Making Surgery Safer for Patients with Diabetes

New Trust Pathway

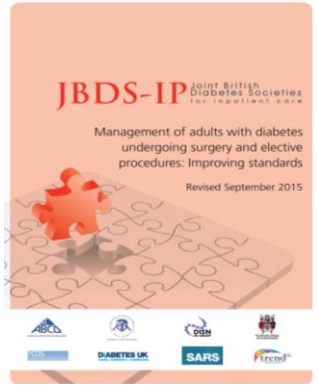
Sign up to SAFETY
LISTEN LEARN ACT

Patient Safety Briefing

Sign-up to Safety SU2S

- National patient safety campaign 2015-2017
- Reduce avoidable harm by 50% in the NHS
- Aims nationally to save 6000 lives per year
- Trust priority surgical safety
- Peri-operative diabetes care

The Challenge



NCEPOD

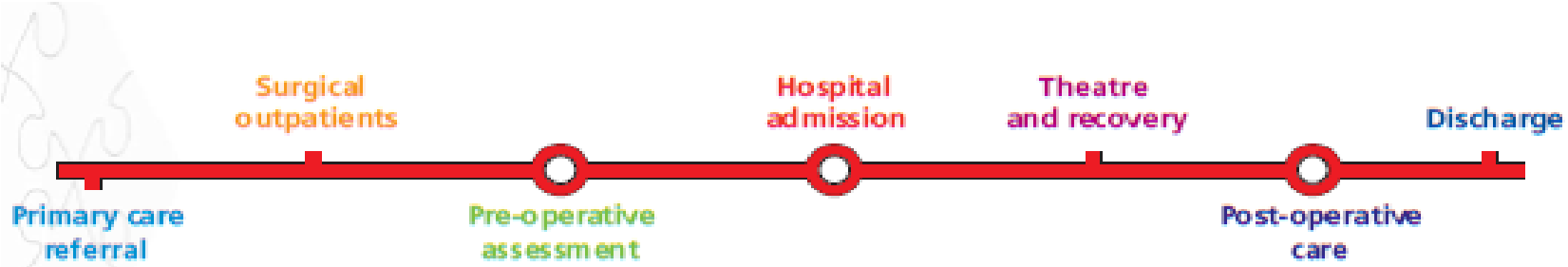
- Surgical patients with diabetes have higher mortality and morbidity rates and increased lengths of stay
- Improved diabetic care improves outcomes
- > 5000 patients with diabetes have surgery at NUTH per year. **Who is responsible for their diabetes?**

How safe are we now?...

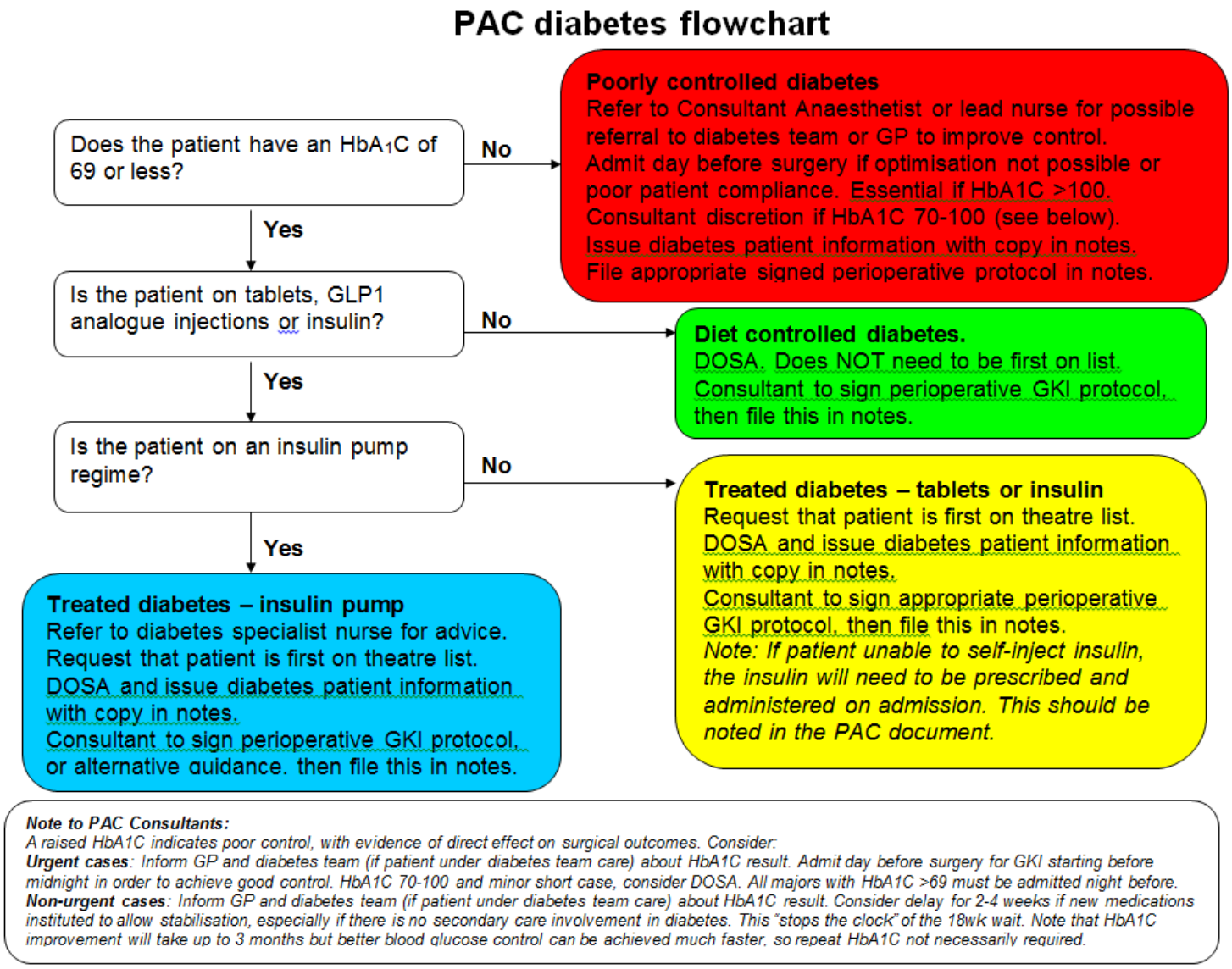
- 66% no perioperative plan diabetes from PAC
- 40% who should have had a GKI in theatre did not
- 1 in 5 who got a GKI did not need one
- 25% did not get their blood glucose checked in theatre
- 50% had no handover of diabetes plan from recovery or ITU to the ward
- 165 hypoglycaemic episodes in 8 ward patients with nothing done to reduce them in 110
- > 50% persistent hyperglycaemia left untreated

New Trust Peri-operative Diabetes Pathway

- Launched 9 May 2016
- Aims to join up peri-operative diabetes care



Individual patient planning PAC



Note to PAC Consultants:
A raised HbA1C indicates poor control, with evidence of direct effect on surgical outcomes. Consider:
***Urgent cases**: Inform GP and diabetes team (if patient under diabetes team care) about HbA1C result. Admit day before surgery for GKI starting before midnight in order to achieve good control. HbA1C 70-100 and minor short case, consider DOSA. All majors with HbA1C >69 must be admitted night before.*
***Non-urgent cases**: Inform GP and diabetes team (if patient under diabetes team care) about HbA1C result. Consider delay for 2-4 weeks if new medications instituted to allow stabilisation, especially if there is no secondary care involvement in diabetes. This "stops the clock" of the 18wk wait. Note that HbA1C improvement will take up to 3 months but better blood glucose control can be achieved much faster, so repeat HbA1C not necessarily required.*

Patient information

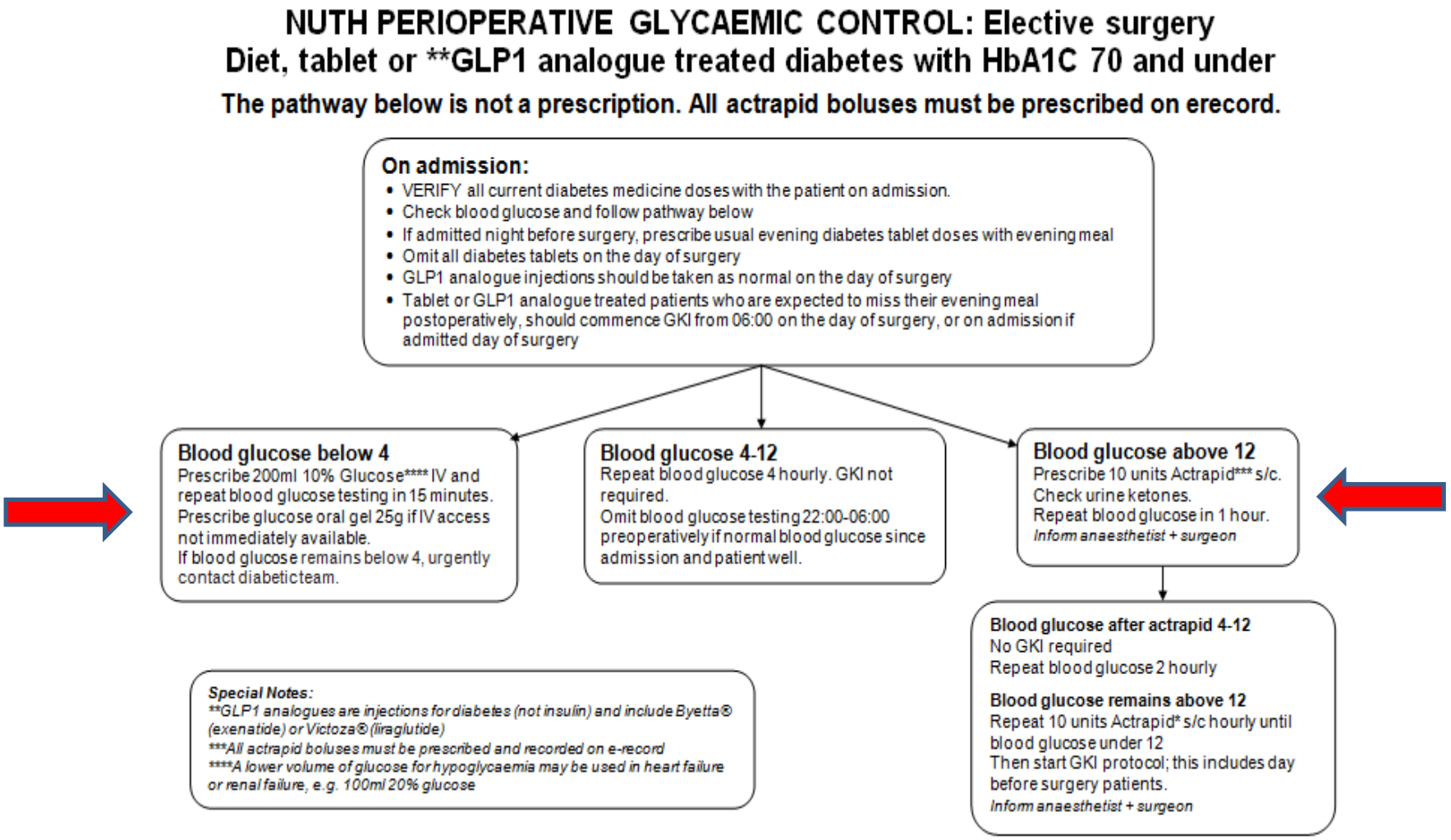
Preoperative diabetes medication management

Omit all diabetes <u>tablets</u> on the morning of surgery
Ensure insulin advice is checked by TWO NURSES OR DOCTORS.

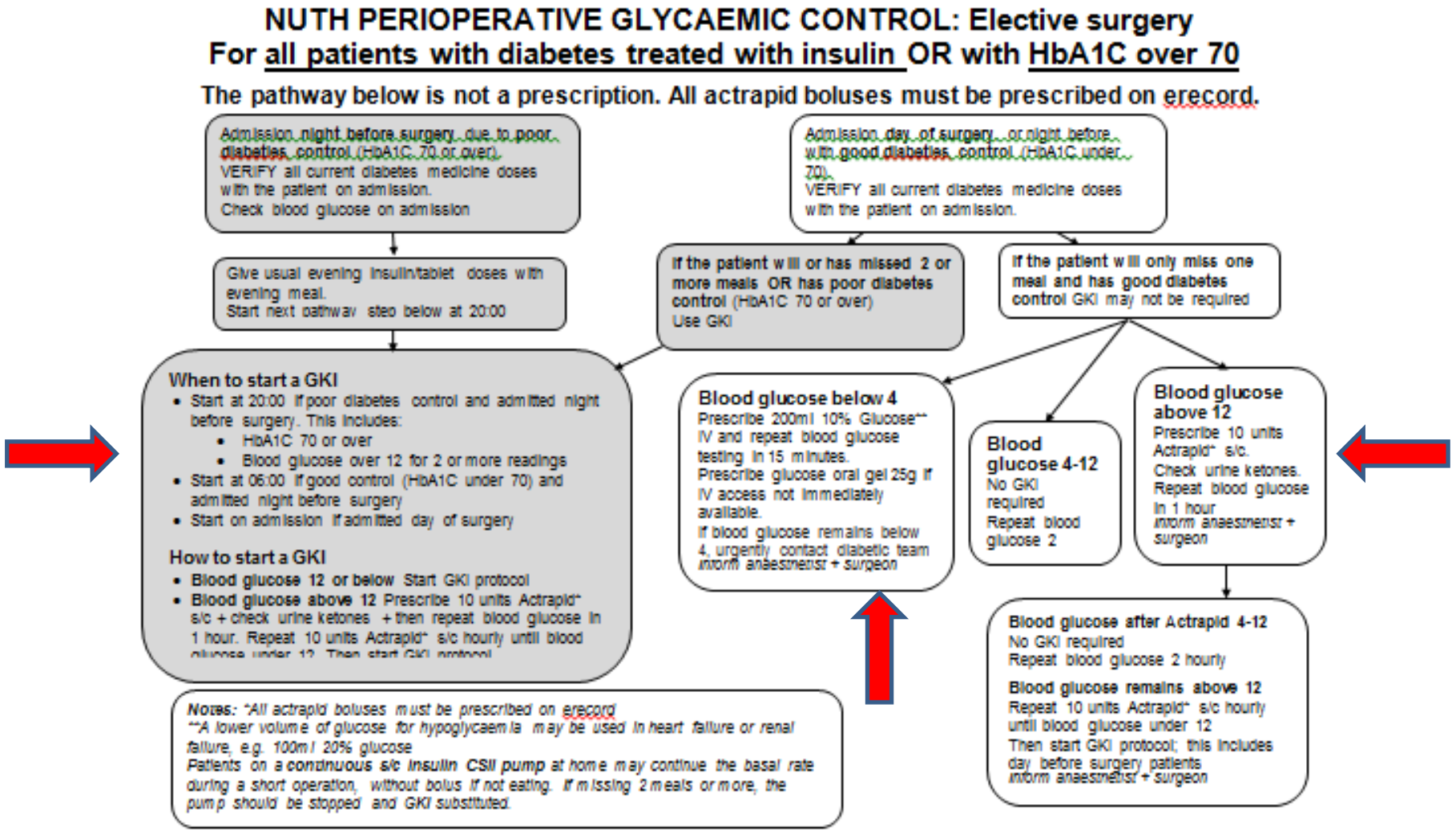
Byetta® (exenatide) or Victoza® (liraglutide) should be taken as normal on the day of surgery

INSULIN	Day before operation	Day of operation: morning surgery	Day of operation: afternoon surgery
Once daily Insulin (evening) (Lantus®/Glargine or Levemir/Detemir®) Insulatard® or Humulin I®	Take insulin as usual	Resume normal insulin with evening meal.	Resume normal insulin with evening meal.
Once daily Insulin (morning) (Lantus®/Glargine or Levemir/Detemir®) Insulatard® or Humulin I®	Take insulin as usual	Reduce dose by 20% = *usual number of units x 0.8 (e.g. 15 units becomes 12 units)*	Reduce dose by 20% = *usual number of units x 0.8 (e.g. 15 units becomes 12 units)*
Twice daily Insulin (Novomix 30®, Humulin M3®, Humalog Mix 25®, Humalog Mix 50®)	Take insulin as usual	Use half of usual morning dose. Resume normal insulin with evening meal.	Use half of usual morning dose. Resume normal insulin with evening meal.
Twice daily - Self mixed short acting and intermediate acting insulin. (e.g. animal neutral, Actrapid® Humulin S®) **and intermediate acting** (e.g. animal isophane Insulatard®, Humulin I®)	Take insulin as usual	Calculate the total dose of both morning insulins and take half this dose as intermediate acting insulin only in the morning. *E.g. if patient taking actrapid 10 units + Insulatard 20 units, this is 30 units in total. Half is 15 units ALL taken as Insulatard.* Resume normal insulin with evening meal.	Calculate the total dose of both morning insulins and take half this dose as intermediate acting insulin only in the morning. *E.g. if patient taking actrapid 10 units + Insulatard 20 units, this is 30 units in total. Half is 15 units ALL taken as Insulatard.* Resume normal insulin with evening meal.
3, 4, or 5 Insulin injections daily (Basal Bolus insulin regime) eg long acting: (Lantus®/Glargine or Levemir/Detemir®) **with short acting:** Novorapid®/Aspart or Humalog®/lispro	Take insulin as usual	Do not take morning dose of short acting insulin. If normally takes long acting basal insulin in the morning they should take their normal dose. Resume normal insulin with next meal.	Take usual morning insulin dose(s). Do not take lunchtime dose. Resume normal insulin with evening meal.
"Insulin pump" CSII.	Take insulin as usual	Continue basal insulin pump but do not use a morning bolus	Continue basal pump and usual morning bolus. Do not use a lunchtime bolus.

Diet/tablets good control



Insulin or poor control



New GKI prescription

NUTH GKI prescription

GKI: 80 ml/hr 500ml 10% glucose + ……mmol potassium (KCl) + Actrapid ……. Units (16 standard)

10mmol standard&maximum — ***Omit potassium in renal failure***

*Use 12 units if patient received long acting insulin**

Use 10 units if renal failure or known insulin sensitivity

*NOTE: If taking LONG-ACTING S/C INSULIN, continue at USUAL DOSE (*Insulatard, Humulin I, Glargine, Detemir) whilst on GKI

Check blood glucose hourly or sooner if patient has symptoms of hypoglycaemia

Blood glucose below 4.0
STOP GKI & give 200ml 10% Glucose
Recheck blood glucose every 15mins
When blood glucose above 4 re-start GKI with 4 units less Actrapid (change bag)
Inform responsible doctor

Blood glucose 4.1 - 6
Reduce Actrapid by 4 units after 1 blood glucose reading in this range (change bag)

Target blood glucose 6.1 – 10
Continue current GKI dosing
Consider 2-hourly blood glucose testing if within target for 2 consecutive readings

Blood glucose 10.1 – 13
Increase Actrapid by 4 units after two consecutive hourly readings in this range (change bag)

Blood glucose above 13
Prescribe 10units** Actrapid s/c AND increase Actrapid in GKI by 4 units (change bag)
Repeat blood glucose in 1 hour and if not falling contact diabetes team for advice
Check urinary ketones
Inform responsible doctor

GKI must be continued until one hour after subcutaneous insulin or tablets are restarted, which should be once the patient is eating & drinking

For support and advice contact diabetes specialist nurses or registrar via switchboard

Prescription of this GKI regime is valid for up to 18 weeks before elective surgery, for use if required as per perioperative protocols.
All **Actrapid boluses MUST be prescribed separately on erecord.
Prescribe a GKI placeholder on erecord – Adding "GKI" will refer nursing staff to paper chart.

Prescriber's name:……

Prescribers signature:……

Date:……

Surname	Patient I.D. No.
Forename	D.O.B. DDMMYYY
Address	NHS No.
	Sex Male / Female
Postcode	

Post-op transfer to surgical wards

CARE OF PATIENTS WITH DIABETES ON TRANSFER TO WARD

To be used for all **patients with diabetes** transferring area of care.
Refer to Management of Diabetes on the Surgical Ward or Postoperative Glycaemic Control in Recovery if blood glucose outside **target range of 4-12mmol/l** and patient not on GKI.

Doctor to choose and initial appropriate box below	**To be completed by a doctor:** Radiology contrast within 24hrs? YES/ NO Renal impairment (*eGFR <50 or Creatinine>150mmol/l)?* YES / NO Name..... Designation..... Signature..... Date:..... Time:.....	Surname / Patient I.D. No. Forename / D.O.B. DD/MM/YYY Address / NHS No. Sex Male / Female Postcode
	Eating and drinking normally • Re-start diabetes medications at their usual times, once the patient is able to eat at least a sandwich or equivalent. Doses must be verified with the patient. • Metformin: Avoid for 24 hours after radiological contrast or if eGFR<50 or creat>150mmol/l. • Continuous insulin s/c pump – continue basal rate, add boluses with meals as usual • Check blood glucose every 4 hours minimum, increasing if outside range. • Continue any GKI until 1 hour after eating + diabetic medications restarted.	
	Eating and drinking, but less than usual Re-start reduced diabetes medications as below, at their usual times, once the patient is able to eat at least a slice of toast or equivalent. Verify usual doses with the patient. • Sulphonylureas (gliclazide/gliclazide MR, glimepiride) – Halve usual dose until full diet • Metformin – Avoid until eating normally and avoid for 24 hours after radiological contrast or if eGFR <50 or creatinine >150mmol/l. • GLP1 analogues – Usual dose can be given. • Long-acting s/c insulin (Insulatard, Humulin I, Glargine, Detemir) – 80% of usual dose. • Continuous insulin s/c pump – Continue basal rate; reduce boluses until eating normally • Other s/c insulin – Halve usual dose and then adjust as required. • Check blood glucose every 2 hours minimum, increasing if blood glucose outside range. • Continue any GKI until 1 hour after eating + diabetes medications restarted.	
	Unable to eat, tablet or GLP1 analogue treated diabetes • Omit these medicines until the patient can eat and drink. GKI may be required. • Check blood glucose every 2 hours minimum, increasing if blood glucose outside range.	
	Unable to eat, insulin controlled diabetes (or insulin + tablet) • Omit diabetes tablets until the patient is able to eat and drink. • Long-acting s/c insulin (Insulatard, Humulin I, Glargine, Detemir) should be continued at usual dose alongside a GKI. GKI is required until the patient is able to eat. • Continuous s/c insulin pump should be stopped and GKI used • Check blood glucose as per GKI protocol. • Patients with diabetes who are receiving parenteral or NG nutrition will require the input of the diabetic specialist team when discontinuing the GKI; contact via switchboard	

NURSE TO COMPLETE BEFORE TRANSFER

GKI to be continued until 1 hour after the patient has eaten & had usual s/c insulin and/or tablets

GKI running on discharge from recovery or critical care YES / NO

S/C insulin or tablets given with food and documented on e-record YES / NO

Handover plan and blood glucose result within last hour to ward nursing staff YES / NO

Nurse name:..... Signature..... Date:..... Time:.....

Management of Diabetes on the Surgical Ward

Please complete the trust's "safe use of insulin in hospital" e-learning module online.

Preoperative care

- Elective surgical patients should follow the appropriate perioperative pathway, which should be in the patient's notes from preassessment clinic and can be found on the intranet.
- Emergency admissions should follow the emergency surgical perioperative pathway, which can be found on the intranet.

Postoperative care or where no surgery is planned

Emergency admissions should follow the emergency surgical perioperative pathway when they are first admitted. This can be found on the intranet.

Key messages:
- VERIFY all current diabetes medicine doses with the patient on admission: type (trade name and generic), dose and timing
- Insulin dependent patients must NEVER completely omit their insulin
- Aim for target blood glucose of 4-12 mmol/l
- Avoid **metformin** if any likelihood of contrast scans or if renal function poor (egfr <45mmol/mol or unstable).
- An insulin dependent patient who is vomiting or not eating at all requires a GKI (glucose potassium infusion).

Patients with diabetes who are unwell are likely to have higher insulin requirements and may need an adjustment to their medications.
Insulin dependent patients must never have their insulin omitted due to the risk of ketoacidosis.
Some patients will prefer to administer their own insulin; refer to the hospital SAMS policy, tick the patient self-administration box on the e-prescription and prescribe a dose range for the insulin. All insulin must be recorded on erecord.

Managing hypoglycaemia (blood glucose less than 4mmol/l)

Record the treatment of hypoglycaemia on e-record using the adhoc recording system

Adults who are alert and able to swallow	Adults who are unconscious or very aggressive
Give 15 – 20g quick-acting carbohydrate such as: - 150 – 200mls pure fruit juice - 90 – 120 mls lucozade - 4 – 5 glucotabs - 2 tubes glucogel	Prescribe 200mls of 10% glucose/dextrose or 100mls of intravenous 20% glucose/dextrose Prescribe Glucagon 0.5 mg S/C or IM if intravenous access unavailable (takes 5 to 10 minutes to work)
Repeat blood glucose after 15 minutes. Repeat up to 3 times if required, then prescribe IV glucose or IM glucagon if not improving.	Repeat blood glucose 15 minutes later. If still less than 4mmol/l or remains unconscious, repeat the IV dextrose and urgently contact the diabetes team.
Once blood glucose above 4mmol/l, give toast, biscuits or milk.	Once blood glucose above 4mmol/l and conscious, give toast, biscuits or milk.
See section on managing medications.	See section on managing medications.

Managing hyperglycaemia (blood glucose over 12mmol/l)

Emergency management of hyperglycaemia:
- Prescribe 10 units Actrapid* s/c.
- Check urine ketones: **If positive** – ask diabetes team for help urgently, this may be a DKA
- Repeat blood glucose in 1 hour

If blood glucose remains above 12mmol/l
Repeat 10 units Actrapid* s/c hourly until blood glucose under 12mmol/l
See section on managing medications.

**All actrapid boluses must be prescribed and recorded on e-record*

Managing medication

Ensure all medications are verified with the patient on this admission and prescribed on erecord. Remember that long acting insulin should be continued even with a GKI.

If there is **more than one episode of hyperglycaemia (over 12) or hypoglycaemia (less than 4)** on two consecutive days, a dose adjustment of diabetes medication is required. Look at when the hyper/hypoglycaemia occurred and change medications as below:

Step 1: Choose which TIME dose to change

Reduce the dose that preceded the hyper/hypoglycaemic event, to try to prevent it happening tomorrow.
E.g. if hyper/hypoglycaemia occurs at 4pm, change the lunchtime dose for the next day

Step 2: Choose which DRUG to change

Priority order for changing doses:
Short acting insulin → Long acting insulin → Sulphonylurea Tablets → Other diabetes tablets

Hypoglycaemia: Reduce insulin by 10%. Reduce tablets by 25-50%.
Hyperglycaemia: Increase insulin by 10%. Increase tablets by 25-50%.

E.g. For a patient usually on Glargine 30 units and Novorapid 20 units 4 times a day, change the Novorapid by 10% for only the dose that preceded the time of the hyper/hypoglycaemic event.

Short and ultra-short acting insulin	Intermediate acting insulin	Long acting insulin	Sulphonylureas	Other diabetes tablets
Actrapid® HumulinS® Novorapid®/Aspart Humalog®/lispro	Novomix 30® Humulin M3® Humalog Mix 25® Humalog Mix 50®	**Glargine** **Detemir®** **Insulatard®** **Humulin I®**	Gliclazide Glipizide Glibenclamide Glimepiride	Metformin Pioglitazone Acarbose

Contact the diabetes team for advice if your patient is on an insulin pump or if hypoglycaemia persists following dose adjustment.

Safely stopping a GKI infusion

Do not stop a GKI until the patient is eating and drinking and there is no vomiting.
In Type 1 diabtes ensure your patient has been given s/c insulin before stopping the GKI.
Patients who have been on a GKI must have their normal diabetes medications restarted with the appropriate meal. The GKI may be discontinued ONE HOUR after this.

Podiatry Referrals

Every Vascular inpatient with diabetes will either have active foot disease or are at higher risk of developing them during their stay, and all should be referred to the inpatient podiatry service as a matter of routine. Refer non-vascular patients if there is any history or evidence of foot disease. This can be done via a link on the bottom of the tissue viability webpage on the intranet (Support Services > Patient Services>Tissue Viability)

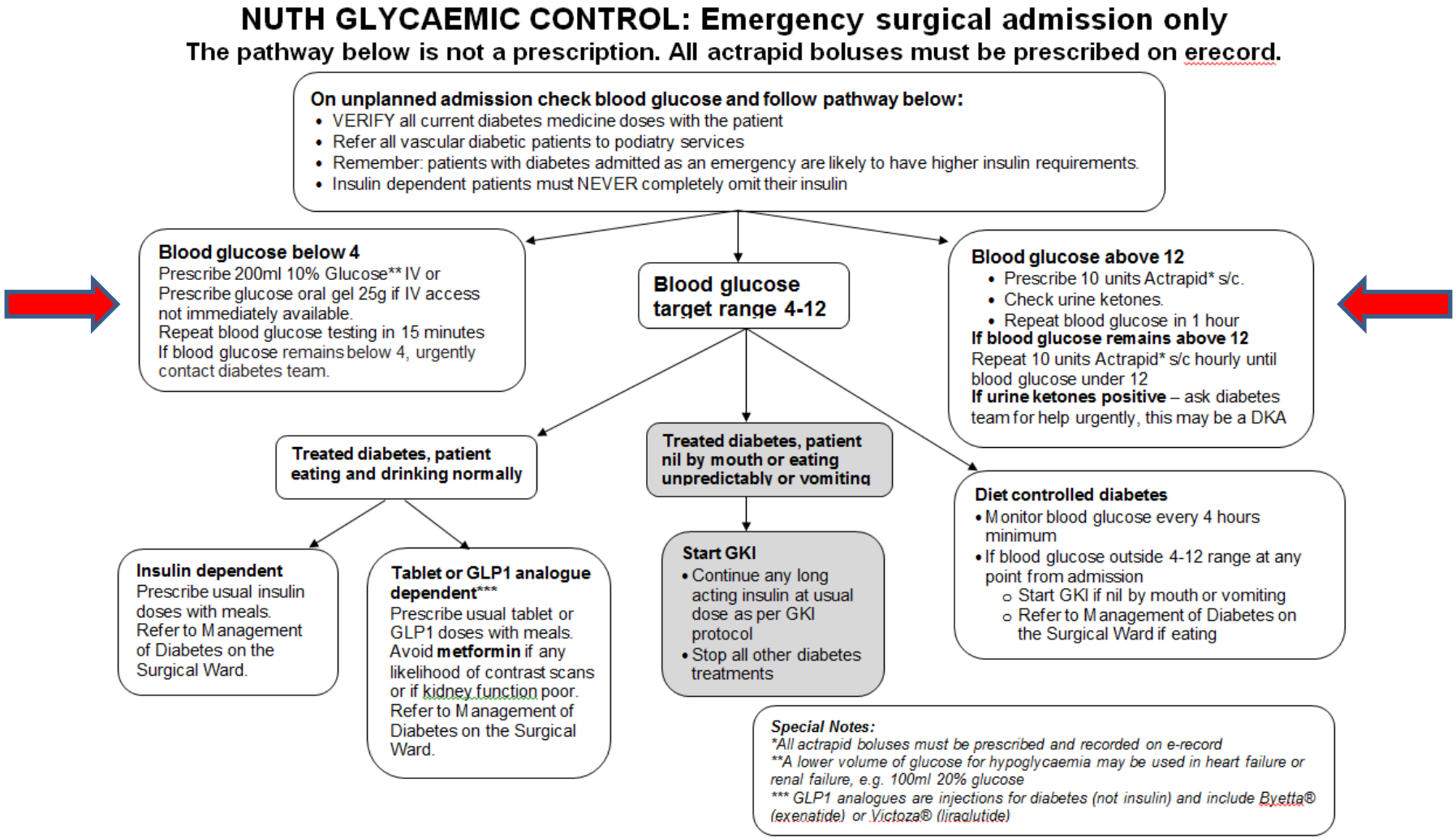
Discharge Planning

Many vascular patients with diabetes will require outpatient diabetes and podiatry care, and this should be organised prior to discharge. Please liaise with the inpatient medical foot team (Diabetes, podiatry) to determine who needs the appropriate outpatient arrangements.

Newcastle Upon Tyne - Fax direct referral to: **Newcastle Diabetes Centre Fax: 0191 282 3212**

Other areas: Fax a direct referral to the local diabetes foot specialist – A list of contact details of the relevant specialists working in the North-East will be available on the ward (Northern Regional Footcare Network directory).

Emergency Patients



Summary Changes

- PAC plans in notes for all elective admissions
- New theatre/recovery protocols
- Transfer of care forms on return to wards
- New ward guidelines for diabetes management hyperglycaemia/hypoglycaemia
- New emergency admission guidelines
- **We need your help to make surgery safer for patients with diabetes!**

Further Information

- New chapter Diabetes Handbook on intranet for peri-operative management of diabetes
- Diabetes Specialist Nurse Team Leaders
  - RVI Rebecca Cook 29718
  - FRH Moira Gray 39451
  - switchboard out of hours
  - **Please contact for advice and support**
- Ward diabetes link nurses
- Diabetes registrar through switchboard