Type 2 diabetes mellitus

Improving patient outcomes through community pharmacy

A training guide on how to undertake patient diabetes reviews

Innovation, Education, Collaboration

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How to use the slide deck

The forwards and backwards buttons take you through the presentation in a linear way.

Clicking on the home button will take you to the main navigation slide.

This button will take you back to the slide you were viewing previously.

By clicking on this button you can view the references relating to the slide you are on.

Objectives

The navigation bar along the bottom will allow you to move through the sections. Clicking on each section title will take you to the first slide in that section.

The white cross appears on pop-up boxes and allows you to close them.

Medicines and food

These buttons will open up pop-up boxes or take you to background slides containing additional information.

Disclaimer

Since the preparation and approval of this training module some information relating to medicines including licensed indications and safety information may have changed. Clinical treatment guidelines and other models of practice are also subject to change.

Please always refer to the individual Summary of Product Characteristics for full information on the medicines mentioned in the module and please refer to relevant guidelines for most up to date version.

Navigation slide

- Objectives of the training
- Impact of diabetes
- The T2DM patient outcomes
- What to ask
- Patient questions
- Stay well
- Guidance and signposting
- What to do now

Medicine information hub

Objectives of the training

To equip you with the knowledge to confidently undertake a patient review on patients with type 2 diabetes mellitus (T2DM)

Help you support your patients with T2DM to enable them to use their medicines appropriately and achieve the best possible outcomes for their health

Help support patients to use their medicines safely

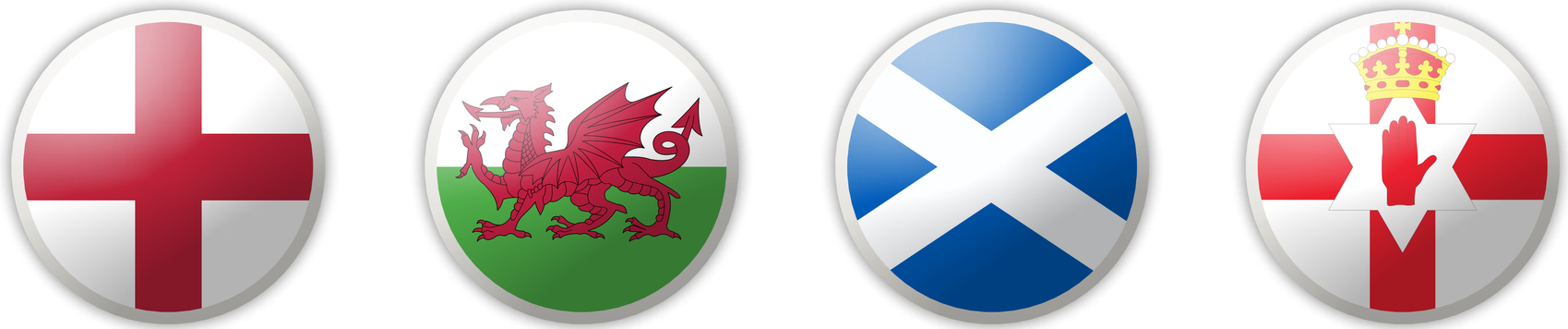
Diabetes as a priority for community pharmacy

- T2DM is a clinical priority for community pharmacy with specific NHS-funded services aimed at improving outcomes for people with the condition[1-4]
- Prescribing for diabetes is increasing
  - Prescription levels have increased every year for the past 10 years*[5]
  - Between 2015/16 and 2016/17 the number of prescriptions for diabetes increased by 4.7%*[5]

4.7% **of all medicines prescribed in primary care are for diabetes*[5]**

*These figures do not distinguish between treatment for type 1 and type 2 diabetes.

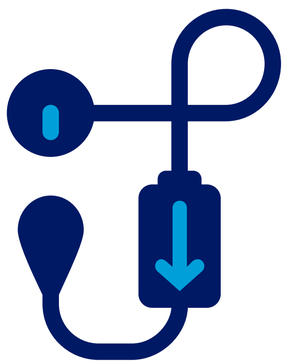
Patients with diabetes are a target group for a number of government-funded community pharmacy services



Type 2 diabetes mellitus (T2DM) is a chronic metabolic condition characterised by insulin resistance and insufficient pancreatic insulin production, resulting in hyperglycaemia[1]

T2DM is commonly associated with:[1-3]

Hyperlipidaemia
patients will often be on a lipid lowering drug



Hypertension
patients will often be on a blood pressure lowering drug

Obesity
patients will often be on a weight loss programme or medicine

Increased cardiovascular risk
leading to long-term microvascular and macrovascular complications

Reduced quality of life and life expectancy

Glycaemic control, weight management and cardiovascular risk management are all important in the management of T2DM[4-7]

- Patient risk factors
- T1DM vs. T2DM
- Obesity and CV risk

Impact of diabetes

Data shown on this page may include other types of diabetes

59% of people with diabetes (excluding T1DM) **DO NOT** achieve three key treatment targets in the UK[1]

£10 BILLION

Spent by the NHS on diabetes each year.[2] It has been estimated that **£7.7 BILLION** is spent on diabetes **COMPLICATIONS** (type 1 and 2)[3]

People with diabetes account for **ONE IN FIVE HOSPITAL ADMISSIONS** for heart attacks, stroke or heart failure in England and Wales[4]

People with T2DM have a **TWO-FOLD** increased risk of ischaemic **STROKE** within the first 5 years of diabetes diagnosis compared with the general population[4]

ONE IN THREE PEOPLE with diabetes may go on to **DEVELOP KIDNEY DISEASE** in the UK[5]

Around **7,000** leg, foot or toe **AMPUTATIONS** are performed in England each year due to diabetes[6]

How do national figures translate in your locality?

231

Average number of patients with T2DM per community pharmacy in England and Wales[1-4]

59.2%

of patients with T2DM diabetes do not meet targets*[1]

137

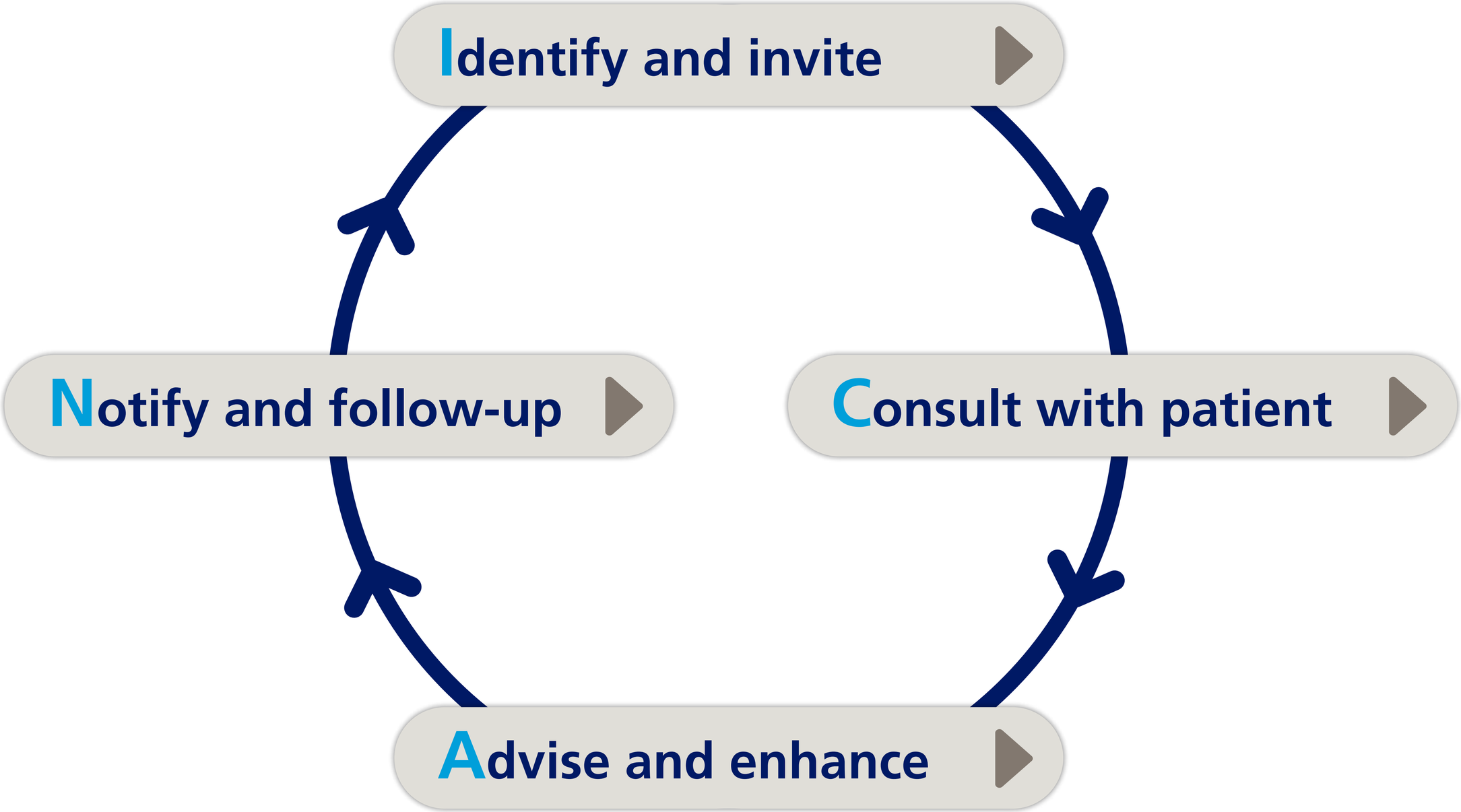
Average number of patients not meeting treatment targets per community pharmacy in England and Wales[1-4]

Offering reviews:

- May allow you to improve the health of your patients, particularly those not currently meeting treatment targets
- Contributes to your targets for services such as medicines use reviews
- Potentially increases patient retention so they return to you for other services such as dispensing and over the counter medicines

*Concurrent achievement of all three NICE recommended glucose, blood pressure and serum cholesterol levels.[1]

I CAN improve T2DM patient outcomes



What to ask?

T-TWO-DM

T Timing	Is the patient taking their medicines at the correct time and in relation to food/meals?	If not explore any reasons behind incorrect use or issues contributing to difficulties with timing and provide patient with advice on correct use or practical ways to resolve timing issues
T Technique	Is the patient comfortable injecting and are they injecting correctly?	If not, provide advice on correct injection technique or refer to their specialist nurse
W Wise about their diabetes medicines?	Does the patient know why they're taking the medicine and the outcomes of taking/not taking it	If not, let the patient know why they're taking each medicine and what the outcomes will be for them
O Observations and checks	Is the patient receiving all annual checks?*	If not, refer patient to GP for clinical checks to be arranged, make the GP aware in any feedback provided
D Driving	Does the patient know about their responsibility when driving?	If not, provide patient with overview and direct to DVLA information
M Managing hypoglycaemia	Does the patient know the signs of hypoglycaemia and how to self-treat hypoglycaemia?	If not, provide patient with advice on the signs of hypoglycaemia and how to treat it

*HbA_{1c}, blood pressure, serum cholesterol, serum creatinine, urine/albumin creatinine ratio, foot risk surveillance, Body Mass Index, smoking history, digital retinal screening.

Combination products

Insulins

Biguanides

Sulfonylureas

Glucagon-like peptide-1 receptor agonists

Medicine information hub

Alpha glucosidase inhibitors

Sodium glucose co-transporter 2 inhibitors

Dipeptidyl-peptidase-4 inhibitors (gliptins)

Thiazolidinedione

Meglitinides

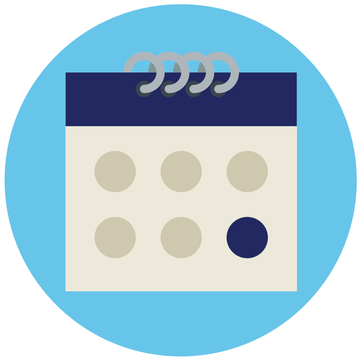
Patient safety | Guidelines | Outcomes | Medicines and food

Addressing patient questions

In this section

Does injecting insulin hurt?

How do I inject my medicine?



How long will I be on treatment for?

Can I go on holiday?

Can I fast?

Can I drive?

How do I dispose of my injectable medicine and equipment?

What do I do if I'm sick or have diarrhoea?

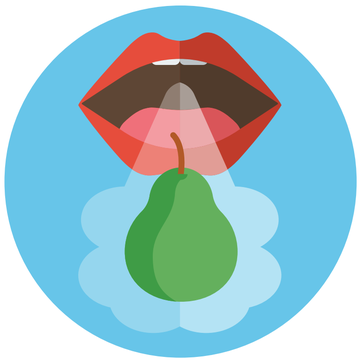
Ensuring your patient stays well

This section provides an overview of some key areas relevant to managing T2DM so you can better advise patients.

Annual care processes

Self-monitoring of blood glucose for type 2 diabetes

Hypoglycaemia



Diabetic ketoacidosis

Sick day rules

Additional questions

Guidance and signposting

Support for patients

Patient education

Patient support programmes

Information prescriptions

Diabetes UK has produced a number of information prescriptions that can be given to patients.

Information prescriptions can be downloaded from the Diabetes UK website

What to do now

- Enhance your knowledge with this training pack so you feel confident in undertaking reviews with patients with T2DM
- Identify local services which you can signpost your patients to for further support in managing their T2DM
- Identify which of your patients may be suitable for review and seek to arrange a review

- Revalidate your practice[1]
  - Consider recording this training as a continuing professional development entry
  - Consider your learnings from this training and from undertaking such medicines reviews when completing your reflective account (from 2019 revalidation submission cycle)
  - https://www.mygphc.org

Patients with diabetes form part of the target group for medicines use reviews (MURs)

Targeted MURs – 70% of MURs should be targeted[1]			MUR[2]
Cardiovascular MUR	**High risk medicines MUR**	**Post-discharge MUR**	**MUR**
Patients at risk of or diagnosed with cardiovascular disease and regularly being prescribed at least **four medicines** will qualify for a Cardiovascular risk MUR. Patients must be prescribed at least one medicine from the following medicines categories: • Cardiovascular • Diabetes • Thyroid	Receiving at least **one medicine** from the following medicines categories: • Diuretics • Antiplatelets • Anticoagulants • NSAIDs	Receiving two or more medicines and the patient has been discharged from hospital within the previous eight weeks AND has had changes to the medicines they are taking while in hospital. Patients in this group should ideally be offered an MUR within four weeks of discharge.	Patient eligible if they have been taking **multiple medicines** dispensed by the pharmacy for the previous **three months (the three-month rule).**

Prescription intervention MURs

Wales: MURs

There are differences between the arrangements for MUR services in England and Wales.
The key differences are that in Wales:

- The need for patients to have received services from the pharmacy for a period of three months do not apply
- The MUR National Target groups are different

Patients with diabetes can fall under one of the following groups:

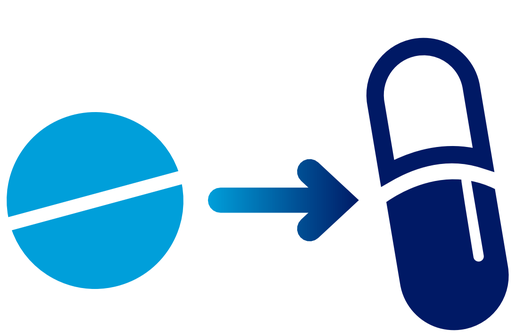
Targeted MURs – 70% of MURs should be targeted[1]			MUR[2]
Patients taking antihypertensive medication	**High risk medicines MUR**	**Patients prescribed a medicine no longer required**	**MUR**
Patients must be prescribed at least **one medicine** from the following medicines categories: • Cardiovascular • Diabetes • Thyroid	Receiving at least **one medicine** from the following medicines categories: • Diuretics • Antiplatelets • Anticoagulants • NSAIDs	In order for patients to be eligible for this MUR they must be identified as being in one of the following groups: • Repeat prescriptions are not synchronised • When required (PRN) medicines are ordered routinely • Medicines waste is returned to the pharmacy	Patient eligible if they have been taking **two or more medicines.** At the pharmacist's professional discretion an MUR can be undertaken on a patient taking one medicine. This decision should be recorded.

The Discharge Medicines Review (DMR) service

Patients discharged from a care setting will be eligible for the service:[1]

- Where the pharmacy is in receipt of the Discharge Advice Letter (DAL) resulting from the most recent discharge, either from the patient, their carer, or from a healthcare professional

And where any of the following criteria are met:[1]



The patient's medicines have been changed during their stay in the care setting from which they are being discharged

The patient is taking four or more medicines

The patient's medicine requires dispensing into a multi-compartment compliance device

The pharmacist has, in their professional opinion, reason to consider that the patient would benefit from the service

Scotland: Chronic Medication Service

- Available to patients with a long term condition (e.g. T2DM)[1]
- Involves collaborative working between GPs and their practice teams, community pharmacists and patients[1]

Northern Ireland: Managing Your Medicines

The service is designed for patients who are:[1]

1. Taking four or more medications (systemic, non prn)

OR

2. Taking any high risk medicines e.g. digoxin, warfarin, diuretics, lithium, methotrexate, phenytoin, NSAIDs, insulin, antiplatelets

AND WHO HAVE

3. Low level of support for managing medicines

OR

4. Poor prescription compliance/ administration compliance (evident from pharmacy or GP patient records)

OR

5. Been recently discharged from hospital with a significant medication change

Patients meeting these criteria will be identified by the pharmacist (or referred by other professionals). Following patient consent and notification to their GP, the pharmacist will review the patient's medicines, identifying any problems and appropriate remedial action. A report will be forwarded to the GP, specifying action points including any requiring GP co-operation. A follow-up interview may be carried out if appropriate to assess outcomes.

Diabetes is one of only two clinical areas eligible for MURs in Northern Ireland

An MUR can be carried out for all respiratory patients or patients with diabetes who are taking multiple medicines, including one or more of the following medicines included in the following categories:[1]

- Adrenoceptor agonists
- Antimuscarinic bronchodilators
- Theophylline
- Compound bronchodilator preparations; Corticosteroids
- Cromoglicate and related therapy
- Leukotriene receptor antagonists and phosphodiesterase type-4 inhibitors
- Insulins
- Antidiabetic drugs

Glycaemic control, weight management, and cardiovascular risk management must work in synergy for optimal T2DM management[1]

Good glycaemic control reduces cardiovascular risk[3]

Reducing weight improves glycaemic control[1]

Reducing weight reduces cardiovascular risk[2]

Weight loss of **10-15 kg** is associated with **REMISSION** to a non-diabetic state in >50% T2DM patients[4]
(baseline weight 101 kg, over 12 months)

T2DM is commonly associated with multimorbidities such as obesity and increased cardiovascular risk[1]

33%

of patients with T2DM did **NOT ACHEIVE** an **HbA_{1c}** of ≤58 mmol/mol (7.5%) in England and Wales in 2016/17*[2]

90%

of people with T2DM are **OVERWEIGHT or OBESE** in England[3]

#1

Cause of **DEATH AND DISABILITY** in diabetes worldwide[4]

*NICE recommends, involving adults with T2DM in decisions about their individual target. For adults with T2DM managed by lifestyle and diet or lifestyle and diet combined with one drug, a target of 48 mmol/mol (6.5%) is suggested. For adults on a drug associated with hypoglycaemia, a target HbA_{1c} of 7% (53 mmol/mol) is encouraged.[1]

Identify and invite

Identify

- Suitable patients can be identified from the patient medication record (PMR) or on presentation of a prescription
- Where undertaking a specific type of review (for example, an MUR), criteria for that review must be met
- Ensure medicines prescribed are for T2DM and not for an alternative diagnosis

Invite

- Patients can be invited for review at the point of dispensing
- The review service can be advertised in the pharmacy
- Appropriate consent should be obtained from the patient when undertaking a review service

MUR: Medicines Use Review

Consult with patient

What to look for in a review

Medicines Use Review

New Medicine Service

Chronic medication service

Medicines Use Review

Discharge medicines review

Medicines Use Review

Managing your medicines

What to look for in a review

ARE PATIENTS RECEIVING ALL APPROPRIATE MEDICINES?

Patients being treated for T2DM will not just be receiving anti-diabetes medicines; T2DM management is a holistic approach of managing blood glucose levels as well as cardiovascular risk – it is important to ensure all patients are receiving all indicated medicines for diabetes and co-morbidities.[1]

ARE PATIENTS ABLE TO USE THEIR MEDICINES APPROPRIATELY?

This may include asking questions that ascertain:

- Injection technique
- If medicines are being used as intended
- Whether there are adherence issues and what is the cause of these issues

DO PATIENTS HAVE THE KNOWLEDGE TO ALLOW THEM TO USE THEIR MEDICINES APPROPRIATELY?

This may include asking questions that ascertain:

- If they understand why they are taking their medicine?
- Whether they received appropriate counselling and/or training on how to take their medicines?
- If they are aware of what will happen if they do not take their medicines or do not take them as intended?

MUR: suggested questions

PSNC Suggested question[1]	Additional prompts for patients with type 2 diabetes
1. How are you getting on with your medicines?	
2. How do you take or use each of these medicines?	Can you tell me how many units of insulin you inject at different times of day? At what times of day do you take this medicine? Which dose do you select on your GLP-1 agonist? Do you take this medicine with meals?
3. Are you having any problems with your medicines, or concerns about taking or using them?	How are you getting on with your medicines? How are you managing with injecting your medicines? (if relevant)
4. Do you think they are working? *Prompt: is this different from what you were expecting?*	What have you been told are the benefits of your medicines? Does your doctor ask you to monitor your blood glucose? Do you know what is done with the results?
5. Do you think you are getting any side effects or unexpected effects?	Have you had any episodes of hypoglycaemia in the past few months? Do you know how to manage an episode of hypogylcaemia? Do you know the signs of hypoglycaemia? Hypoglycaemia
6. People often miss taking doses of their medicines, for a wide range of reasons. Have you missed any doses of your medicine, or changed when you take it? *Prompt: when did you last miss a dose?*	Is there a particular medicine you often miss taking? Is there a time of day when you tend to miss taking medicines?
7. Do you have anything else you would like to know about your medicines or is there anything you would like me to go over again? *Prompt: Are you happy with the information you have on your medicines?*	Have you been offered the chance to go on an NHS training course about your diabetes? Have you had your weight checked recently? Have you had your annual health checks - eyes, kidneys, feet, blood pressure, cholesterol? Do you drive? Are you aware of your requirements for driving? Do you have any specific questions about your diabetes medicines? Medicines information hub

Chronic medication service: pharmaceutical care risk assessment questionnaire

Pharmaceutical care issues which affect the patient:[1]	Additional prompts for patients with type 2 diabetes
Care issue with the appropriateness of the medicines	How are you getting on with your medicines? How are you managing with injecting your medicines? (if relevant)
Care issue with the formulation of the medicines	At what times of day do you take this medicine? Do you take this medicine with meals?
Care issue with the dosage and frequency of the medicines	
Care issue with a contraindication	
Drug interaction with one or more medicines	
Side effects with one or more medicines	Have you had any episodes of hypoglycaemia in the past few months? Do you know the signs of hypoglycaemia? Do you know how to manage an episode of hypogylcaemia?
Problems with concordance	Is there a particular medicine you often miss taking? Is there a time of day when you tend to miss taking medicines?
Care issue in relation to polypharmacy	
Pharmacokinetic risk factors	
Pharmacodynamic risk factors	
Disease risk factor	
Taking one or more medicines with a narrow therapeutic index	
Taking one or more black triangle medicines	
Duplication of medication	

Chronic medication service: pharmaceutical care risk assessment questionnaire

Example pharmaceutical care risk assessment questionnaire for a patient with T2DM[1]

Pharmaceutical care issues	Desired outcomes	Proposed actions
Patient's HbA_{1c} above target level	To reach target HbA_{1c} in three months' time	Counsel patient on medicines adherence
Blood pressure above target level	To reach target blood pressure in one month	Refer patient back to GP to assess current hypertension treatment
Patient's cholesterol above target level	To reach target cholesterol level	Refer to GP for hyperlipidaemia management. Provide healthy eating advice
Injection site pain	Reduced or no injection site pain	Counselling on injection technique
Patient's sharps box is getting too full	Appropriate capacity to dispose of hypodermic equipment	Request a larger sharps bin or more frequent collection
Patient is not taking medicines as intended	Patient to take medicine as intended	Counselling on use of medicines Follow-up with patient
Patient overweight	To reduce patient weight	Refer patient to approriate weight loss programme. Provide guidance on healthy eating

Wales: MUR

Example action plan for a patient with T2DM[1]

Issue	Recommendation
Patients HbA_{1c} above target level	Counsel patient on medicines adherence
Blood pressure above target level	Refer patient back to GP to assess current hypertension treatment
Injection site pain	Counselling on injection technique
Patient is not taking medicines as intended	Counselling on use of medicines Follow-up with patient
Patient's cholesterol above target level	Refer to GP for hyperlipidaemia management. Provide healthy eating advice
Patient overweight	Refer patient to approriate weight loss programme. Provide guidance on healthy eating

Managing your Medicines

Medicines name and directions	Knowledge gaps identified[1]	General comments relating to issues
	• Name • Reason for taking • Dosage/frequency directions • Special instructions • Medication dispensed which does not correspond to that currently used • Inappropriate formulations (e.g. swallowing problems)	

Managing your Medicines

Question[1]	Additional prompts for patients with type 2 diabetes
Did the patient mention any conditions which appear to be untreated?	
Do you have concerns about the appropriateness of the therapy? (Are there additional medicines required or medicines no longer required?)	
Is there an opportunity to optimise medication? (e.g. generic substitution, dose optimisation, product standardisation)	
Do you ever have difficulty in ordering or collecting your prescription from the doctor or pharmacy? If YES, please give details.	
Do you ever run out of any of your medicines? If YES, please give details.	
Have you ever had any unpleasant effects from any current or recent medication which you have taken?	Have you had any episodes of hypoglycaemia in the past few months? Do you know the signs of hypoglycaemia? Do you know how to manage an episode of hypogylcaemia?
In the past six months have you taken any other medicines apart from those you get from your doctor? (e.g. any medicines bought OTC or herbal medicines)	

Managing your Medicines

Question[1]	Additional prompts for patients with type 2 diabetes
Does the patient have difficulty with storage of medication?	Do you know how your medicine should be stored once you have started using it? Do you have enough space in your fridge? Do you ever put these medicines in your freezer? If travelling, do you store appropriately in a cold pack or similar?
Do you require someone to help you to take your medicines as prescribed by your doctor?	
How do you remember to take your medicines?	Is there a particular medicine you often miss taking? Is there a time of day when you tend to miss taking medicines?
How often do you choose not to take your prescribed medicines?	
If you do not take your medicines as prescribed, why do you choose not to?	At what times of day do you take this medicine? Do you take this medicine with meals?
Do you alter the times you take your medicines? Please give details why.	
Do you have problems with the packaging or containers in which the medicines prescribed for you are dispensed?	
Would you please read the small print on your medication container?	
Do you know how to monitor the control of your condition?	What have you been told are the benefits of your medicines? Does your doctor ask you to monitor your blood glucose? Do you know what is done with the results?
Do you attend the GP for health checks?	Have you had your annual health checks - eyes, kidneys, feet, blood pressure, cholesterol?

Patients with diabetes are commonly prescribed new therapies and could require the ‘New Medicine Service’ (NMS)[1]

Patients with T2DM are a priority group eligible to receive an NMS[1]

Medicines should be from the following BNF categories:[1]

- Short acting insulins
- Intermediate and long acting insulins
- Antidiabetic drugs (oral and injectable)

NMS intervention interview schedule

PSNC Suggested question[1]	Additional prompts for patients with type 2 diabetes
1. Have you had the chance to start taking your new medicine yet?	Identify any issues why a patient may not have started taking a medicine yet such as fear of injection or concern about hypoglycaemia.
2. How are you getting on with it?	Are you comfortable with your injection technique? How are you getting on with your medicines? How are you managing with injecting your medicines? (if relevant)
3. Are you having any problems with your new medicine, or concerns about taking it?	Are you concerned about injecting your medicine?
4. Do you think it is working? *Prompt: is this different from what you were expecting?*	Do you know what you are taking this medicine for? Does your doctor ask you to monitor your blood glucose?
5. Do you think you are getting any side effects or unexpected effects?	Have you had any episodes of hypoglycaemia since taking the medicine? Do you know the signs of hypoglycaemia?
6. People often miss taking doses of their medicines, for a wide range of reasons. Have you missed any doses of your new medicine, or changed when you take it? *Prompt: when did you last miss a dose?*	Identify any issues why a patient may not take a medicine such as fear of injection or concern about hypoglycaemia or weight gain or the patient not being clear on how to take the medicine.
7. Do you have anything else you would like to know about your new medicine or is there anything you would like me to go over again?	Do you know how to store your medicine? Have you received an insulin passport?

NMS follow-up interview schedule

PSNC Suggested question[1]	Additional prompts for patients with type 2 diabetes
1. How have you been getting on with your new medicine since we last spoke? *Prompt: are you still taking it?*	Identify if there are any issues that are now preventing the patient using their medicine or if any previous ones have been resolved. Is there any way you can advise the patient?
2. Last time we spoke, you mentioned a few issues you'd been having with your new medicine. Shall we go through each of these and see how you're getting on?	How are you getting on with your medicines? How are you managing with injecting your medicines? (if relevant)
3. A) The first issue you mentioned was [refer to specific issue] – is that correct? **B) Did you try [the advice / solution recommended at the previous contact] to help with this issue?**	
4. Did you try anything else?	
5. Did this help? *Prompt: how did it help?*	
6. Is this still a problem or concern?	Have you had any episodes of hypoglycaemia in the past few months? Do you know the signs of hypoglycaemia? Do you know how to manage an episode of hypogylcaemia?
7. Have there been any other problems/concerns with your new medicine since we last spoke?	
8. People often miss taking doses of their medicines, for a wide range of reasons. Since we last spoke, have you missed any doses of your new medicine, or changed when you take it? *Prompt: when did you last miss a dose?*	Is there a particular medicine you often miss taking? Is there a time of day when you tend to miss taking medicines?

DMR: DMR 1

Medicines queries/issues[1]	Additional prompts for patients with type 2 diabetes
Restarted in the community after discharge	
Discontinued in the community after discharge	
Continued but at wrong dose	
Continued but at wrong strength	
Continued but in wrong formulation	
Duplicated (prescribed by brand and generic name)	
Other	

DMR: DMR 2

Example action plan for a patient with T2DM[1]

Issue	Recommendation
Patient's HbA_{1c} above target level	Counsel patient on medicines adherence
Blood pressure above target level	Refer patient back to GP to assess current hypertension treatment
Injection site pain	Counselling on injection technique
Patient is not taking medicines as intended	Counselling on use of medicines Follow-up with patient
Patient's cholesterol above target level	Refer to GP for hyperlipidaemia management. Provide healthy eating advice
Patient overweight	Refer patient to approriate weight loss programme. Provide guidance on healthy eating

NI: Medicines Use Review

Example action plan for a patient with T2DM[1]

Issue	Recommendation
Patient's HbA_{1c} above target level	Counsel patient on medicines adherence
Blood pressure above target level	Refer patient back to GP to assess current hypertension treatment
Injection site pain	Counselling on injection technique
Patient is not taking medicines as intended	Counselling on use of medicines Follow-up with patient

Advise and enhance

Advise the patient on the safe and appropriate use of their medicines.

Encourage patients to discuss their medicines and build a relationship with the patient so that he or she feels comfortable to return to you for future advice, services and dispensing of prescriptions

- Clarify whether patients have received other appropriate care processes for their diabetes
- Help the patient to have a complete picture of their treatment and the reasons why they are on the medicine
- Equip patients with the knowledge to enable them to take their medicines effectively and as safely as possible
- Remind patients, where appropriate, of there responsibility with regards to driving
- Signpost patients to other appropriate services

Notify and follow-up

Notify

- Fill out appropriate feedback forms for the service provided for the patient
- Aim to provide the prescriber with as much detail as possible about:
  - The medicines the patient is taking
  - The outcomes of the consultation
  - Any medicines-related issues identfied in the consultation
  - Any advice provided
  - Any other issues identified in the consultation such the patient not having received all appropriate care processes, reports of frequent hypoglycaemia
- Fill out appropriate paperwork for remuneration

Follow-up

- Undertake any appropriate follow up reviews with patients
- Check how patient is getting on at each point of dispensing

Patient safety

High strength, fixed combination or biosimilar insulin[1]

Patients starting treatment with a high strength, fixed combination or biosimilar insulin product should:

- Read and understand the patient leaflet and any patient education material
- Receive appropriate training on the correct use of the product
- Receive a patient booklet and Insulin Passport (or safety card)
- Be advised only to use insulin as they have been trained because using it any other way may result in a dangerous overdose or underdose

High strength insulin (insulin >100 units/mL)	Tresiba® (insulin degludec) 200 units/mL Humalog® (insulin lispro) 200 units/mL Toujeo® (insulin glargine) 300 units/mL
Combination product	Xultophy® ▼ (insulin degludeg 100 units/mL and liraglutide 3.6 mg/mL)
Biosimilar insulin	Abasaglar® ▼ (insulin glargine 100 units/mL)

Safety warnings

YellowCard reporting

Guidelines

NICE:
type 2 diabetes
in adults

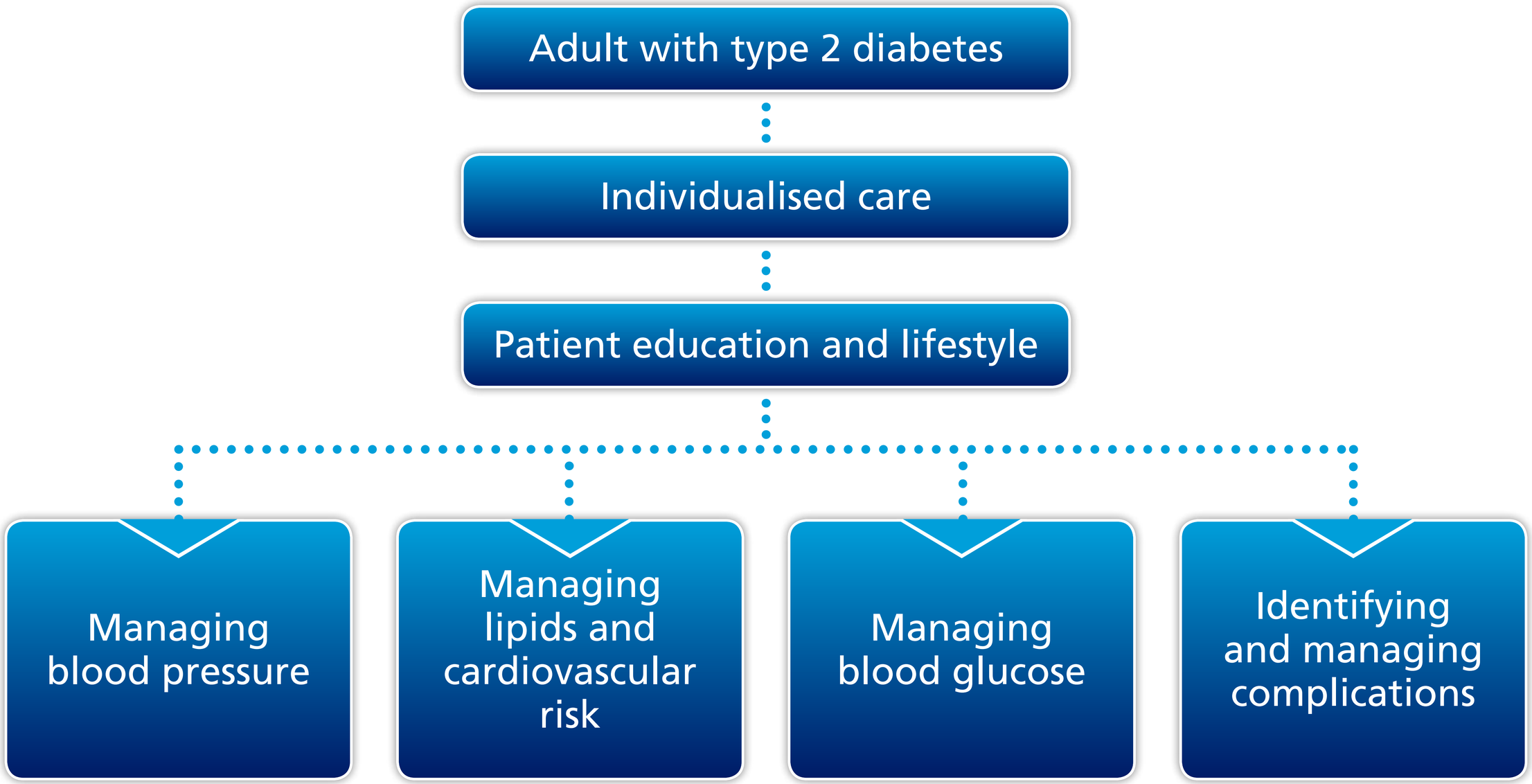
NICE:
managing blood
glucose

NICE:
Algorithm for
blood glucose

SIGN

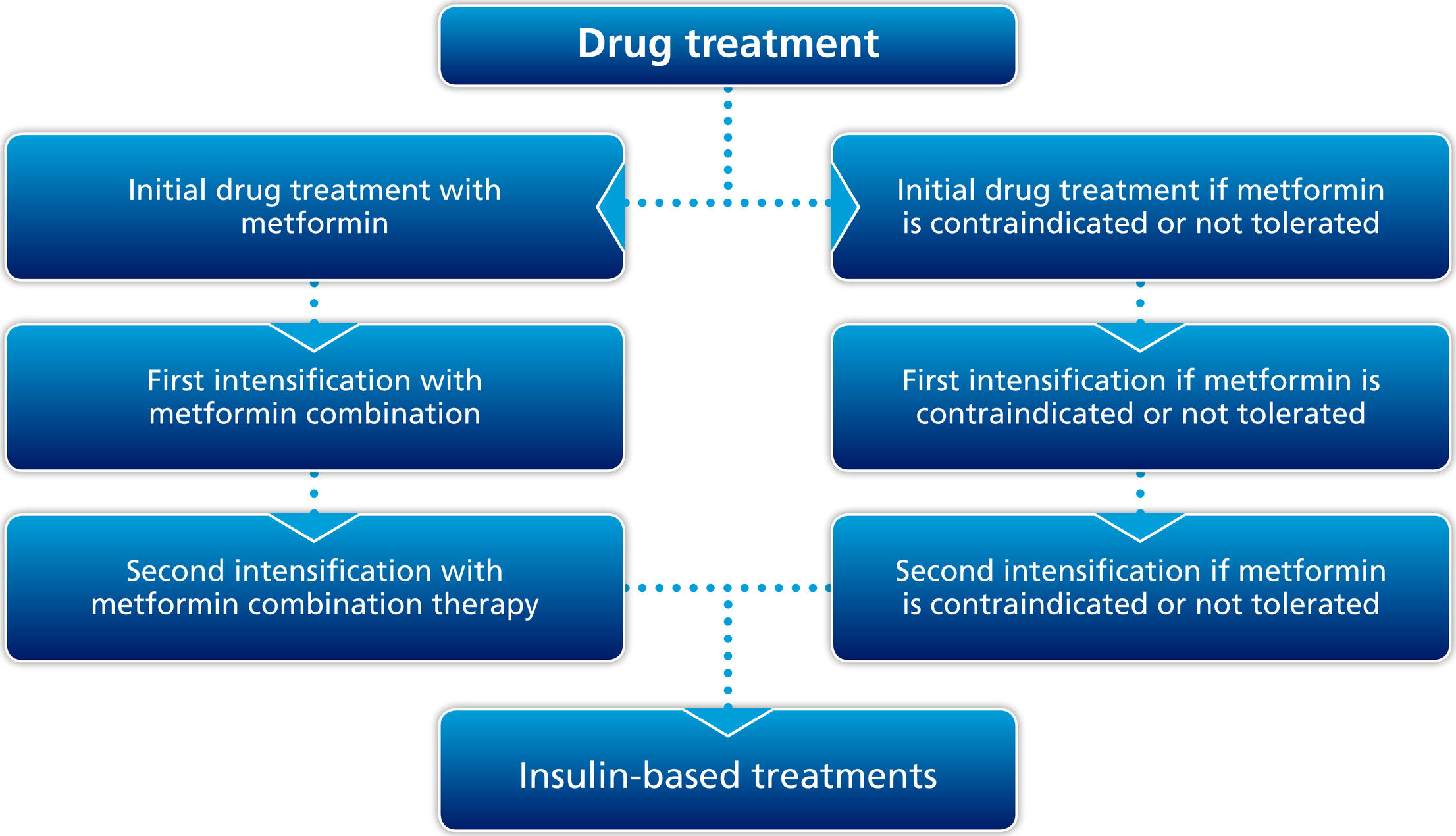
SIGN: Scottish Intercollegiate Guidelines Network.

NICE algorithm: type 2 diabetes in adults[1]



Adapted from NICE. Type 2 diabetes in adults overview.[1]

NICE: managing blood glucose in adults with type 2 diabetes



Adapted from NICE. Managing blood glucose in adults with type 2 diabetes.[1]

Algorithm for blood glucose lowering therapy in adults with type 2 diabetes*[1]

NICE National Institute for Health and Care Excellence

If the person is symptomatically hyperglycaemic, consider insulin or an SU. Review treatment when blood glucose control has been achieved.

ADULT WITH TYPE 2 DIABETES WHO CAN TAKE METFORMIN

If HbA_{1c} rises to 48 mmol/mol (6.5%) on lifestyle interventions:

- Offer standard-release metformin
- Support the person to aim for an HbA_{1c} level of 48 mmol/mol (6.5%)

→ If standard-release metformin is not tolerated, consider a trial of modified-release metformin

FIRST INTENSIFICATION
If HbA_{1c} rises to 58 mmol/mol (7.5%):

- Consider dual therapy with:
  - metformin and a DPP-4i
  - metformin and pioglitazone[a]
  - metformin and an SU
  - metformin and an SGLT-2i[b]
- Support the person to aim for an HbA_{1c} level of 53 mmol/mol (7.0%)

SECOND INTENSIFICATION
If HbA_{1c} rises to 58 mmol/mol (7.5%):

Consider:

- Triple therapy with:
  - metformin, a DPP-4i and an SU
  - metformin, pioglitazone[a] and an SU
  - metformin, pioglitazone[a] or an SU and an SGLT-2i[b]
  - insulin-based treatment
- Support the person to aim for an HbA_{1c} level of 53 mmol/mol (7.0%)

→ If triple therapy is not effective, tolerated or contraindicated, consider combination therapy with metformin, an SU and a GLP-1 mimetic[c] for adults with type 2 diabetes who:

- Have a BMI of 35 kg/m² or higher (adjust accordingly for people from black, Asian and other minority ethnic groups) and specific psychological or other medical problems associated with obesity,

or

- Have a BMI lower than 35 kg/m², and for whom insulin therapy would have significant occupational implications, or weight loss would benefit other significant obesity-related comorbidities

METFORMIN CONTRAINDICATED OR NOT TOLERATED

If HbA_{1c} rises to 48 mmol/mol (6.5%) on lifestyle interventions:

- Consider one of the following[d]:
  - a DPP-4i, pioglitazone[a], or an SU
  - an SGLT-2i[b] instead of a DPP-4i if an SU or pioglitazone is not appropriate
- Support the person to aim for an HbA_{1c} level of 48 mmol/mol (6.5%) for people on a DPP-4i, SGLT-2i or pioglitazone or 53 mmol/mol (7.0%) for people on an SU

FIRST INTENSIFICATION
If HbA_{1c} rises to 58 mmol/mol (7.5%):

- Consider dual therapy[e] with:
  - a DPP-4i and pioglitazone[a]
  - a DPP-4i and an SU
  - Pioglitazone[a] and an SU
- Support the person to aim for an HbA_{1c} level of 53 mmol/mol (7.0%)

SECOND INTENSIFICATION
If HbA_{1c} rises to 58 mmol/mol (7.5%):

- Consider insulin-based treatment
- Support the person to aim for an HbA_{1c} level of 53 mmol/mol (7.0%)

Insulin-based treatment

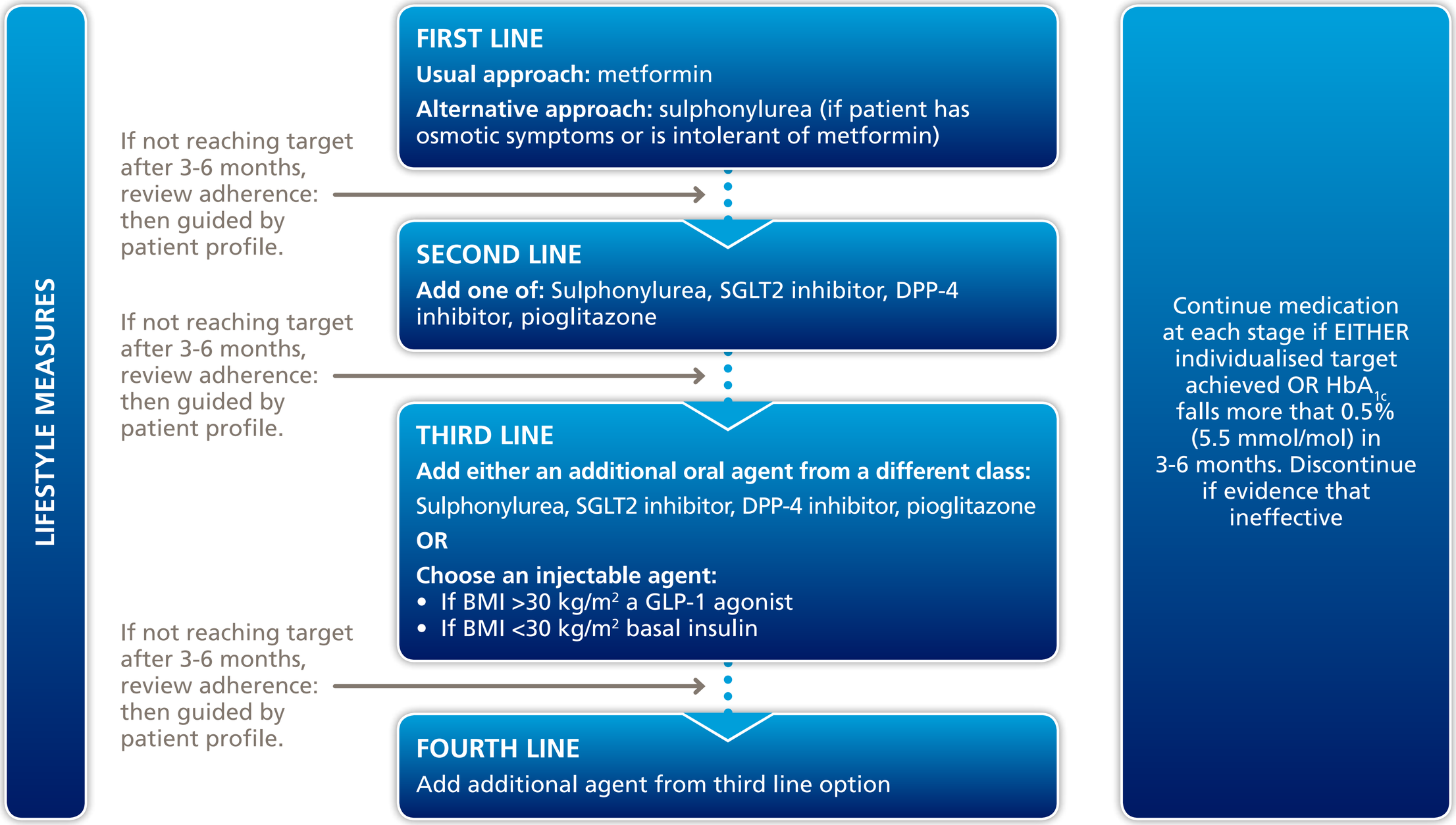
- When starting insulin, use a structured programme and continue metformin for people without contraindications or intolerance. Review the continued need for other blood glucose lowering therapies[f]
- Offer NPH insulin once or twice daily according to need
- Consider starting both NPH and short-acting insulin either separately or as pre-mixed (biphasic) human insulin (particularly if HbA_{1c} is 75 mmol/mol (9.0%) or higher)
- Consider, as an alternative to NPH insulin, using insulin detemir or glargine[g] if the person: needs assistance to inject insulin, lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes or would otherwise need twice-daily NPH insulin in combination with oral blood glucose lowering drugs
- Consider pre-mixed (biphasic) preparations that include short-acting insulin analogues, rather than pre-mixed (biphasic) preparations that include short-acting human insulin preparations, if: the person prefers injecting insulin immediately before a meal, hypoglycaemia is a problem or blood glucose levels rise markedly after meals
- Only offer a GLP-1 mimetic[c] in combination with insulin with specialist care advice and ongoing support from a consultant-led multidisciplinary team[h]
- Monitor people on insulin for the need to change the regimen
- *An SGLT-2i in combination with insulin with or without other antidiabetic drugs is an option[b]*

BMI; body mass index: DPP-4i; dipeptidyl peptidase-4 inhibitor: GLP-1; glucagon-like peptide-1: NPH; neutral protamine Hagedorn: SU; sulphonylurea: SGLT-2; sodium–glucose cotransporter-2.

Footnotes

Objectives | Impact of diabetes | T2DM patient outcomes | What to ask? | Medicine info hub | Patient questions | Stay well | Guidance and signposting | What to do now

SIGN abbreviated algorithm for glucose lowering[1]



Adapted from SIGN. Pharmacological management of glycaemic control in people with type 2 diabetes.[1]

SGLT2 inhibitor: Sodium glucose co-transporter 2 inhibitors, DPP-4 inhibitor: Dipeptidylpeptidase-4 inhibitors.

Biguanides[1,2]

Drug names	Metformin
Mechanism of action	Metformin may act via 3 mechanisms:[1] • Reduction of hepatic glucose production by inhibiting gluconeogenesis and glycogenolysis • In muscle, by increasing insulin sensitivity, improving peripheral glucose uptake and utilisation • Delay of intestinal glucose absorption Metformin stimulates intracellular glycogen synthesis by acting on glycogen synthase. Metformin increases the transport capacity of all types of membrane glucose transporters (GLUTs) known to date.
Drug class counselling points	Take during or after meals. If you have severe vomiting, diarrhoea or fever speak to your doctor before continuing to take metformin. Avoid excessive alcohol intake. Be aware of hypoglycaemia if taking in combination with other glucose-lowering medicines.

(Individual product SPCs and PILs should be consulted for additional counselling points)

Sulfonylureas[1-6]

Drug names	Glibenclamide, gliclazide, glimepiride, glipizide, tolbutamide
Mechanism of action	Stimulating insulin secretion
Drug class counselling points	Patients should be aware of the signs of hypoglycaemia. Patients should be aware of what could precipitate hypoglycaemia such as skipping meals, dehydration, excessive exercise. Drivers need to consider DVLA guidance

Can I drive?

(Individual product SPCs and PILs should be consulted for additional counselling points)

Outcomes

Alpha glucosidase inhibitors[1,2]

Drug names	Acarbose
Mechanism of action	Acarbose exerts its activity in the intestinal tract. Competitive inhibition of intestinal enzymes (α-glucosidases) involved in the degradation that leads to a dose-dependent delay in the digestion of carbohydrates (disaccharides, oligosaccharides, and polysaccharides). Glucose derived from these carbohydrates is released and taken up into the blood more slowly reducing the postprandial rise in blood glucose, thus reducing blood glucose fluctuations.
Drug class counselling points	Take with a meal - chew tablets with first mouthful of food or swallow whole with a little liquid before starting a meal. Antacid preparations containing magnesium and aluminium salts should be avoided. Sugar and foods containing it can lead to severe abdominal discomfort and diarrhoea during treatment. Take glucose (or dextrose) to treat a hypoglycaemic episode not sucrose. Increased wind (flatulence), stomach rumbling and fullness and abdominal cramps may occur in the first 2 or 3 days. Contact GP if stomach and digestive side effects last longer then 2 or 3 days or if severe and associated with diarrhoea.

(Individual product SPCs and PILs should be consulted for additional counselling points)

Meglitinides[1,2]

Drug names	Nateglinide, repaglinide
Mechanism of action	Short-acting oral insulin secretagogue. Stimulates release of insulin from the pancreas. Dependent on functioning beta-cells in the pancreas islets.
Drug class counselling points	Nateglinide: take within 1 to 30 minutes before meals. Repaglinide: take before main meals. Patients should be aware of the signs of hypoglycaemia.

(Individual product SPCs and PILs should be consulted for additional counselling points)

Thiazolidinedione[1,2]

Drug names	Pioglitazone
Mechanism of action	Appears to act via activation of specific nuclear receptors (peroxisome proliferator activated receptor gamma) leading to increased insulin sensitivity of liver, fat and skeletal muscle cells. Pioglitazone reduces hepatic glucose output and increases peripheral glucose disposal in the case of insulin resistance.
Drug class counselling points	Can be taken with or without food. If your weight increases, inform your doctor (possible symptom of heart failure). If you experience unusual shortness of breath or rapid increase in weight or localised swelling (oedema), especially if you are over the age of 65, seek medical advice straight away (possible symptom of heart failure). Due to the risk of bladder cancer patients should be advised to promptly report any blood in urine, painful or difficult urination or urinary urgency during treatment. Due to risk of hepatotoxicity patients should be advised to seek immediate medical attention if symptoms such as nausea, vomiting, abdominal pain, fatigue and dark urine develop.

(Individual product SPCs and PILs should be consulted for additional counselling points)

Dipeptidylpeptidase-4 inhibitors (gliptins)[1-5]

Drug names	Alogliptin, linagliptin, saxagliptin, sitagliptin, vildagliptin
Mechanism of action	Inhibition of dipeptidylpeptidase-4 inhibitors (DDP-4) an enzyme involved in the inactivation of the incretin hormones glucagon-like peptide 1 (GLP-1) and glucose-dependent insulinotropic polypeptide (GIP). GLP-1 and GIP increases insulin biosynthesis and secretion from pancreatic beta cells, while GLP-1 also inhibits glucagon secretion and hepatic glucose production.
Drug class counselling points	Take with or without food. Patients should be informed of the characteristic symptoms of acute pancreatitis: persistent, severe abdominal pain.

(Individual product SPCs and PILs should be consulted for additional counselling points)

Outcomes

Objectives | Impact of diabetes | T2DM patient outcomes | What to ask? | Medicine info hub | Patient questions | Stay well | Guidance and signposting | What to do now

Sodium glucose co-transporter 2 inhibitors[1-3]

Drug names	Canagliflozin▼, dapagliflozin, empagliflozin▼
Mechanism of action	Inhibition of sodium glucose co-transporter 2 (SGLT2), the predominant transporter in the proximal renal tubules responsible for reabsorption of glucose from the glomerular filtrate back into the circulation. Inhibition of SGLT2 reduces reabsorption of filtered glucose and lowers the renal threshold for glucose and thereby increases urinary glucose excretion, lowering elevated plasma glucose concentrations.
Drug class counselling points	Patients should be aware of the signs of diabetic ketoacidosis. Patients should be aware to report signs of urinary tract infections.

Diabetic ketoacidosis (DKA)

(Individual product SPCs and PILs should be consulted for additional counselling points)

Outcomes

Glucagon-like peptide-1 receptor agonists[1-6]

Drug names	Dulaglutide▼, exenatide, liraglutide, lixisenatide, semaglutide*
Mechanism of action	Increase the secretion of insulin from pancreatic beta cells, inhibits glucagon secretion and decreases weight. The GLP-1 receptor is the target for native GLP-1, an endogenous incretin hormone that potentiates glucose-dependent insulin secretion from the pancreatic beta cells. GLP-1 receptor agonists are not insulin and work differently.
Drug class counselling points	Injected subcutaneously in the thigh, abdomen or upper arm. Patients should be informed of the characteristic symptom of acute pancreatitis: persistent, severe abdominal pain. Initial gastrointestinal effects subside with time. GLP-1 receptor agonists are not subject to specific DVLA requirements (although concomitant drugs or co-morbidities may be).

Can I drive?

(Individual product SPCs and PILs should be consulted for additional counselling points)

* Due to be launched in January 2019[7]

Outcomes

Anti-diabetes medicines and effect on HbA_{1c}, weight and risk of hypoglycaemia when taken with metformin

	GLP-1 RAs	DPP-4is	SUs	SGLT-2is
HbA_{1c}-lowering effect	HIGH	INTERMEDIATE	HIGH	INTERMEDIATE
Weight	LOSS	NEUTRAL	GAIN	LOSS
Risk of hypoglycaemia	LOW	LOW	MODERATE	LOW

Adapted from Inzucchi SE, *et al*. 2015.[1]

GLP-1 RAs: glucagon-like peptide-1 receptor agonists; DPP-4is: dipeptidyl peptidase-4 inhibitors; SUs: sulphonylureas; SGLT-2is: sodium glucose cotransporter-2 inhibitors.

Combination products[1]

Brand name	Drugs	
Competact®	pioglitazone	metformin
Eucreas®▼	vidagliptin	metformin
Jentadueto®	linagliptin	metformin
Janumet®	sitagliptin	metformin
Komboglyze®	saxagliptin	metformin
Qtern®	saxagliptin	dapagliflozin
Synjardy®▼	empagliflozin	metformin
Vipdomet®	alogliptin	metformin
Vokanamet®▼	canagliflozin	metformin
Xigduo®	dapagliflozin	metformin

Refer to individual SPCs for the most up-to-date information available at: www.medicines.org.uk

Insulins

- Prefilled insulin pens
- Rapid-acting insulin
- Reusable insulin pens
- Intermediate-acting insulins
- Long-acting insulin
- Intermediate-acting combined with rapid-acting

Insulin regimens

Intermediate-acting insulins[1]

Intermediate-acting insulins (isophane insulin) have an intermediate duration of action, designed to mimic the effect of endogenous basal insulin. When given by subcutaneous injection, they have an onset of action of approximately 1–2 hours, a maximal effect at 3–12 hours, and a duration of action of 11–24 hours.

Non-proprietary name	Brand names	
Isophane insulin	Humulin I®	Insulin human (as Insulin isophane human) 100 unit per 1 ml
	Hypurin Bovine Isophane® 100 units/ml	Insulin bovine (as Insulin isophane bovine) 100 unit per 1 ml
	Hypurin Porcine Isophane® 100 units/ml	Insulin porcine (as Insulin isophane porcine) 100 unit per 1 ml
	Insulatard® 100 units/ml suspension for injection	Insulin human (as Insulin isophane human) 100 unit per 1 ml
	Insuman Basal® 100 units/ml suspension	Insulin human (as Insulin isophane human) 100 unit per 1 ml
Biphasic isophane insulin	Humulin M3®	Insulin human (as Insulin isophane human) 70 unit per 1 ml Insulin human (as Insulin soluble human) 30 unit per 1 ml
	Hypurin Porcine 30/70 Mix®	Insulin porcine (as Insulin isophane porcine) 70 unit per 1 ml Insulin porcine (as Insulin soluble porcine) 30 unit per 1 ml
	Insuman Comb 15®	Insulin human (as Insulin isophane human) 85 unit per 1 ml Insulin human (as Insulin soluble human) 15 unit per 1 ml
	Insuman Comb 25®	Insulin human (as Insulin isophane human) 75 unit per 1 ml Insulin human (as Insulin soluble human) 25 unit per 1 ml
	Insuman Comb 50®	Insulin human (as Insulin isophane human) 50 unit per 1 ml Insulin human (as Insulin soluble human) 50 unit per 1 ml

Rapid-acting insulin[1]

Rapid-acting insulins have a faster onset of action (within 15 minutes) and shorter duration of action (approximately 2–5 hours) than soluble insulin, and are usually given by subcutaneous injection

Non-proprietary name	Brand names	
Insulin aspart	NovoRapid®	Insulin aspart 100 unit per 1 ml
	Fiasp®▼	Insulin aspart 100 unit per 1 ml
Insulin glulisine	Apidra®	Insulin glulisine 100 unit per 1 ml
Insulin lispro	Humalog®	Insulin lispro 100 unit per 1 ml Insulin lispro 200 unit per 1 ml

Intermediate-acting combined with rapid-acting[1]

Non-proprietary name	Brand names	
Biphasic insulin aspart	NovoMix 30® 100 units/ml suspension	Insulin aspart 30 unit per 1 ml Insulin aspart (as Insulin aspart protamine) 70 unit per 1 ml
Biphasic insulin lispro	Humalog Mix25® 100 units/ml suspension	Insulin lispro 25 unit per 1 ml Insulin lispro (as Insulin lispro protamine) 75 unit per 1 ml
	Humalog Mix50® 100 units/ml suspension	Insulin lispro 50 unit per 1 ml Insulin lispro (as Insulin lispro protamine) 50 unit per 1 ml

Long-acting insulin[1]

Long-acting insulins mimic endogenous basal insulin secretion, but their duration of action may last up to 36 hours. They achieve a steady-state level after 2–4 days to produce a constant level of insulin.

Non-proprietary name	Brand names	
Insulin degludec	Tresiba®	Insulin degludec 100 units per 1 mL Insulin degludec 200 units per 1 mL
	Xultophy®▼	Insulin degludec 100 units per 1 mL liraglutide 3.6 mg per 1 mL
Insulin detemir	Levemir®	Insulin detemir 100 units per 1 mL
Insulin glargine	Abasaglar®▼	Insulin glargine 100 units per 1 mL
	Lantus®	Insulin glargine 100 units per mL
	Toujeo®	Insulin glargine 300 units per mL
Insulin zinc suspension	Hypurin Bovine Lente®	Insulin bovine (as Insulin zinc suspension mixed bovine) 100 unit per 1 ml
Protamine zinc insulin	Hypurin Bovine Protamine Zinc® 100 units/ml suspension	Insulin bovine (as Insulin protamine zinc bovine) 100 unit per 1 ml

Reusable insulin pens[1,2]

Pen name	Insulins	Units	Compatible needles	Other attributes
Allstar Pro	The following Sanofi 3 mL cartridges: Apidra®, Insuman Basal®, Insuman Comb 15®, Insuman Comb 25®, Insuman Comb 50®, Insuman Rapid®, Lantus®	1–80 units in one-unit increments	BD Micro-Fine®, BD AutoShield Duo®, Clickfine®, Penfine®, Unifine®, Insupen®	
Autopen 24		1–21 unit green pen dials up in one-unit increments 2–42 unit blue pen dials up in two-unit increments	BD Micro-Fine®, NovoFine®, Penfine®, Unifine®	
Juniorstar		1–30 units in half-unit increments	BD Micro-Fine®, Unifine®, Penfine®	
Autopen Classic	The following Eli Lilly 3 mL cartridges: Abasaglar®, Humalog®, Humalog Mix 25®, Humalog Mix 50®, Humulin I®, Humulin M3®, Humulin S®	1–21 unit green pen dials up in one-unit increments 2–42 unit blue pen dials up in two-unit increments	BD Micro-Fine®, NovoFine®, Penfine®, Unifine®	
Humapen Savvio	The following Wockhart 3 mL cartridges (Autopen Classic only): Hypurin bovine neutral®, Hypurin porcine 30/70 mix®, Hypurin porcine isophane®, Hypurin porcine neutral®	1–60 units in one-unit increments		
Insujet	The system can be used for all types of U100 insulin[3]			Transdermal administration via high pressure jet[3]
Novopen 5	The following Novo Nordisk 3 mL cartridges: Fiasp®, Insulatard Penfill®, Levemir Penfill®, NovoMix 30 Penfill®, NovoRapid Penfill®, Tresiba® 100 units/mL	1–60 units in one-unit increments	NovoFine®, NovoTwist®	Memory function displays last dose in units and time since last dose
Novopen echo		0.5–30 units in half-unit increments	NovoFine®, NovoTwist®	Memory function displays last dose in units and time since last dose

Reusable vs. prefilled

Prefilled insulin pens[1-5]

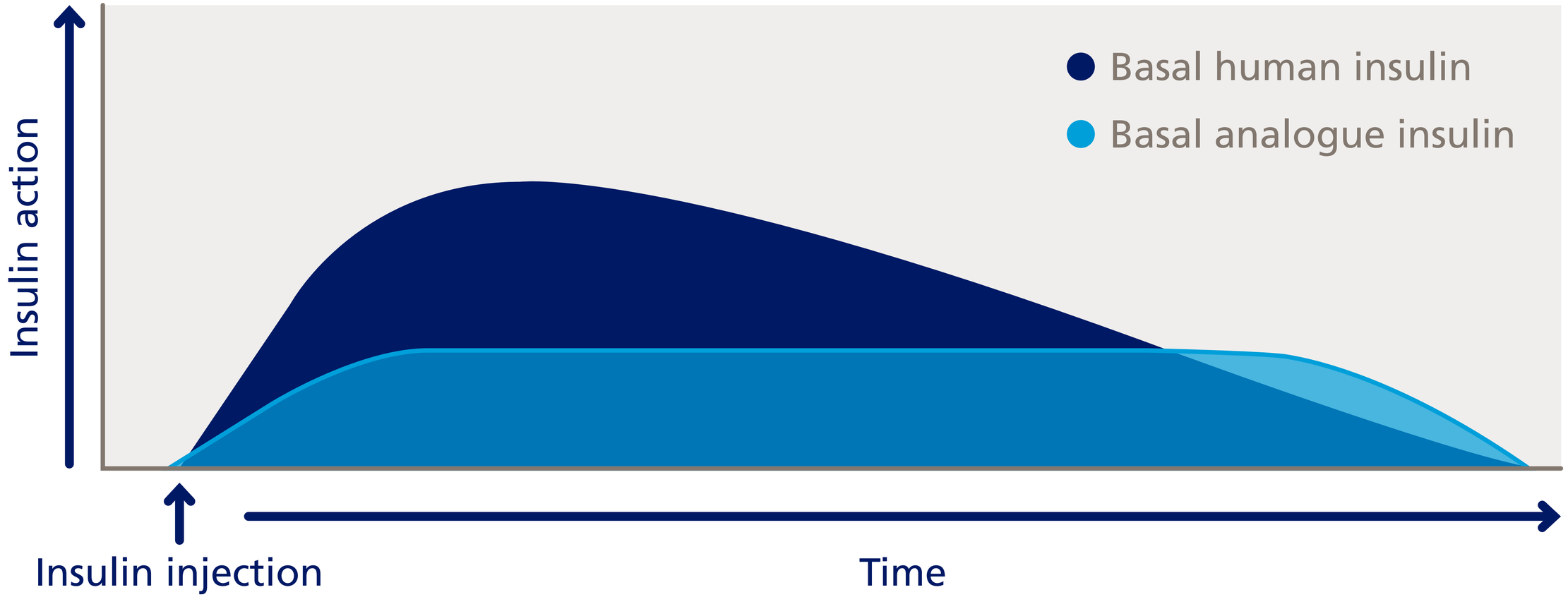
Pen name	Insulins[2]	Units	Compatible needles
FlexPen	Levemir®, NovoMix 30®, NovoRapid®	1–60 units in one-unit increments	NovoFine®, NovoTwist®
FlexTouch	NovoRapid®, Tresiba®, Fiasp®	1–80 units in one-unit increments The Tresiba® 200 units/ml pen delivers 2–160 units in two-unit increments	NovoFine®, NovoFine Plus®, NovoTwist®
Kwikpen	Abasaglar®, Humalog®, Humalog Mix 25®, Humalog Mix 50®, Humulin I®, Humulin M3®	1–60 units in one-unit increments	BD Micro-Fine®, Unifine®, Penfine®
Innolet	Insulatard®, Levemir®	1–50 units in one-unit increments	NovoFine®, NovoTwist®
Solostar	Apidra®, Insuman basal®, Insuman Comb 25®, Lantus®, Toujeo®	1–80 units in one-unit increments[3,4]	BD Micro-Fine®, Unifine®, Penfine®

Reusable vs. prefilled

Insulin regimens[1]

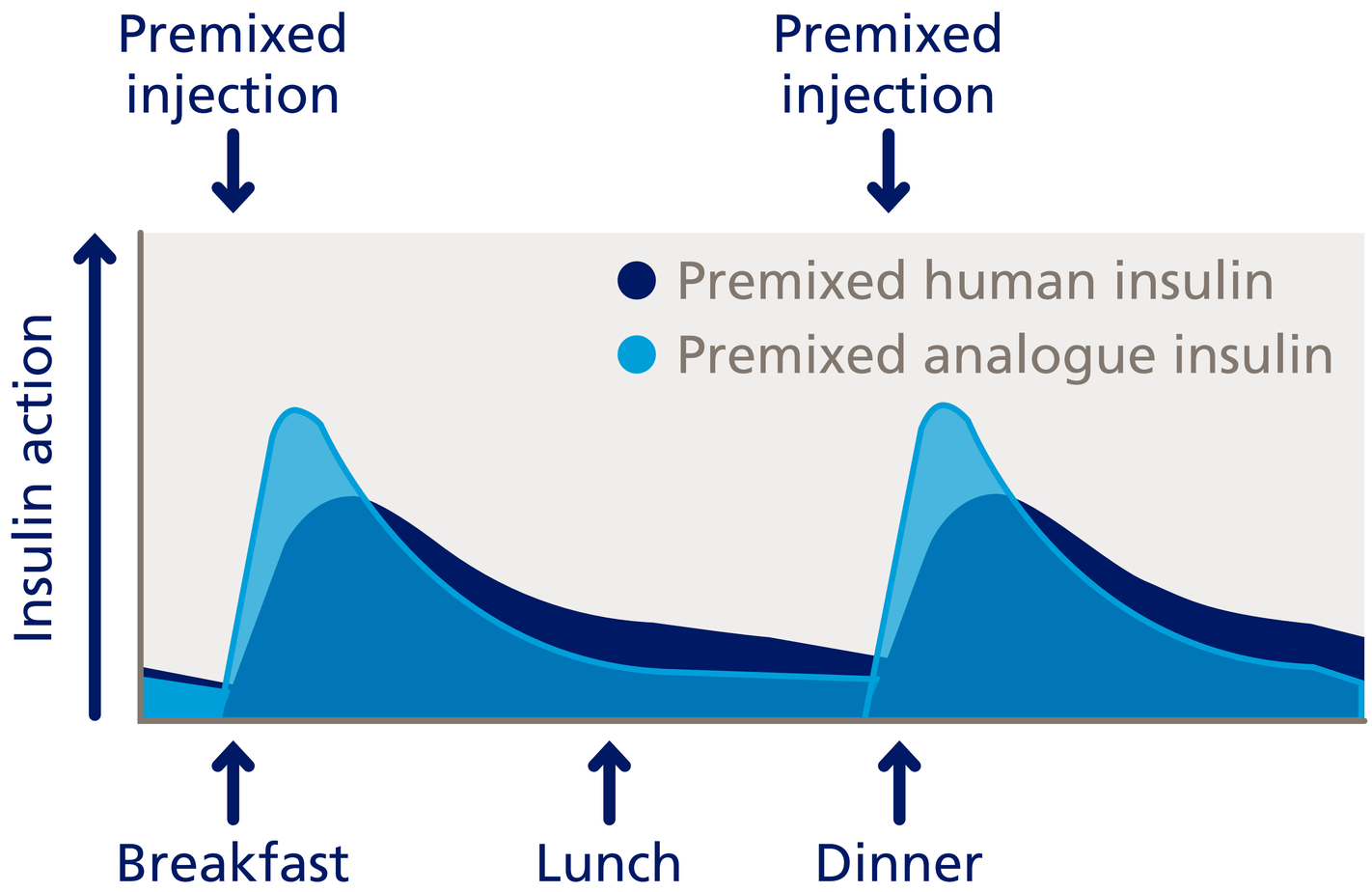
Regimen name	Treatment	Notes
Once-daily regimen	Long-acting or intermediate-acting insulin given at bedtime.	Only for patients with type 2 diabetes.
Twice-daily regimen	Biphasic insulin is injected twice a day (pre-breakfast and pre-evening meal).	Assumes the patient eats three meals per day. Peak action varies directly with the proportion of soluble insulin in the combination. Additional snacks are often required to avoid hypoglycaemia.
Basal-bolus regimen	Intermediate-acting or long-acting insulin given at bedtime. Rapid-acting or short-acting insulin injections given at mealtimes.	Potentially offers greater flexibility.
Continuous subcutaneous insulin infusion (CSII) therapy, or insulin pump therapy	Adjustable basal infusion rate of insulin via an indwelling catheter. Patients can activate pre-meal boluses.	Pumps can be disconnected for short periods (up to one hour) for activities such as swimming. The rate of insulin absorption from pumps is more predictable than with multiple subcutaneous injections.

Once-daily basal insulin



Schematic representation.

Premixed insulin – once, twice or three times daily



Contains:

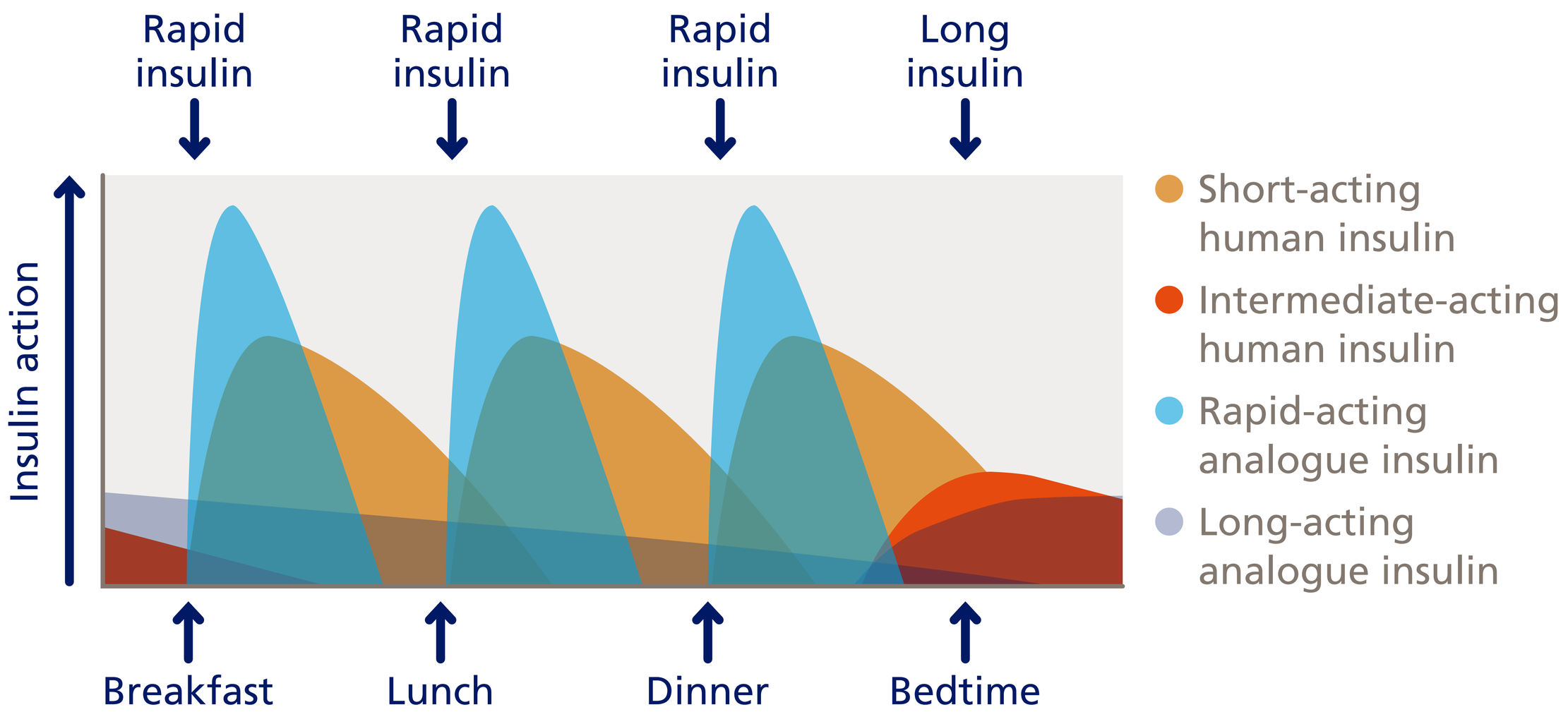
- Basal component
- Short-acting/rapid-acting component

Possible regimens:

- Once daily with largest daily meal (usually dinner)
- Twice daily with dinner and breakfast (figure)
- Three times daily, with each meal

Schematic representation.

Basal–bolus therapy



Schematic representation.

Medicines and food

Drug name	Directions
Acarbose	Take with a meal — chew tablets with first mouthful of food or swallow whole with a little liquid before starting a meal.[1]
Metformin	Take during or after meals.[2]
Nateglinide	Take within 1 to 30 minutes before meals.[3]
Repaglinide	Take with main meals.[4]
Rapid-acting insulin	Given 15 to 30 minutes before meal.[5]
Short-acting insulin	Given immediately before meal.[5]

Does injecting insulin hurt?[1]

In most cases injecting insulin will not hurt. The following may make it uncomfortable for the patients:

- Repeatedly using an injection site
- Re-using needles
- Using insulin straight from the fridge
- Incorrect injection technique
- Using a needle that is too long

Some people find particular insulins hurt when injecting; they should discuss alternative options with their prescriber.

Fear of injecting
Questionnaire
Minimising injection pain

Diabetes fear of injecting and self-testing questionnaire[1]

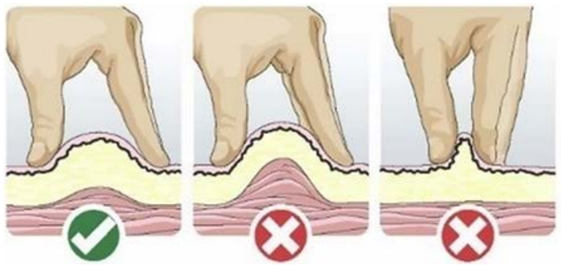
	Almost never (score 0)	Sometimes	Often	Almost always (score 3)
When I have to inject myself:				
I become restless				
I feel tense				
I feel afraid				
I worry about it				
I feel nervous				
I brood about it				
I try to postpone it				
I get angry				
When I have to prick my finger:				
I become restless				
I try to avoid it				
I feel tense				
I feel afraid				
I worry about it				
I feel nervous				
I brood about it				
I try to postpone it				
I get angry				

How do I inject my medicine?

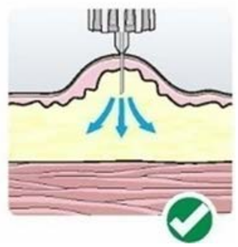
Injection technique: general guidance[1,2]

1. **Clean** the skin
2. **Insert** the needle at 90°
3. **Push the button** to inject the medicine
4. **Leave the needle** in place for 10 seconds
5. **Remove** the needle

Getting the ‘pinch up’ right



Correct *Incorrect*



Needle insertion

If required, pinch the skin before inserting the needle:

1. **Squeeze** the skin between your thumb and two fingers
2. **Insert** the needle
3. **Hold** the pinch
4. **Inject the medicine**
5. **Leave the needle** in place for a count of 10
6. **Remove** the needle
7. **Release** your grip on skin

More detailed information may be available in the patient information leaflet for individual products.

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Injection sites

How long will I be on treatment for?

T2DM – lifelong treatment[1,2]

- T2DM is a chronic metabolic condition
- T2DM is progressive and intensification of blood glucose lowering drug therapies is indicated over time
- In most cases patients will be on insulin for the rest of their lives, but there are circumstances where this may be different particularly if the patient loses a lot of weight

Can I go on holiday?

Diabetes and travelling

- Patients should carry diabetes ID, an insulin passport or safety card and a letter from their GP stating that they have diabetes and stating the medicines they use including injectable medicines and any pens, needles, testing strips or monitors[1]
- Advise patients to take twice the quantity of medical supplies they normally use for their diabetes[1]
- Patients should find out if they can get supplies of their medicine at the destination they are travelling to, including if the brand name is the same; this information can be obtained from the manufacturer[1]
- Do not pack injectable medicines in hold baggage when flying as this may cause degradation[1]
- Pack extra snacks in case of delay with the journey[1]
- Split diabetes supplies in separate bags[1]; cool bags are available to keep refrigerated at the correct temperature. Insulin kept out of the fridge should be discarded after a few weeks[2]; for other medicines check individual SPCs
- Patients should seek guidance on managing their diabetes over different time zones from their diabetes team[1]
- A patient guide “Diabetes & Travelling” is available from the Diabetes UK website[3]

Can I fast?

Diabetes and fasting

- Many people fast intermittently, including those of Hindu, Muslim, Jewish and other religious faiths[1]
- People who would put their health at risk from fasting are often exempt from fasting, further guidance can be sought from a patient's religious leader[1]
- Patients may experience hypoglycaemia if fasting[1]
- Patients should eat more slowly absorbed foods that have a lower glycaemic index[1] such as basmati or easy cook rice, pasta or noodles, granary, pumpernickel or rye bread
- When breaking the fast, patients should drink plenty of sugar-free and decaffeinated drinks to avoid dehydration[1]
- Patients should seek advice from their Diabetes Healthcare professional as medication may need to be adjusted or changed

Can I drive?

Driving and diabetes

- Patients managing their diabetes with diet/lifestyle may drive and are not required to inform the DVLA[1]
- Patients being treated with insulin are required to notify the DVLA and meet certain criteria (depending on whether they drive cars and motorcycles or buses and lorries) to permit them to drive[1]
- Patients treated with tablets that carry a risk of hypoglycaemia do not need to notify the DVLA if they meet specific criteria[1]
- Patients managed by other medicines, including non-insulin injectables generally do not need to notify the DVLA if they are under regular medical review; however they may sometimes be required to[1]
- Patients with impaired awareness of hypoglycaemia must not drive[1]
- Patients developing complications of diabetes may need to stop driving and notify the DVLA[1]

Insulin and driving[1]

Group 1: Car and motorcycle drivers

Must meet the criteria to drive and must notify the DVLA.

All the following criteria must be met for the DVLA to license the person with insulin-treated diabetes for 1, 2 or 3 years:

- Adequate awareness of hypoglycaemia
- No more than 1 episode of severe hypoglycaemia while awake in the preceding 12 months or the most recent episode occurred more than 3 months ago
- Practises appropriate blood glucose monitoring
- Not regarded as a likely risk to the public while driving
- Meets the visual standards for acuity and visual field
- Under regular review

Group 2: Bus and lorry drivers

Must meet the criteria to drive and must notify the DVLA.

All the following criteria must be met for the DVLA to license the person with insulin-treated diabetes for 1 year (with annual review as indicated last below):

- Full awareness of hypoglycaemia
- No episode of severe hypoglycaemia in the preceding 12 months
- Practises blood glucose monitoring regularly
- Must use a glucose meter with sufficient memory to store 3 months of readings
- Demonstrates an understanding of the risks of hypoglycaemia
- No disqualifying complications of diabetes that would mean a licence being refused or revoked, such as visual field defect

The law defines ‘severe’ as an episode of hypoglycaemia requiring the assistance of another person.

Definitions

Impaired awareness of hypoglycaemia

- Group 1 drivers: an inability to detect the onset of hypoglycaemia because of total absence of warning symptoms
- Group 2 drivers: must have full awareness of hypoglycaemia

Insulin and driving: blood glucose testing[1]

Group 1: Car and motorcycle drivers

- Blood glucose testing no more than 2 hours before the start of the first journey

and

- Every 2 hours while driving

Applicants will be asked to sign an undertaking to comply with the directions of the healthcare professionals treating their diabetes and to report any significant change in their condition to the DVLA immediately.

More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine).

Group 2: Bus and lorry drivers

- Regular blood glucose testing – at least twice daily including on days when not driving

and

- No more than 2 hours before the start of the first journey

and

- Every 2 hours while driving

More frequent self-monitoring may be required with any greater risk of hypoglycaemia (physical activity, altered meal routine), in which case a bus or lorry driver may be licensed if they:

- Use one or more glucose meters with memory functions to ensure 3 months of readings that will be available for assessment

Driving when taking tablets carrying hypoglycaemia risk[1]

Including sulphonylureas and glinides

Group 1: Car and motorcycle drivers

May drive and need not notify the DVLA, provided:

- No more than 1 episode of severe hypoglycaemia while awake in the last 12 months or the most recent episode occurred more than 3 months ago
- If needed, detection of hypoglycaemia is by appropriate blood glucose monitoring at times relevant to driving and clinical factors, including frequency of driving
- Under regular review

It is appropriate to offer self monitoring of blood glucose at times relevant to driving to enable the detection of hypoglycaemia.

If the above requirements and others outlined by the DVLA are met, the DVLA need not be informed.

The DVLA must be notified if clinical information indicates the agency may need to undertake medical enquiries.

Group 2: Bus and lorry drivers

May drive but must notify the DVLA. All the following criteria must be met for the DVLA to issue a licence for 1, 2 or 3 years:

- No episode of severe hypoglycaemia in the last 12 months
- Full awareness of hypoglycaemia
- Regular self-monitoring of blood glucose – at least twice daily and at times relevant to driving, ie no more than 2 hours before the start of the first journey and every 2 hours while driving
- Demonstrates an understanding of the risks of hypoglycaemia
- Has no disqualifying complications of diabetes that mean a licence will be refused or revoked, such as visual field defect

Severe hypoglycaemia

An episode of hypoglycaemia requiring the assistance of another person.

Driving when managed by other medicines, including non-insulin injectables[1]

Excluding sulphonylureas and glinides

Group 1: Car and motorcycle drivers

May drive and need not notify the DVLA, provided specific requirements are met and the driver is under regular medical review.

May drive but must notify the DVLA if clinical information indicates the agency may need to undertake medical enquiries.

Group 2: Bus and lorry drivers

May drive but must notify the DVLA. The DVLA may issue a licence if specific requirements are met and the driver is under regular medical review.

A licence is refused or revoked if relevant disqualifying complications have developed, such as diabetic retinopathy affecting visual acuity or visual fields.

A short-term licence may be issued if diabetes complications have developed but the required medical standards have been met.

Severe hypoglycaemia

An episode of hypoglycaemia requiring the assistance of another person.

Driving when suffering complications of diabetes[1]

Group 1: Car and motorcycle drivers

Visual complications – affecting visual acuity or visual field

May need to stop driving and notify the DVLA.

Renal complications

May need to stop driving and notify the DVLA.

Limb complications – including peripheral neuropathy

Any complication such as peripheral neuropathy that means a driver must meet requirements (such as vehicle adaptations) for disabilities.

May need to stop driving and notify the DVLA.

Limb problems or amputations are of themselves unlikely to prevent driving since they may be assisted by suitable vehicle adaptations. The ability to safely control a vehicle at all times is the essential requirement.

Group 2: Bus and lorry drivers

Visual complications – affecting visual acuity or visual field

Must not drive and must notify the DVLA.

The licence will be refused or revoked.

Renal complications

May need to stop driving and notify the DVLA.

Limb complications – including peripheral neuropathy

Any complication such as peripheral neuropathy that means a driver must meet requirements (such as vehicle adaptations) for disabilities.

May need to stop driving and notify the DVLA.

Limb problems or amputations are themselves unlikely to prevent driving since they may be assisted by suitable vehicle adaptations. The ability to safely control a vehicle at all times is the essential requirement.

How do I dispose of my injectable medicine and equipment?[1]

Needles[1]

- Used needles must not be bent or broken before disposal and do not try to recap a needle
- Sharps bins can be used to dispose of: lancets (used with finger pricking devices), needles, needle clippers, syringes
- Only fill the bin up to where it says "Do not fill above this line“
- Arrangements for disposal of sharps bins vary by area, further information should be available from your local council. See also: https://www.gov.uk/request-clinical-waste-collection
- Devices with pre-attached needles can be disposed of in the sharps bin*

*The used device should be disposed of in the sharps bin.

Nine annual care processes[1]

1. HbA_{1c}
2. Blood pressure
3. Serum cholesterol
4. Serum creatinine
5. Urine/albumin creatinine ratio
6. Foot risk surveillance
7. Body Mass Index
8. Smoking history
9. Digital retinal screening

Meeting Care processes

Meeting care processes

IN 2016-17 ONLY

47.6%

OF PATIENTS

received NICE recommended care processes covering HbA_{1c}, blood pressure, serum cholesterol, serum creatinine, urine albumin/creatinine ratio, foot risk surveillance, body mass index, smoking history*[1]

Younger patients tend to be less likely to receive their annual checks[1]

During patient consultations, pharmacists can identify if a patient has received a particular care process, and if not highlight this to the patient's prescriber

*The outcomes of digital retinal screening can not currently be exported to the National Diabetes Audit and are not included in the care processes calculation.

Self-monitoring of blood glucose: type 2 diabetes

Patients with T2DM are not routinely required to test their blood glucose levels[1]

Patients with T2DM who should be monitoring blood glucose:[1]

- Those taking insulin
- Those who experience hypoglycaemic episodes
- Those taking oral medication that may increase their risk of hypoglycaemia while driving or operating machinery
- Those who are pregnant or planning a pregnancy

Patients with T2DM who may need to temporarily monitor their blood glucose:[1]

- Those starting treatment with oral or IV corticosteroids
- To confirm suspected hypoglycaemia

DVLA guidance should also be taken into consideration when making decisions about self-monitoring of blood glucose in patients.

Assessment of the quality and use made of the results obtained should be assessed at least annually or more frequently according to need. As a minimum, a structured assessment should be undertaken each year, for patients that carry out self-monitoring of their blood glucose.[1,2]

Hypoglycaemia

Symptoms

Self-management

Causes

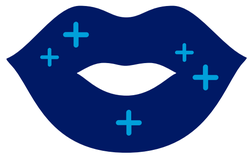
Hypoglycaemia: symptoms

A blood sugar reading of <4 mmol/L indicates hypoglycaemia[1]

Early signs[1]

Feeling hungry

Sweating



Tingling lips

Dizziness

Feeling shaky or trembling

Feeling tired

Palpitations

Turning pale

Becoming easily irritated, tearful, stroppy or moody

Later signs[1]

Weakness

Blurred vision

Confusion

Difficulty concentrating

Feeling sleepy

Seizures

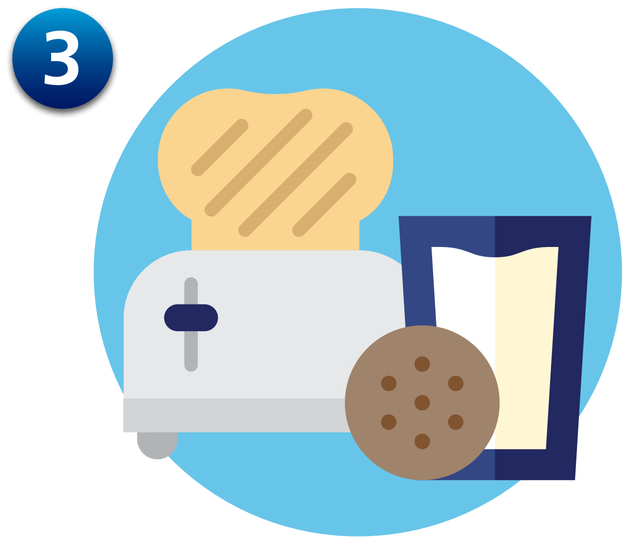
Collapsing or passing out

Unusual behaviour, slurred speech or clumsiness

Hypoglycaemia: self-management[1,2]

Have a sugary drink or snack – for example, a small glass of non-diet fizzy drink (150-200 mL) or fruit juice (200 mL), a small handful of sweets, three glucose or dextrose tablets or a tube of glucose gel

Test blood sugar after 10-15 minutes – if it's 4 mmol or above and the patient is feeling better, move on to step 3. If it's still below 4 mmol, treat again with a sugary drink or snack and take another reading in 10-15 minutes



Eat a main meal (containing carbohydrate) if you're about to have it or have a carbohydrate-containing snack – this could be a slice of toast with spread, a couple of biscuits, bowl of cereal or a glass of milk

Severe hypoglycaemia

Hypoglycaemia: causes

Skipping or delaying a meal[1]

Exercise or activity, especially if it's intense or unplanned[1]

Binge drinking or drinking alcohol on an empty stomach[1*]

Taking too much of a diabetes medicine – such as insulin, sulphonylureas or glinides[1]

Interaction with other medicines (refer to the BNF or individual SPCs)

Eating less carbohydrate-containing food than usual, such as bread, cereals, pasta, potato and fruit[1]

Insulin is absorbed much quicker if the area is subjected to heat, for example, after a hot bath/shower or hot weather[2]

*Alcohol can inhibit the liver's ability to release glucose into the blood meaning that the liver is not able to release enough glycogen to keep blood glucose levels from going too low under the influence of the insulin in the body.[3]

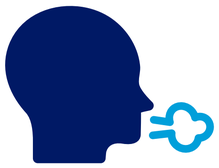
Diabetic ketoacidosis (DKA)

Symptoms[1]

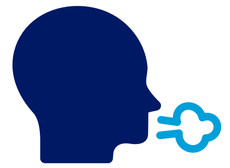
Feeling very thirsty

Being sick

Tummy pain



Deep or fast breathing



Needing to urinate more frequently

Feeling very sleepy or tired

Confusion

Passing out

Fruity smelling breath (like pear drops or nail varnish)*

DKA is associated with high blood glucose. If blood glucose is ≥11 mmol/L patients should test ketone levels.[1]

Blood ketone testing results	
Reading	**Interpretation**
<0.6 mmol/L	Normal
0.6-1.5 mmol/L	Slightly increased risk of DKA – retest in a couple of hours
1.6-2.9 mmol/L	Increased risk of DKA and should contact GP or diabetes team
≥3 mmol/L	A very high risk of DKA and should get immediate medical help from A&E

*Due to high blood ketone levels.

Sick day rules

Managing drug therapy

- If patients are on insulin therapy, they should not stop their treatment[1]
  - The dose of insulin may need to be altered during periods of illness; and advice should be sought from the patient's diabetes team if they are unsure of how to adjust their insulin doses[1]
- It is advisable to stop taking a SGLT2 inhibitor if the patient is unwell and unable to eat or drink[2]

Monitoring

- If self-monitoring of blood glucose levels is indicated (for example in people on insulin therapy), it should be done carefully and frequently[1]
  - It should be checked at least every 3–4 hours including through the night, and sometimes every 1–2 hours and the results recorded[1]
- Consider ketone monitoring (blood or urine)[1]
  - This should be checked regularly, for example every 3–4 hours including through the night, and sometimes every 1–2 hours depending on results[1]
  - If the urine ketone level is greater than 2+, or blood ketone levels are greater than 3 mmol/L, the person should seek immediate medical advice[1]

Self-management

- Maintain a normal meal pattern (where possible) if appetite is reduced[1]
  - Normal meals could be replaced with carbohydrate-containing drinks (such as milk, milkshakes, fruit juices, and sugary drinks)[1]
- Patients should aim to drink at least 3 L of fluid a day to prevent dehydration. They should seek urgent medical advice if:[1]
  - They are sick, drowsy, or unable to keep fluids down
  - They have persistent vomiting or diarrhoea
- When feeling better, they should continue to monitor their blood glucose levels carefully (if indicated) until it returns to normal[1]

Patient guidance is available from Diabetes UK: https://www.diabetes.org.uk/guide-to-diabetes/life-with-diabetes/illness