Hyperglycaemia (blood glucose > 10mmol/L)

- Ideally, blood glucose levels should be 4-7mmol/L before meals.
- Avoid adjusting insulin reactively to ‘quick fix’ high readings, this may precipitate hypoglycaemia.
- Review pattern of blood glucose levels over the previous 48 hours.
- Adjust insulin dose prior to the elevated blood glucose level as follows:
  - blood glucose > 7 mmol/L at lunchtime **increase** the breakfast insulin dose.
  - blood glucose > 7mmol/L at teatime **increase** the lunchtime insulin dose.
  - blood glucose > 7 mmol/L at suppertime **increase** the evening meal insulin dose.
  - blood glucose > 7 mmol/L at breakfast time **increase** basal insulin dose (e.g. insulatard, lantus, humulin I, levemir).
- An increase of 2-4 units /10 % of dose of insulin is generally recommended.
- Check ketones in people with type 1 diabetes.
- Observe the pattern of premeal blood glucose levels thereafter and titrate insulin again if necessary.

Hypoglycaemia (blood glucose <4mmol/L) should not be tolerated on a regular basis

- In the event of an episode of **unexplained hypoglycaemia** reduce insulin.
- Adjust insulin prior to the hypoglycaemic episode as follows:
  - blood glucose < 4mmol/L prior to lunchtime **reduce** the breakfast insulin dose.
  - blood glucose < 4mmol/L prior to teatime **reduce** the lunchtime insulin dose.
  - blood glucose < 4mmol/L prior to suppertime **reduce** the evening meal insulin dose.
  - blood glucose < 4mmol/L prior to breakfast time **reduce** basal insulin dose (e.g. insulatard, lantus, humulin I, levemir).
- A reduction of 2-4 units/ 10 % of dose of insulin is generally recommended.
- Observe the pattern of the blood glucose levels thereafter and titrate insulin again if necessary.
- **DO NOT OMIT INSULIN**, ask for advice from diabetes team if necessary.
- If blood glucose level is low (below 4mmol/L) and insulin injection is due, provide patient with some quick acting carbohydrate e.g. 50mLs of Lucozade to increase blood glucose level, then administer insulin and meal as usual.
- Address the cause of hypoglycaemia to prevent it from happening again.

**CONTACT DETAILS FOR DIABETES TEAM**
Specialist Registrar for Diabetes bleep 5416,
Diabetes Specialist Nurse bleep 4872 tel. Ext. 36009
Diabetes information available via NHS Intranet [www.diabetes-healthnet.ac.uk](http://www.diabetes-healthnet.ac.uk)
D Voigt SPI GWT 03/2006
Basic Guidelines - Insulin Adjustment for Twice Daily Insulin Regimen

Hyperglycaemia (blood glucose >10mmol/L)

- Ideally, blood glucose levels should be 4-7mmol/L before meals
- Avoid adjusting insulin reactively to ‘quick fix’ high readings, this may precipitate hypoglycaemia.
- Review the pattern of blood glucose levels over the previous 48 hours.
- Adjust insulin if the pattern of blood glucose level is elevated.
- Adjust the insulin dose prior to the elevated blood glucose level:
  - blood glucose > 7mmol/L before lunch and tea increase the breakfast insulin dose.
  - blood glucose > 7mmol/L before bed and before breakfast increase the teatime insulin dose
- An increase of 2-4 units/ 10 % of dose of insulin is generally recommended.
- Check ketones in people with type 1 diabetes.
- Observe the pattern of the premeal blood glucose levels thereafter and titrate insulin again if necessary.
- Occasionally a different ‘mixture’ of insulin may be required.

Hypoglycaemia (blood glucose <4mmol/L) should not be tolerated on a regular basis

- In the event of an episode of unexplained hypoglycaemia reduce insulin.
- Adjust the insulin dose prior to the hypoglycaemic episode:
  - blood glucose < 4mmol/L before lunch and/or before tea reduce breakfast insulin
  - blood glucose < 4mmol/L before bed and/or before breakfast reduce the teatime insulin dose
- A reduction of 2-4-units/ 10 % of dose of insulin is generally recommended.
- If blood glucose level is low (below 4mmol/L) and insulin injection is due, provide patient with some quick acting carbohydrate e.g. 50mLs of Lucozade to increase blood glucose level, then administer insulin and meal as usual.
- Address the cause of hypoglycaemia to prevent it from happening again.
- Occasionally a different ‘mixture’ of insulin may be required.

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Diabetes Specialist Nurse bleep 4872 tel. Ext. 36009
Diabetes information available via NHS Intranet www.diabetes-healthnet.ac.uk
D Voigt SPI GWT 03/20006
## Trouble Shooting Guidelines - Glycaemic Control

### GLYCAEMIC CONTROL
- If normal insulin regimen unknown **DO NOT OMIT INSULIN** consider suitable substitute until routine insulin details are established e.g. daily/BD isophane in elderly, biphasic insulin twice daily in others - dose 0.5units/kg/24hours.
- Quality controlled blood glucose meters should be used in acute wards by healthcare staff.
- Ideally, pre meal blood glucose should be maintained 4-7mmol/L.
- Assess target blood glucose range and frequency of blood monitoring for each individual.
- Hba1c indicates the glycaemic control during previous 3 months –target 6.5% to reduce risk of health problems associated with diabetes.

### SITUATION

#### HYPERGLYCAEMIA and/or KETOSIS

**Blood glucose level >10mmol/L** Risk of osmotic symptoms of diabetes and dehydration. Risk of DKA in type 1 diabetes

<table>
<thead>
<tr>
<th>BACKGROUND</th>
<th>ASSESSMENT</th>
<th>RECOMMENDATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consider causes of high blood glucose levels: e.g.</td>
<td>Assess recent pattern of blood glucose levels i.e. last 48 hours</td>
<td>Address identified causes if possible</td>
</tr>
<tr>
<td>• Infection</td>
<td>Identify potential causes of elevated blood glucose levels</td>
<td><strong>Check ketones</strong> in patients with type 1 diabetes 2-4 hourly until ketone free, daily thereafter.</td>
</tr>
<tr>
<td>• Stress</td>
<td>Check insulin/diabetes medication is being prescribed and administered at correct dose, and time, in relation to food intake.</td>
<td>Insulin and fluid increase may be indicated in ketosis, report to medical staff.</td>
</tr>
<tr>
<td>• Steroid therapy</td>
<td>Check for signs of lipohypertrophy (lumpy areas at injection sites) which may affect insulin absorption.</td>
<td>Refer to DKA protocol in type 1 diabetes with ketosis</td>
</tr>
<tr>
<td>• Insulin and/or diabetes medication omission /inadequacy</td>
<td>Check credibility of blood glucose monitoring e.g. handwashing</td>
<td>Consider increase in insulin/ diabetes medication if recent pattern of pre meal blood glucose levels greater than 7mmol/L</td>
</tr>
<tr>
<td>• Concordance with treatment/food intake</td>
<td>Check ketones in type 1 diabetes.</td>
<td>Inform patient if medication dose is changed</td>
</tr>
<tr>
<td>• Problems with insulin injection technique</td>
<td>Check ketones in all patients at diagnosis of diabetes</td>
<td><strong>Monitor pre meal blood glucose levels to assess glycaemic control</strong></td>
</tr>
<tr>
<td>• Problems with injection site affecting insulin absorption</td>
<td><strong>KETONES signify potential risk of DKA in people with type 1 diabetes</strong></td>
<td>Review glycaemic control over next 48 hours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adjust insulin/medication again if necessary</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Consult with diabetes team for advice as required</td>
</tr>
</tbody>
</table>

### HYPOGLYCAEMIA

**Blood glucose level <4mmol/L.** A potentially dangerous side effect of insulin therapy and sulphonylureas e.g. gliclazide, glipizide, glibenclamide. Prompt treatment is required. **Hypoglycaemia should not be tolerated on a regular basis.**

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<tr>
<td>Consider causes of low blood glucose levels: e.g.</td>
<td>Assess recent pattern of blood glucose levels i.e. last 48 hours</td>
<td><strong>Check ketones</strong> in type 1 diabetes 2-4 hourly until ketone free, daily thereafter.</td>
</tr>
<tr>
<td>• Inadequate food intake, fasting, missed meals</td>
<td>Identify potential causes of low blood glucose levels</td>
<td>Insulin and fluid increase may be indicated in ketosis, report to medical staff.</td>
</tr>
<tr>
<td>• Too much insulin/diabetes medication</td>
<td>Assess recent nutritional status</td>
<td>Refer to DKA protocol in type 1 diabetes with ketosis</td>
</tr>
<tr>
<td>• Insulin administration or drug administration at inappropriate time</td>
<td>Check insulin/ diabetes medication is being prescribed and administered at correct dose, and time, in relation to food intake.</td>
<td>Consider increase in insulin/ diabetes medication if recent pattern of pre meal blood glucose levels greater than 7mmol/L</td>
</tr>
<tr>
<td>• Problems with insulin injection technique</td>
<td>Check for signs of lipohypertrophy (lumpy areas at injection sites) which may affect insulin absorption.</td>
<td>Inform patient if medication dose is changed</td>
</tr>
<tr>
<td>• Problems with injection site affecting insulin absorption</td>
<td>Check credibility of blood glucose monitoring e.g. handwashing</td>
<td><strong>Monitor pre meal blood glucose levels to assess glycaemic control</strong></td>
</tr>
<tr>
<td>• Increased activity</td>
<td></td>
<td>Review glycaemic control over next 48 hours</td>
</tr>
<tr>
<td>• Renal or hepatic impairment</td>
<td></td>
<td>Adjust insulin/medication again if necessary</td>
</tr>
<tr>
<td>• Pancreatic pathology</td>
<td></td>
<td>Consult with diabetes team for advice as required</td>
</tr>
</tbody>
</table>

### TROUBLE SHOOTING GUIDELINES

- Blood glucose in 15 minutes and repeat treatment if recovery complete.
- If patient able to swallow - administer 50mL Lucozade
- If patient confused or drowsy and able to swallow – administer glucogel
- If patient unconscious/unable to swallow - IV 50%dextrose.
- Provide complex CHO snack e.g. wholemeal bread/toast
- **Recheck** blood glucose in 15 minutes and repeat treatment if necessary.

#### Establish the cause of hypoglycaemia and take action to prevent re occurrence.
- Consider reduction of insulin/medication
- Inform patient if medication dose is changed
- Monitor pre meal blood glucose levels over next 48 hours
- Review glycaemic control, adjust insulin/medication again if necessary
- **NEVER OMIT insulin**
- Consult with diabetes team for advice as required