

This Medicines Information Leaflet is produced locally to optimise the use of medicines by encouraging prescribing that is safe, clinically appropriate and cost-effective to the NHS.

Managing Diabetes in Adults Before, During and After Surgery and Procedures

The aim of this MIL is to provide guidance to support the care and management of adults with diabetes (type 1 and type 2) undergoing operative or investigative procedures involving a period of fasting.

This MIL applies to patients for endoscopy without bowel preparation. For patients undergoing bowel preparation prior to endoscopy or surgery follow separate local guidance. Specific guidance for specialist patients are not within the scope of this MIL e.g., maternity, Oxford Heart Centre, bariatrics, and islet cell transplant.

Diabetes is common, affecting around one in six inpatients throughout the Trust. Both the number and complexity of patients with diabetes are increasing. Patients with diabetes who have poor perioperative glycaemic control are at significantly increased risk of post-operative infection. Improving blood glucose control leads to better postoperative outcomes and a reduced length of stay.

Blood glucose monitoring

Target blood glucose concentration is 6-10 mmol/L but up to 12mmol/L may be acceptable.
Blood ketone concentration should be less than 1 mmol/L.

Refer to the Diabetes Specialist Team if blood glucose targets are not achieved by following the management guidelines below:

- ★ **URGENTLY** for patients experiencing **persistent hypo(Low)glycaemia**
- ★ Patients experiencing **persistent hyper(High)glycaemia**

Refer by EPR: Requests & Prescribing – inpatient Diabetes. Working hours Mon-Sun 0800-1600hrs

Out of hours contact the on-call Diabetes Registrar via switchboard.

Table 1: Monitoring capillary blood glucose (CBG) and ketone requirements appropriately throughout the inpatient stay

Current Diabetes treatment	Minimum monitoring frequency	
	Glucose	Ketones
- Unwell patients or those with unstable diabetes - All insulin treatment	Four times daily (pre-meals and pre-bed)	If CBG over 12 mmol/L
- Diet controlled - Metformin	Once daily	
Other diabetes medicines*	Twice daily	
SGLT2 inhibitor (including if stopped on or pre-admission)	Once daily	Daily for first 3 days AND if CBG over 12mmol/L

*Pioglitazone, DPP-4 inhibitor e.g., alogliptin, GLP-1 analogue e.g., Liraglutide/Semaglutide/Tirzepatide, sulphonylurea e.g., gliclazide, acarbose, meglitinide e.g., repaglinide.

SGLT2 inhibitors before procedures

SGLT2 inhibitors (e.g., empagliflozin, dapagliflozin, canagliflozin and ertugliflozin) are licensed for heart failure and chronic kidney disease as well as type 2 diabetes. For simplicity, this guidance adopts a single approach irrespective of the indication.

SGLT2 inhibitors should be stopped:

- **24 hours before planned major surgery**
- **As soon as possible (for example on admission) when patients are acutely unwell.**

SGLT-2 inhibitors (e.g., empagliflozin, dapagliflozin, canagliflozin and ertugliflozin) can cause diabetic ketoacidosis while blood sugar levels remain below 12 mmol/L. This is known as **Euglycaemic Diabetic Ketoacidosis (euDKA)**. EuDKA is life threatening and needs urgent treatment. The MHRA issued a [Drug Safety Update](#) on this topic.. [PIL SGLT2i Diabetes](#) & [SGLT2i](#)

[Diabetes Checklist](#) link to checklist and patient information for SGLT2 inhibitors.

Patients must have ketone levels measured daily for the first three days even if blood glucose levels are below 12 mmol/L.

If the patient had ketoacidosis during admission, the SGLT2 inhibitor should be replaced with a different medication for Type 2 diabetes which has proven cardiovascular benefits ([Overview](#) | [Type 2 diabetes in adults: management](#) | [Guidance](#) | [NICE](#)).

Management of diabetes medicines before, during and after procedure

Patients should be reminded to bring a supply of their usual medication, device, and consumables into hospital with them in the original packaging. This helps prevent delayed and omitted doses.

There are new medicines and combinations continually being brought on the market. The following tables contain the commonly encountered agents on the hospital formulary. Check the BNF on-line for new products. If the patient is on a combination medicine, follow the guidance for each component separately. Be aware that this might involve arranging a supply of a component from pharmacy where the advice for the individual components differs.

Non-insulin diabetes medicines:				
Type of diabetes medicine	Day before procedure	On the day of procedure		Following procedure
		If procedure in the morning	If procedure in the afternoon	
Pioglitazone	Continue as usual	Take as usual	Take as usual	Continue if eating and drinking adequately
DPP- 4 inhibitor (e.g., sitagliptin, alogliptin, linagliptin)				
GLP-1 analogue* (e.g., liraglutide, Semaglutide, dulaglutide, Tirzepatide)				
Metformin (where no injection of contrast required, eGFR over 60mL/min/1.73m²)				
Metformin (where having contrast injection or if eGFR less than 60mL/min/1.73m²)	Continue as usual	Omit	Omit	Restart 48 hours after procedure
Sulphonylurea (e.g., gliclazide, glibenclamide)	Continue as usual	Omit	Omit	Restart once eating and drinking adequately
Acarbose	Continue as usual	Omit if NBM	Take as usual with breakfast	
Meglitinide (e.g., repaglinide)				
SGLT2 inhibitor (e.g., empagliflozin, dapagliflozin, canagliflozin, ertugliflozin)	Stop 24 hours before for surgery.	Stop on admission and omit during inpatient stay		One week after discharge

*The American Society of Anaesthesiologists have released advice stating that GLP1 agonists should be withheld prior to surgery to reduce the risk of pulmonary aspiration. It is the considered opinion of the expert committee advising CPOC that these drugs should be continued to maintain peri-operative glycaemic control, however prudent precautions should be undertaken to avoid pulmonary aspiration. These include regional anaesthesia or intubation using a modified rapid sequence induction using the ramped position.

Insulins- Check blood glucose on admission					
Examples of insulin types	Usual frequency	Days pre-procedure	Morning procedure	Afternoon procedure	Following procedure
Long-acting insulin and intermediate acting insulin:					
Long acting: E.g., Lantus® Abasaglar® Levemir® (discontinued Dec 2026) Semglee® Toujeo® Tresiba® Intermediate acting: E.g., Humulin I® Animal isophane	Once daily in the morning	If basal given in the evening or at night take 80% of usual dose (usual dose x 0.8)	Take 80% of usual dose (usual dose x 0.8)	Take 80% of usual dose (usual dose x 0.8)	Restart usual dose once eating and drinking
	Once daily in the evening or night		Not applicable	Take usual evening/night dose	
	Twice daily	Otherwise continue as usual	Take half morning dose, take usual evening dose	Take half morning dose and usual evening dose	
Pre-mixed insulin					
E.g., Novomix 30® Humulin M3® Humalog Mix 25° or 50° Hypurin porcine 30/70 mix®	Twice daily with meals, occasionally three times a day	Continue as usual	Take half of usual morning dose If on three times a day OMIT lunchtime dose	Take half of the morning dose with breakfast. If on three time a day OMIT lunchtime dose	Restart usual dose with evening meal. Give half dose if meal size reduced.
Basal (long acting)/bolus (short acting) insulin regimen					
Long acting (basal) insulin see above for examples Short acting (mealtime) insulin: E.g., NovoRapid® Trurapi® Humalog®	Multiple daily injections	If basal given in the evening or at night give 80% of usual dose (usual dose x 0.8) Otherwise continue as usual	Basal: Give 80% of usual dose (usual dose x 0.8) + Bolus: Omit morning and lunchtime doses	Basal: Give 80% of usual dose (usual dose x 0.8) + Bolus: Take usual morning dose, omit lunchtime dose	Restart usual doses of bolus insulins with evening meal
Continuous Subcutaneous Insulin Infusion (CSII) – i.e., uses an insulin pump to deliver insulin at home					
Patients must bring in spare consumables i.e., cannula, giving sets and cartridges.					

Management during admission

Key inpatient points to remember:

1. Monitor Capillary blood glucose (CBG):
 - **Always on admission** to hospital
 - At least **four times on the day** of the procedure and as in Table 1- Monitoring blood glucose and ketone requirements appropriately throughout the inpatient stay
 - **Hourly** during anaesthesia and whilst in recovery for patients on insulin and sulphonylureas, as hypoglycaemia may be difficult to detect.
2. **Variable Rate Intravenous Insulin Infusions**
Check Capillary Blood Glucose (CBG) levels **hourly (day and night)** whilst on **Variable Rate IV Insulin Infusion** [Variable RIII]
 - This is important to prevent low blood glucose
 - Check ketones when CBG over 12 mmol/L
 - Standard fluid with IV insulin is 4% glucose and sodium chloride 0.18% with potassium as needed.
3. **Correct hyper(HIGH)glycaemia if not on Variable RIII** (high blood glucose, over 12 mmol/L) unless tight glycaemic management is inappropriate e.g., frail, elderly with higher target BG range) using the flow chart in the appendix.
4. **Treat hypo(LOW)glycaemia as per MIL:**
 - ALL patients with **CBG less than 4 mmol/L**
 - Where **CBG is 4-6 mmol/L and both the following** apply to the patient:
 - Takes medicine (oral/injection) to treat diabetes
 - Has symptoms of hypo(Low)glycaemia
 - Ideally hypo(Low)glycaemia will be treated orally
 - Prescribe 75mL intravenous 20% glucose infusion if required for hypo(Low)glycaemia. This ensures prompt treatment if the patient is unconscious or unable to co-operate.
 - Responsible medical/surgical team to review for potential causes.
5. Manage nausea and vomiting to promote early return to normal diet and usual diabetes management. Avoid dexamethasone where possible.

Variable Rate Intravenous Insulin Infusion – Detailed guidance is contained within the **Variable RIII MIL**:

- a. Use VRIII for:
 - i. patients treated with **insulin who are likely to miss more than one meal**
 - ii. people for urgent surgery with high CBG over 12mmol/L
 - iii. **where CBG is** more than 12mmol/L for more than 2 hours **AND** the patient is nil-by-mouth
 - iv. people with suboptimal diabetes management as defined as an HbA1c >69mmol/mol (>8.5%)
- b. **For people with planned short starvation period** (only one missed meal)
 - i. Avoid Variable RIII wherever possible
 - ii. Manage by modification of existing diabetes medication (see table “Management of medicines before, during and after procedures”)



DO NOT STOP VARIABLE RIII DURING OPERATION/PROCEDURE UNLESS HYPO (LOW) GLYCAEMIA (as per MIL)

Post-operative (procedure) care

If starting enteral feeding or TPN seek specialist diabetes advice.

Restarting oral hypoglycaemic medication

- Restart oral hypoglycaemic agents at preoperative doses once the patient is ready to eat and drink.
- Be prepared to withhold or reduce sulphonylureas (e.g., gliclazide) if the food intake is likely to be reduced.
- Metformin should only be recommenced if the renal function is back to baseline.
- SGLT2 Inhibitors can be restarted once **all** the following apply:
 - ✓ One week after discharge OR when the patient had made a full recovery after discharge (whichever is later)
 - ✓ Once eGFR is more than 45 ml/min
 - ✓ When patient is aware of the risks, signs and symptoms of euglycaemic DKA.

- ✓ Use with caution in patients ≥ 65 years as may be at greater risk for volume depletion if treated with diuretic
- Do NOT restart SGLT2 inhibitors if the patient:
 - ✗ Has active foot disease.
 - ✗ Has experienced DKA (*unless discussed and agreed with Diabetes Consultant*).
 - ✗ Has or had experienced Fournier's Gangrene.
 - ✗ Has an eGFR 45ml/minute or less.

Restarting subcutaneous insulin for patients on insulin pre-operative (procedure)

- Once daily long-acting basal insulin should have been continued alongside the VRIII. Where this is the only regular insulin, the insulin infusion can be taken down when appropriate.
- Conversion to subcutaneous **meal-time insulin** should be delayed until the patient is able to eat and drink without nausea or vomiting.
- Make sure the subcutaneous insulin is available to be administered before stopping the variable rate insulin infusion.
- Once ready give usual meal-time insulin dose and continue the Variable RIII for one hour after the subcutaneous meal-time insulin has been administered
- Continue 2 hourly CBG monitoring for 6 hours (i.e., three occasions).
 - If then in target range, revert to appropriate monitoring as per guidance on first page
 - If out of target range continue 2 hourly CBG monitoring
- Insulin requirements may change as a result of postoperative stress, infection or altered food intake and doses may need adjusting.
- Consult the diabetes specialist team if CBG levels are outside the acceptable range (6-12mmol/L) or if a change in diabetes management is required.

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 Minor updates (2026): David Jones & Katie Hards – Diabetes Nurses; Helen Baker & Judith Bailey – Pharmacists.

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5. National Institute for Health and Care Excellence (NICE) (2026) *Type 2 diabetes in adults: management (NG28)*. London: NICE. Available at: <https://www.nice.org.uk/guidance/ng28> (Accessed: 23 July 2026).

