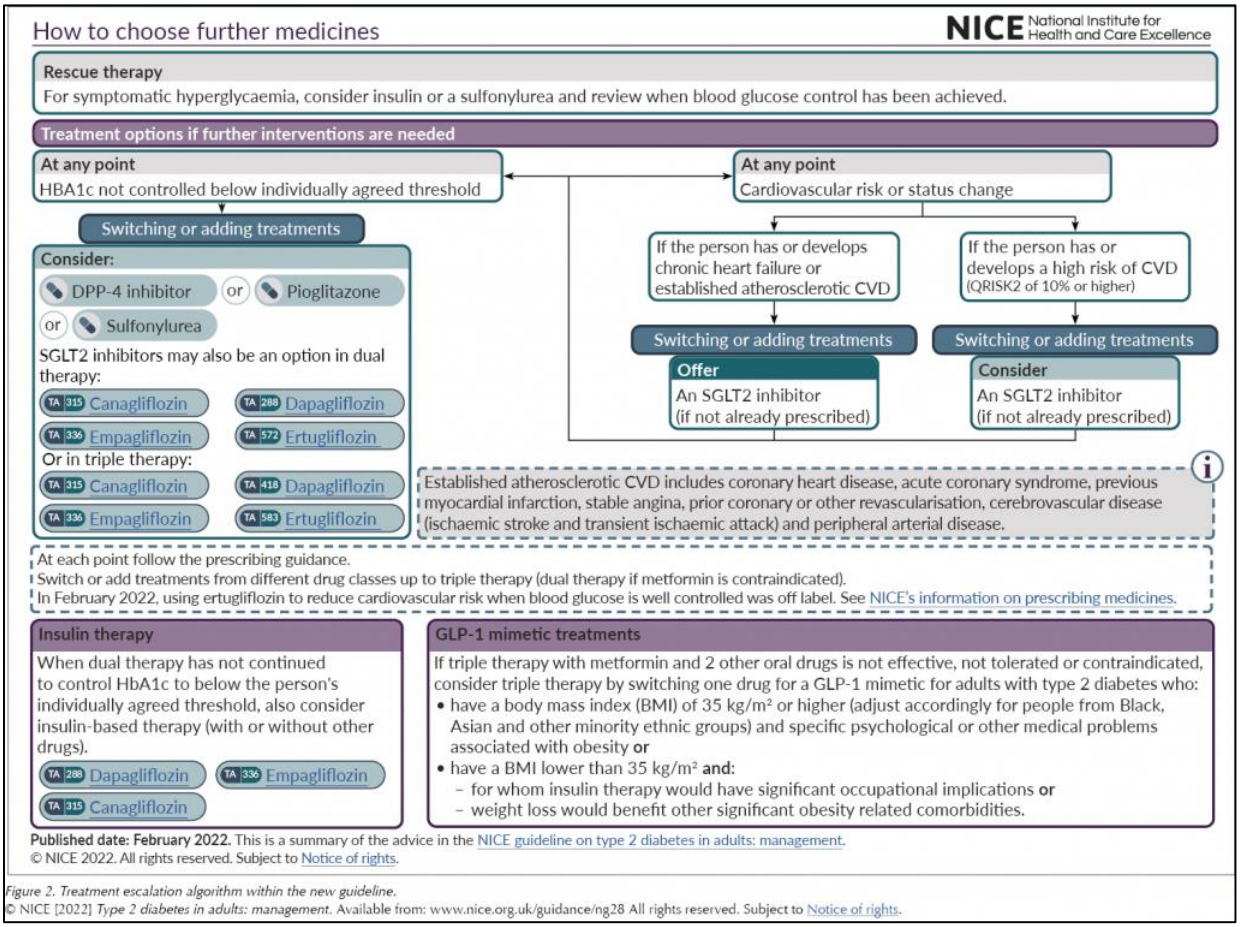


Figure 2. Treatment escalation algorithm within the new guideline.
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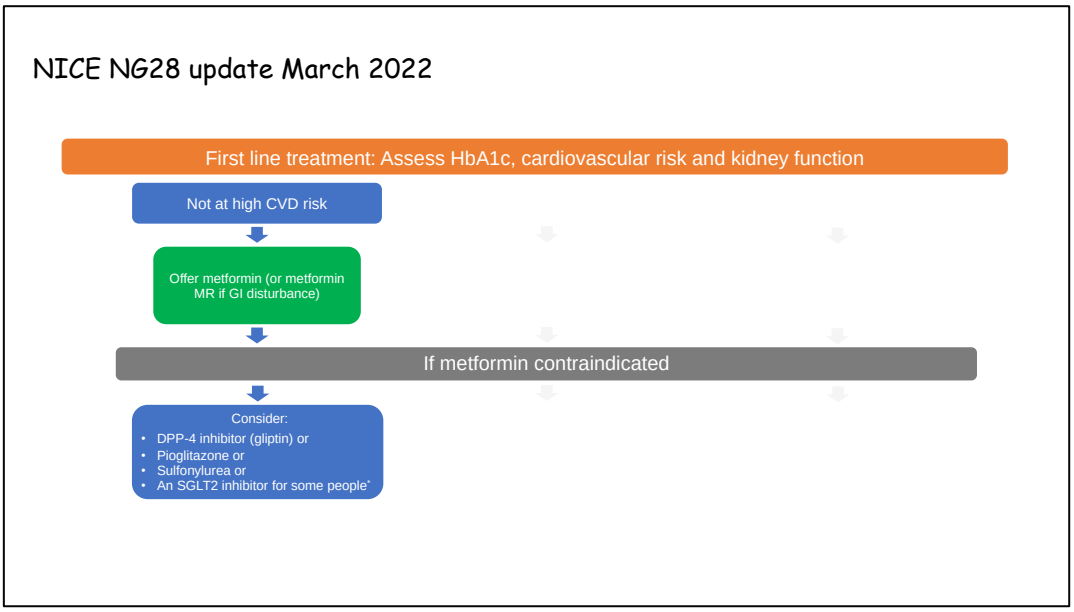
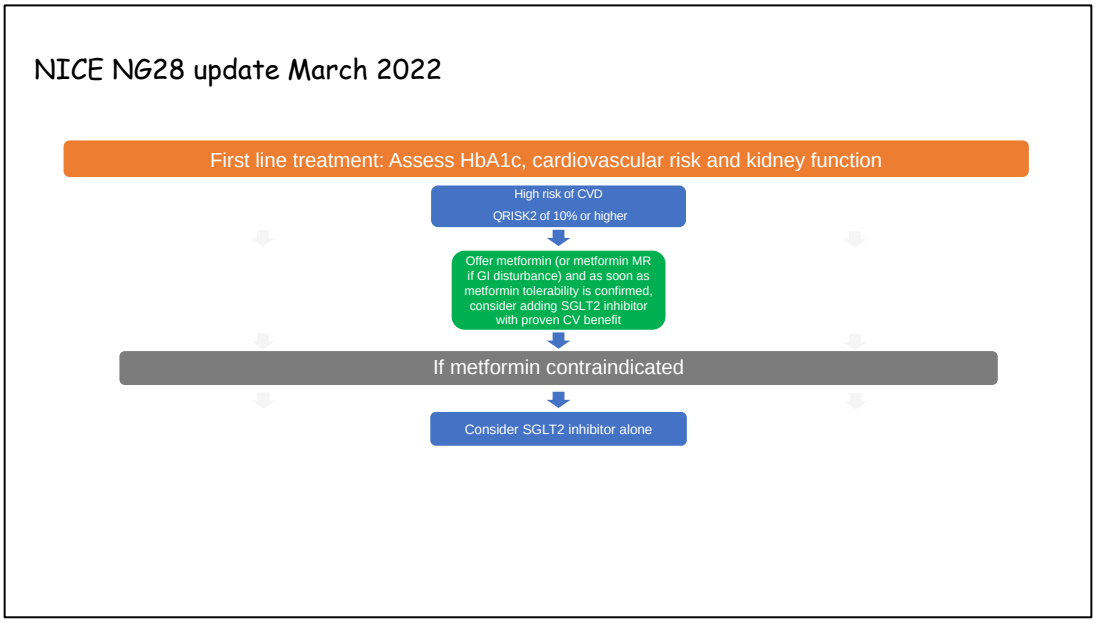
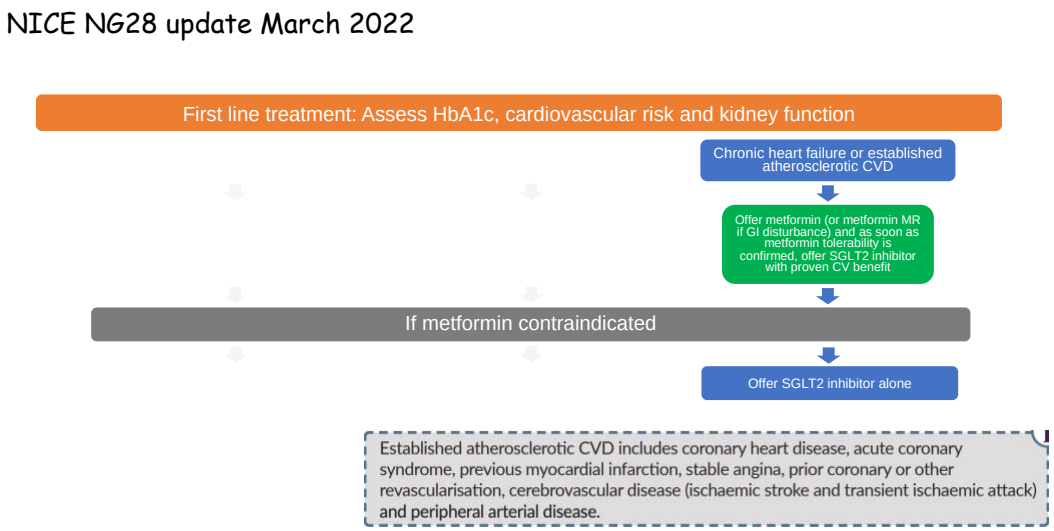
https://www.nice.org.uk/guidance/ng28

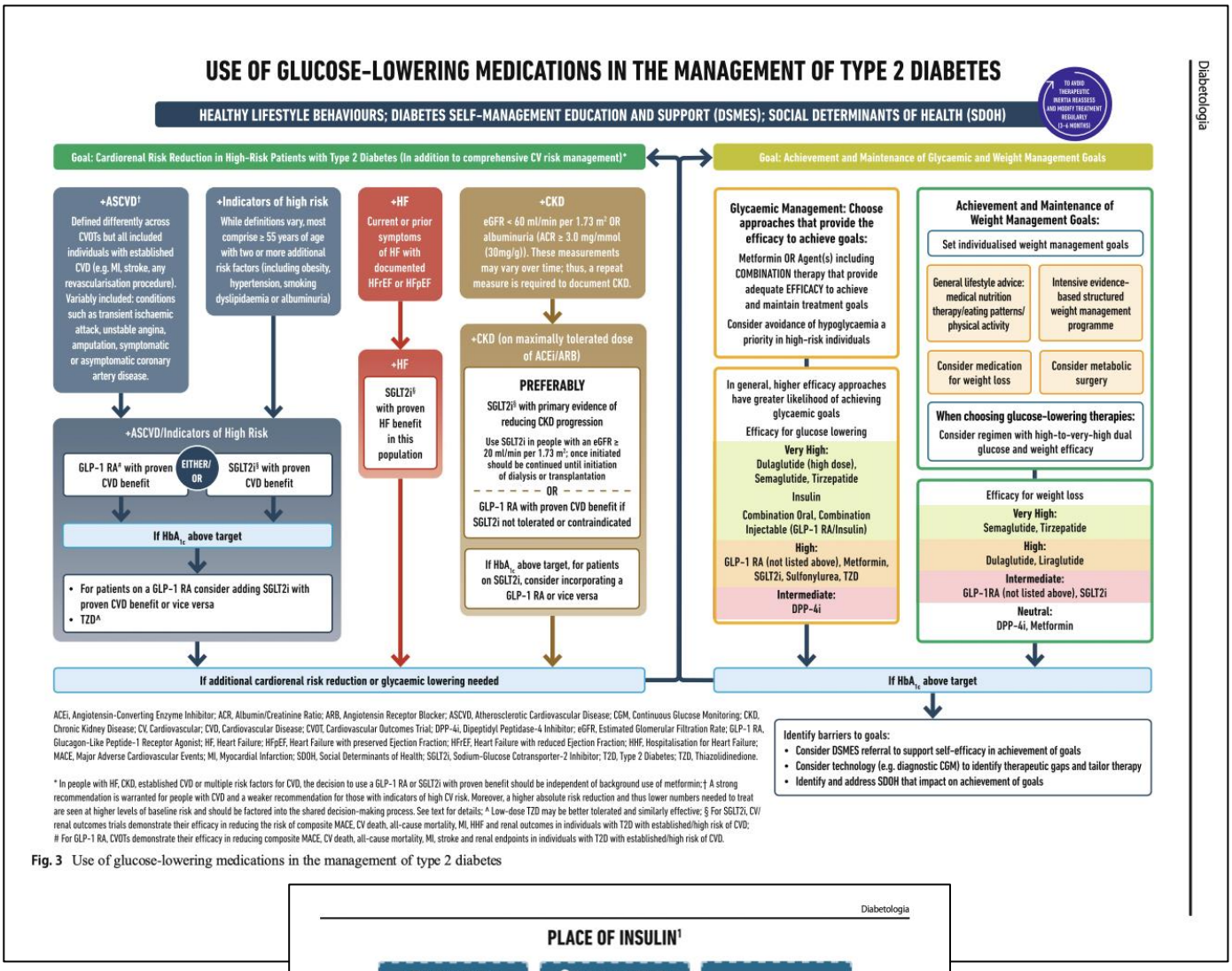
NICE NG28 updated March 2022







ADA/ESD Guidelines for management of hyperglycaemia in T2D



ACEi, Angiotensin-Converting Enzyme Inhibitor; ACR, Albumin/Creatinine Ratio; ARB, Angiotensin Receptor Blocker; ASCVD, Atherosclerotic Cardiovascular Disease; CGM, Continuous Glucose Monitoring; CKD, Chronic Kidney Disease; CV, Cardiovascular; CVD, Cardiovascular Disease; CVOT, Cardiovascular Outcomes Trial; DPP-4i, Dipeptidyl Peptidase-4 Inhibitor; eGFR, Estimated Glomerular Filtration Rate; GLP-1 RA, Glucagon-Like Peptide-1 Receptor Agonist; HF, Heart Failure; HFpEF, Heart Failure with preserved Ejection Fraction; HFrEF, Heart Failure with reduced Ejection Fraction; HHF, Hospitalisation for Heart Failure; MACE, Major Adverse Cardiovascular Events; MI, Myocardial Infarction; SDOH, Social Determinants of Health; SGLT2i, Sodium-Glucose Cotransporter-2 Inhibitor; T2D, Type 2 Diabetes; TZD, Thiazolidinedione.

* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; † A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and thus lower numbers needed to treat are seen at higher levels of baseline risk and should be factored into the shared decision-making process. See text for details; ^ Low-dose TZD may be better tolerated and similarly effective; § For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, HHF and renal outcomes in individuals with T2D with established/high risk of CVD; # For GLP-1 RA, CVOTs demonstrate their efficacy in reducing composite MACE, CV death, all-cause mortality, MI, stroke and renal endpoints in individuals with T2D with established/high risk of CVD.

Fig. 3 Use of glucose-lowering medications in the management of type 2 diabetes

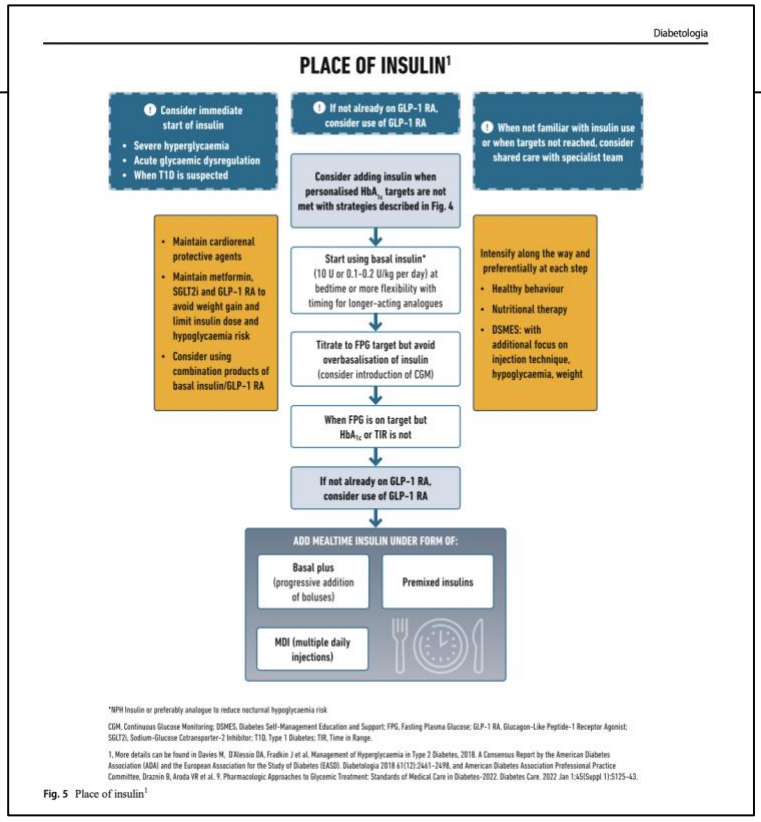


Fig. 5 Place of insulin[1]

https://diabetologia-journal.org/wp-content/uploads/2022/09/ADAEASDConsensusReport.pdf#page=9

GMMMG Greater Manchester Medicines Management Group

INSULIN TITRATION GUIDANCE IN ADULTS WITH TYPE 2 DIABETES

THIS GUIDANCE APPLIES TO PATIENTS ON ESTABLISHED INSULIN REGIMENS

PRINCIPLES OF TITRATION

Before adjusting doses, consider:

- **Diet / level of activity / injection sites e.g. lipohypertrophy**
- **'Sick day guidance'- if vomiting/ dehydrated check capillary blood glucose (CBG) 3-4 hourly.**

If blood glucose levels are >20mmol/L, consider testing for ketones:

- **Check ketones at lower blood glucose levels if patient is unwell and taking an SGLT2 inhibitor**

Glucose targets should be individualised e.g:

- **If CKD 4-5, elderly, and/or reduced hypo-awareness then 5-9mmol/L before meals might be appropriate**
- **In end of life care: the aim is for the patient to be free from osmotic symptoms**

Unless you are concerned about hypoglycaemia, AVOID changing insulin doses based on one-off blood glucose levels:

- **look at blood glucose patterns over 4 to 7 days**

ALWAYS USE YOUR CLINICAL JUDGEMENT AND SEEK ADVICE WHERE NECESSARY

BASAL

Pre-breakfast CBG (mmol/L)	ACTION
< 4	**Reduce** insulin by 10%
4 to 7	No change
7.1 to 15	**Increase** insulin by 10%
15.1 to 20	**Increase** insulin by 15%
>20	**Increase** insulin 20%

BASAL BOLUS

CBG (mmol/L)	< 4	4 to 7	7.1 to 14	14.1 to 20	> 20
Pre-breakfast	Reduce **basal** insulin by 10%	No change	Increase **basal** insulin by 5-10%	Increase **basal** insulin by 15-20%	**Increase** insulin by 20%
Pre-lunch	Reduce **breakfast** insulin by 10%	No change	Increase **breakfast** insulin by 5-10%	Increase **breakfast** by 15-20%	
Pre-tea	Reduce **lunch** insulin by 10%	No change	Increase **lunch** insulin by 5-10%	Increase **lunch** insulin by 15-20%	
Pre-bed	Reduce **teatime** insulin 10%	No change	Increase **teatime** insulin by 5-10%	Increase **teatime** insulin by 15-20%	

TWICE DAILY

CBG (mmol/L)	< 4	4 to 7	7.1 to 14	14.1 to 20	> 20
Pre-breakfast	Reduce **teatime** insulin by 10%	No change	Increase **teatime** insulin by 10%	Increase **teatime** insulin by 15%	**Increase** insulin by 20%
Pre-tea	Reduce **breakfast** insulin by 10%	No change	Increase **breakfast** insulin by 10%	Increase **breakfast** insulin by 15%	
Pre-bed	Reduce **teatime** insulin by 10%	No change	Increase **teatime** insulin by 10%	Increase **teatime** insulin by 15%	

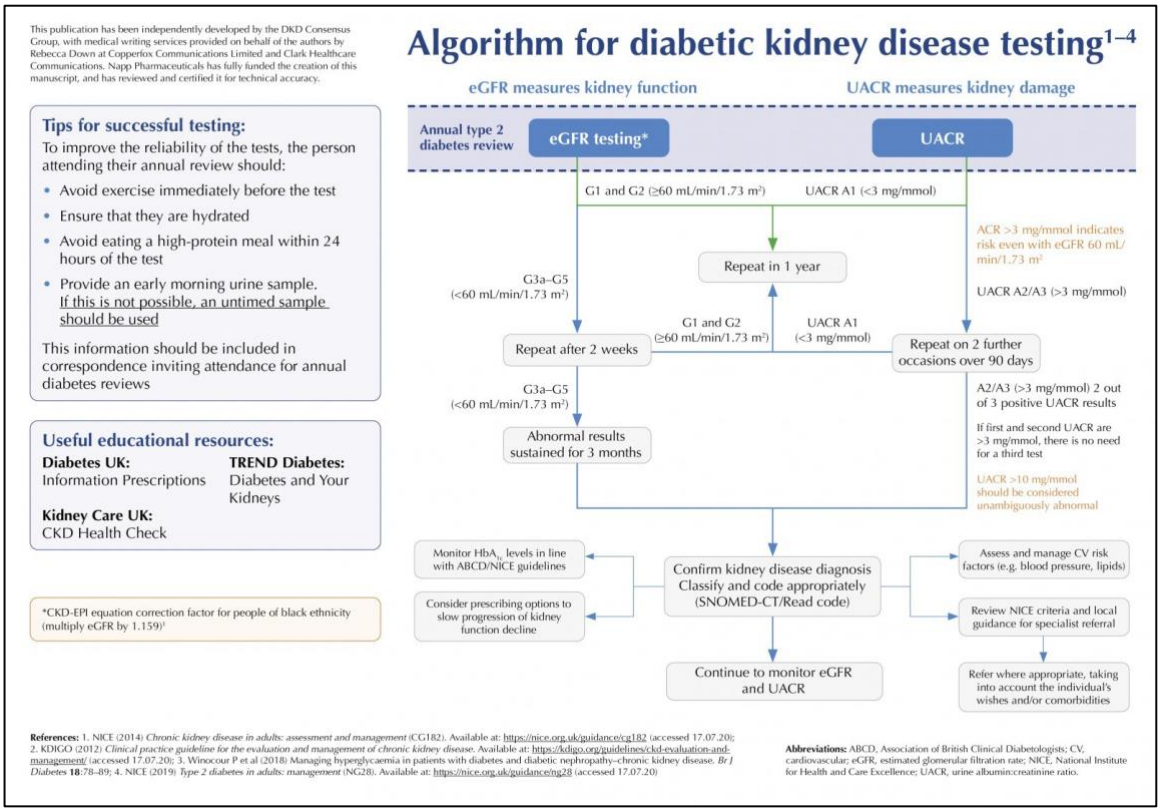
INSULIN SHOULD ALWAYS BE PRESCRIBED BY BRAND, USING THE FULL PRODUCT NAME

See GMMMG formulary for further information.

https://gmmmg.nhs.uk/wp-content/uploads/2021/08/GMMMG-Insulin-Prescribing-Aid-for-Adults-with-Type-2-Diabetes-V-1-1-PaGDSG-approved.pdf

https://diabetesonthenet.com/cpd-modules/

CKD diagnosis and management



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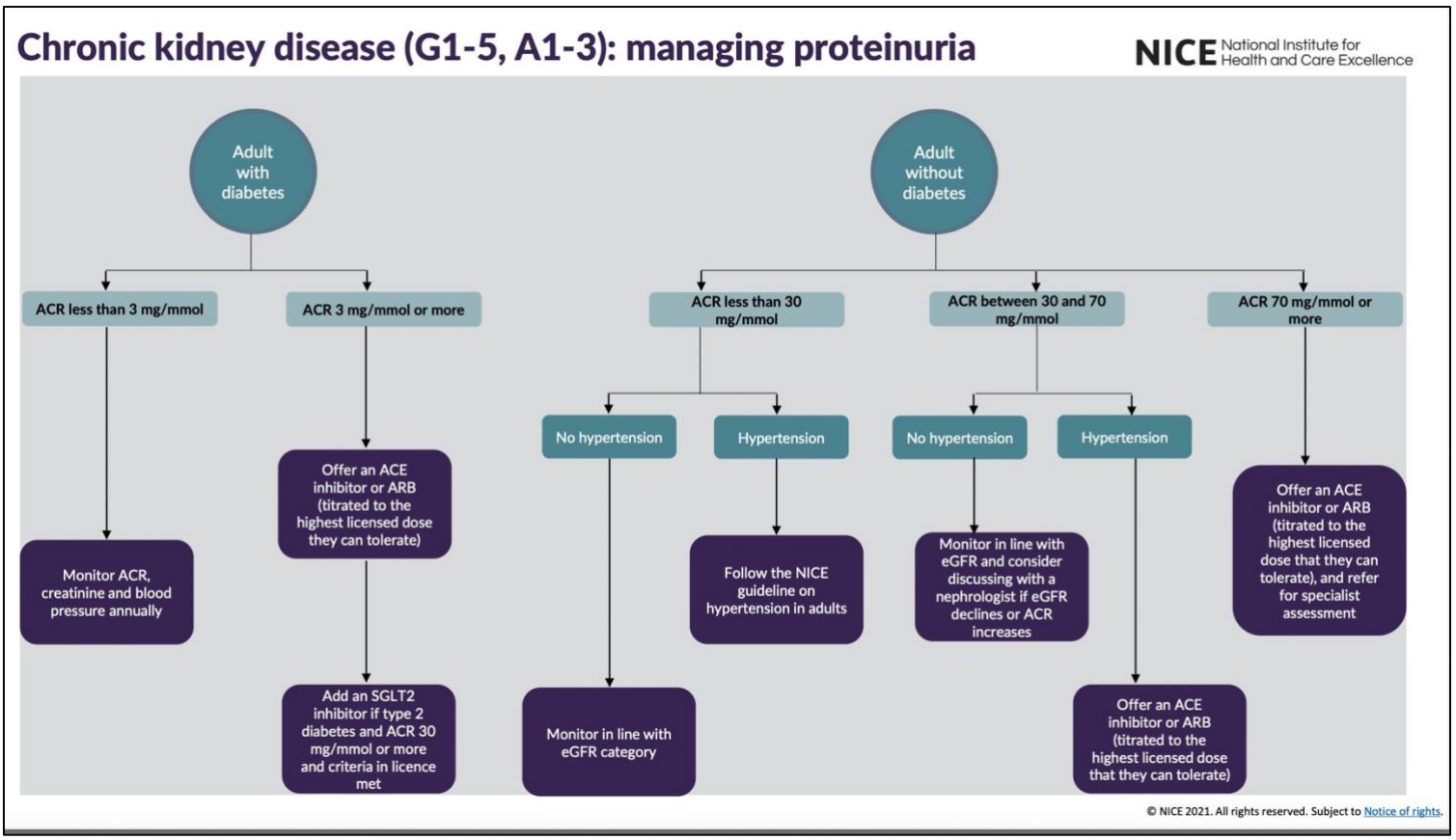
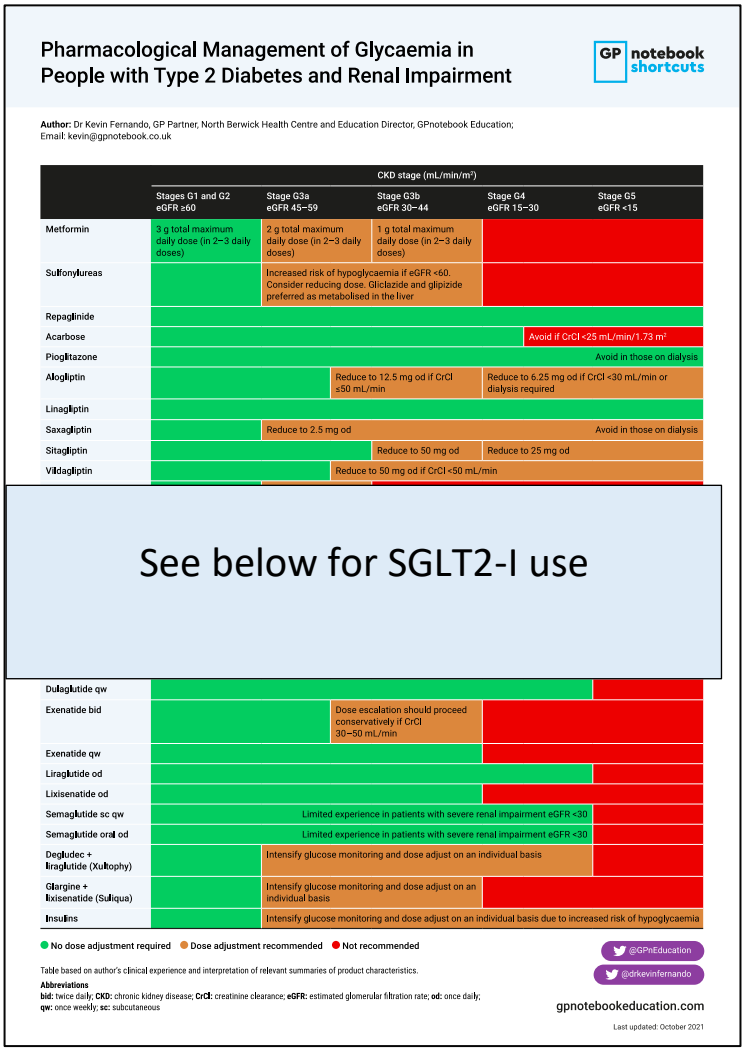


https://www.nice.org.uk/guidance/ng203

Safe prescribing in CKD



Pharmacological Management of Glycaemia in People with Type 2 Diabetes and Renal Impairment

GP notebook shortcuts

Author: Dr Kevin Fernando, GP Partner, North Berwick Health Centre and Education Director, GPnotebook Education;
Email: kevin@gpnotebook.co.uk

	CKD stage (mL/min/m²)				
	Stages G1 and G2 eGFR ≥60	Stage G3a eGFR 45–59	Stage G3b eGFR 30–44	Stage G4 eGFR 15–30	Stage G5 eGFR <15
Metformin	3 g total maximum daily dose (in 2–3 daily doses)	2 g total maximum daily dose (in 2–3 daily doses)	1 g total maximum daily dose (in 2–3 daily doses)		
Sulfonylureas		Increased risk of hypoglycaemia if eGFR <60. Consider reducing dose. Gliclazide and glipizide preferred as metabolised in the liver			
Repaglinide					
Acarbose				Avoid if CrCl <25 mL/min/1.73 m²	
Pioglitazone					Avoid in those on dialysis
Alogliptin			Reduce to 12.5 mg od if CrCl ≤50 mL/min	Reduce to 6.25 mg od if CrCl <30 mL/min or dialysis required	
Linagliptin					
Saxagliptin		Reduce to 2.5 mg od			Avoid in those on dialysis
Sitagliptin			Reduce to 50 mg od	Reduce to 25 mg od	
Vildagliptin			Reduce to 50 mg od if CrCl <50 mL/min		

See below for SGLT2-I use

Dulaglutide qw					
Exenatide bid			Dose escalation should proceed conservatively if CrCl 30–50 mL/min		
Exenatide qw					
Liraglutide od					
Lixisenatide od					
Semaglutide sc qw	Limited experience in patients with severe renal impairment eGFR <30				
Semaglutide oral od	Limited experience in patients with severe renal impairment eGFR <30				
Degludec + liraglutide (Xultophy)		Intensify glucose monitoring and dose adjust on an individual basis			
Glargine + lixisenatide (Suliqua)		Intensify glucose monitoring and dose adjust on an individual basis			
Insulins		Intensify glucose monitoring and dose adjust on an individual basis due to increased risk of hypoglycaemia			

● No dose adjustment required ● Dose adjustment recommended ● Not recommended

Table based on author's clinical experience and interpretation of relevant summaries of product characteristics.

Abbreviations
bid: twice daily; **CKD:** chronic kidney disease; **CrCl:** creatinine clearance; **eGFR:** estimated glomerular filtration rate; **od:** once daily; **qw:** once weekly; **sc:** subcutaneous

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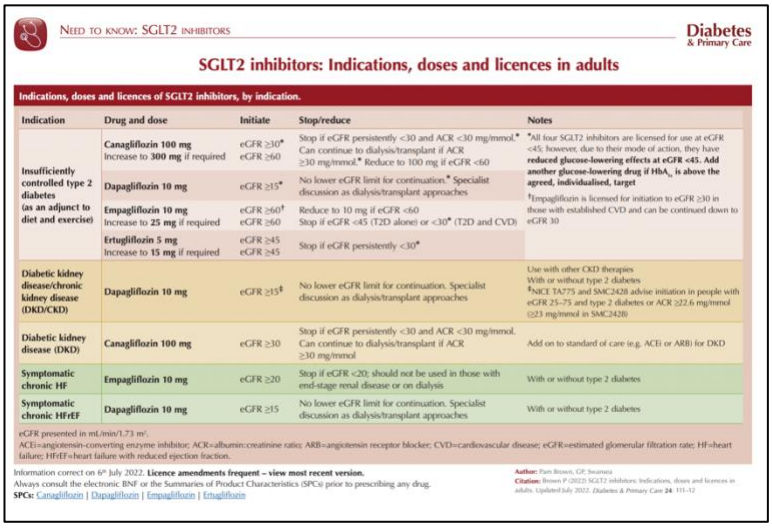
https://gpnotebookeducation.com/shortcuts/prescribing-for-people-living-with-type-2-diabetes-renal-impairment/



NEED TO KNOW: SGLT2 INHIBITORS

Diabetes & Primary Care

SGLT2 inhibitors: Indications, doses and licences in adults

Indications, doses and licences of SGLT2 inhibitors, by indication.

Indication	Drug and dose	Initiate	Stop/reduce	Notes
Insufficiently controlled type 2 diabetes (as an adjunct to diet and exercise)	**Canagliflozin 100 mg** Increase to **300 mg** if required	eGFR ≥30* eGFR ≥60	Stop if eGFR persistently <30 and ACR <30 mg/mmol.* Can continue to dialysis/transplant if ACR ≥30 mg/mmol.* Reduce to 100 mg if eGFR <60	*All four SGLT2 inhibitors are licensed for use at eGFR <45; however, due to their mode of action, they have **reduced glucose-lowering effects at eGFR <45. Add another glucose-lowering drug if HbA_{1c} is above the agreed, individualised, target**
	Dapagliflozin 10 mg	eGFR ≥15*	No lower eGFR limit for continuation.* Specialist discussion as dialysis/transplant approaches	†Empagliflozin is licensed for initiation to eGFR ≥30 in those with established CVD and can be continued down to eGFR 30
	Empagliflozin 10 mg Increase to **25 mg** if required	eGFR ≥60† eGFR ≥60	Reduce to 10 mg if eGFR <60 Stop if eGFR <45 (T2D alone) or <30* (T2D and CVD)	
	Ertugliflozin 5 mg Increase to **15 mg** if required	eGFR ≥45 eGFR ≥45	Stop if eGFR persistently <30*	
Diabetic kidney disease/chronic kidney disease (DKD/CKD)	**Dapagliflozin 10 mg**	eGFR ≥15‡	No lower eGFR limit for continuation. Specialist discussion as dialysis/transplant approaches	Use with other CKD therapies With or without type 2 diabetes ‡NICE TA775 and SMC2428 advise initiation in people with eGFR 25–75 and type 2 diabetes or ACR ≥22.6 mg/mmol (≥23 mg/mmol in SMC2428)
Diabetic kidney disease (DKD)	**Canagliflozin 100 mg**	eGFR ≥30	Stop if eGFR persistently <30 and ACR <30 mg/mmol. Can continue to dialysis/transplant if ACR ≥30 mg/mmol	Add on to standard of care (e.g. ACEi or ARB) for DKD
Symptomatic chronic HF	**Empagliflozin 10 mg**	eGFR ≥20	Stop if eGFR <20; should not be used in those with end-stage renal disease or on dialysis	With or without type 2 diabetes
Symptomatic chronic HFrEF	**Dapagliflozin 10 mg**	eGFR ≥15	No lower eGFR limit for continuation. Specialist discussion as dialysis/transplant approaches	With or without type 2 diabetes

eGFR presented in mL/min/1.73 m².
ACEi=angiotensin-converting enzyme inhibitor; ACR=albumin:creatinine ratio; ARB=angiotensin receptor blocker; CVD=cardiovascular disease; eGFR=estimated glomerular filtration rate; HF=heart failure; HFrEF=heart failure with reduced ejection fraction.

Information correct on 6th July 2022. **Licence amendments frequent – view most recent version.**
Always consult the electronic BNF or the Summaries of Product Characteristics (SPCs) prior to prescribing any drug.
SPCs: Canagliflozin | Dapagliflozin | Empagliflozin | Ertugliflozin

Author: Pam Brown, GP, Swansea
Citation: Brown P (2022) SGLT2 inhibitors: Indications, doses and licences in adults. Updated July 2022. *Diabetes & Primary Care* **24**: 111–112

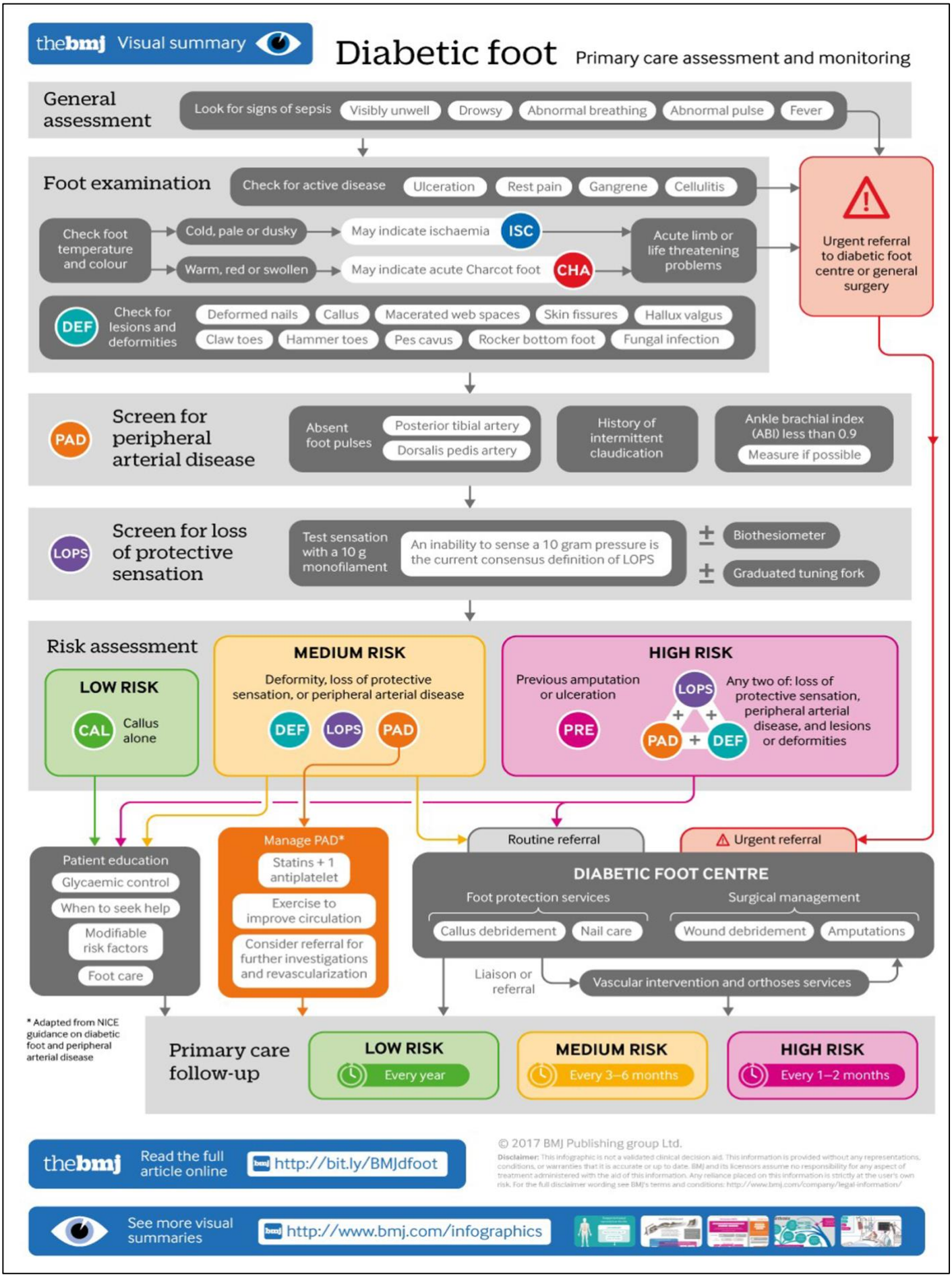
Indications, doses and starting/stopping recommendations of SGLT2 inhibitors, by drug name.

Drug	Indication	Drug and dose	Initiate	Stop/reduce	Notes
Canagliflozin	**Insufficiently controlled type 2 diabetes**	**Canagliflozin 100 mg** Increase to **300 mg** if required	eGFR ≥30* eGFR ≥60	Stop if eGFR persistently <30 and ACR <30 mg/mmol.* Can continue to dialysis/transplant if ACR ≥30 mg/mmol.* Reduce to 100 mg if eGFR <60	*Licensed for initiation to eGFR ≥30 but reduced glucose lowering below eGFR 45; add another glucose-lowering drug if needed
	Diabetic kidney disease (DKD)	**Canagliflozin 100 mg**	eGFR ≥30	Stop if eGFR persistently <30 and ACR <30 mg/mmol. Can continue to dialysis/transplant if ACR ≥30 mg/mmol	Add on to standard of care (e.g. ACEi or ARB) for DKD
Dapagliflozin	**Insufficiently controlled type 2 diabetes**	**Dapagliflozin 10 mg**	eGFR ≥15†	No lower eGFR limit for continuation.† Specialist discussion as dialysis/transplant approaches	†Licensed for initiation to eGFR ≥15 but reduced glucose lowering below eGFR 45; add another glucose-lowering drug if needed
	Diabetic/chronic kidney disease (DKD/CKD)	**Dapagliflozin 10 mg**	eGFR ≥15‡	No lower eGFR limit for continuation. Specialist discussion as dialysis/transplant approaches	Use with other DKD/CKD therapies With or without type 2 diabetes ‡NICE TA775 and SMC2428 advise initiation in people with eGFR 25–75 and T2DM or ACR ≥22.6 mg/mmol
	Symptomatic chronic HFrEF	**Dapagliflozin 10 mg**	eGFR ≥15	No lower eGFR limit for continuation. Specialist discussion as dialysis/transplant approaches	With or without type 2 diabetes
Empagliflozin	**Insufficiently controlled type 2 diabetes**	**Empagliflozin 10 mg** Increase to **25 mg** if required	eGFR ≥60¶ eGFR ≥60	Reduce to 10 mg if eGFR <60 Stop if eGFR <45 (T2D alone) or <30 (T2D+CVD)¶	¶Licensed for initiation to eGFR ≥30 in those with established CVD and can be continued to eGFR 30, but reduced glucose lowering below eGFR 45; add another glucose-lowering drug if needed
	Symptomatic chronic HF	**Empagliflozin 10 mg**	eGFR ≥20	Stop if eGFR <20; should not be used in those with end-stage renal disease or on dialysis	With or without type 2 diabetes
Ertugliflozin	**Insufficiently controlled type 2 diabetes**	**Ertugliflozin 5 mg** Increase to **15 mg** if required	eGFR ≥45 eGFR ≥45	Stop if eGFR persistently <30**	**Licensed for continuation to GFR ≥30 but reduced glucose lowering below eGFR 45; add another glucose-lowering drug if needed

eGFR presented in mL/min/1.73 m².
ACEi=angiotensin-converting enzyme inhibitor; ACR=albumin:creatinine ratio; ARB=angiotensin receptor blocker; CVD=cardiovascular disease; eGFR=estimated glomerular filtration rate; HF=heart failure; HFrEF=heart failure with reduced ejection fraction.

Information correct on 6th July 2022. **Licence amendments frequent – view most recent version.**
Always consult the electronic BNF or the Summaries of Product Characteristics (SPCs) prior to prescribing any drug.
SPCs: Canagliflozin | Dapagliflozin | Empagliflozin | Ertugliflozin

https://diabetesonthenet.com/wp-content/uploads/DPC_24-4_111-112.pdf



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