

For UK-registered HCPs only, Prescribing Information can be found on the final slide.

SGLT2 THERAPY: PUTTING THE EVIDENCE AND GUIDELINES INTO PRACTICE



A. MENARINI
FARMACEUTICA
INTERNAZIONALE SRL

The Committee is supported by an educational grant from A. Menarini Farmaceutica Internazionale SRL.



PP-ENDO-UK-0488 | February 2025

THE IMPROVING DIABETES STEERING COMMITTEE

- The IDSC is a multidisciplinary group of HCPs convened to offer evidence-informed practical guidance for the appropriate use of the SGLT2i class of medicines in people with T2DM.

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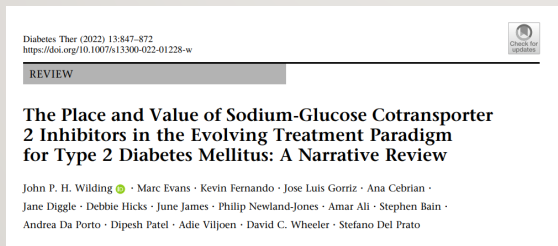
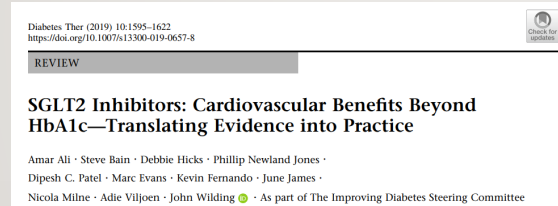
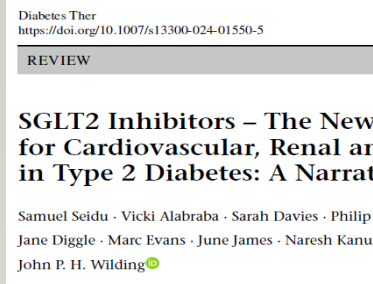
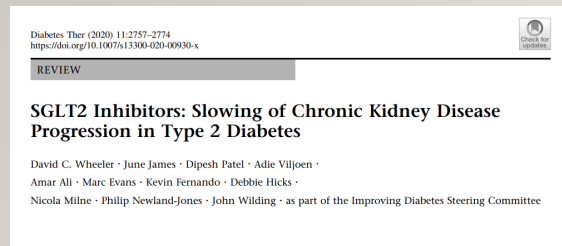
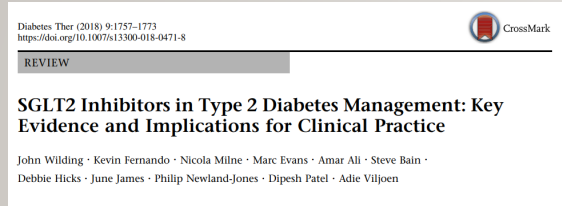
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References:

1. Seidu S, et al. Diabetes Ther. 2024

THE IDSC HAS PUBLISHED 5 NARRATIVE REVIEWS: TRANSLATING EVIDENCE TO CLINICAL PRACTICE



2024 focusing on SGLT2 inhibitors as the new standard of care for cardiovascular, renal and metabolic protection in T2DM and bridging the gap between the evidence, guidelines and clinical practice.

- The IDSC has developed an SGLT2i Decision Tool, to support appropriate guideline-/evidence-led SGLT2i use.

References:

1. Wilding J, et al. Diabetes Ther. 2018;9:1757–73.
2. Ali A, et al. Diabetes Ther. 2019;10:1595–622.
3. Wheeler DC, et al. Diabetes Ther. 2020;11:2757–74.
4. Wilding JPH, et al. Diabetes Ther. 2022;13:847–72.
5. Seidu S, et al. Diabetes Ther. 2024; (April 5) doi: 10.1007/s13300-024-01550-5

How to access the latest IDSC publication and SGLT2i Decision Tool

DECISION TOOL

Prescribing SGLT2i therapy for Type 2 Diabetes Mellitus Management

The SGLT2i Prescribing Tool has been independently prepared by the Improving Diabetes Steering Committee, A. Menarini Farmaceutica Internazionale SRL has fully funded the creation of this non-promotional document

The NICE resource impact report for T2DM in adults suggests that around 1.7 million people with T2DM in England (approximately 50%) are eligible for SGLT2i treatment in accordance with current NICE guidelines [1,2]. However, given the weight of existing evidence and growing expert opinion, the Improving Diabetes Steering Committee estimates that up to 80% of people with T2DM would benefit from SGLT2i treatment, with some caveats that are summarized in this Decision Tool [1-53]. The Decision Tool aims to guide appropriate SGLT2i treatment in people diagnosed with T2DM. Before using this Tool, please determine the QRISK³ score and renal function for the individual you are treating using up-to-date eGFR and UACR values. Please refer to the relevant summary of product characteristics (SmPC) before prescribing any SGLT2i therapy.

Key practice points [1-53]:

- Discuss the relative benefits and risks of SGLT2i therapy with the person you are treating.
- Use dual first-line SGLT2i therapy with metformin (unless contraindicated). Initiate 4 weeks after metformin, post-date the SGLT2i prescription and do not wait for HbA1c assessment at 3 months after metformin initiation.
- Emphasise the importance of ongoing hydration and good personal hygiene.
- Give written information/electronic resources to support advice on the management of T2DM medicines during periods of acute or dehydrating illness.
- If symptomatic of hyperglycaemia, start rescue therapy and then reassess initiation of SGLT2i when symptoms resolved.
- For planned surgery or procedures requiring nil by mouth, advise on the importance of pausing SGLT2i treatment 3-7 days prior to surgery or liaise with pre-operative team.
- Discussion with an expert clinician is advisable for more complex cases.

Initial assessment

- Go to QRISK³ calculator
- Go to QRISK³ lifetime calculator
- Kidney function (eGFR and UACR)

Consider SGLT2i therapy

Offer SGLT2i therapy

Do not prescribe SGLT2i therapy

IMPORTANT – this decision tool is for guidance only. The final clinical decisions are the responsibility of the prescriber.

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ADA, American Diabetes Association; ARBs, angiotensin receptor blockers; ASCVD, atherosclerotic cardiovascular disease; AUC, area under the curve; BMI, body mass index; CKD, chronic kidney disease; C_{max}, maximum serum drug concentration; CV, cardiovascular; CVD, cardiovascular disease; CVD, cardiovascular outcomes trial; DKA, diabetic ketoacidosis; DKD, diabetic kidney disease; EASD, European Association for the Study of Diabetes; eGFR, estimated glomerular filtration rate; ESKD, end-stage kidney disease; GLP-1 RA, glucagon-like peptide-1 receptor agonist; HbA1c, glycated haemoglobin A1c; HCP, healthcare professional; HF, heart failure; HFREF, heart failure with ejection fraction; HHF, hospitalisation for heart failure; HHS, hyperosmolar hyperglycaemic state; LADA, latent autoimmune diabetes in adult; MACE, major adverse cardiac event; MDT, multidisciplinary team; MHRA, Medicines and Healthcare products Regulatory Agency; NSAID, non-steroidal anti-inflammatory drug; QRISK, cardiovascular risk score; RAAS, renin-angiotensin-aldosterone system; SGLT2, sodium glucose cotransporter-2 inhibitor; SmPC, summary of product characteristics; SU, sulphonylurea; T2DM, Type 2 diabetes mellitus; UACR, urine albumin to creatinine ratio; UKA, UK Kidney Association; UTIs, urinary tract infections.

- The publication and SGLT2i Decision Tool is open access and available to download from [Volumes and issues | Diabetes Therapy \(springer.com\)](#)

A. MENARINI FARMACEUTICA INTERNAZIONALE SRL

Access the publication, wallchart & the interactive tool by scanning the QR code

You can request the printed wallchart from Menarini at diabetes@menariniuk.com

SGLT2i PRESCRIBING DECISION TOOL FOR TYPE 2 DIABETES

ABBREVIATED VERSION

IMPROVING DIABETES STEERING COMMITTEE

Key practice points [1-53]:

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- Use dual first-line SGLT2i therapy with metformin (unless contraindicated). Initiate 4 weeks after metformin, post-date the SGLT2i prescription and do not wait for HbA1c assessment at 3 months after metformin initiation.
- Emphasise the importance of ongoing hydration and good personal hygiene.
- Give written information/electronic resources to support advice on the management of T2DM medicines during periods of acute or dehydrating illness.
- If symptomatic of hyperglycaemia, start rescue therapy and then reassess initiation of SGLT2i when symptoms resolved.
- For planned surgery or procedures requiring nil by mouth, advise on the importance of pausing SGLT2i treatment 3-7 days prior to surgery or liaise with pre-operative team.
- Please refer to the relevant SmPC before prescribing any SGLT2i therapy.
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Initial assessment

- QRISK³ calculator
- QRISK³ lifetime calculator
- Kidney function (eGFR and UACR)

Consider SGLT2i therapy

Offer SGLT2i therapy

Do not prescribe SGLT2i therapy

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Abbreviations: ASCVD, atherosclerotic cardiovascular disease; BMI, body mass index; CKD, chronic kidney disease; CVD, cardiovascular disease; DKA, diabetic ketoacidosis; DKD, diabetic kidney disease; EASD, European Association for the Study of Diabetes; eGFR, estimated glomerular filtration rate; ESKD, end-stage kidney disease; GLP-1 RA, glucagon-like peptide-1 receptor agonist; HbA1c, glycated haemoglobin A1c; HCP, healthcare professional; HF, heart failure; HFREF, heart failure with ejection fraction; HHF, hospitalisation for heart failure; HHS, hyperosmolar hyperglycaemic state; LADA, latent autoimmune diabetes in adult; MACE, major adverse cardiac event; MDT, multidisciplinary team; MHRA, Medicines and Healthcare products Regulatory Agency; NSAID, non-steroidal anti-inflammatory drug; QRISK, cardiovascular risk score; RAAS, renin-angiotensin-aldosterone system; SGLT2, sodium glucose cotransporter-2 inhibitor; SmPC, summary of product characteristics; SU, sulphonylurea; T2DM, Type 2 diabetes mellitus; UACR, urine albumin to creatinine ratio; UKA, UK Kidney Association; UTIs, urinary tract infections.

IMPROVING DIABETES STEERING COMMITTEE

Prescribing information and adverse events reporting information can be found at the bottom of this page. This website has been developed, prepared and funded by A. Menarini Farmaceutica Internazionale SRL. The committee is supported by an educational grant from A. Menarini Farmaceutica Internazionale SRL. The results generated by the steering committee are shared and published on the website. The website has been developed by the steering committee.

Bridging the gap between type 2 diabetes guidelines and prescribing practices

The Improving Diabetes Steering Committee (IDSC) – a multidisciplinary group of experts across primary and secondary care – aims to support healthcare professionals by creating useful tools and resources that are evidence-based, balanced and practical.

This tool collates these tools so that you can enhance your knowledge of the current type 2 diabetes guidelines, bolster your confidence in making prescribing decisions and optimise the care of your patients living with type 2 diabetes.

Ensure of when to use an SGLT2 inhibitor?

Educational videos

SGLT2 inhibitors & CVRM – a new narrative review

References:
1. Seidu S, et al. Diabetes Ther. 2024; .

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The SGLT2i Decision Tool has been independently prepared by the IDSC.

IMPROVING DIABETES STEERING COMMITTEE
PP-ENDO-UK-0488 | February 2025

SGLT2i therapy: putting the evidence and guidelines into practice



[View case study](#)

High CV/renal risk and normal/target HbA1c in a young person with T2DM (aged <40 years)



[View case study](#)

Elevated HbA1c (additional HbA1c-lowering required, initial rescue therapy)



[View case study](#)

Chronic kidney disease (slowing progression of CKD)



[View case study](#)

Diabetic polyneuropathy/diabetic foot disease



[View case study](#)

Electrolyte/diuretic sparing with SGLT2i therapy

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Gemma

Gender: Female

Age: 34 years

Ethnicity: White, Caucasian

Family: Married with a son (aged 7 years) and a daughter (aged 5 years)

Employment status: Teaching Assistant

Key diagnostics and risk factors:

Height: 168 cm

Weight: 80.5 kg

BMI: 30.3 kg/m²

Blood pressure: 112/77 mmHg

eGFR: 92 ml/min/1.73 m²

uACR: 2.1 mg/mmol

Smoker (20 cigarettes/day)

Current HbA1c: 54 mmol/mol

HbA1c at diagnosis: 64 mmol/mol

Total cholesterol: 7.1 mmol/L

Non-HDL-C: 6.0 mmol/L

HDL-C: 1.1 mmol/L

LDL-C: 4.8 mmol/L

Triglycerides: 2.6 mmol/L



Case
study
overview



Case notes

Treatment aims
& considerations



SGLT2i initiation



Key practice
points



Follow up



Links to
SGLT2i
Decision
Tool

Abbreviations
and references



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homepage

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High CV/renal risk and normal/target HbA1c in a young person with T2DM (aged <40 years)

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Case study overview



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Links to SGLT2i Decision Tool

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Clinical case notes at presentation:

- Gemma had gestational diabetes during her second pregnancy, although no diabetes follow-up was conducted after her daughter's birth
- Blood tests revealed a diagnosis of T2DM 3 years ago, when she presented with fatigue
- Gemma's current HbA1c (54 mmol/mol) remains high, despite being reduced compared with that of her last review (64 mmol/mol)
- Lifestyle advice was given at diagnosis, alongside a referral to a structured education programme. Gemma was unable to attend the programme, due to family and work commitments, and did not engage with digital education offerings
- **Current medications: metformin 1 g bd (well tolerated) and fluoxetine 20 mg**
- Some lifestyle changes (e.g. diet) have helped to reduce Gemma's HbA1c and she has tried to cut down on smoking

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Aims of T2DM treatment:

- Early intensive management due to Gemma's young age and high CV lifetime risk
- Although Gemma's HbA1c has improved since diagnosis, treatment must consider her future health and aim to offer long-term CVRM protection
- Address raised cholesterol (prescribe statin and optimise dose during follow-up). Highlight warnings regarding statins and pregnancy and discuss potential referral to the lipid clinic

Considerations/drivers for SGLT2i use:

- Gemma has an elevated CV risk due to her raised lipid levels, smoking status and BMI
- [NICE NG28](#) guidance recommends SGLT2i therapy for appropriate individuals aged <40 years with elevated CV risk to offer CVRM protection
- An SGLT2i is unlikely to cause weight gain and may promote weight loss. An SGLT2i also has a low hypoglycaemia risk
- NICE NG28 and local formularies would favour SGLT2i therapy before an GLP-I RA (injectable)
- SGLT2i therapy represents a cost-effective approach, due to avoidance of CVRM complications

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11):2753-86.
4. NICE. Resource impact report. 2022.
5. NICE. NG238 guideline. 2023.

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SGLT2i therapy initiation – key practice points:

- The [QRISK®3-Lifetime](#) calculator would usually be used for to evaluate CV risk in people with T2DM aged <40 years. However, in line with current [NICE NG28](#) guidance, SGLT2i therapy should be considered for Gemma (without the need for QRISK®3-Lifetime evaluation) due to her raised lipid levels, smoking status and BMI
- Despite availability of the QRISK®3-Lifetime calculator, current assessment tools may underestimate CV risk in people with early onset T2DM because they tend to have greater cardiometabolic risk, compared with onset at an older age
- Provide advice regarding the potential benefits of SGLT2is in terms of CVRM protection
- Discuss the potential benefits of additional glucose lowering and weight loss with SGLT2i therapy
- Highlight cautions regarding pregnancy with SGLT2i therapy and the importance of reliable contraception
- Provide sick day advice and discuss relative risk of DKA
- Discuss the importance of good personal hygiene and the risk and management of potential genital infections

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753-86.

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Clinical case notes at 3-month follow-up:

- Gemma has tolerated her new SGLT2i therapy well and has lost some weight (2.5 kg)
- She has read a magazine article about the benefits of ketogenic diets in T2DM and is keen to try this approach

Key practice points at follow-up:

- Discuss the risks associated with ketogenic/very low carbohydrate diets and SGLT2i therapy
- At each follow up appointment, highlight cautions regarding pregnancy with SGLT2i therapy and the importance of reliable contraception

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11):2753–86.
4. Diggle J. Diabetes & Primary Care. 2020;22:49–50.

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Relevant clinical summaries from the SGLT2i Decision Tool:

BOX A: NICE and ADA / EASD recommendations for SGLT2i prescribing

BOX B: Sick day guidance

BOX I: T2DM in younger people (aged 18–40 years)

BOX D: Diabetic ketoacidosis

BOX E: Diets and eating disorders



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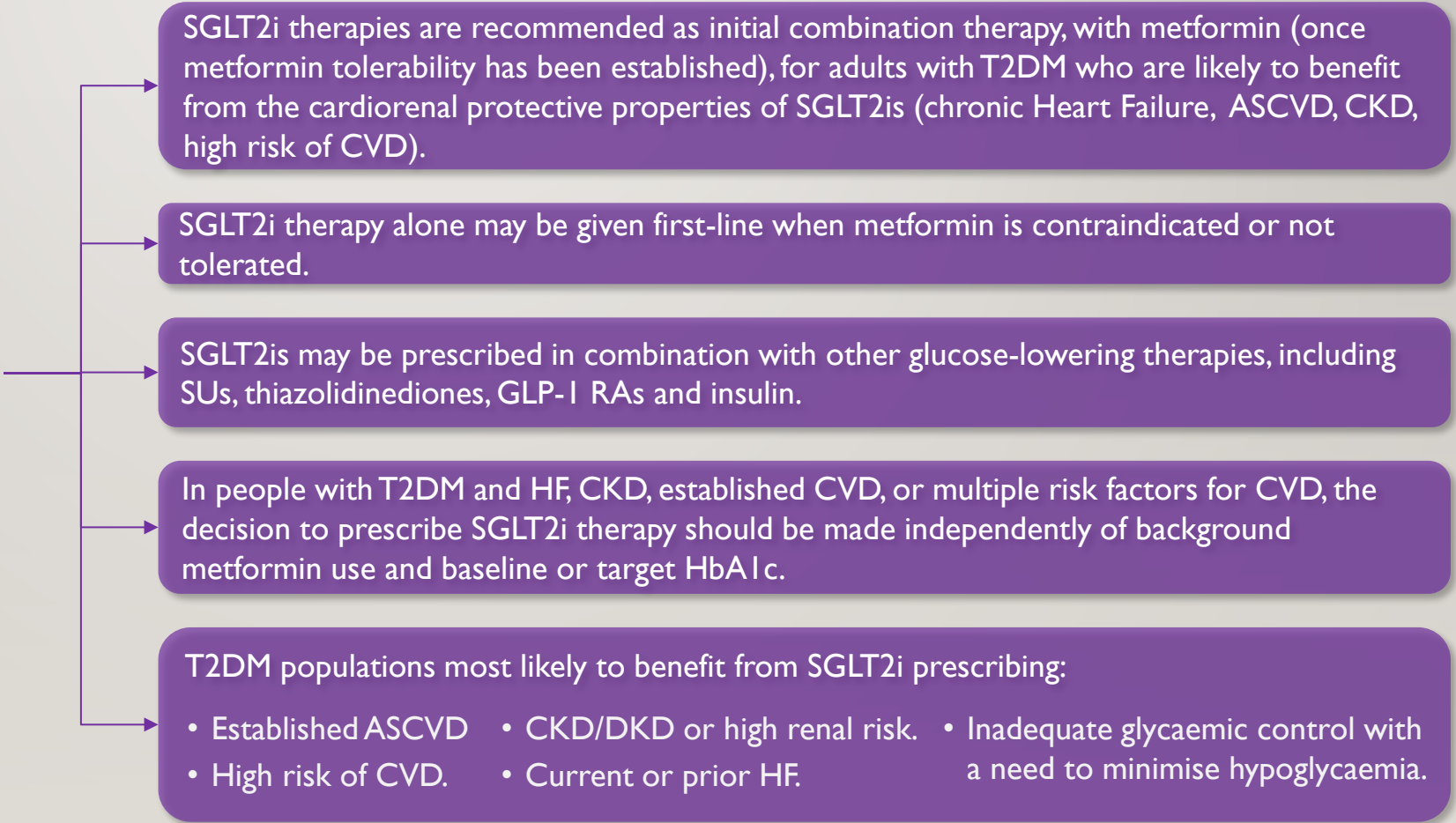
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BOX A: NICE AND EASD/ADA RECOMMENDATIONS FOR SGLT2I PRESCRIBING



For an overview of the NICE NG28 guidelines for the management of Type 2 diabetes in adults and the ADA/EASD consensus report on the management of hyperglycaemia in Type 2 diabetes click [here](#).

Key points are highlighted here:



References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753-86.

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BOX B: SICK DAY GUIDANCE



Sick day guidance should be followed when a person with diabetes has an acute dehydrating illness or is unable to eat and/or drink normally.

The guidance is intended for people taking oral T2DM therapies with or without insulin, with the aim of reducing the risk of DKA and glucose fluctuation during periods of illness.

Advice should be given on what constitutes a ‘sick day’, with clear explanation of when and why specific medications must be paused.

Access to glucose and ketone monitoring should be offered to individuals where this is deemed clinically necessary.

If DKA is suspected, refer to [Box D](#). Guidance should include the following:

Offer the person advice on sick day guidance when initiating SGLT2is and remind them of this at every medication review. Patient information leaflets should be provided to support advice.

Those with access to a glucose self-monitoring device (typically those on insulin or an SU) should check their glucose levels more frequently during periods of acute illness. Medical assistance must be sought if levels are persistently high or low.

The following medications should be temporarily stopped if the person is unable to eat and drink normally and is at risk of dehydration or vomiting: SGLT2is, ACEis, diuretics*, metformin, ARBs and NSAIDs (the [SADMAN](#) mnemonic may be a helpful reminder).

The person should maintain normal hydration and food, where possible. If this is not possible, oral fluids should be encouraged (≥ 100 mL/hour). Recommend sugar-free fluids if glucose levels are high or sugary fluids when glucose levels are low.

Once eating and drinking normally and vomiting has ceased, or the individual is feeling better, oral medications (including SGLT2i therapy) can be restarted.

***Decisions regarding the pausing of diuretics for HF should be based on current fluid status, as assessed by an HCP.**

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Down S.. Diabetes Prim Care. 2020;22:47–8.

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BOX I: T2DM IN YOUNGER PEOPLE (AGED 18–40 YEARS)



Prevalence of T2DM in younger people has increased over recent decades. Evidence suggests that younger people with T2DM have high lifetime CVD risk.

Diabetes-related complications appear early and progress rapidly in this group. Intensive treatment should therefore be implemented from an early stage in the therapeutic pathway.

NICE NG28 guidance recommends SGLT2i therapy for people with T2DM under the age of 40 years with ≥ 1 CV risk factor, comprising hypertension, dyslipidaemia, smoking, obesity, and family history (first-degree relative) of premature CVD.

- Initiate SGLT2i therapy with first-line therapies [Box A] and provide advice regarding contraception for women of childbearing age. SGLT2is are not licensed for use during pregnancy and should only be given if contraception is being used.
- Education should be given regarding reduction in CV risk through lifestyle factors (e.g. diet, exercise).
- The QRISK[®]2 tool is only designed for use with people aged above 40 years and uses a 10-year risk calculation instead of lifetime risk. SGLT2i treatment should not be stopped when a person reaches 40 years of age as they will continue to benefit from the protection offered by this therapeutic class of agent regarding CV, renal and metabolic complications of T2DM.
- The QRISK[®]3 tool can be used in people aged >25 years. The QRISK[®]3-Lifetime tool may be more appropriate for assessment of people aged 18–40 years.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
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BOX D: DIABETIC KETOACIDOSIS



DKA is a rare but serious complication that can occur in people treated with SGLT2is.

Clinicians should be aware of the signs of DKA and the people who may be at greatest risk. SGLT2i therapies reduce insulin secretion and shift energy metabolism toward lipid oxidation, which can cause DKA during intercurrent illness as stress hormones increase insulin resistance and reduced oral intake can lead to starvation ketosis or increased ketone concentration (due to dehydration).

Ketoacidosis occurring during SGLT2i use may be atypical and associated with euglycaemia (relatively normal glucose levels). Key resources on DKA can be found at: [DUK](#), [EDEN](#), [Trend Diabetes](#) and [Diggle J, 2020](#)

Risk factors for DKA include:

- Low beta-cell function (e.g. those with T2DM and low C-peptide levels, LADA/slowly evolving immune-related diabetes or a history of pancreatitis). Ensure correct diagnosis of T2DM before initiating SGLT2i treatment.
- Restricted food intake (very low calorie or very low carbohydrate diet) or severe dehydration [see [Box E](#) for advice on intermittent fasting].
- Sudden reduction in insulin.
- Increased insulin requirements due to rising glucose levels (e.g. during acute illness).
- Surgery or surgical procedure that requires fasting.
- Alcohol abuse.
- Corticosteroid use.

Signs of DKA include abdominal pain, nausea, vomiting, shortness of breath (Kussmaul breathing), drowsiness, confusion and sweet smelling (pear-drop) breath.

- Provide clear verbal and written sick day guidance [[Box B](#)].
- Explain the signs and symptoms of DKA and the need to temporarily pause SGLT2is and seek immediate medical advice if symptoms develop.

If DKA develops while taking an SGLT2i, the agent should be stopped. The decision to restart where a clear contributing factor has been identified should be taken in discussion with the individual and clinical team to establish whether the benefits of reintroducing an SGLT2i outweigh the risks.

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11):2753–86.
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BOX E: DIETS AND EATING DISORDERS



Conditions leading to restricted food intake or severe dehydration may predispose SGLT2i users to DKA [[Box D](#)].

- Low carbohydrate, very low calorie and ketogenic diets are not recommended for SGLT2i recipients due to an increased risk of DKA.
- SGLT2i therapy is not recommended for people living with T2DM and a comorbid eating disorder (e.g. anorexia nervosa, diabulimia).
- Individuals with T2DM who follow an intermittent fasting diet (e.g. 5:2 diet) require a diabetes therapy review, with some treatments (including SGLT2is) being reduced in dosage or suspended on fasting days.
- For advice on SGLT2i use during Ramadan, refer to the [IDF-DAR guidelines](#) and/or the [SAHF guidelines](#).
- SGLT2i users should receive information relating to the risk of DKA [[Box D](#)] and sick day advice [[Box B](#)].

Urgent medical attention must be sought if a person receiving SGLT2i therapy is unwell and tests positive for ketones.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
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ABBREVIATIONS

ACEi, angiotensin-converting enzyme inhibitor	LADA, latent autoimmune diabetes in adult
ADA, American Diabetes Association	LDL-C, low-density lipoprotein cholesterol
ARB, angiotensin receptor blocker	LVEF, left ventricular ejection fraction
ASCVD, atherosclerotic cardiovascular disease	MACE, major adverse cardiac event
ALT, alanine transaminase	MDT, multidisciplinary team
BMI, body mass index	MHRA, Medicines and Healthcare products Regulatory Agency
BNP, B-type natriuretic peptide	NICE, National Institute for Health and Care Excellence
CKD, chronic kidney disease	RCT, randomised controlled trial
CV, cardiovascular	QRISK, cardiovascular risk score
CVD, cardiovascular disease	SAFH, South Asian Health Foundation
CVOT, cardiovascular outcomes trial	SGLT2i, sodium glucose cotransporter-2 inhibitor
CVRM, cardiovascular renal and metabolic	SMBG, self-monitoring of blood glucose
DKA, diabetic ketoacidosis	SmPC, summary of product characteristics
DKD, diabetic kidney disease	SU, sulphonylurea
EASD, European Society for the Study of Diabetes	T2DM, Type 2 diabetes mellitus
ECG, electrocardiogram	uACR, urine albumin to creatinine ratio
eGFR, estimated glomerular filtration rate	UKKA, United Kingdom Kidney Association
GLP-1 RA, glucagon-like peptide-1 receptor agonist	UTI, urinary tract infection
HCP, healthcare professional	
HDL-C, high-density lipoprotein cholesterol	
HF, heart failure	
HFrEF, heart failure with reduced ejection fraction	
IDF-DAR, International Diabetes Federation – Diabetes and Ramadan	
IDSC, Improving Diabetes Steering Committee	
KDIGO; Kidney Disease: Improving Global Outcomes	

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Yogesh

Elevated HbA1c (additional HbA1c-lowering required, initial rescue therapy)



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Elevated HbA1c (additional HbA1c lowering required, initial rescue therapy)

Yogesh

Gender: Male

Age: 58 years

Ethnicity: South Asian

Family: Married with adult children

Employment status: Pharmaceutical Salesperson



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Clinical case notes at presentation:

- Yogesh was diagnosed with T2DM 7 years ago and has background retinopathy and hypertension
- His father also has T2DM and experienced a myocardial infarction at the age of 58 years
- Yogesh's BMI (28.1 kg/m²) places him in the obesity category according to relevant BMI adjustment thresholds for ethnicity
- **Current medications: metformin 1 g bd, ramipril 5 mg od, atorvastatin 40 mg od**
- He has noticed that his levels have been high (16–19 mmol/L) when conducting self-monitoring of blood glucose (SMBG)
- Today, he presents with raised HbA1c (90 mmol/mol) and symptoms of polyuria, polydipsia, balanitis, and thrush

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Aims of T2DM treatment:

- Reduce Yogesh's deteriorating HbA1c (rescue therapy), address his accompanying symptoms and promote weight loss

Key practice points:

- Initiate rescue therapy, comprising **gliclazide 40 mg bd** (titrate according to glucose profile)
- Review ACEi/ARB therapy in line with guidelines and titrate to maximum dose with kidney protection in mind
- Initiate finerenone and follow-up on elevated uACR in 12 months' time
- SGLT2i therapy would not be the first-choice treatment at this stage due to osmotic symptoms and level of hyperglycaemia
- Discuss treatment options for current thrush issues and make recommendations around future prevention and management (e.g. stringent personal hygiene, topical creams)
- Arrange regular follow-up (telephone call) every 2 weeks until glucose is stable and reassess HbA1c at 3 months. Gliclazide dose adjustment may be required if SGLT2i therapy is initiated later in the treatment pathway
- Consider whether Yogesh may benefit from the addition of GLP-1 RA with evidence of cardiorenal protection

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. NICE. CKS. Diabetes – type 2: Finerenone. 2024
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IMPROVING DIABETES
STEERING COMMITTEE

February 2025 | PP-ENDO-UK-0488



Elevated HbA1c (additional HbA1c lowering required, initial rescue therapy)

Yogesh

Gender: Male

Age: 58 years

Ethnicity: South Asian

Family: Married with adult children

Employment status: Pharmaceutical Salesperson

Key tests, diagnostics and risk factors:

BMI: 27 kg/m²

Total cholesterol: 4.2 mmol/L

Non-HDL-C: 2.9 mmol/L

LDL-C: 1.9 mmol/L

HDL-C: 1.3 mmol/L

HbA1c: 60 mmol/mol

eGFR: 58 ml/min/1.73 m²

uACR: 8.02 mg/mmol

Potassium: 3.8 mmol/L



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Clinical case notes at follow-up:

- Yogesh has tolerated gliclazide well but experienced symptoms of hypoglycaemia (confirmed with recorded SMBG levels <4 mmol/L)
- His QRISK[®]3 score remains high
- Statin use should be reviewed

Aims of T2DM treatment:

- Avoidance of hypoglycaemia (Yogesh's job as a salesperson requires him to drive long distances each day)
- Improve and maintain HbA1c
- Slow progression of existing CVRM complications (elevated uACR and high CV risk) and provide cardiorenal protection
- Promote weight loss

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Considerations/drivers for SGLT2i use:

- Potential benefits of CVRM protection (albuminuria) and the need to minimise the risk of hypoglycaemia
- Promotion of weight loss and potential beneficial effect on blood pressure

SGLT2i therapy initiation – key practice points:

- De-escalate gliclazide, based on capillary blood glucose readings
- Add SGLT2i therapy and explain the potential benefits in terms of CVRM protection and lower risk of hypoglycaemia
- Provide sick day guidance and discuss the relative risk of DKA
- Discuss the importance of good personal hygiene and advise on the risk and management of potential genital infections
- Advise on diuretic effect and the need for adequate hydration
- Provide diet and lifestyle advice to support weight loss

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Elevated HbA1c (additional HbA1c lowering required, initial rescue therapy)

Yogesh

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Relevant clinical summaries from the SGLT2i Decision Tool:

BOX K: High glucose levels despite oral diabetes medication

BOX F: Genital and urinary infections

BOX A: NICE and ADA / EASD recommendations for SGLT2i prescribing

BOX B: Sick day guidance

BOX D: Diabetic ketoacidosis



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BOX K: HIGH GLUCOSE LEVELS DESPITE ORAL DIABETES MEDICATION

While there is no evidence-based consensus regarding the upper HbA1c threshold for SGLT2i initiation (or to signal the pausing/stopping of use), high HbA1c due to low beta-cell function increases the risk of DKA [[Box D](#)].

Consider the reliability of the test. Any condition that affects the lifespan of the red blood cell will affect HbA1c.

Consider red flags for pancreatic malignancy.

Is the T2DM diagnosis correct/secure? Consider LADA/slowly evolving immune-related diabetes or significant decline in beta-cell function and insulin deficiency.

Check adherence to the current treatment regimen (and lifestyle changes).

Is there a possibility of DKA or hyperosmolar hyperglycaemic state?

Are new medications raising glucose levels (e.g. steroids, antipsychotics)?

Have any recent or current infections or comorbidities potentially contributed to raised glucose?

If a person has a high HbA1c and is osmotically symptomatic, rescue therapy (see [NICE NG28](#)) may be appropriate initially, with reassessment for SGLT2i treatment at a later date.

BOX F: GENITAL AND URINARY INFECTIONS



SGLT2i therapy may be associated with an increased risk of genital mycotic infections (vulvovaginitis and balanitis) and, less commonly, UTIs.

Infections are more common in women than men and usually occur early in treatment but generally respond well to standard topical or oral medications and most people can continue taking their SGLT2i therapy.

Glycosuria may cause urinary symptoms, including more frequent voiding.

Treat mycotic genital infections with antifungal medications and UTIs with standard antibiotics. Patient information is available via [Trend Diabetes](#).

The risk of infections is reduced by maintaining good genital hygiene. Advise SGLT2i users on genital health and hydration.

Fournier’s Gangrene is a very rare but serious soft tissue infection of the genital area. Risk factors include diabetes, local trauma, male gender, obesity, older age, immunosuppression, HIV infection, end-stage renal or liver failure, smoking and alcohol abuse. Until 2019, 6 yellow card reports of Fournier’s Gangrene had been received by the UK MHRA for an estimated exposure to SGLT2i treatment of 548,565 patient-years

Urgent medical attention should be sought if a person receiving SGLT2i therapy experiences severe pain, tenderness, worsening redness or widespread swelling in the genital or perineal area.

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BOX A: NICE AND EASD/ADA RECOMMENDATIONS FOR SGLT2I PRESCRIBING



For an overview of the NICE NG28 guidelines for the management of Type 2 diabetes in adults and the ADA/EASD consensus report on the management of hyperglycaemia in Type 2 diabetes click [here](#).

Key points are highlighted here:

- SGLT2i therapies are recommended as initial combination therapy, with metformin (once metformin tolerability has been established), for adults with T2DM who are likely to benefit from the cardiorenal protective properties of SGLT2is (chronic Heart Failure, ASCVD, CKD, high risk of CVD).
- SGLT2i therapy alone may be given first-line when metformin is contraindicated or not tolerated.
- SGLT2is may be prescribed in combination with other glucose-lowering therapies, including SUs, thiazolidinediones, GLP-1 RAs and insulin.
- In people with T2DM and HF, CKD, established CVD, or multiple risk factors for CVD, the decision to prescribe SGLT2i therapy should be made independently of background metformin use and baseline or target HbA1c.
- T2DM populations most likely to benefit from SGLT2i prescribing:
 - Established ASCVD
 - CKD/DKD or high renal risk.
 - Inadequate glycaemic control with a need to minimise hypoglycaemia.
 - High risk of CVD.
 - Current or prior HF.

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1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
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BOX B: SICK DAY GUIDANCE



Sick day guidance should be followed when a person with diabetes has an acute dehydrating illness or is unable to eat and/or drink normally.

The guidance is intended for people taking oral T2DM therapies with or without insulin, with the aim of reducing the risk of DKA and glucose fluctuation during periods of illness.

Advice should be given on what constitutes a ‘sick day’, with clear explanation of when and why specific medications must be paused.

Access to glucose and ketone monitoring should be offered to individuals where this is deemed clinically necessary.

If DKA is suspected, refer to [Box D](#). Guidance should include the following:

Offer the person advice on sick day guidance when initiating SGLT2is and remind them of this at every medication review. Patient information leaflets should be provided to support advice.

Those with access to a glucose self-monitoring device (typically those on insulin or an SU) should check their glucose levels more frequently during periods of acute illness. Medical assistance must be sought if levels are persistently high or low.

The following medications should be temporarily stopped if the person is unable to eat and drink normally and is at risk of dehydration or vomiting: SGLT2is, ACEis, diuretics*, metformin, ARBs and NSAIDs (the [SADMAN](#) mnemonic may be a helpful reminder).

The person should maintain normal hydration and food, where possible. If this is not possible, oral fluids should be encouraged (≥ 100 mL/hour). Recommend sugar-free fluids if glucose levels are high or sugary fluids when glucose levels are low.

Once eating and drinking normally and vomiting has ceased, or the individual is feeling better, oral medications (including SGLT2i therapy) can be restarted.

***Decisions regarding the pausing of diuretics for HF should be based on current fluid status, as assessed by an HCP.**

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BOX D: DIABETIC KETOACIDOSIS

DKA is a rare but serious complication that can occur in people treated with SGLT2is.

Clinicians should be aware of the signs of DKA and the people who may be at greatest risk. SGLT2i therapies reduce insulin secretion and shift energy metabolism toward lipid oxidation, which can cause DKA during intercurrent illness as stress hormones increase insulin resistance and reduced oral intake can lead to starvation ketosis or increased ketone concentration (due to dehydration).

Ketoacidosis occurring during SGLT2i use may be atypical and associated with euglycaemia (relatively normal glucose levels). Key resources on DKA can be found at: [DUK](#), [EDEN](#), [Trend Diabetes](#) and [Diggle J, 2020](#)

Risk factors for DKA include:

- Low beta-cell function (e.g. those with T2DM and low C-peptide levels, LADA/slowly evolving immune-related diabetes or a history of pancreatitis). Ensure correct diagnosis of T2DM before initiating SGLT2i treatment.
- Restricted food intake (very low calorie or very low carbohydrate diet) or severe dehydration [see [Box E](#) for advice on intermittent fasting].
- Sudden reduction in insulin.
- Increased insulin requirements due to rising glucose levels (e.g. during acute illness).
- Surgery or surgical procedure that requires fasting.
- Alcohol abuse.
- Corticosteroid use.

Signs of DKA include abdominal pain, nausea, vomiting, shortness of breath (Kussmaul breathing), drowsiness, confusion and sweet smelling (pear-drop) breath.

- Provide clear verbal and written sick day guidance [[Box B](#)].
- Explain the signs and symptoms of DKA and the need to temporarily pause SGLT2is and seek immediate medical advice if symptoms develop.

If DKA develops while taking an SGLT2i, the agent should be stopped. The decision to restart where a clear contributing factor has been identified should be taken in discussion with the individual and clinical team to establish whether the benefits of reintroducing an SGLT2i outweigh the risks.

BOX E: DIETS AND EATING DISORDERS



Conditions leading to restricted food intake or severe dehydration may predispose SGLT2i users to DKA [[Box D](#)].

- Low carbohydrate, very low calorie and ketogenic diets are not recommended for SGLT2i recipients due to an increased risk of DKA.
- SGLT2i therapy is not recommended for people living with T2DM and a comorbid eating disorder (e.g. anorexia nervosa, diabulimia).
- Individuals with T2DM who follow an intermittent fasting diet (e.g. 5:2 diet) require a diabetes therapy review, with some treatments (including SGLT2is) being reduced in dosage or suspended on fasting days.
- For advice on SGLT2i use during Ramadan, refer to the [IDF-DAR guidelines](#) and/or the [SAHF guidelines](#).
- SGLT2i users should receive information relating to the risk of DKA [[Box D](#)] and sick day advice [[Box B](#)].

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BMI, body mass index	MHRA, Medicines and Healthcare products Regulatory Agency
BNP, B-type natriuretic peptide	NICE, National Institute for Health and Care Excellence
CKD, chronic kidney disease	RCT, randomised controlled trial
CV, cardiovascular	QRISK, cardiovascular risk score
CVD, cardiovascular disease	SAFH, South Asian Health Foundation
CVOT, cardiovascular outcomes trial	SGLT2i, sodium glucose cotransporter-2 inhibitor
CVRM, cardiovascular renal and metabolic	SMBG, self-monitoring of blood glucose
DKA, diabetic ketoacidosis	SmPC, summary of product characteristics
DKD, diabetic kidney disease	SU, sulphonylurea
EASD, European Society for the Study of Diabetes	T2DM, Type 2 diabetes mellitus
ECG, electrocardiogram	uACR, urine albumin to creatinine ratio
eGFR, estimated glomerular filtration rate	UKKA, United Kingdom Kidney Association
GLP-1 RA, glucagon-like peptide-1 receptor agonist	UTI, urinary tract infection
HCP, healthcare professional	
HDL-C, high-density lipoprotein cholesterol	
HF, heart failure	
HFrEF, heart failure with reduced ejection fraction	
IDF-DAR, International Diabetes Federation – Diabetes and Ramadan	
IDSC, Improving Diabetes Steering Committee	
KDIGO; Kidney Disease: Improving Global Outcomes	

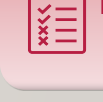
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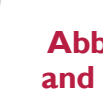
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Ashad

Gender: Male

Age: 54 years

Ethnicity: South Asian

Family: Married with adult children

Employment status:
Machine Operator in a biscuit factory

Key diagnostics and risk factors:

Height: 175.3 cm

Weight: 88.7 kg

BMI: 28.9 kg/m²

HbA1c: 59 mmol/mol

eGFR: 53 ml/min/1.73 m²

uACR: 12 mg/mmol

Blood pressure: 140/80 mmHg

Total cholesterol: 3.9 mmol/L

Non-HDL-C: 2.9 mmol/L

LDL-C: 2.3 mmol/L

HDL-C: 1.0 mmol/L

Triglycerides: 1.2 mmol/L

Potassium: 4.2 mmol/L

Physical activity level: low



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Chronic kidney disease (slowing progression of CKD)

Ashad

Gender: Male

Age: 54 years

Ethnicity: South Asian

Family: Married with adult children

Employment status: Machine Operator in a biscuit factory



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Clinical case notes:

- Ashad attends for his annual primary care T2DM review. He was diagnosed with T2DM 12 years ago
- He does not drink alcohol and has a vegetarian, high carbohydrate diet. His wife cooks at home
- Ashad's father had T2DM and died of a heart attack at the age of 62 years. Ashad is worried about his own heart attack risk and is fearful of injections as his father used insulin before he died
- Ashad's BMI (28.9 kg/m²) places him in the obesity category according to relevant BMI adjustment thresholds for ethnicity
- **Current medications: atorvastatin 40 mg od, metformin 1 g bd, gliclazide 160 mg bd, and irbesartan 150mg od**
- Ashad's HbA1c at review last year was 55 mmol/mol
- eGFR at review 2 years ago was 85 ml/min/1.73 m² (uACR was not done)
- Other relevant comorbidities/complications: raised ALT 65 U/L (likely fatty liver disease)
- A dipstick test shows that there is no blood in the urine

References:
1. NICE CG189. 2023

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Chronic kidney disease (slowing progression of CKD)

Ashad

Gender: Male

Age: 54 years

Ethnicity: South Asian

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Aims of T2DM treatment:

- Lower HbA1c, promote weight loss and improve blood pressure
- Reduce progression of CKD and the risk of CVD (antihypertensive medications should also be reviewed)

Considerations/drivers for SGLT2i use:

- Rate of eGFR decline (>5 ml/min/1.73 m² per year) is an important flag for CKD progression and likelihood of nephropathy
- NICE, KDIGO and UKKA guidelines recommend SGLT2is for people living with T2DM and CKD, based on their proven benefit in slowing/preventing kidney disease progression
- Consider any potential risk of hypoglycaemia as Ashad is already taking gliclazide

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2. NICE NG203 guideline. 2021
3. NICE. NG28 guideline. 2022.
4. KDIGO Kidney Int. 2022;102:S1–127.
5. UKKA. 2021.



Chronic kidney disease (slowing progression of CKD)

Ashad

Gender: Male

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SGLT2i therapy initiation – key practice points:

- Explain the benefits of SGLT2i therapy in terms of slowing/preventing kidney disease progression
- Discuss sick day guidance and relative risk of DKA
- Discuss the importance of good personal hygiene and advise on the risk and management of potential genital infections
- No post-treatment eGFR check required (a reversible reduction in eGFR of up to 30% may occur when initiating therapy). However, eGFR and uACR should be checked at 3 months to confirm CKD diagnosis
- Review gliclazide dose and counsel on increasing the frequency of self-monitoring of blood glucose (SMBG) in case of hypoglycaemia. This will also allow for step-wise reduction in gliclazide dosage when the SGLT2i is initiated
- Check Fibrosis-4 (FIB-4) score to assess risk for fibrotic liver disease

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Diggle J. Diabetes & Primary Care. 2020;22:49–50.
4. NICE. CKS NAFLD. 2023.

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Key practice points at follow-up:

- Additional HbA1c lowering medication may be needed if target is not met as, due to SGLT2i mechanism of action, glucose-lowering efficacy is inversely proportional to the degree of renal impairment. Ongoing SMBG should help to inform these decisions
- Finerenone should be offered
- Monitor blood pressure and review antihypertensive medication
- Monitor albuminuria
- Reinforce sick day rules at each follow-up visit
- Emphasise preventative foot care

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1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. NICE. CKS. Diabetes – type 2: Finerenone. 2024



Chronic kidney disease (slowing progression of CKD)

Ashad

Gender: Male

Age: 54 years

Ethnicity: South Asian

Family: Married with adult children

Employment status: Machine Operator in a biscuit factory

Relevant clinical summaries from the SGLT2i Decision Tool:

BOX C: Renal disease, eGFR and reduced glucose-lowering effect

BOX F: Genital and urinary infections

BOX A: NICE and ADA / EASD recommendations for SGLT2i prescribing

BOX B: Sick day guidance

BOX D: Diabetic ketoacidosis



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BOX C: RENAL DISEASE, EGFR AND REDUCED GLUCOSE-LOWERING EFFECT



Some SGLT2is have shown cardiorenal benefits independent of their glucose lowering effect and have been granted extended licenses specifically for these indications (please refer to the individual SmPC for prescribing guidance). Recommendations on SGLT2i use have been published by the [UKKA](#)

- If the person has an eGFR <60 mL/min/1.73 m² or clinically significant proteinuria (uACR >3 mg/mmol) and is receiving the maximally tolerated dose of ACEi/ARB therapy, consider adding an SGLT2i for renal protection irrespective of glycaemic control. In addition, consider adding finerenone to the reduce the risk of adverse kidney and CV outcomes if significant proteinuria persists despite maximally tolerated ACEi/ARB and SGLT2i doses.
- Check eGFR before starting therapy, with ongoing monitoring implemented according to CKD stage.
- A reversible reduction in eGFR of up to 30% may occur when initiating therapy, which will usually stabilise with time and should not be a cause for concern as overall decline in eGFR will be slowed with ongoing treatment.
- No additional eGFR monitoring is required unless the person is unwell, or it is otherwise indicated (e.g. starting another therapy likely to impact on kidney function).
- Due to SGLT2i mechanism of action, glucose-lowering efficacy is inversely proportional to the degree of renal impairment. Therefore, the glucose lowering effect will be reduced when the eGFR falls <45 mL/min/1.73 m² and will be negligible if eGFR falls further. In these circumstances, if further glucose-lowering is required, an additional agent should be considered. A GLP-1 RA may be a useful add-on option to reduce albuminuria and retain glucose-lowering effect.

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. KDIGO Kidney Int. 2022;102:S1–127.
4. UKKA. 2021.

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BOX F: GENITAL AND URINARY INFECTIONS

SGLT2i therapy may be associated with an increased risk of genital mycotic infections (vulvovaginitis and balanitis) and, less commonly, UTIs.

- Infections are more common in women than men and usually occur early in treatment but generally respond well to standard topical or oral medications and most people can continue taking their SGLT2i therapy.
- Glycosuria may cause urinary symptoms, including more frequent voiding.
- Treat mycotic genital infections with antifungal medications and UTIs with standard antibiotics. Patient information is available via [Trend Diabetes](#).
- The risk of infections is reduced by maintaining good genital hygiene. Advise SGLT2i users on genital health and hydration.
- Fournier’s Gangrene is a very rare but serious soft tissue infection of the genital area. Risk factors include diabetes, local trauma, male gender, obesity, older age, immunosuppression, HIV infection, end-stage renal or liver failure, smoking and alcohol abuse. Until 2019, 6 yellow card reports of Fournier’s Gangrene had been received by the UK MHRA for an estimated exposure to SGLT2i treatment of 548,565 patient-years

Urgent medical attention should be sought if a person receiving SGLT2i therapy experiences severe pain, tenderness, worsening redness or widespread swelling in the genital or perineal area.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.

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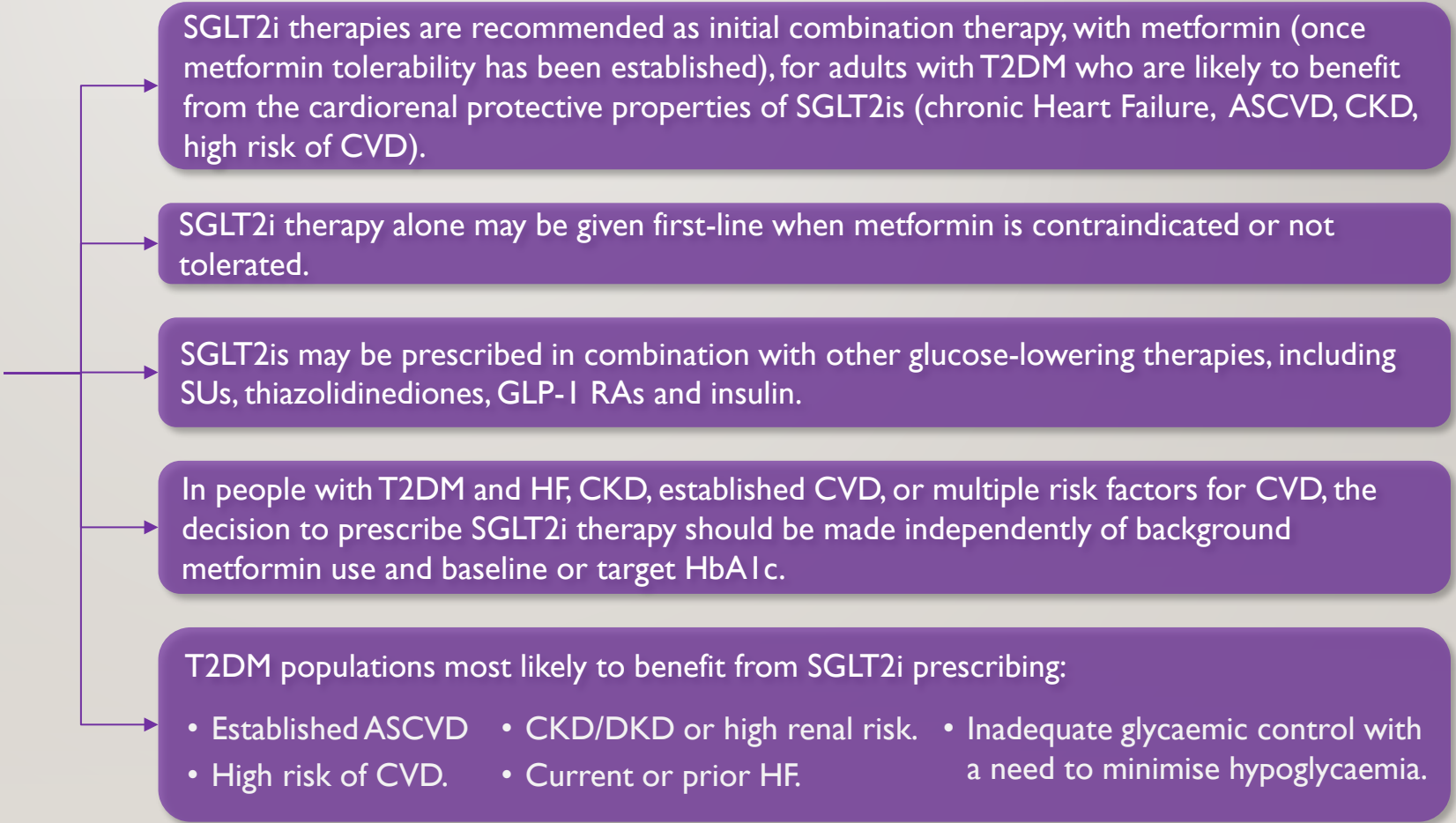
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BOX A: NICE AND EASD/ADA RECOMMENDATIONS FOR SGLT2I PRESCRIBING



For an overview of the NICE NG28 guidelines for the management of Type 2 diabetes in adults and the ADA/EASD consensus report on the management of hyperglycaemia in Type 2 diabetes click [here](#).

Key points are highlighted here:



References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753-86.

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BOX B: SICK DAY GUIDANCE



Sick day guidance should be followed when a person with diabetes has an acute dehydrating illness or is unable to eat and/or drink normally.

The guidance is intended for people taking oral T2DM therapies with or without insulin, with the aim of reducing the risk of DKA and glucose fluctuation during periods of illness.

Advice should be given on what constitutes a ‘sick day’, with clear explanation of when and why specific medications must be paused.

Access to glucose and ketone monitoring should be offered to individuals where this is deemed clinically necessary.

If DKA is suspected, refer to [Box D](#). Guidance should include the following:

Offer the person advice on sick day guidance when initiating SGLT2is and remind them of this at every medication review. Patient information leaflets should be provided to support advice.

Those with access to a glucose self-monitoring device (typically those on insulin or an SU) should check their glucose levels more frequently during periods of acute illness. Medical assistance must be sought if levels are persistently high or low.

The following medications should be temporarily stopped if the person is unable to eat and drink normally and is at risk of dehydration or vomiting: SGLT2is, ACEis, diuretics*, metformin, ARBs and NSAIDs (the [SADMAN](#) mnemonic may be a helpful reminder).

The person should maintain normal hydration and food, where possible. If this is not possible, oral fluids should be encouraged (≥ 100 mL/hour). Recommend sugar-free fluids if glucose levels are high or sugary fluids when glucose levels are low.

Once eating and drinking normally and vomiting has ceased, or the individual is feeling better, oral medications (including SGLT2i therapy) can be restarted.

***Decisions regarding the pausing of diuretics for HF should be based on current fluid status, as assessed by an HCP.**

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Down S.. Diabetes Prim Care. 2020;22:47–8.

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BOX D: DIABETIC KETOACIDOSIS



DKA is a rare but serious complication that can occur in people treated with SGLT2is.

Clinicians should be aware of the signs of DKA and the people who may be at greatest risk. SGLT2i therapies reduce insulin secretion and shift energy metabolism toward lipid oxidation, which can cause DKA during intercurrent illness as stress hormones increase insulin resistance and reduced oral intake can lead to starvation ketosis or increased ketone concentration (due to dehydration).

Ketoacidosis occurring during SGLT2i use may be atypical and associated with euglycaemia (relatively normal glucose levels). Key resources on DKA can be found at: [DUK](#), [EDEN](#), [Trend Diabetes](#) and [Diggle J, 2020](#)

Risk factors for DKA include:

- Low beta-cell function (e.g. those with T2DM and low C-peptide levels, LADA/slowly evolving immune-related diabetes or a history of pancreatitis). Ensure correct diagnosis of T2DM before initiating SGLT2i treatment.
- Restricted food intake (very low calorie or very low carbohydrate diet) or severe dehydration [see [Box E](#) for advice on intermittent fasting].
- Sudden reduction in insulin.
- Increased insulin requirements due to rising glucose levels (e.g. during acute illness).
- Surgery or surgical procedure that requires fasting.
- Alcohol abuse.
- Corticosteroid use.

Signs of DKA include abdominal pain, nausea, vomiting, shortness of breath (Kussmaul breathing), drowsiness, confusion and sweet smelling (pear-drop) breath.

- Provide clear verbal and written sick day guidance [[Box B](#)].
- Explain the signs and symptoms of DKA and the need to temporarily pause SGLT2is and seek immediate medical advice if symptoms develop.

If DKA develops while taking an SGLT2i, the agent should be stopped. The decision to restart where a clear contributing factor has been identified should be taken in discussion with the individual and clinical team to establish whether the benefits of reintroducing an SGLT2i outweigh the risks.

BOX E: DIETS AND EATING DISORDERS



Conditions leading to restricted food intake or severe dehydration may predispose SGLT2i users to DKA [[Box D](#)].

- Low carbohydrate, very low calorie and ketogenic diets are not recommended for SGLT2i recipients due to an increased risk of DKA.
- SGLT2i therapy is not recommended for people living with T2DM and a comorbid eating disorder (e.g. anorexia nervosa, diabulimia).
- Individuals with T2DM who follow an intermittent fasting diet (e.g. 5:2 diet) require a diabetes therapy review, with some treatments (including SGLT2is) being reduced in dosage or suspended on fasting days.
- For advice on SGLT2i use during Ramadan, refer to the [IDF-DAR guidelines](#) and/or the [SAHF guidelines](#).
- SGLT2i users should receive information relating to the risk of DKA [[Box D](#)] and sick day advice [[Box B](#)].

Urgent medical attention must be sought if a person receiving SGLT2i therapy is unwell and tests positive for ketones.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753-86.

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Seidu S, Alabraba V, Davies S, et al. SGLT2 inhibitors: the new standard of care for cardiovascular, renal and metabolic protection in Type 2 diabetes - narrative review. *Diabetes Ther*. 2024;15(5):1099–124

UK Kidney Association. UK Kidney Association clinical practice guideline: Sodium-glucose co-transporter-2 (SGLT-2) inhibition in adults with kidney disease. 2021. <https://ukkidney.org/health-professionals/guidelines/ukka-clinical-practice-guideline-sodium-glucose-co-transporter-2>

Zheng RJ, Wang Y, Tang JN, et al. Association of SGLT2 Inhibitors With Risk of Atrial Fibrillation and Stroke in Patients With and Without Type 2 Diabetes: A Systemic Review and Meta-Analysis of Randomized Controlled Trials. *J Cardiovasc Pharmacol*. 2022;79(2):e145–e152.

ABBREVIATIONS

ACEi, angiotensin-converting enzyme inhibitor	LADA, latent autoimmune diabetes in adult
ADA, American Diabetes Association	LDL-C, low-density lipoprotein cholesterol
ARB, angiotensin receptor blocker	LVEF, left ventricular ejection fraction
ASCVD, atherosclerotic cardiovascular disease	MACE, major adverse cardiac event
ALT, alanine transaminase	MDT, multidisciplinary team
BMI, body mass index	MHRA, Medicines and Healthcare products Regulatory Agency
BNP, B-type natriuretic peptide	NICE, National Institute for Health and Care Excellence
CKD, chronic kidney disease	RCT, randomised controlled trial
CV, cardiovascular	QRISK, cardiovascular risk score
CVD, cardiovascular disease	SAFH, South Asian Health Foundation
CVOT, cardiovascular outcomes trial	SGLT2i, sodium glucose cotransporter-2 inhibitor
CVRM, cardiovascular renal and metabolic	SMBG, self-monitoring of blood glucose
DKA, diabetic ketoacidosis	SmPC, summary of product characteristics
DKD, diabetic kidney disease	SU, sulphonylurea
EASD, European Society for the Study of Diabetes	T2DM, Type 2 diabetes mellitus
ECG, electrocardiogram	uACR, urine albumin to creatinine ratio
eGFR, estimated glomerular filtration rate	UKKA, United Kingdom Kidney Association
GLP-1 RA, glucagon-like peptide-1 receptor agonist	UTI, urinary tract infection
HCP, healthcare professional	
HDL-C, high-density lipoprotein cholesterol	
HF, heart failure	
HFrEF, heart failure with reduced ejection fraction	
IDF-DAR, International Diabetes Federation – Diabetes and Ramadan	
IDSC, Improving Diabetes Steering Committee	
KDIGO; Kidney Disease: Improving Global Outcomes	

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Diabetic polyneuropathy/diabetic foot disease

Angela

Gender: Female

Age: 53 years

Ethnicity: White, Caucasian

Family: Mother of 3 adult children
(sterilised after birth of last child)

Employment status:
Shop Assistant at local supermarket

Key diagnostics and risk factors:

Height: 163 cm

Weight: 97 kg

BMI: 36.5 kg/m²

HbA1c: 64 mmol/mol

eGFR: 90 ml/min/1.73 m²

uACR: 2.3 mg/mmol

Blood pressure: 136/82 mmHg

Total cholesterol: 5.9 mmol/L

Non-HDL-C: 4.8 mmol/L

LDL-C: 3.8 mmol/L

HDL-C: 1.1 mmol/L

Triglycerides: 2.1 mmol/L

Background retinopathy



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Diabetic polyneuropathy/diabetic foot disease

Angela

Gender: Female

Age: 53 years

Ethnicity: White Caucasian

Family: Mother of 3 adult children (sterilised)

Employment status: Shop Assistant at local supermarket

Clinical case notes:

- Angela was diagnosed with T2DM 7 years ago
- **Current medication: metformin 1 g bd**
- At Angela's last T2DM review, her HbA1c was 57 mmol/mol
- Background retinopathy was identified at a recent eye screening appointment
- Angela stepped on broken glass a week ago resulting in a traumatic foot injury, which was red and swollen. The cut has begun to settle down, with mild oedema and redness present, and there is a healing scar on the plantar surface of the foot
 - An X-ray revealed that there was no evidence of a foreign body present or osteomyelitis
 - There is evidence of neuropathy – shown by 10 g monofilament test



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Diabetic polyneuropathy/diabetic foot disease

Angela

Gender: Female

Age: 53 years

Ethnicity: White Caucasian

Family: Mother of 3 adult children (sterilised)

Employment status: Shop Assistant at local supermarket



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Aims of T2DM treatment:

- Optimise HbA1c, promote weight loss, lower blood pressure and provide cardiorenal protection
- Lipid-lowering medication (statin) is also required

Considerations/drivers for SGLT2i use:

- A need for long-term CVRM protection
- While Angela has a foot injury and evidence of neuropathy, she does not have an active foot ulcer
- SGLT2i use is supported in these circumstances, due to the importance of providing CV and renal protection. SGLT2i prescribing should be in accordance with the individual product SmPC

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11):2753-86.
4. NICE. NG238 guideline. 2023

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Diabetic polyneuropathy/diabetic foot disease

Angela

Gender: Female

Age: 53 years

Ethnicity: White Caucasian

Family: Mother of 3 adult children (sterilised)

Employment status: Shop Assistant at local supermarket

SGLT2i therapy initiation – key practice points:

- Discuss sick day guidance and relative risk of DKA
- Provide foot care advice
- Discuss the importance of good personal hygiene and advise on the risk and management of potential genital infections
- Consider the use of fenofibrate



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Diabetic polyneuropathy/diabetic foot disease

Angela

Gender: Female

Age: 53 years

Ethnicity: White Caucasian

Family: Mother of 3 adult children (sterilised)

Employment status: Shop Assistant at local supermarket

Key practice points at follow-up:

- Reinforce foot care advice
- Conduct foot examination at annual check
- Monitor blood pressure
- Monitor HbA1c
- Check lipid levels after initiating statin treatment



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Relevant clinical summaries from the SGLT2i Decision Tool:

BOX H: Foot disease

BOX A: NICE and ADA /
EASD recommendations
for SGLT2i prescribing

BOX F: Genital and
urinary infections

BOX B: Sick day
guidance

BOX D: Diabetic
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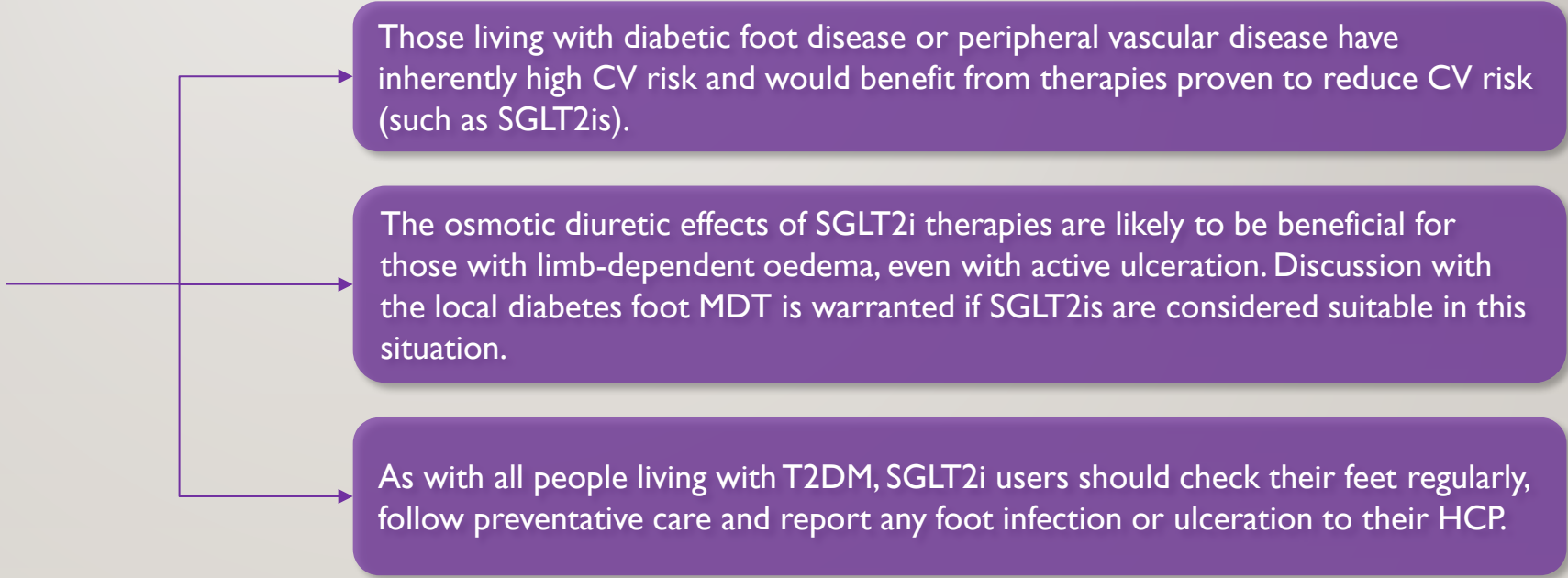
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BOX H: FOOT DISEASE (LIMB ISCHAEMIA OR ULCERATION)



One SGLT2i trial has demonstrated an imbalance in lower limb amputations (toe amputations).

Subsequent SGLT2i trials, systematic reviews and meta-analyses have found no compelling evidence of a significant association.



References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.

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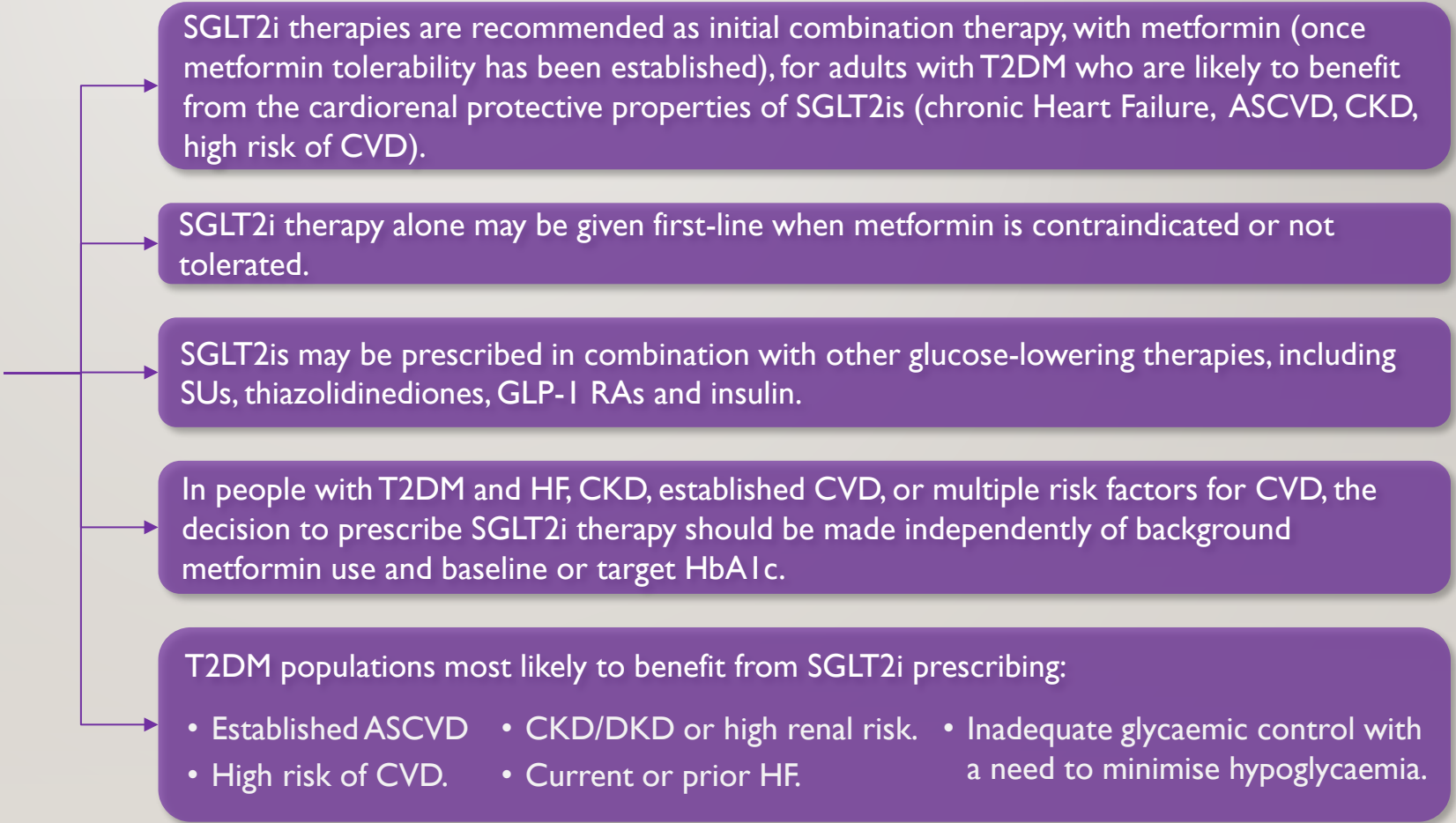
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BOX A: NICE AND EASD/ADA RECOMMENDATIONS FOR SGLT2I PRESCRIBING



For an overview of the NICE NG28 guidelines for the management of Type 2 diabetes in adults and the ADA/EASD consensus report on the management of hyperglycaemia in Type 2 diabetes click [here](#).

Key points are highlighted here:



References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
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BOX F: GENITAL AND URINARY INFECTIONS



SGLT2i therapy may be associated with an increased risk of genital mycotic infections (vulvovaginitis and balanitis) and, less commonly, UTIs.

Infections are more common in women than men and usually occur early in treatment but generally respond well to standard topical or oral medications and most people can continue taking their SGLT2i therapy.

Glycosuria may cause urinary symptoms, including more frequent voiding.

Treat mycotic genital infections with antifungal medications and UTIs with standard antibiotics. Patient information is available via [Trend Diabetes](#).

The risk of infections is reduced by maintaining good genital hygiene. Advise SGLT2i users on genital health and hydration.

Fournier’s Gangrene is a very rare but serious soft tissue infection of the genital area. Risk factors include diabetes, local trauma, male gender, obesity, older age, immunosuppression, HIV infection, end-stage renal or liver failure, smoking and alcohol abuse. Until 2019, 6 yellow card reports of Fournier’s Gangrene had been received by the UK MHRA for an estimated exposure to SGLT2i treatment of 548,565 patient-years

Urgent medical attention should be sought if a person receiving SGLT2i therapy experiences severe pain, tenderness, worsening redness or widespread swelling in the genital or perineal area.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.

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BOX B: SICK DAY GUIDANCE



Sick day guidance should be followed when a person with diabetes has an acute dehydrating illness or is unable to eat and/or drink normally.

The guidance is intended for people taking oral T2DM therapies with or without insulin, with the aim of reducing the risk of DKA and glucose fluctuation during periods of illness.

Advice should be given on what constitutes a ‘sick day’, with clear explanation of when and why specific medications must be paused.

Access to glucose and ketone monitoring should be offered to individuals where this is deemed clinically necessary.

If DKA is suspected, refer to [Box D](#). Guidance should include the following:

Offer the person advice on sick day guidance when initiating SGLT2is and remind them of this at every medication review. Patient information leaflets should be provided to support advice.

Those with access to a glucose self-monitoring device (typically those on insulin or an SU) should check their glucose levels more frequently during periods of acute illness. Medical assistance must be sought if levels are persistently high or low.

The following medications should be temporarily stopped if the person is unable to eat and drink normally and is at risk of dehydration or vomiting: SGLT2is, ACEis, diuretics*, metformin, ARBs and NSAIDs (the [SADMAN](#) mnemonic may be a helpful reminder).

The person should maintain normal hydration and food, where possible. If this is not possible, oral fluids should be encouraged (≥ 100 mL/hour). Recommend sugar-free fluids if glucose levels are high or sugary fluids when glucose levels are low.

Once eating and drinking normally and vomiting has ceased, or the individual is feeling better, oral medications (including SGLT2i therapy) can be restarted.

***Decisions regarding the pausing of diuretics for HF should be based on current fluid status, as assessed by an HCP.**

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Down S.. Diabetes Prim Care. 2020;22:47–8.

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BOX D: DIABETIC KETOACIDOSIS



DKA is a rare but serious complication that can occur in people treated with SGLT2is.

Clinicians should be aware of the signs of DKA and the people who may be at greatest risk. SGLT2i therapies reduce insulin secretion and shift energy metabolism toward lipid oxidation, which can cause DKA during intercurrent illness as stress hormones increase insulin resistance and reduced oral intake can lead to starvation ketosis or increased ketone concentration (due to dehydration).

Ketoacidosis occurring during SGLT2i use may be atypical and associated with euglycaemia (relatively normal glucose levels). Key resources on DKA can be found at: [DUK](#), [EDEN](#), [Trend Diabetes](#) and [Diggle J, 2020](#)

Risk factors for DKA include:

- Low beta-cell function (e.g. those with T2DM and low C-peptide levels, LADA/slowly evolving immune-related diabetes or a history of pancreatitis). Ensure correct diagnosis of T2DM before initiating SGLT2i treatment.
- Restricted food intake (very low calorie or very low carbohydrate diet) or severe dehydration [see [Box E](#) for advice on intermittent fasting].
- Sudden reduction in insulin.
- Increased insulin requirements due to rising glucose levels (e.g. during acute illness).
- Surgery or surgical procedure that requires fasting.
- Alcohol abuse.
- Corticosteroid use.

Signs of DKA include abdominal pain, nausea, vomiting, shortness of breath (Kussmaul breathing), drowsiness, confusion and sweet smelling (pear-drop) breath.

- Provide clear verbal and written sick day guidance [[Box B](#)].
- Explain the signs and symptoms of DKA and the need to temporarily pause SGLT2is and seek immediate medical advice if symptoms develop.

If DKA develops while taking an SGLT2i, the agent should be stopped. The decision to restart where a clear contributing factor has been identified should be taken in discussion with the individual and clinical team to establish whether the benefits of reintroducing an SGLT2i outweigh the risks.

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11):2753–86.
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BOX E: DIETS AND EATING DISORDERS



Conditions leading to restricted food intake or severe dehydration may predispose SGLT2i users to DKA [[Box D](#)].

- Low carbohydrate, very low calorie and ketogenic diets are not recommended for SGLT2i recipients due to an increased risk of DKA.
- SGLT2i therapy is not recommended for people living with T2DM and a comorbid eating disorder (e.g. anorexia nervosa, diabulimia).
- Individuals with T2DM who follow an intermittent fasting diet (e.g. 5:2 diet) require a diabetes therapy review, with some treatments (including SGLT2is) being reduced in dosage or suspended on fasting days.
- For advice on SGLT2i use during Ramadan, refer to the [IDF-DAR guidelines](#) and/or the [SAHF guidelines](#).
- SGLT2i users should receive information relating to the risk of DKA [[Box D](#)] and sick day advice [[Box B](#)].

Urgent medical attention must be sought if a person receiving SGLT2i therapy is unwell and tests positive for ketones.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753–86.

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ABBREVIATIONS

ACEi, angiotensin-converting enzyme inhibitor	LADA, latent autoimmune diabetes in adult
ADA, American Diabetes Association	LDL-C, low-density lipoprotein cholesterol
ARB, angiotensin receptor blocker	LVEF, left ventricular ejection fraction
ASCVD, atherosclerotic cardiovascular disease	MACE, major adverse cardiac event
ALT, alanine transaminase	MDT, multidisciplinary team
BMI, body mass index	MHRA, Medicines and Healthcare products Regulatory Agency
BNP, B-type natriuretic peptide	NICE, National Institute for Health and Care Excellence
CKD, chronic kidney disease	RCT, randomised controlled trial
CV, cardiovascular	QRISK, cardiovascular risk score
CVD, cardiovascular disease	SAFH, South Asian Health Foundation
CVOT, cardiovascular outcomes trial	SGLT2i, sodium glucose cotransporter-2 inhibitor
CVRM, cardiovascular renal and metabolic	SMBG, self-monitoring of blood glucose
DKA, diabetic ketoacidosis	SmPC, summary of product characteristics
DKD, diabetic kidney disease	SU, sulphonylurea
EASD, European Society for the Study of Diabetes	T2DM, Type 2 diabetes mellitus
ECG, electrocardiogram	uACR, urine albumin to creatinine ratio
eGFR, estimated glomerular filtration rate	UKKA, United Kingdom Kidney Association
GLP-1 RA, glucagon-like peptide-1 receptor agonist	UTI, urinary tract infection
HCP, healthcare professional	
HDL-C, high-density lipoprotein cholesterol	
HF, heart failure	
HFrEF, heart failure with reduced ejection fraction	
IDF-DAR, International Diabetes Federation – Diabetes and Ramadan	
IDSC, Improving Diabetes Steering Committee	
KDIGO; Kidney Disease: Improving Global Outcomes	

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Electrolyte/diuretic sparing with SGLT2i therapy

Derek

Gender: Male

Age: 75 years

Ethnicity: Black

Family: Widowed with adult children

Employment status:

Retired Solicitor

Key diagnostics and risk factors:

Height: 183 cm

Weight: 117 kg

BMI: 34.9 kg/m²

HbA1c: 64 mmol/mol

eGFR: 49 ml/min/1.73 m²

uACR: 10.1 mg/mmol

Blood pressure: 119/69 mmHg

Total cholesterol: 5.2 mmol/L

Non-HDL-C: 3.6 mmol/L

HDL-C: 1.6 mmol/L

LDL-C: 2.5 mmol/L

Triglycerides: 2.3 mmol/L

Potassium: 4.7 mmol/L

Sodium: 130 mmol/L

History of myocardial infarction
(6 years prior)

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Clinical case notes:

- Derek was diagnosed with T2DM 14 years ago
- He had a myocardial infarction 6 years ago
- Episodes of shortness of breath led to a diagnosis of HFrEF. Echocardiography revealed moderate dysfunction (LVEF 35%) 5 years prior to presentation, which was treated with diuretics/ACEi/beta-blocker according to the guidance at that time. He was then discharged to primary care
- Approximately 8 months ago, Derek experienced viral gastroenteritis that caused diarrhoea and vomiting for 48 hours and left him severely dehydrated. He was hospitalised for acute kidney injury and hyperkalaemia shortly afterwards and ACEi dosage was reduced
- Derek has been given advice on self-monitoring of blood glucose (SMBG) but is not confident in using it regularly
- **Current medications: atorvastatin 80 mg od, metformin 1 g bd, gliclazide 160 mg bd, furosemide 40 mg bd, linagliptin 5 mg od, bisoprolol 5 mg od, lisinopril 2.5 mg od, aspirin 75 mg od**

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Aims of T2DM treatment:

- HbA1c reduction
- Reduction of HF morbidity and mortality risk
- Address cardiorenal morbidity and promote weight loss

Considerations/drivers for SGLT2i use:

- Limited diuretic dose without hypokalaemia – potential benefits of reducing diuretic requirement with SGLT2i use
- Risk of hypoglycaemia as Derek is already taking gliclazide
- Possible risk associated with transient drop in eGFR following SGLT2i initiation due to prior acute kidney injury
- Potential reduction in risk of tachyarrhythmia and new onset atrial fibrillation
- Added benefit of weight loss

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5. Zheng RJ, et al. J Cardiovasc Pharmacol. 2022;79(2):e145–e152.
6. Pandey AK, et al. J Am Heart Assoc. 2021;10(17):e022222.
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SGLT2i therapy initiation – key practice points:

- Explain the potential benefits of SGLT2i therapy in terms of reduced cardiorenal risk/progression
- Provide diet and lifestyle guidance with the aim of achieving a healthier weight. Highlight the added benefit of SGLT2i therapy in promoting weight loss
- Advise on risk of postural hypotension
- Advise on sick day guidance, genital health (e.g. stringent personal hygiene) including management of infections and relative risk of DKA
- Assess frailty score
- Provide education/guidance to increase confidence on use of SMBG
- Aim to reduce gliclazide dosage to avoid hypoglycaemia
- Optimise lisinopril dosage (ACEi/ARB therapy remains an appropriate choice) offer finerenone and discuss the potential introduction of a GLP-1 RA for additional cardiorenal protection

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Key practice points at follow-up:

- Monitor HbA1c and provide support/education so that Derek is able to use SMBG
- Provide counselling regarding relative DKA risk
- Reinforce sick day guidance at each appointment
- Monitor urea and electrolytes as indicated for Derek's underlying conditions. Monitor fluid status and aim to lower furosemide to reduce hypokalaemia and hyponatraemia issues

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Relevant clinical summaries from the SGLT2i Decision Tool:

BOX A: NICE and ADA / EASD recommendations for SGLT2i prescribing

BOX B: Sick day guidance

BOX C: Renal disease, eGFR and reduced glucose-lowering effect

BOX F: Genital and urinary infections

BOX J: Older people/ frailty/dementia

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 **IMPROVING DIABETES STEERING COMMITTEE**

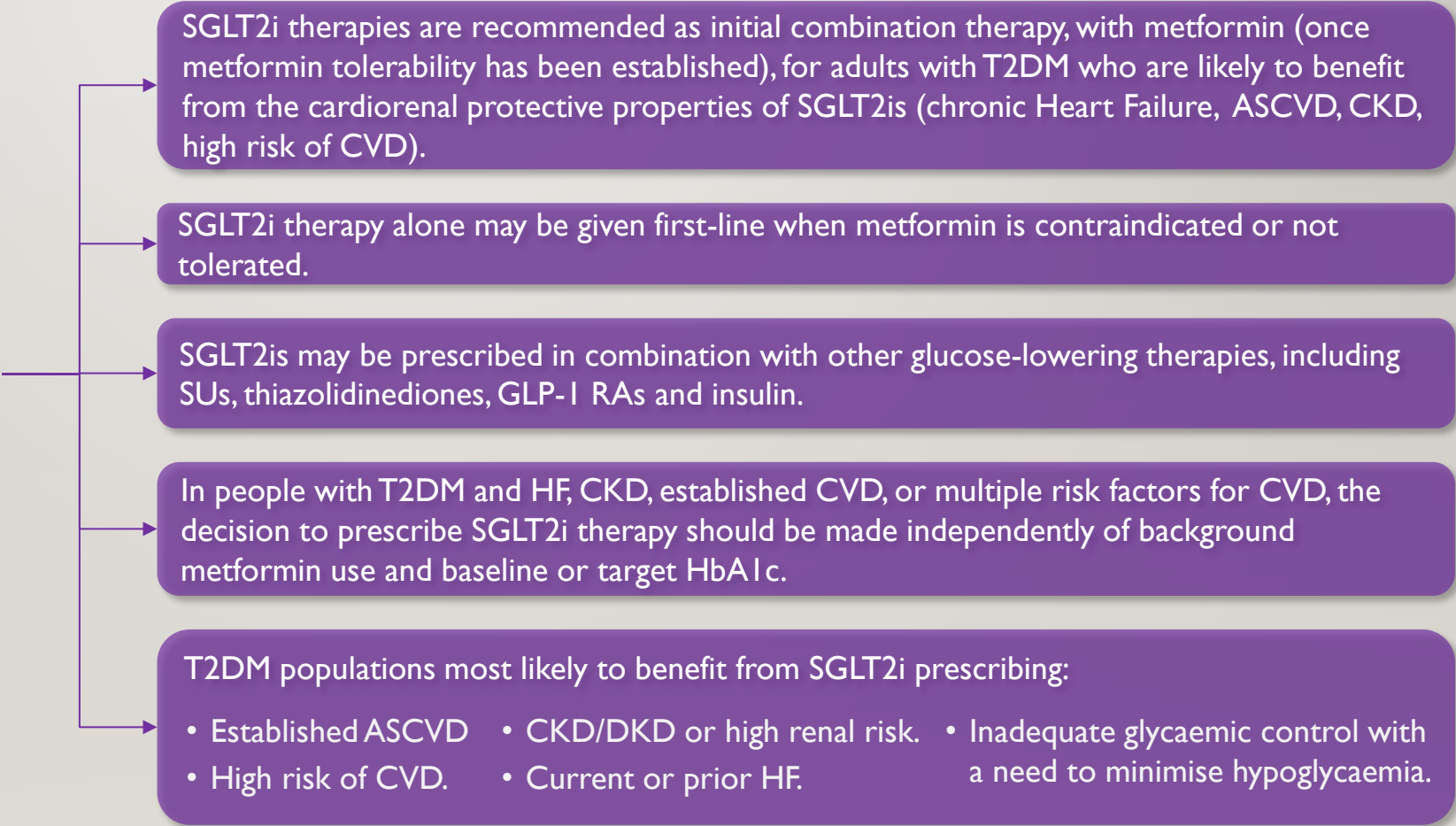
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BOX A: NICE AND EASD/ADA RECOMMENDATIONS FOR SGLT2I PRESCRIBING



For an overview of the NICE NG28 guidelines for the management of Type 2 diabetes in adults and the ADA/EASD consensus report on the management of hyperglycaemia in Type 2 diabetes click [here](#).

Key points are highlighted here:



References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Davies MJ, et al. Diabetes Care. 22;45(11)2753-86.

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BOX B: SICK DAY GUIDANCE



Sick day guidance should be followed when a person with diabetes has an acute dehydrating illness or is unable to eat and/or drink normally.

The guidance is intended for people taking oral T2DM therapies with or without insulin, with the aim of reducing the risk of DKA and glucose fluctuation during periods of illness.

Advice should be given on what constitutes a ‘sick day’, with clear explanation of when and why specific medications must be paused.

Access to glucose and ketone monitoring should be offered to individuals where this is deemed clinically necessary.

If DKA is suspected, refer to [Box D](#). Guidance should include the following:

- Offer the person advice on sick day guidance when initiating SGLT2is and remind them of this at every medication review. Patient information leaflets should be provided to support advice.
- Those with access to a glucose self-monitoring device (typically those on insulin or an SU) should check their glucose levels more frequently during periods of acute illness. Medical assistance must be sought if levels are persistently high or low.
- The following medications should be temporarily stopped if the person is unable to eat and drink normally and is at risk of dehydration or vomiting: SGLT2is, ACEis, diuretics*, metformin, ARBs and NSAIDs (the [SADMAN](#) mnemonic may be a helpful reminder).
- The person should maintain normal hydration and food, where possible. If this is not possible, oral fluids should be encouraged (≥ 100 mL/hour). Recommend sugar-free fluids if glucose levels are high or sugary fluids when glucose levels are low.
- Once eating and drinking normally and vomiting has ceased, or the individual is feeling better, oral medications (including SGLT2i therapy) can be restarted.

***Decisions regarding the pausing of diuretics for HF should be based on current fluid status, as assessed by an HCP.**

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. Down S.. Diabetes Prim Care. 2020;22:47–8.

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BOX C: RENAL DISEASE, EGFR AND REDUCED GLUCOSE-LOWERING EFFECT



Some SGLT2is have shown cardiorenal benefits independent of their glucose lowering effect and have been granted extended licenses specifically for these indications (please refer to the individual SmPC for prescribing guidance). Recommendations on SGLT2i use have been published by the [UKKA](#)

- If the person has an eGFR <60 mL/min/1.73 m² or clinically significant proteinuria (uACR >3 mg/mmol) and is receiving the maximally tolerated dose of ACEi/ARB therapy, consider adding an SGLT2i for renal protection irrespective of glycaemic control. In addition, consider adding finerenone to reduce the risk of adverse kidney and CV outcomes if significant proteinuria persists despite maximally tolerated ACEi/ARB and SGLT2i doses.
- Check eGFR before starting therapy, with ongoing monitoring implemented according to CKD stage.
- A reversible reduction in eGFR of up to 30% may occur when initiating therapy, which will usually stabilise with time and should not be a cause for concern as overall decline in eGFR will be slowed with ongoing treatment.
- No additional eGFR monitoring is required unless the person is unwell, or it is otherwise indicated (e.g. starting another therapy likely to impact on kidney function).
- Due to SGLT2i mechanism of action, glucose-lowering efficacy is inversely proportional to the degree of renal impairment. Therefore, the glucose lowering effect will be reduced when the eGFR falls <45 mL/min/1.73 m² and will be negligible if eGFR falls further. In these circumstances, if further glucose-lowering is required, an additional agent should be considered. A GLP-1 RA may be a useful add-on option to reduce albuminuria and retain glucose-lowering effect.

References:

1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.
2. NICE. NG28 guideline. 2022.
3. NICE. Resource impact report. 2022.
4. KDIGO Kidney Int. 2022;102:S1–127.
5. UKKA. 2021.

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BOX F: GENITAL AND URINARY INFECTIONS



SGLT2i therapy may be associated with an increased risk of genital mycotic infections (vulvovaginitis and balanitis) and, less commonly, UTIs.

- Infections are more common in women than men and usually occur early in treatment but generally respond well to standard topical or oral medications and most people can continue taking their SGLT2i therapy.
- Glycosuria may cause urinary symptoms, including more frequent voiding.
- Treat mycotic genital infections with antifungal medications and UTIs with standard antibiotics. Patient information is available via [Trend Diabetes](#).
- The risk of infections is reduced by maintaining good genital hygiene. Advise SGLT2i users on genital health and hydration.
- Fournier's Gangrene is a very rare but serious soft tissue infection of the genital area. Risk factors include diabetes, local trauma, male gender, obesity, older age, immunosuppression, HIV infection, end-stage renal or liver failure, smoking and alcohol abuse. Until 2019, 6 yellow card reports of Fournier's Gangrene had been received by the UK MHRA for an estimated exposure to SGLT2i treatment of 548,565 patient-years

Urgent medical attention should be sought if a person receiving SGLT2i therapy experiences severe pain, tenderness, worsening redness or widespread swelling in the genital or perineal area.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.

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BOX J: OLDER PEOPLE/FRAILITY/DEMENTIA

Glucose-lowering therapies should be prescribed with the individual's age, degree of frailty and cognitive function in mind.

Older people: most SGLT2i therapies do not give specific ages for discontinuation in adults (please refer to the individual SmPC for prescribing guidance relating to age). The SOLD study found that SGLT2is were an effective and generally well-tolerated therapeutic option with a good safety profile in people aged above 70 years and living with T2DM. However, some caution was suggested, especially in those who were most frail mainly due to UTIs and worsening renal function.

Frailty: CVOTs have demonstrated delayed progression of CKD, HF and MACE, and reduced hypoglycaemia risk with SGLT2is (unless used with insulin and or SUs). Moderately or severely frail people may be at risk of weight loss resulting in sarcopenia, candidiasis and UTIs, possible urinary incontinence, fluid volume depletion and subsequent DKA. Regular monitoring and sick day education [[Box B](#)] are important in this group.

HF and frailty: a pre-specified analysis of data from the DELIVER trial found health-related improvements in quality of life occurred early with SGLT2i treatment. Improvements were greatest in people with higher levels of frailty.

References:
1. Seidu S, et al. Diabetes Ther. 2024;15(5):1099–124.

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ABBREVIATIONS

ACEi, angiotensin-converting enzyme inhibitor	LADA, latent autoimmune diabetes in adult
ADA, American Diabetes Association	LDL-C, low-density lipoprotein cholesterol
ARB, angiotensin receptor blocker	LVEF, left ventricular ejection fraction
ASCVD, atherosclerotic cardiovascular disease	MACE, major adverse cardiac event
ALT, alanine transaminase	MDT, multidisciplinary team
BMI, body mass index	MHRA, Medicines and Healthcare products Regulatory Agency
BNP, B-type natriuretic peptide	NICE, National Institute for Health and Care Excellence
CKD, chronic kidney disease	RCT, randomised controlled trial
CV, cardiovascular	QRISK, cardiovascular risk score
CVD, cardiovascular disease	SAFH, South Asian Health Foundation
CVOT, cardiovascular outcomes trial	SGLT2i, sodium glucose cotransporter-2 inhibitor
CVRM, cardiovascular renal and metabolic	SMBG, self-monitoring of blood glucose
DKA, diabetic ketoacidosis	SmPC, summary of product characteristics
DKD, diabetic kidney disease	SU, sulphonylurea
EASD, European Society for the Study of Diabetes	T2DM, Type 2 diabetes mellitus
ECG, electrocardiogram	uACR, urine albumin to creatinine ratio
eGFR, estimated glomerular filtration rate	UKKA, United Kingdom Kidney Association
GLP-1 RA, glucagon-like peptide-1 receptor agonist	UTI, urinary tract infection
HCP, healthcare professional	
HDL-C, high-density lipoprotein cholesterol	
HF, heart failure	
HFrEF, heart failure with reduced ejection fraction	
IDF-DAR, International Diabetes Federation – Diabetes and Ramadan	
IDSC, Improving Diabetes Steering Committee	
KDIGO; Kidney Disease: Improving Global Outcomes	

**Case study overview**

**Case notes**

Treatment aims & considerations


SGLT2i initiation
**Key practice points**

**Follow up**

**Links to SGLT2i Decision Tool**

Abbreviations and references

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How to access the latest IDSC publication and SGLT2i Decision Tool

- The publication and SGLT2i Decision Tool is open access and available to download from [Volumes and issues | Diabetes Therapy \(springer.com\)](#)

DECISION TOOL

Prescribing SGLT2i therapy for Type 2 Diabetes Mellitus Management

The SGLT2i Prescribing Tool has been independently prepared by the Improving Diabetes Steering Committee. A. Menarini Farmaceutica Internazionale SRL has fully funded the creation of this non-promotional document.

The NICE resource impact report for T2DM in adults suggests that around 1.7 million people with T2DM in England (approximately 50%) are eligible for SGLT2i treatment in accordance with current NICE guidelines [1,2]. However, given the weight of existing evidence and growing expert opinion, the Improving Diabetes Steering Committee estimates that up to 80% of people with T2DM would benefit from SGLT2i treatment, with some caveats that are summarized in this Decision Tool [1–53]. The Decision Tool aims to guide appropriate SGLT2i treatment in people diagnosed with T2DM. Before using this Tool, please determine the QRISK³ score and renal function for the individual you are treating using up-to-date eGFR and UACR values. Please refer to the relevant summary of product characteristics (SmPC) before prescribing any SGLT2i therapy.

Key practice points [1–53]:

- Discuss the relative benefits and risks of SGLT2i therapy with the person you are treating.
- Use dual first-line SGLT2i therapy with metformin (unless contraindicated). Initiate 4 weeks after metformin, post-date the SGLT2i prescription and do not wait for HbA1c assessment at 3 months after metformin initiation.
- Emphasise the importance of ongoing hydration and good personal hygiene.
- Give written information/electronic resources to support advice on the management of T2DM medicines during periods of acute or dehydrating illness.
- If symptomatic of hyperglycaemia, start rescue therapy and then reassess initiation of SGLT2i when symptoms resolved.
- For planned surgery or procedures requiring nil by mouth, advise on the importance of pausing SGLT2i treatment 3–7 days prior to surgery or liaise with pre-operative team.
- Discussion with an expert clinician is advisable for more complex cases.

Initial assessment

- Go to QRISK³ calculator
- Go to QRISK³ lifetime calculator
- Kidney function (eGFR and UACR)

Consider SGLT2i therapy

FIND OUT MORE

Offer SGLT2i therapy

FIND OUT MORE

Do not prescribe SGLT2i therapy

FIND OUT MORE

IMPORTANT – this decision tool is for guidance only. The final clinical decisions are the responsibility of the prescriber.

Abbreviations: ACEi, angiotensin-converting enzyme inhibitor; ADA, American Diabetes Association; ARBs, angiotensin receptor blockers; ASCVD, atherosclerotic cardiovascular disease; AUC, area under the curve; BMI, body mass index; CKD, chronic kidney disease; C_{max}, maximum serum drug concentration; CV, cardiovascular; CVOT, cardiovascular outcomes trial; DKA, diabetic ketoacidosis; DKD, diabetic kidney disease; EASD, European Association for the Study of Diabetes; eGFR, estimated glomerular filtration rate; ESKD, end-stage kidney disease; GLP-1 RA, glucagon-like peptide-1 receptor agonist; HbA1c, glycated haemoglobin A1c; HCP, healthcare professional; HF, heart failure; HFREF, heart failure with ejection fraction; HHF, hospitalisation for heart failure; HHS, hyperosmolar hyperglycaemic state; LADA, latent autoimmune diabetes in adult; MACE, major adverse cardiac event; MDT, multidisciplinary team; MHRA, Medicines and Healthcare products Regulatory Agency; NSAID, non-steroidal anti-inflammatory drug; QRISK, cardiovascular risk score; RAAS, renin-angiotensin-aldosterone system; SGLT2, sodium glucose cotransporter-2 inhibitor; SmPC, summary of product characteristics; SU, sulphonylurea; T2DM, Type 2 diabetes mellitus; UACR, urine albumin to creatinine ratio; UKA, UK Kidney Association; UTIs, urinary tract infections.

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Access the publication, wallchart & the interactive tool by scanning the QR code

You can request the printed wallchart from Menarini at diabetes@menariniuk.com

SGLT2i PRESCRIBING DECISION TOOL FOR TYPE 2 DIABETES

ABBREVIATED VERSION

Initial assessment

- QRISK³ calculator
- QRISK³ lifetime calculator
- Kidney function (eGFR and UACR)

Consider SGLT2i therapy

FIND OUT MORE

Offer SGLT2i therapy

FIND OUT MORE

Do not prescribe SGLT2i therapy

FIND OUT MORE

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Prescribing information and adverse events reporting information can be found at the bottom of this page. This website has been developed, designed and funded by A. Menarini Farmaceutica Internazionale SRL. The content is supported by an educational grant from A. Menarini Farmaceutica Internazionale SRL. The results generated by the steering committee are shared and published on the web. Downloaded and published on the Menarini tool to report into the content of this website.

Bridging the gap between type 2 diabetes guidelines and prescribing practices

The Improving Diabetes Steering Committee (IDSC) – a multidisciplinary group of experts across primary and secondary care – aims to support healthcare professionals by creating useful tools and resources that are evidence-based, balanced and practical.

This tool collates these tools so that you can enhance your knowledge of the current type 2 diabetes guidelines, bolster your confidence in making prescribing decisions and optimise the care of your patients living with type 2 diabetes.

Unsure of when to use an SGLT2 inhibitor?

Educational videos

SGLT2 inhibitors & CVRM – a new narrative review

References:
1. Seidu S, et al. Diabetes Ther. 2024; .

The IDSC is funded by an educational grant from A. Menarini Farmaceutica Internazionale SRL.
The SGLT2i Decision Tool has been independently prepared by the IDSC.

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