ADULTS – Insulin dose titration decision support tool for adult inpatients with diabetes	University Hospitals of Leicester NHS Trust Trust reference: B55/2019

1. Introduction and Who Guideline applies to

1.1 This guideline details the titration of insulin doses for adult inpatients with diabetes in UHL. The guidance is applicable for both medical and nursing staff.

2. Guideline Standards and Procedures

2.1 This guideline sets out in a series of flowcharts (see appendix 1) an approach to safely titrating insulin doses for all adult inpatients admitted to medical and surgical wards in UHL. At the end of the document is a one page summary guidance.

2.2 If staff are unsure regarding safe titration of insulin despite referral to the guidance then they should seek advice from the specialist diabetes team or a senior colleague.

2.3 The Diabetes specialist nurse team can be contacted via ICE (electronic referral) or via switchboard (mobile phone) and this is a 7 day service 9-5pm at LRI and Mon-Fri 9-5pm at LGH and GGH. Diabetes SpR on-call via switch board Mon-Fri 9-5pm. Out of hours medical advice should be via the medical SpR on-call via switchboard.

3. Education and Training

All medical and nursing staff are required to complete essential to role Insulin Safety training. This training can be accessed via HELM and is renewable on a yearly basis.

4. Monitoring Compliance

Element to be monitored	Lead	Tool	Frequency	Reporting arrangements
Implementation of this guidance in appropriate areas.	Dr Kath Higgins, Helen Atkins, Julia Ball	Case note reviews, datix incident reporting, Inpatient diabetes dashboard	Continuous	Report to the Diabetes Inpatient Safety Committee monthly.

5. Supporting References

None required.

6. Key Words

Insulin dose titration, Diabetes, Adult inpatients

CONTACT AND REVIEW DETAILS	
Guideline Lead (Name and Title): Dr Kath Higgins, Clinical Lead for Inpatient Diabetes Care.	**Executive Lead:** Andrew Furlong, Medical Director
Details of Changes made during review: None.	

NB: Paper copies of this document may not be most recent version. The definitive version is held on INsite Documents

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Insulin Dose Titration Decision Support Tool

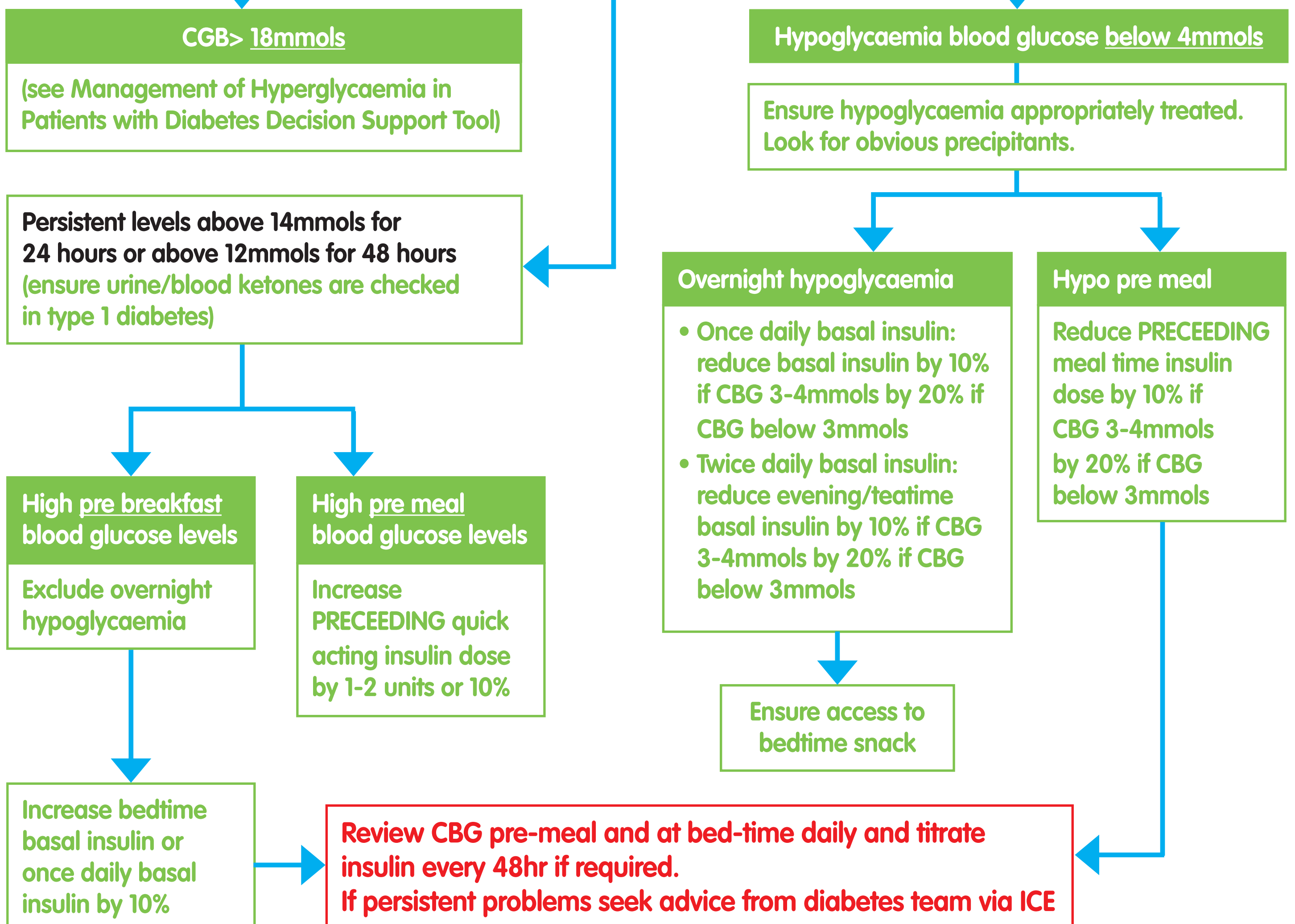
This Insulin Dose Titration Decision Support Tool is not applicable to patients on continuous subcutaneous insulin pump treament.

Basal Bolus Insulin Regime

- **Standard CBG target** is 6-10mmols (4-12mmols acceptable)
- **Conservative CBG target** Frail older patients 7.8-10mmol/l, moderate/severe frailty and end of life 7.8-15mmol/l.

Quick acting insulin with meal
(Novorapid/Humalog/Apidra/Fiasp/Actrapid/Humulin S)
Once or twice daily basal/background insulin
(Lantus/Levemir/Tresiba/Toujeo/Abasaglar/Humulin I/Insulatard/Insuman basal)

If patient has type 1 diabetes and is carbohydrate counting trained
e.g. DAFNE trained, and capable and competent to self-manage their diabetes, they should be able to self-adjust their insulin doses.



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Insulin Dose Titration Decision Support Tool

Twice Daily Insulin Regime

Novomix 30/Humalog mix 25/
Humalog mix 50/Humulin M3/
Insuman comb 15/25/50 mixed insulin
Insuman Basal/Humulin I/Insulatard

CGB> 18mmols

(see Management of Hyperglycaemia in Patients with Diabetes Decision Support Tool)

Persistent levels above 14mmols for 24 hours or above 12mmols for 48 hours (ensure urine/blood ketones are checked in type 1 diabetes)

- **Before bed or before breakfast blood glucose** → Increase evening meal by 10%
- **Pre lunch and evening meal blood glucose** → Increase breakfast dose by 10%

Hypoglycaemia

Any blood glucose below 4mmols

Ensure hypoglycaemia appropriately treated. Look for obvious precipitants.

- **Before bed or overnight** → Decrease evening dose by 10% if CBG between 3-4mmols. If CBG below 3mmols decrease by 20% → Ensure access to bedtime snack
- **During the day** → Decrease breakfast dose by 10% if CBG between 3-4mmols. If CBG below 3mmols decrease by 20%

Review CBG pre-meal and at bed-time daily and titrate insulin every 48hr if required.
If persistent problems refer to DSN via ICE

- **Standard CBG target** is 6-10mmols (4-12mmols acceptable)
- **Conservative CBG target** Frail older patients 7.8-10mmol/l, moderate/severe frailty and end of life 7.8-15mmol/l.

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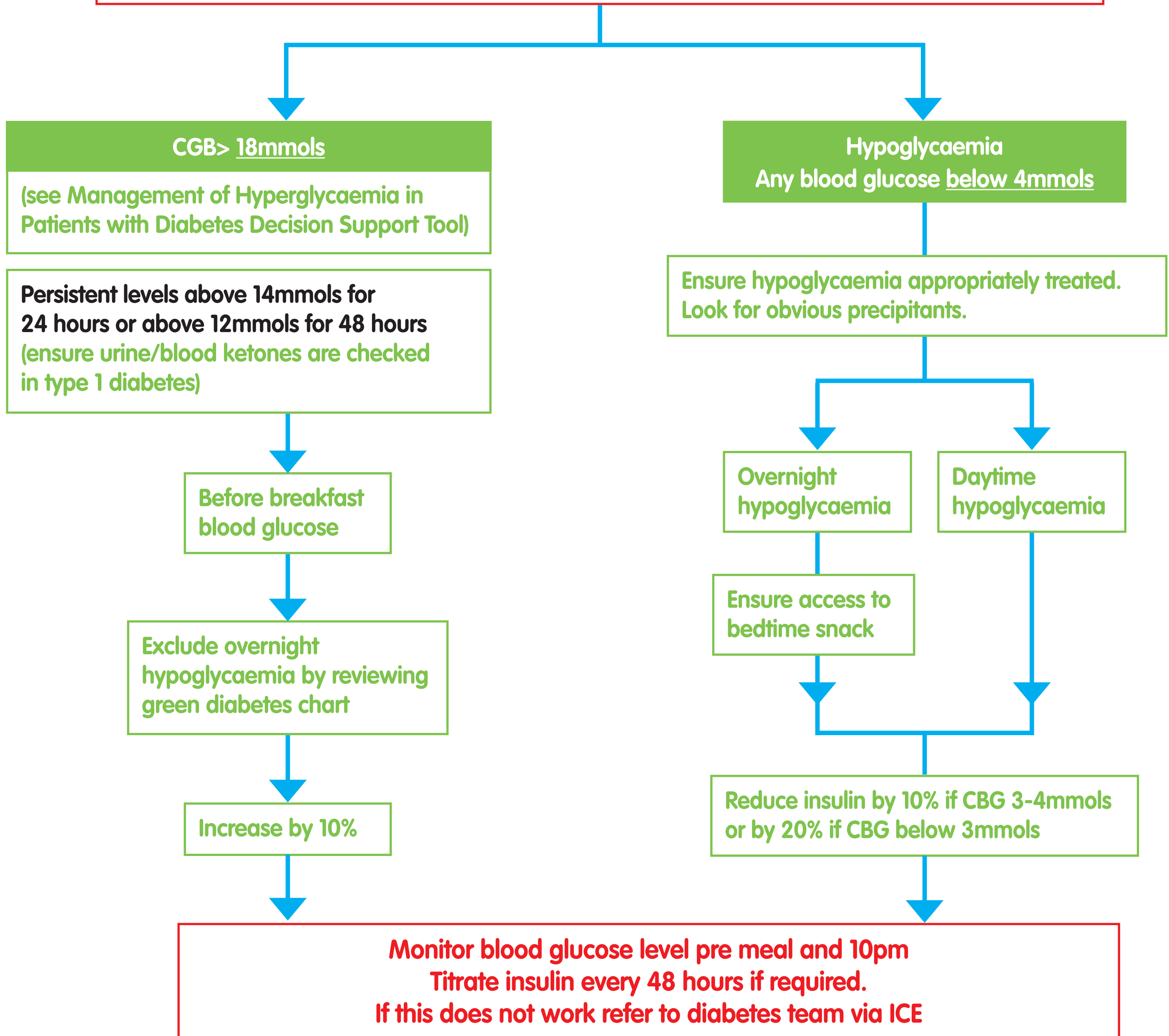
Insulin Dose Titration Decision Support Tool

Once Daily Insulin Regime

Levemir/Lantus/Insulatard/Humulin I/Insuman basal/Tresiba/Toujeo/Abasaglar

Please note:

- Once daily regimen titration should be based on pre breakfast blood glucose levels. Daytime levels will probably be higher but expected to fall overnight. If daytime hyperglycaemia is a problem, regimen may need changing so refer to DSN team
- Patients on once daily insulin regimes usually have type 2 diabetes and take other glucose lowering medications. These should also be reviewed when insulin doses reviewed.



Monitor blood glucose level pre meal and 10pm
Titrate insulin every 48 hours if required.
If this does not work refer to diabetes team via ICE

- **Standard CBG target** is 6-10mmols (4-12mmols acceptable)
- **Conservative CBG target** Frail older patients 7.8-10mmol/l, moderate/severe frailty and end of life 7.8-15mmol/l.

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Insulin Dose Titration Decision Support Tool Guidance Notes

Sepsis, reduced mobility, stress, steroids and supplementary feeding can all have an effect and may increase blood glucose levels.

For patients who are clinically unwell refer intitially to the Hyperglcyeaemia Decision support tool and ensure DKA/HHS excluded.

Once the patient is well, doses may need reducing back to their pre-admission doses to prevent hypoglycaemia at home.

- Ensure medication has been given as prescribed and patient compliant with regimen
- Ensure correct insulin is being administered at correct time - Insulin is a time-critical medication

  Right person
  Right insulin
  Right time
  Right place
  Right dose
  Right device

Never abbreviate units to "u" or "iu" as abbreviation can result in a 10x insulin overdose.

- Exclude any mechanical problems with insulin delivery device (pen device working correctly?)
- Insulin pen devices should be prescribed on a named patient basis and should always be used with an insulin safety needle.
- Use insulin safety syringe for administration if using a vial of insulin.

Never draw insulin from a pen device with a syringe

- Insulin should be shaken prior to administration
- Offer a bedtime snack to all patients on insulin. If the patient usually has a bedtime snack at home this should continue in hospital.
- Check any episodes of hypoglycaemia are not a direct result of receiving PRN insulin doses (see Hyperglycaemia decision support tool)
- Review glucose control on a daily basis
- Patients on insulin must have an insulin time-critical aide in their bedside notes and a magnet on the white board to prompt timely insulin administration.

Know what you are doing

- Ensure you have had sufficient training to enable you to prescribe, administer and titrate insulin doses safely.

Refer to the diabetes team if any concerns, contact:

- **DSN via ICE**
  (Mon-Fri 9am-5pm,
  incl Sat / Sun 9am-5pm LRI site)
- **Diabetes SpR**
  via switchboard
  (Mon-Fri 9am-5pm)
- **Out of hours**
  Medical SpR on call
  via switchboard