# Routine Capillary Blood Glucose Monitoring Guideline for Hospital In patients with Diabetes According to Treatment Type.

## For frequency of blood glucose monitoring according to glucose level see guide on page 2

**Capillary Blood glucose must be measured within 1 hour of admission.** Recommend pre meal and bed time i.e. four times daily for the first 48 hours then thereafter follow guide below**. Do not share your barcode.**

| Suggested frequency of blood glucose monitoring- a general guide<br>*check BNF not a complete list of medications | |
|---|---|
| Diet controlled alone<br>or Metformin<br>and/or DPPIV inhibitor ("...gliptin")*<br>and/or SGLT2 ("...gliflozin")*<br>and/or GLP1 injections<br>(Victoza®, Byetta®, Lyxumia®)* | **Once daily if stable****<br><br>See table for increased frequency of monitoring if unstable |
| On Sulphonylurea tablets<br>(Gliclazide, Glipizide, Glibenclamide)*<br><br>and/or<br>Once or Twice daily insulin | **Twice daily if stable****<br><br>See table for increased frequency of monitoring when unstable |
| Basal Bolus insulin (4 or more injections a day) | **Four times a day as minimum**<br>See table for increased frequency of monitoring when unstable |
| Continuous subcutaneous insulin pump (CSII) | |

| | |
|---|---|
| * | Not a complete list consult BNF |
| ** | Stable: defined as within acceptable and expected CBG range for the individual who is considered medically otherwise stable |

**<u>Interpreting Blood Glucose Levels:</u> "Target" range will be different for each individual.**
**<u>Always use clinical judgement</u>, this is general advice. If in doubt ASK.**

<table>
<tr><th colspan="5">Capillary Blood Glucose mmol/l</th></tr>
<tr><td>Low<br>< 4.0</td><td>Normal<br>4.0-7.0</td><td>Slightly High<br>7.1-11.0</td><td>High<br>11.1-16.9</td><td>Very High<br>17.0 and above</td></tr>
<tr><td rowspan="2">1. Treat promptly<br><br>2. Follow hypoglycaemia guideline. Use Hypobox<br><br>3. Increase monitoring to 4 times a day for 48 hours<br><br>4. Explore & address cause of hypoglycaemia</td><td rowspan="2">Continue usual blood glucose testing at recommended frequency</td><td colspan="3">Increase monitoring to four times a day if >11 mmol/l on two or more occasions<br><br>Always consider the possible cause of hyperglycaemia. Do not treat food related hyperglycaemia expect this to settle within 4 to 6 hours.</td></tr>
<tr><td>Maybe normal or acceptable for patient<br><br>Seek routine advice from own team if concern</td><td>May be normal for patient seek routine diabetes advice if well<br><br>If patient unwell inform specialty team<br><br>If unwell or vomiting check Blood Ketones in these high risk groups</td><td>Inform medical staff if unstable or unwell<br>Check Capillary Blood Ketones in:<br>1. Any patient with symptoms of Diabetic Ketoacidosis<br>2. Any patient with diabetes who is vomiting<br>3. Type 1 diabetes<br>4. Pregnancy<br>5. Any patient with CBG > 20 mmol/L who is unwell or persistently hyperglycaemic<br>6. On SGLT2 (DKA is a rare Side effect)</td></tr>
</table>

# Capillary Blood Ketones: Interpretation of Results

(Clinical judgement required for interpretation, ketosis can occur in starvation and malnutrition)

| **Follow capillary blood glucose guideline on page 2 for suggested indication of when to check a Capillary Blood Ketone level. Always use clinical judgement.** | | | | |
|---|---|---|---|---|
| If hypoglycaemia (CBG < 4.0 mmol/l) do not check capillary blood ketone level. | Normal <0.6 | Ketosis 0.6-1.5 | Decompensated diabetes at risk of DKA 1.5 to 2.9 | DKA 3.0 or above |
| | | | | |
| | Follow advice on blood glucose monitoring, no need to recheck routinely | 1. Ensure adequate hydration<br>2. Increase monitoring of blood glucose according to blood glucose level (page 2)<br>3. Repeat blood ketone levels hourly until normal <0.6 mmol/l<br>4. If blood ketones > 1.5 mmol/l follow guideline in orange box | 1. Medical review. Address hydration and level of hyperglycaemia<br>2.Additional insulin required see hyperglycaemia treatment guideline | Use DKA protocol if all criteria met with<br>1. Blood ketones greater than 3.0 mmol/l<br>2. pH of less than 7.3 and/or bicarbonate less than 15 mmol/l<br>3. Hyperglycaemia: blood glucose level of greater than 11 mmol/l |

Link to DKA guideline: http://howis.wales.nhs.uk/sitesplus/866/opendoc/291966

# Management of Hyperglycaemia in Hospital Patients.
## Advice if Capillary Blood Ketones (CBK) and/or Capillary Blood Glucose (CBG) are in the Amber or Red Category.

*s.c. = subcutaneous **separate guidelines exist for paediatric and obstetric patients.

Assess patient if unwell request medical review. Always explore the reason for hyperglycaemia. Consider the possibility and assess for Diabetic Ketoacidosis (DKA) in any patient who is unwell. Alert patient's own team/on call team. Follow "Think Glucose" criteria for referral to the diabetes team.

**Blood ketones 1.5 to 2.9 mmol/L and persistent hyperglycaemia Follow capillary blood glucose guideline** (i.e. not DKA). (page 2).

1. Has the patient had their usual diabetes medication (s)?
2. Consider if additional insulin required to correct ketonaemia and/or persistent hyperglycaemia. Address hydration status.
3. If required prescribe any additional s.c.* insulin on the front of insulin chart (not more than 2 s.c. correction doses and do not repeat dose within 2 hours)

Type 1 diabetes if additional insulin required:

1. Ask the patient their usual correction dose
2. Otherwise assume 1 unit of s.c. Novorapid® will reduce blood glucose by approx. 3 mmol/L.

Type 2 diabetes if additional insulin required:

1. Give 0.1 unit/Kg of Novorapid® s.c. (e.g. 70kg patient = 7 units Novorapid®). Max 10 units.

Check blood glucose (CBG) and/or blood ketones (CBK) in **1 hour**.

If blood glucose and/or blood ketone levels are not improving after **2 hours consider repeat** subcutaneous Novorapid® **once** only and continue hourly monitoring (assess for risk of hypoglycaemia if repeat dose given). **Target blood glucose 10 mmol/L**.

**Blood ketones are > 3 mmol/L** check venous pH and blood glucose

If all three diagnostic criteria fulfilled for DKA use DKA pathway

- Blood ketones > 3 mmol/L
- Venous pH of < 7.3 and/or bicarbonate < 15 mmol/l
- Capillary blood glucose of > 11 mmol/L

Follow DKA guideline commence Fluids and Fixed Rate Intravenous Insulin Infusion (FRIII)

If blood ketone and/or blood glucose levels are not improving or if clinical concerns commence a variable rate intravenous insulin infusion (VRIII or "sliding scale"). Use surgical chart in patients who are nil by mouth expected for theatre. Use medical chart if not expected to undergo a procedure**