These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
Notes for using these Guidelines

These guidelines are evidence-based using the best current information/research available; this is listed in the reference section.

Guidelines of this nature are written to direct and inform and may not be suitable for application to all patients in Dudley. These guidelines have been designed to provide general information and direction for the clinical management of people with type 2 diabetes. The assessing clinician will need to consider individual patient circumstances when using these guidelines and apply them as considered appropriate. If there is any doubt, advice can be sought from any member of the Primary or Secondary Care Diabetes Specialist Teams.

These are recommendations as of time of print (Feb 2014) and web addresses are provided to enable clinicians who are using them to update the information that has been provided. It is considered that it is the responsibility of all clinicians using these guidelines to ensure that they keep up to date with the most recent changes in diabetes management and safety issues.

In the event of significant changes resulting from new research or findings, changes will be posted in the prescribing newsletters, on the CCG intranet and on the DGH Foundation Trust Hub.

Please visit NHS Dudley Joint Medicines Formulary (http://www.dudleyformulary.nhs.uk/) for latest versions of the following guidelines:

- Management of hypertension
- Lipid management
- Prescribing of Anti-platelet Therapy in Primary and Secondary Care
- Prescribing Guidelines for the Management of Type 2 Diabetes with Oral Hypoglycaemic Agents
Contributors to these Guidelines

These guidelines have been developed by the Dudley Diabetes Clinical Advisory Team (CAT) which consists of a multi-disciplinary team of clinicians involved in diabetes care across community, primary and secondary care. The following professionals have contributed to these guidelines (in alphabetical order):

- Cerys Akarca, Specialist Nurse, Dudley Group NHSFT
- Dr K Ashawesh, Consultant Diabetologist, Dudley Group NHSFT
- Sue Bacon, Lead Nurse Diabetes, Dudley Group NHSFT
- Dr A Bdiri, Consultant Diabetologist, Dudley Group NHSFT
- Lynda Bloomer, Specialist Podiatrist, Dudley Group NHSFT
- Caroline Brown, Specialist Dietitian, Dudley Group NHSFT
- Shelagh Cleary, Vascular Programme Manager, Dudley MBC
- Dr Alison Craggs, General Practitioner, Albion House Surgery
- Dr Jane Dale, Consultant Diabetologist, Dudley Group NHSFT
- Clare Dolan, Specialist Nurse, Dudley Group NHSFT
- Jane Elvidge, Pharmacist, Dudley Group NHSFT
- Helen Horrobin, Specialist Podiatrist, Dudley Group NHSFT
- Clare Huckerby, Pharmaceutical Advisor, Dudley CCG
- Inderjit Kaur, Long Term Conditions Specialist Nurse, Moss Grove Surgery
- Margaret Jackson, Specialist Nurse, Dudley Group NHSFT
- Jas Johal, Consultant Pharmacist, Dudley CCG
- Dr Helen Moran, General Practitioner, Northway Medical Practice
- Dr T Pang, Consultant Diabetologist, Dudley Group NHSFT
- Dr Steve Parnell, General Practitioner, Moss Grove Surgery
- Dr Parmindar Sahni, General Practitioner, Brierley Hill Health Centre
- Dr Siddique, Consultant Diabetologist, Dudley Group NHSFT
- Dr Ruth Tapparo, General Practitioner, Three Villages Medical Practice
- Wendy Walker, Specialist Podiatrist, Dudley Group NHSFT
<table>
<thead>
<tr>
<th>Contents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialist Referral</td>
</tr>
<tr>
<td>Diabetes/impaired glucose regulation diagnostic pathway</td>
</tr>
<tr>
<td>Gestational Diabetes</td>
</tr>
<tr>
<td>Management of Type 2 Diabetes with Blood Glucose Lowering Agents</td>
</tr>
<tr>
<td>Blood Glucose Monitoring Guidelines</td>
</tr>
<tr>
<td>Lifestyle Guidelines for Patients with Diabetes and Poor Glycaemic Control (HbA1c &gt;57 mmol/mol or Blood Glucose Outside Individually Agreed Range)</td>
</tr>
<tr>
<td>Treatment Decision Flow Chart for Insulin Initiation in Adult Diabetes</td>
</tr>
<tr>
<td>Treatment Decision Flow Chart for Urgent Insulin Initiation in Primary Care for Adult Diabetes</td>
</tr>
<tr>
<td>Insulin</td>
</tr>
<tr>
<td>Insulin Regimens and Titration</td>
</tr>
<tr>
<td>Community Preconception Guidelines</td>
</tr>
<tr>
<td>Primary Care Neuropathic Pain Guidelines</td>
</tr>
<tr>
<td>People with Diabetes Requiring Annual Review Assessment</td>
</tr>
<tr>
<td>Diabetes Foot Screening Tool</td>
</tr>
<tr>
<td>Pathway of Events for the Patient in Digital Diabetic Retinopathy Screening</td>
</tr>
<tr>
<td>HbA1c Conversion Chart</td>
</tr>
<tr>
<td>References</td>
</tr>
</tbody>
</table>
Specialist Referral

Consider specialist referral/consultant advice through triage form for these groups of patients:

All Patients:

- Failure to reach treatment targets despite following guidelines or significant side effects from medication
- Any admission with uncontrolled diabetes e.g. DKA, HONK
- Hypoglycaemia requiring medical assistance
- New development of microvascular complications
  1. Nephropathy = CKD 3B - 5
  2. Retinopathy requiring ophthalmology follow up
  3. Neuropathy: mononeuritis, amyotrophy, painful neuropathy if not responding to first-line treatment
  4. Autonomic neuropathy e.g gastroparesis
- Commencing/titrating insulin (depending on the competencies of individual practices)
- Commencement of GLP-1 analogue therapy (depending on the competencies of individual practices)

Special Circumstances:

- ‘Brittle’ diabetes
- Continuous glucose monitoring or insulin pump assessment in Type 1
- People with type 2 diabetes with BMI > 35 on maximum oral therapy / Insulin in combination with GLP-1 analogue therapy which is not currently licensed
- Vocational drivers on insulin or medication that can cause hypoglycaemia
- Children and adolescents
- Type 1 diabetes
- Pre-conception
- Pregnancy
- Foot ulceration - see foot care pathway
- Osteomyelitis and acute Charcot Joint - see footcare pathway
- Psychological problems - e.g. fear of hypos, injection-related anxieties, eating disorders

Discharge Criteria:

General specialist discharge will be considered in partnership with individual GP for patients:

- Who have reached their treatment targets without problematic hypoglycaemia
- Where diabetes control is stable or where no further improvement can be achieved and a care plan completed
- If complications are stable and a management plan is in place
- Whose foot condition has resolved and a care plan completed
- At patient or GP request

Please note this list is general and not exhaustive.

Back to top
**Who to screen?** This Diagnostic Pathway does not apply in pregnancy (follow NICE Guideline CG063)

**Symptomatic**: Weight changes, polydipsia, polyuria, nocturia, urinary incontinence lethargy, frequent infections, sepsis, blurred vision. If acutely unwell, check random (capillary) glucose and ketones for suspected type 1 diabetes*

**Risk factors**: Overweight/obesity, large waist, black/south Asian ethnicity, aged over 40, existing vascular condition (or at high risk of CVD) hypertension, family history of diabetes, previous gestational diabetes, steroid use, PCOS

---

**Random Plasma Glucose** *(Non-fasting) (mmol/L)*

- Normal ≤6.0
  - No further action required

- Raised ≥6.1 or within 2 hours after food ≥11.0
  - Check fasting glucose or HbA1c

---

**Fasting Plasma Glucose** *(mmol/L)*

- Normal ≤6.0
- Raised ≥6.1

**Glycolysed Haemoglobin** *(HbA1c) (mmol/mol)*

- Low risk ≤41
- High risk 42-47
- Diagnostic ≥48

---

2nd fasting test / HbA1c to confirm diagnosis (HbA1c after no less than 1 month, ideally 3) **N.B. The same test must be used for both 1st and 2nd test, i.e BOTH diagnostic tests should EITHER be fasting glucose OR HbA1c**

(No need for second test if HbA1c is ≥48 and the patient is symptomatic or capillary glucose is ≥11.1) N.B. HbA1c may still be normal if acute onset of T1*

---

**Impaired Glucose Tolerance**

- Fasting venous plasma glucose <7.0
- 2-hour venous plasma glucose >7.8 - <11.1

A diagnosis of impaired glucose tolerance or impaired fasting glucose increases the risk of diabetes, cardiovascular events and diagnoses. An annual review of risk factors is indicated

**Pre-Diabetes**

- Fasting venous plasma glucose >6.1 - <7.0
- 2-hour venous plasma glucose <7.8

**Add to At Risk of Diabetes register using Read code 14O8 for Diabetes Contract**

---

**Annual Review – At Risk of Diabetes Register**

*Use Informatica (icap) to access IGR register, monthly cohort due for annual review and clinical template to complete the review and add correct read codes automatically to Emis Web*

- Complete all fields - see Dudley NHS Health Checks pathway
- Provide individualised patient plan
- Refer to Lifestyle Services using software – see Dudley Best Practice Lifestyle Guidelines
Cautions in the use of Hba1c, especially when using for diagnostic purposes

_N.B. HbA1c should not be used to diagnose Diabetes Mellitus in those with conditions associated with reduced red cell survival, e.g. haemoglobinopathies, haemolytic anaemia and chronic renal failure_

When not to use HbA1c to diagnose diabetes

1. **Rapid onset of diabetes** – an increase in HbA1c may not be detected until a few weeks later.
   a. **Suspected type 1 diabetes** – rapid onset of symptoms, weight loss, ketosis – no matter what age
   b. **Children** – because most will have type 1 diabetes.
   c. **Steroids.** Antipsychotics & immunosuppressant drugs can raise blood glucose, (2 months use or less).
   d. **After pancreatitis or pancreatic surgery.**

2. **Pregnancy.** HbA1c is lowered during pregnancy and should never be used to diagnose gestational diabetes. Women at risk of gestational diabetes should be referred to BHHSCC for screening by GTT (see Dudley Guidelines on Gestational Diabetes, and [NICE Guideline CG063](http://www.dgh.nhs.uk/services/community/D/diabetes-specialist-team-174/))

3. **Conditions with reduced red cell survival (may lower HbA1c markedly):**
   a. **Haemoglobinopathy** which will normally be detected by the lab, but should be suspected in racial groups where there is a high prevalence of sickle trait, sickle disease or thalassaemia.
   b. **Haemolytic anaemia**
   c. **Severe blood loss**
   d. **Splenomegaly**
   e. **Antiretroviral drugs**

4. **Conditions with increased red cell survival (may increase HbA1c)** e.g. splenectomy.

5. **Renal dialysis patients** have a markedly reduced HbA1c especially if treated with erythropoietin.

6. **Iron and B12 deficiency and their treatment.** May raise or lower HbA1c, but the effect is small.


---

**Dudley Community Diabetes Team**
Brierley Hill Health and Social Care Centre
Venture Way
Brierley Hill
West Midlands
DY5 1RU
01384 321420

**Dudley Specialist Diabetes Team**
Diabetes and Endocrine Centre
Russells Hall Hospital
DY1 2HQ

Tel: 01384 244399 or individual consultant’s secretaries who can be contacted for advice or referral.

**Public Health Vascular Team**
 Falcon House
The Minories
Dudley DY2 8PG

01384 816032
[Shelagh.cleary@dudley.gov.uk](mailto:Shelagh.cleary@dudley.gov.uk)

[www.dudleyhealthcheck.co.uk](http://www.dudleyhealthcheck.co.uk)
RISK FACTORS FOR GESTATIONAL DIABETES

Gestational Diabetes is induced by changes in carbohydrate metabolism and insulin sensitivity during pregnancy and it is usually asymptomatic and develops in 2nd trimester. The incidence of gestational diabetes varies from 2 – 5%

Gestational diabetes is associated with an overgrowth of adipose tissue in the foetus causing macrosomia, birth trauma and increased need for caesarean section

Neonatal metabolic complications such as hypoglycaemia

- Increased perinatal mortality
- A 40 – 60% risk of developing T2DM within 10 – 15 years in the mother
- An increased risk of obesity and diabetes in the child.

Screening for gestational diabetes

The following women should be screened for gestational diabetes:

- Previous gestational diabetes
- Previous history of macrosomia (birth weight >4.5 kg or 90th centile for gestation)
- Polyhydramnios this pregnancy
- Foetal macrosomia in current pregnancy on ultrasound scan (> 90th centile)
- First degree relative (mother, father, sibling) with diabetes (any type)
- Body mass index above 30 kg/m2
- Ethnic origin: any origin other than European
- Previous unexplained stillbirth
- Glycosuria 2 ++ or more, on any one occasion

Women presenting with newly identified risk factors between 26 weeks and 35+6 weeks gestation:

The indication to perform an Oral Glucose Tolerance Test should be continually re-risk assessed up to 35+6 weeks of gestation even if a Oral Glucose Tolerance Test (OGTT) has previously been performed with a normal result.

A normal OGTT result is valid for a four week period only and therefore a repeat test should be delayed until after four weeks duration.

Women presenting with a risk factor after 36 weeks

The thresholds for diagnosing diabetes are different. Do not arrange an OGTT as this will cause unnecessary delays. Perform a random blood glucose immediately and discuss any result above 9.0 mmol/L with the diabetes centre on telephone number: 01384 456111 extension 3399.

Please note that postprandial sugars should no longer be performed on any patients

MANAGEMENT OF PREVIOUS GESTATIONAL DIABETIC WOMEN

Women in this category should ANC (Antenatal Clinic) midwives on receipt of the ‘Referral for maternity care at the Dudley Group NHS Foundation Trust’ will book

- OGTT between 16 – 18 weeks
- A 20 week anomaly USS with Joint Obstetric and Endocrine Antenatal Clinic (MEEDAL) appointment
- During the 20 week joint endocrine and obstetric clinic appointment:
  - An individualised plan of care is documented and a perinatal institute diabetic notes may be commenced.
  - If the OGTT performed at 16 – 18 weeks is normal then repeat OGTT for 27 weeks will be booked
  - Book a follow up 28 week MEEDAL appointment with USS for Foetal growth
Management of Type 2 Diabetes with Blood Glucose Lowering Agents

**Diagnosis of Diabetes**

See page 18. However if symptomatic or already developed diabetic complication, seek specialist team input****

<table>
<thead>
<tr>
<th>No</th>
<th>*Glycaemic range achieved? (After 3 months depending on individual patient assessment)</th>
<th>Yes</th>
<th>Monitor every 3-6 months</th>
</tr>
</thead>
</table>

**Step 1: Prescribe: Metformin*** (see pg 10). If patient has a low BMI (underweight) review diagnosis, alternative first line treatment choice in type 2 diabetes for these patients could be a Sulphonylurea.

**Step 2: Prescribe: Sulphonylurea** (see page 11)

<table>
<thead>
<tr>
<th>No</th>
<th>*Glycaemic range achieved?</th>
<th>Yes</th>
<th>Monitor every 3-6 months</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Step 3: Add drugs below, moving to next position if drug is not tolerated or contraindicated, or adding in next drug if glycaemia target* is not achieved 3 months after commencing new drug.</th>
</tr>
</thead>
<tbody>
<tr>
<td>❖ Sulphonylurea (see page 11) and/or</td>
</tr>
<tr>
<td>❖ Glitazone, Pioglitazone (see page 12) and/or</td>
</tr>
<tr>
<td>❖ DPP-4 Inhibitor (see page 13)</td>
</tr>
<tr>
<td>❖ SGLT-2 Inhibitor (see page 14)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No</th>
<th>*Glycaemic range achieved? (Or drug not tolerated/contraindicated)</th>
<th>Yes</th>
<th>Monitor every 3-6 months</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Referral to specialist/competent clinician</strong>* <strong>Consider insulin (page 20-21) or GLP-1 (page 16) initiation</strong></th>
</tr>
</thead>
</table>

**Step 4a: Trial of Insulin**- May be beneficial if the person is markedly hyperglycaemic, has osmotic symptoms, is lean or displays features of Type 1 diabetes (see pathway page 20). See page 23 for guidance on prescribing Insulin Degludec

**OR**

**Step 4b: Trial of GLP-1 Mimetic - Liraglutide/Lixisenatide/Dulaglutide/Semaglutide** For initiation by LIS advanced Tier practices only. For GLP-1 and insulin- see page 16. Prescribe GLP-1 only if patient fits NICE criteria (page 16). Only continue GLP-1 mimetic therapy if the person has had a beneficial metabolic effect (a reduction of at least 1% point in HbA1c AND a weight loss of at least 3% of initial body weight at 6 months)

<table>
<thead>
<tr>
<th>No</th>
<th>*Glycaemic range achieved?</th>
<th>Yes</th>
<th>Monitor every 3-6 months</th>
</tr>
</thead>
</table>

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided
Foot Notes:

* Glycaemic Range - A personal target HbA1c should be agreed with each patient (it is important that this is realistic, a HbA1c in the range 47.5 - 58.5mmol/mol is appropriate for most patients providing they are not having frequent hypoglycaemia). Fasting glucose 4-7mmol/l. Once glycaemic control is achieved, a 6-month review is appropriate.

** Refer to Lifestyle Guidelines, page 18.

N.B. If the patient’s self-monitoring of blood glucose and HbA1c results are discrepant, assess possible reasons for this. Check self-monitoring of blood glucose technique, consider cross-checking HbA1c with a serum fructosamine. Refer to Lifestyle Guidelines, page 18.

*** In patients where the tablet formulation cannot be administered a licensed oral solution is available prescribed as Metformin 500mg/5ml sugar free oral solution. Start Metformin at 500mg OD and build up dose gradually to minimise GI side effects.

**** The term ‘specialist/competent clinician’ refers to a specialist clinician e.g. DGNFT diabetes specialist teams, Diabetes Specialist Nurse and competent clinician e.g. GP, Pharmacist, practice nurse who has successfully completed the CCGs insulin initiation course, and is deemed competent (by the Commissioners) to operate at advanced Tier of the Diabetes Local Improvement Scheme, this is reviewed on an annual basis.

***** Special circumstances
- Hypoglycaemia requiring medical attention
- Hospital attendance for uncontrolled diabetes
- New onset of diabetes-related complication
- Diabetic foot infections and charcot
- Pre-conception/pregnancy
- CKD stages 3-5
- Vocational drivers

1. Metformin - see BNF\textsuperscript{4} for prescribing guidance

Indications/Benefits
- First-line choice of treatment for the vast majority of patients\textsuperscript{5}
- Consider in all patients with diabetes with residual functioning islet cells
- May reduce cardiovascular events in patients

Cautions and Contraindications
- Stop Metformin if serum creatinine > 150 μmol/litre or the eGFR< 30 ml/minute/1.73-m\textsuperscript{2}
- Do NOT start Metformin if eGFR< 45 ml/minute/1.73m\textsuperscript{2} or serum creatinine is above the normal laboratory range
- Review Metformin dose and prescribe with caution if serum creatinine > 130 μmol/litre or in those at risk of a sudden deterioration in kidney function, i.e. eGFR falling to < 45 ml/minute/ 1.73m\textsuperscript{2}
- If the person has mild to moderate liver dysfunction or cardiac impairment, discuss benefits of Metformin so due consideration can be given to its cardiovascular-protective effects before any decision is made to reduce the dose
Side Effects
- Diarrhoea occurs in up to 20%, is dose dependent and may resolve with dose reduction
- If after appropriate dose titration of Metformin, the patient experiences gastrointestinal side effects, Metformin SR should be considered as a suitable alternative prior to switching to another Oral Hypoglycaemic Agent (refer to Area Medicines Management Committee advice on use of Metformin SR tablets, available from Dudley Formulary at http://www.dudleyformulary.nhs.uk/).

Dose
- Take tablets with or immediately after a meal to increase insulin sensitivity
- Start on a low dose and increase dose weekly to achieve glycaemic target up to a maximum of 2g daily in divided doses.
- Metformin SR is available in a range of strengths, including 750mg tablet

Stop Metformin 48 hours before:
- Radiological procedure needing intravenous contrast
- Surgery requiring general anaesthesia
- Re-start if renal function stable after the intervention completed

2. Sulphonylureas - e.g. Gliclazide, start on 40-80mg od (daily). Adjust the dose every 2-4 weeks to optimise glycaemic control or until maximum tolerated dose is reached (160mg as a single dose, maximum daily dose 320mg daily in divided doses) as per BNF. See BNF for prescribing guidance

Indications/Benefits
- Indicated first line if Metformin is either contraindicated or not tolerated

Cautions and Contraindications
- Caution in mild to moderate hepatic and renal impairment due to increased risk of hypoglycaemia
- Educate patients in recognising and treating hypoglycaemia particularly if he or she has renal impairment

Side Effects
- Average weight gain is 2-4kg and in some patients this may exceed 10kg³
- Glimepiride and Gliclazide have a lower risk of hypoglycaemia/weight gain than Glibenclamide

Dose
- Tablets should be taken before meals (15-20 minutes) to stimulate insulin release from the pancreas
- Increase dose every 2-4 weeks to achieve glycaemic target or maximal dose is reached4
- Gliclazide 80mg is equivalent to Gliclazide MR 30mg

N.B. Longer acting sulphonylureas such as Chlorpropamide and Glibenclamide are not recommended and should be avoided due to the high incidence of side effects including prolonged hypoglycaemia.

2a. Rapid-acting insulin secretagogues
- Nateglinide and Repaglinide are alternatives to Sulphonylureas in patients where a rapid onset of action is necessary. See BNF for prescribing guidance
3a. Thiazolidinediones (Glitazones) Pioglitazone - see BNF⁴ for prescribing guidance and NICE guidelines²

Indications/Benefits
- May be the preferred third line choice if the person has marked insulin sensitivity, or a DPP-4 inhibitor is contraindicated, or the person has previously had a poor response to, or did not tolerate a DPP-4 inhibitor
- Licensed as ‘add on’ therapy when:
  - Patient already taking one oral hypoglycaemic agent AND
  - Glycaemic targets not achieved AND
  - Metformin/Sulphonylurea not tolerated as 2nd agent
- Reduces insulin resistance and increases glucose uptake into muscle

Cautions and Contraindications
- Patients with active bladder cancer or with a history of bladder cancer, and those with uninvestigated haematuria, should not receive pioglitazone
- Contraindicated in cardiac failure or in those with a history of or at risk of cardiac failure, hepatic impairment and diabetic ketoacidosis
- Little evidence to support routine use as second agent in overweight patients and as monotherapy
- Monitor Liver Function Tests before initiating treatment and then periodically thereafter. This is recommended annually. Do not use in acute liver disease or if ALT (liver enzyme) is 2.5 x upper limit of normal
- Do not commence or continue in patients with heart failure or at higher risk of fracture (more common in women)

Side Effects
- Average weight gain may be higher than with Sulphonylureas (see BNF or SPC for more information)

Dose
- Pioglitazone:
  - Starting dose of Pioglitazone is 15mg or 30mg once daily. The dose may be increased in increments up to 45mg once daily.
  - Pioglitazone is licensed for combination with insulin and can be considered for those who have previously had a marked glucose lowering effect to glitazone therapy

Exit Criteria
- Maximal effect is seen in 3-6 months; if no response to therapy (a reduction of at least 0.5% in HbA1c in 6 months), treatment should be stopped and the management of diabetes reviewed

N.B. Take into account the advice from the EMEA and MHRA (http://www.mhra.gov.uk/Safetyinformation/Safetywarningsalertsandrecalls/Safetywarningsandmessagesformedicines/CON123285) before prescribing this drug.
3b. DPP-4 inhibitors e.g. Alogliptin, Linagliptin (for rapidly declining renal function or an eGFR less than 30ml/min/1.72m²) and Sitagliptin, DPP-4 inhibitors increase circulatory levels of incretin - gut hormones that can boost insulin levels. See BNF⁴ for prescribing guidance and NICE guidelines²

If a gliptin is to be used, it is advised that the gliptin is selected based on the appropriate licensed indications with the lowest acquisition cost.

Indications/Benefits
- Increase insulin secretion and lower glucagon secretion
- Consider using as second line therapy if either Sulphonylurea or Metformin are contraindicated or not tolerated
- Discuss the benefits and risks of a DPP-4 inhibitor with the person, bearing in mind that a DPP-4 inhibitor might be preferable to a thiazolidinedione if:
  - Further weight gain would cause significant problems, or
  - A thiazolidinedione is contraindicated, or the person had a poor response to or did not tolerate a thiazolidinedione in the past.

Cautions and Contraindications
- See Summary of Product Characteristics (SPC) for Alogliptin: http://www.medicines.org.uk/emc/medicine/28513
- See Summary of Product Characteristics (SPC) for Linagliptin: http://www.medicines.org.uk/emc/medicine/25000
- See Summary of Product Characteristics (SPC) for Sitagliptin: http://www.medicines.org.uk/emc/medicine/19609

Side Effects
- Hypoglycaemia, gastro-intestinal disturbances, headache, rash

Criteria for Use and Dosing
- Alogliptin is licensed for use as an add-on therapy to metformin, a thiazolidinedione, a sulphonylurea, or insulin or as triple therapy with metformin and a thiazolidinedione or insulin.
  - For dosage, see BNF and SPC for Alogliptin:
    - http://bnf.org/bnf/index.htm
    - http://www.medicines.org.uk/emc/medicine/28513
- Linagliptin (for use in patients with either rapidly declining renal function or an eGFR less than 30ml/min/1.72m² (CKD Stage 4 or 5))
  - The dose of linagliptin is 5 mg once daily as monotherapy and combination therapy (in combination with metformin; in combination with sulphonylurea and metformin; in combination with insulin with or without metformin)
    - Please see BNF and SPC for Linagliptin:
      - http://bnf.org/bnf/index.htm
      - http://www.medicines.org.uk/emc/medicine/25000
- Sitagliptin:
  - Sitagliptin is licensed for use as monotherapy, dual and triple therapy with Metformin, sulphonylurea or thiazolidinediones. Sitagliptin is also indicated as add on to insulin (with or without Metformin)
    - For dosage, see BNF and SPC for Sitagliptin:
      - http://bnf.org/bnf/index.htm
      - http://www.medicines.org.uk/emc/medicine/19609
<table>
<thead>
<tr>
<th>Drug Class</th>
<th>DPP-4 Inhibitors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug name</td>
<td>Alogliptin</td>
</tr>
<tr>
<td></td>
<td>Linagliptin</td>
</tr>
<tr>
<td></td>
<td>Sitagliptin</td>
</tr>
<tr>
<td>Strength</td>
<td>6.25, 12.5, 25mg</td>
</tr>
<tr>
<td></td>
<td>5mg</td>
</tr>
<tr>
<td></td>
<td>25,50,100mg</td>
</tr>
<tr>
<td>Dosing</td>
<td>Once daily</td>
</tr>
<tr>
<td></td>
<td>Once daily</td>
</tr>
<tr>
<td></td>
<td>Once daily</td>
</tr>
<tr>
<td>Licensed Indications</td>
<td>Dual, triple therapy, add on to insulin</td>
</tr>
<tr>
<td></td>
<td>Monotherapy, dual therapy with metformin, triple therapy with sulphonylurea, add on to insulin</td>
</tr>
<tr>
<td></td>
<td>Monotherapy, dual, triple therapy, add on to insulin</td>
</tr>
<tr>
<td>NICE</td>
<td><a href="http://www.nice.org.uk/advice/esnm20">http://www.nice.org.uk/advice/esnm20</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://www.nice.org.uk/guidance/cg87">https://www.nice.org.uk/guidance/cg87</a></td>
</tr>
<tr>
<td>Renal impairment (eGFR)</td>
<td>Mild (60-89)</td>
</tr>
<tr>
<td></td>
<td>Moderate (30-59)</td>
</tr>
<tr>
<td></td>
<td>Severe (15-29)</td>
</tr>
<tr>
<td></td>
<td>ESRD (&lt;15)</td>
</tr>
<tr>
<td></td>
<td>Mild- 25mg</td>
</tr>
<tr>
<td></td>
<td>Moderate- 12.5mg</td>
</tr>
<tr>
<td></td>
<td>Severe or ESRD- 6.25mg</td>
</tr>
<tr>
<td></td>
<td>No dose adjustment required</td>
</tr>
<tr>
<td></td>
<td>Mild- 100mg</td>
</tr>
<tr>
<td></td>
<td>Moderate- 50mg</td>
</tr>
<tr>
<td></td>
<td>Severe or ESRD- 25mg</td>
</tr>
<tr>
<td>Hepatic impairment</td>
<td>Not recommended in severe hepatic impairment</td>
</tr>
<tr>
<td></td>
<td>No dose adjustment required</td>
</tr>
<tr>
<td></td>
<td>No dose adjustment in mild to moderate hepatic impairment.</td>
</tr>
<tr>
<td>Cost per month treatment</td>
<td>£26.60 for 28</td>
</tr>
<tr>
<td></td>
<td>£33.26 for 28</td>
</tr>
<tr>
<td></td>
<td>£33.26 for 28</td>
</tr>
</tbody>
</table>

**Exit Criteria**
Maximal effect is seen in 3-6 months; if no response to therapy in 6 months (a reduction of at least 0.5% in HbA1c), treatment should be stopped and the management of diabetes reviewed.
3c. SGLT-2 inhibitors e.g. **Canagliflozin, Dapagliflozin, Empagliflozin, Ertugliflozin** - always refer to BNF, SPCs and NICE guidelines for latest information and prescribing guidance

**Indications:**

**Canagliflozin (NICE TA 315)**
Canagliflozin in a dual therapy regimen in combination with metformin is recommended as an option for treating type 2 diabetes, only if: a sulfonylurea is contraindicated or not tolerated or the person is at significant risk of hypoglycaemia or its consequences.
Canagliflozin in a triple therapy regimen is recommended as an option for treating type 2 diabetes in combination with: metformin and a sulfonylurea or metformin and a thiazolidinedione.
Canagliflozin in combination with insulin with or without other antidiabetic drugs is recommended as an option for treating type 2 diabetes.

**Dapagliflozin (NICE TA 288)**
Dapagliflozin in a dual therapy regimen in combination with metformin is recommended as an option for treating type 2 diabetes, only if it is used as described for dipeptidyl peptidase-4 (DPP-4) inhibitors in *Type 2 diabetes: the management of type 2 diabetes* (NICE clinical guideline 87).
Dapagliflozin in combination with insulin with or without other antidiabetic drugs is recommended as an option for treating type 2 diabetes.
Dapagliflozin in a triple therapy regimen in combination with metformin and a sulfonylurea is not recommended for treating type 2 diabetes, except as part of a clinical trial.

**Empagliflozin (NICE TA 336)**
Empagliflozin in a dual therapy regimen in combination with metformin is recommended as an option for treating type 2 diabetes, only if: a sulfonylurea is contraindicated or not tolerated, or the person is at significant risk of hypoglycaemia or its consequences.
Empagliflozin in a triple therapy regimen is recommended as an option for treating type 2 diabetes in combination with: metformin and a sulfonylurea or metformin and a thiazolidinedione.
Empagliflozin in combination with insulin with or without other antidiabetic drugs is recommended as an option for treating type 2 diabetes.

**Ertugliflozin (NICE TA 572 & 583)**
Ertugliflozin as monotherapy is recommended as an option for treating type 2 diabetes in adults for whom metformin is contraindicated or not tolerated and when diet and exercise alone do not provide adequate glycaemic control, only if: a dipeptidyl peptidase 4 (DPP-4) inhibitor would otherwise be prescribed and a sulfonylurea or pioglitazone is not appropriate.
Ertugliflozin in a dual-therapy regimen in combination with metformin is recommended as an option for treating type 2 diabetes, only if: a sulfonylurea is contraindicated or not tolerated or the person is at significant risk of hypoglycaemia or its consequences.
Ertugliflozin with metformin and a dipeptidyl peptidase-4 (DPP-4) inhibitor is recommended as an option for treating type 2 diabetes in adults when diet and exercise alone do not provide adequate glycaemic control, only if: the disease is uncontrolled with metformin and a DPP-4 inhibitor, and a sulfonylurea or pioglitazone is not appropriate.

If patients and their clinicians consider ertugliflozin to be 1 of a range of suitable treatments including canagliflozin, dapagliflozin and empagliflozin, the least expensive should be chosen.

**Sotagliflozin (NICE TA 622)**
Sotagliflozin with insulin is recommended as an option for treating type 1 diabetes in adults with a body mass index (BMI) of at least 27 kg/m², when insulin alone does not provide adequate glycaemic control despite optimal insulin therapy, only if:
- sotagliflozin is given as one 200 mg tablet daily
- they are on insulin doses of 0.5 units/kg of body weight/day or more and
- have completed a structured education programme that is evidence based, quality assured, delivered by trained educators and includes information about diabetic ketoacidosis, such as:
how to recognise its risk factors, signs and symptoms

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided 15
how and when to monitor blood ketone levels
what actions to take for elevated blood ketones and
- treatment is started and supervised by a consultant physician specialising in endocrinology and
diabetes treatment, and haemoglobin A1c (HbA1c) levels are assessed after 6 months and regularly
after this.

Stop sotagliflozin if there has not been a sustained improvement in glycaemic control (that is, a fall in
HbA1c level of about 0.3% or 3 mmol/mol).

Cardiovascular Outcome Trial (CVOT) data from RCTs for three SGLT2 inhibitors are available:
Canagliflozin: CANVAS
Dapagliflozin: DECLARE-TIMI58
Empagliflozin: EMPA-REG

Renal Outcome trial data
Canagliflozin: CREDENCE

The following restrictions apply:
1) Restrict to patients less than 75 years of age who are less prone to complicated UTI
2) Use in caution for those over 65 years of age who are at risk of volume depletion, for example
patients treated with diuretics.
3) Exclude patients with Type 1 diabetes
4) Refer to individual SPCs for special warnings and precautions for use in renal impairment
5) Explain the risk of genital and urinary infection to patients
6) If Fournier’s gangrene is suspected, stop the SGLT2 inhibitor and start treatment urgently (including
antibiotics and surgical debridement). Fournier’s gangrene is a rare but potentially life-threatening
infection that requires urgent medical attention.

Please see BNF and SPC for Canagliflozin, Dapagliflozin, Empagliflozin, Ertugliflozin

Dose:
Canagliflozin 100mg once daily (£39.20 for 30). In patients tolerating canagliflozin 100 mg who have an
eGFR ≥ 60 mL/min/1.73 m² and need tighter glycaemic control, the dose can be increased to 300 mg
once daily (£39.20 for 30).
Dapagliflozin 10mg once daily (£36.59 for 28)
Empagliflozin 10mg once daily (£36.59 for 28) In patients tolerating empagliflozin 10 mg once daily who
have an eGFR ≥60 mL/min/1.73 m² and need tighter glycaemic control, the dose can be increased to 25
mg once daily (£36.59 for 28)
Ertugliflozin 5 mg once daily, the dose can be increased to 15 mg once daily if additional glycaemic
control is needed. (£29.40 for 28)

Side effects:
Very common: hypoglycaemia (when used with a sulfonylurea or insulin
Common: vulvovaginitis, balantis and related genital infections, UTI’s, dizziness, back pain, dysuria,
polyuria
Uncommon: fungal infection, volume depletion, thirst, constipation, dry mouth, nocturia, renal
impairment, vulvovaginal pruritis, pruritis genital, dehydration.

Drug safety update: SGLT2 inhibitors (canagliflozin, dapagliflozin, empagliflozin): risk of diabetic
ketoacidosis. Test for raised ketones in patients with acidosis symptoms (e.g. vomiting, abdominal pain,
unexplained shortness of breath), even if plasma glucose levels are near-normal.

Exit Criteria:
Maximal effect is seen in 3-6 months; if no response to therapy in 6 months (a reduction of at least
0.5% in HbA1c), treatment should be stopped and the management of diabetes reviewed.
4. GLP-1 mimetics e.g. **Liraglutide, Lixisenatide, Dulaglutide, Semaglutide** - see BNF[^4] for prescribing guidance and NICE guidelines[^2]

N.B. these drugs should only be initiated by clinicians who are deemed competent to operate at the advanced Tier of the Local Improvement Scheme for Diabetes or following discussion at the diabetes MDT.

The combination of GLP-1 & insulin should be initiated by Specialist (Consultant Endocrinologist & Clinicians (including Diabetes Specialist Nurses) operating at advanced tier of the Diabetes LIS) only. When prescribing GLP-1 mimetics they should be prescribed in accordance with an **Effective Shared Care Agreement (ESCA)**

### Indications/Benefits
- Increases insulin secretion, suppresses glucagon secretion and slows gastric emptying

### Cautions and Contraindications
- Caution in the elderly
- Caution in pancreatitis
- Congestive heart failure NYHA class IV

### Side Effects
- Pancreatitis, GI disturbances

### Criteria for Use and Dosing
- GLP 1 mimetics should only be considered for triple therapy in addition to Metformin and a sulphonylurea in people whose HbA1c is >58 mmol/mol, if either:
  - BMI is >35kg/m² in people of European descent and there are problems associated with high weight, or
  - BMI <35kg/m² and therapy with insulin would have significant occupational implications or weight loss would benefit other significant obesity related co-morbidities
- **Semaglutide solution for injection**: The starting dose is 0.25 mg semaglutide once weekly. After 4 weeks the dose should be increased to 0.5 mg once weekly. After at least 4 weeks with a dose of 0.5 mg once weekly, the dose can be increased to 1 mg once weekly to further improve glycaemic control.
  
  The results of SUSTAIN 6, published in *The New England Journal of Medicine*, showed a significant 26% reduction in the composite primary endpoint of cardiovascular death, nonfatal myocardial infarction, and nonfatal stroke. This endpoint occurred in 6.6% of patients taking semaglutide and 8.9% of those taking placebo during a median of 2.1 years of follow-up.
- **Semaglutide tablets**: The starting dose of semaglutide is 3 mg once daily for one month. After one month, the dose should be increased to a maintenance dose of 7 mg once daily. After at least one month with a dose of 7 mg once daily, the dose can be increased to a maintenance dose of 14 mg once daily to further improve glycaemic control.
- **Liraglutide**: Liraglutide is injected once daily, the starting dose is 0.6mg daily increased after at least 1 week to a maintenance dose of 1.2mg daily. The dose can be increased to 1.8 mg to further improve glycaemic control.
  

  - See page 26 for guidance on prescribing of insulin degludec + liraglutide (Xultophy) or Insulin Glargine + Lixisenatide (Suliqua)

- **Dulaglutide**:
  - For new patients requiring a once weekly GLP1
  - To be prescribed by diabetes specialist or Advanced LIS member practices only.
  - When prescribed in combination with insulin - to be consultant endocrinologist initiation only and continued prescribing to be under their supervision, and in line with ESCA
- **Lixisenatide**: Starting dose- Lixisenatide 10 mcg once daily for 14 days then fixed maintenance dose of 20 mcg once daily
Exit Criteria
- GLP-1 mimetics should only be continued if the individual has a beneficial metabolic response (a reduction of at least 11 mmol/mol (1%) HbA1c AND a weight loss of at least 3% of initial body weight at 6 months)
These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided
Education and training should consist of:

- Practical use of their equipment to include cleaning, calibration and quality control testing
- Awareness of common problems which may be responsible for errors in testing
- Why they are testing and their individual targets
- Effects of medication, food, exercise, stress, illness, injury, hypoglycaemia and every day circumstances
- The need to test more frequently during significant changes in lifestyle and inter-current illness.
  - How home blood glucose monitoring will not replace HbA1c testing at least every 6 months
  - Building a profile of testing by performing tests at different times of the day; this will assist in making clinical decisions at the consultation. It is essential that patients are taught and constantly reminded to bring these results with them to all appointments

Assess at least annually and in a structured way:

- Self-monitoring skills
- The quality and appropriate frequency of testing
- The use made of the results obtained
- The impact on quality of life
- The continued benefit
- The equipment used

Discontinue home monitoring if the results are meaningless to both the patient and the healthcare professional.

If self-monitoring is appropriate but blood glucose monitoring is unacceptable to the individual, discuss the use of urine glucose monitoring.

**Practice issues**

Practices may take the opportunity to review patients with diabetes to ensure:

- That their HbA1c is measured at least every 6 months to assess overall blood glucose control
- Where appropriate, they have an individual management plan directing them on how to respond to the results of blood glucose testing
- Strips to be prescribed along with correct directions for use. This will make it easier to monitor and control supply in line with patient needs
- Encourage patients to bring their diaries to their appointments and complete the comments section in the diary
- Always make decisions on treatment according to the blood glucose profile
- Ensure that local weight management guidelines are followed where appropriate to optimise weight control

Part of the diabetes review should include re-educating the patient on the correct use of testing strips. Such a review is likely to improve the well-being of patients with diabetes and release scarce resources needed for their ongoing management.

*Back to top*
Lifestyle guidelines for people with diabetes and poor glycaemic control (HbA1c > 57mmol/mol OR blood glucose outside individually agreed range)

**Referral to Community Dietetic Team**

Dietetic intervention needed for co-morbidity.
Examples:
- Coeliac disease
- MUST (Malnutrition Universal Screening Tool) score 2 or over - see local guideline***
- Weight management, individual appointment on a one off basis
Or if the patient or the healthcare professional feel it would be beneficial.

**YES**
Refer using Community Dietetic Team referral form

**NO**

**Assess individual needs**
- For example, clinical, social, educational and cultural factors

**Formulate a care plan using the appropriate checkpoints below**

- Basic diet and diabetes knowledge for people with type 2 diabetes
  - Dudley Diabetes Structured Education e.g. Discovering Diabetes

- People with type 2 diabetes and treated with oral and insulin medication:
  - Meal timings
  - Snacks
  - Concordance with all medication
  - Dudley Diabetes Structured Education e.g. ALFIE

- People with type 2 diabetes requiring weight management:
  - BMI > 28kg/m²
  - Dudley Public Health Weight Management Services

- People with type 2 diabetes requiring weight management: BMI > 35kg/m² and co-morbidities**
  - Specialist Weight Management Services**

- Physical activity
  - Consider: Action Heart
  - Dudley Public Health Schemes

- Hypoglycaemia prevention and management
  - Consider structured education initiatives or referral to the Diabetes Specialist Team

**Revised Care Plan**

Negotiate goals in appropriate areas, aim for intervention within one month.
Courses: Refer using the Community Diabetes Team referral form.
Treatment Decision Flow Chart for Insulin Initiation in Adult Diabetes

Consider referral to Specialist Diabetes Team/hospital for special groups:
- Pregnancy
- Pre-conception
- Renal disease
- MI
- Very obese
- Vulnerable people including the elderly
- Vocational licences

** ALFIE: Adjustment and Life skills For Insulin Education**

** Specialist Weight Management Services - Individuals must have accessed Level 1 & 2 before accessing SWMS**

** Guidelines for Identification and Treatment of Malnutrition - to review this guideline, go to [http://www.dudleyformulary.nhs.uk/](http://www.dudleyformulary.nhs.uk/)**

For further information about items on the flowchart on this page, go to [http://www.dudleyformulary.nhs.uk/](http://www.dudleyformulary.nhs.uk/)

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
**STEP 4**

Symptoms of hyperglycaemia and a diagnostic blood glucose; according to WHO guidelines

- **Yes**
  - Exclude DKA (Diabetes Ketoacidosis, for type 1 diabetes) and HHS (Hyperosmolar Hyperglycaemic State, for type 2 diabetes). Are any of these present?
    1. Acutely unwell
    2. Vomiting
    3. Reduced consciousness
    4. Dehydrated
    5. Ketonuria > 2+ and or blood ketones > 1.5 mmol/l
    6. Hyperglycaemia with any of the above

  - **Yes**
    - Arrange immediate/urgent assessment in hospital to exclude DKA/HHS
      - Arrange urgent assessment. Discuss with the Diabetes Specialist Teams (community or hospital) within 24 - 48 hours.

  - **No**
    - Does the patient have severe osmotic symptoms, hyperglycaemia and mild to moderate ketonuria or blood ketones of between 0.6 and 1.5 mmol/L?
      - **Yes**
        - Likely to need insulin. Discuss the Diabetes Specialist Teams (community or hospital) within 24 - 48 hours.
      - **No**
        - Are there one or more of the following present?
          - Short history of any of the above symptoms
          - Marked weight loss (irrespective of absolute weight)
          - Marked hyperglycaemia

  - **Yes**
    - There is no immediate need for insulin. Consider oral agents. Give dietary and lifestyle advice. If in any doubt, contact the Diabetes Specialist Teams (community or hospital)

  - **No**

**GO TO STEP 1**

---

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
Insulin

- If other measures do not keep HbA1c to <59 mmol/mol (or other agreed target), discuss benefits and risks of insulin treatment.
- Initiate with a structured programme (encompassing structured education, continuing telephone support, frequent self-monitoring, dose titration to target, dietary understanding, management of hypoglycaemia, management of acute changes in plasma glucose control, support from an appropriately trained and experienced healthcare professional.) Telephone Dudley Community Diabetes Team for information about local structured education courses on 01384 321420.

When introducing insulin the aim is for self-management for most patients; Refer to ALFIE ( Adjustment and Life Skills for Insulin Education) using the Primary Care Diabetes Team referral form for structured patient education, in line with NICE (2009) guidance.

Insulin Regimens and Titration

Once started on insulin, it is considered appropriate to continue Metformin but to usually stop Sulphonylurea agents (if using more than a once daily insulin regimen) and other drugs which are not licensed to be used with insulin. Local consensus is that Pioglitazone should be stopped when starting insulin (although use with insulin is licensed).

- Always ensure correct insulin is prescribed and be aware of potential insulin errors - http://www.nrls.npsa.nhs.uk/alerts/?entryid45=74287
- Ensure patients receive insulin safety passports - http://www.nrls.npsa.nhs.uk/resources/?EntryId45=130397
- Always ensure that insulin is prescribed by brand name only

This guideline on Insulin Regimens and Titration is to aid clinicians who have completed the Dudley Model for Comprehensive Insulin Initiation Part 1 (or equivalent) only, in conjunction with the Dudley Local Improvement Scheme (LIS), enhanced and advanced Tier level practices.

This work represents consensus opinion from within Dudley Health Economy using research-based advice and evidence from current working practices referenced from around the West Midlands. Insulin should only be initiated by a Health Care Professional with recognised competency. If this expertise is not available, refer to Community or Secondary Care Specialist Diabetes Teams.

Aims:
- Aid smooth transition and titration of insulin unit doses
- Ensure patients develop an awareness of self-care
- Help clinicians in primary care feel confident and secure to safely advise or alter insulin unit dosages as early as possible

Back to top
Adding Once Daily Insulin to Current Oral Agents

NEW TO ONCE DAILY INSULIN WITH ORAL AGENTS

OPTIONS

Begin with Human NPH insulin taken at bedtime, or twice daily according to need:

- Humulin I
- Insulatard

Alternatively consider a once daily insulin analogue (Insulin Detemir, Insulin Glargine) if:

- The person needs help with injecting insulin and the long acting insulin analogue would reduce injections from twice to once daily; or
- The person’s lifestyle is restricted by recurrent symptomatic hypoglycaemic episodes; or
- The person would otherwise need twice daily basal insulin injections plus oral glucose lowering drugs; or
- The person cannot use the device to inject NPH insulin.
  (NICE 2009)

Suggested starting dose:

- 6-10 units once daily, depending on fasting blood glucose levels.

<table>
<thead>
<tr>
<th>Self Titration - Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fasting blood glucose &gt;6.7mmol/l</strong> Increase insulin by 2 insulin units every 4th day.</td>
</tr>
<tr>
<td><strong>Continue with this process until:</strong></td>
</tr>
<tr>
<td>A fasting blood glucose target of 5.5mmol/l on average over 3 consecutive days is reached.</td>
</tr>
<tr>
<td>Targets may vary according to individual needs.</td>
</tr>
<tr>
<td><strong>DO NOT</strong> increase dose if blood glucose is less than 4mmol/l or if symptoms of hypoglycaemia are present. If unsure, contact your named healthcare professional.</td>
</tr>
</tbody>
</table>

**NB:** If patients are not controlled on large doses of once daily insulin (i.e. greater than 0.5 units of insulin per kg of body weight or >50 units of once daily insulin) consider the benefits of changing to twice daily pre-mixed insulin.

**Insulin Glargine 100 units/ml** is available as the brand name Lantus or the biosimilar version Abasaglar. Abasaglar has the same pharmaceutical form and strength as Lantus. **Abasaglar is the preferred brand of insulin glargine.** Ensure prescriptions for insulin are only prescribed by brand name to minimise the risk of patients receiving the incorrect preparation of insulin.

**Insulin Degludec** is a neutral, soluble, ultra long acting insulin analogue which is available in 100 units/ml and a higher strength 200 units/ml. Insulin degludec use in Dudley is approved in the following circumstances:

U100 – for initiation by Advanced LIS member practices, or following MDT review / advice and guidance with Diabetes Specialist Team; for patients with insulin-treated diabetes on basal-bolus therapy, who have objective evidence of significant nocturnal hypoglycaemia e.g. CGMS or HBGM, and in whom other strategies to optimise basal insulin therapy have been unsuccessful. Degludec should not be used as a basal-only insulin in T2DM for this indication.
U200 - for initiation by Advanced LIS member practices, or following MDT review / advice and guidance with Diabetes Specialist Team, where patients are requiring large volumes of their existing basal insulin therapy (>100 units daily) and there are concerns that this is causing difficulty with drug absorption or patient tolerability.

Enhanced LIS practices will NOT be able to prescribe degludec for their patients who will continue to receive degludec from DGHFT.

**Insulin Degludec + Liraglutide (Xultophy) OR Insulin Glargine + Lixisenatide (Suliqua)** for initiation by Advanced LIS member practices, or following MDT review / advice and guidance with Diabetes Specialist Team; patient should fulfil NICE guidance on GLP-1 receptor agonist use and have a pre-treatment HbA1c of > or = 75mmol/mol. It should not be used in conjunction with other insulins. Patients must have a review at 6 months following initiation to assess efficacy.

**Toujeo (Insulin Glargine 300 units/ml) SoloStar pre-filled pen** *(Each pen contains 1.5 ml of solution for injection, equivalent to 450 units)* or **Toujeo (Insulin Glargine 300 units/ml) DoubleStar pre-filled pen** *(Each pen contains 3 ml of solution for injection, equivalent to 900 units)* - To be prescribed by diabetes specialist or Advanced LIS member practices only.

### Key Points

- High glucose levels - a higher dose is needed
- Low glucose levels - a lower dose is needed
- Individual blood glucose targets should be agreed with the person with diabetes, sometimes short, medium and long term goals are more appropriate

It is generally regarded that there is no 'correct dose'. The aim is to start low and work up slowly building the individual's confidence at the same time. It is important that they are aware of this and that it may take several weeks or months to obtain their target blood glucose results.

Professor David Cousins, NPSA’s Head of Patient Safety for Medication and Medical Devices, said: “Insulin is a widely used medicine used to treat diabetes. It is given to thousands of patients each day and in the majority of cases, this procedure is safe. However, there is a real potential for serious harm if it is not administered and handled properly.”

Suggested Regimen HbA1c >75 mmol/mol
(See Step 3 Treatment Decision Flow Chart for Insulin Initiation in Adult Diabetes, page 19)

Twice Daily Insulin Regimen (BD)

- Humalog Mix 25
- Humalog Mix 50
- Humulin M3
- Novomix 30

Starting dose:

Should be individualised according to patient.

Titration/Dose Adjustment - for patients and healthcare professionals

**AIm** - Pre-meal blood sugars to range between 4-7mmol/l. Targets may vary according to individual needs.

- Adjust **MORNING** insulin unit dose based on ‘before lunch’ and ‘before evening meal’ blood glucose results.
- Adjust **EVENING** insulin unit dose based on ‘before bed’ and ‘before breakfast’ blood glucose results.

Back to top
**Blood Glucose**

<table>
<thead>
<tr>
<th>Blood Glucose</th>
<th>Titration advice</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;10mmol/l</td>
<td>Increase by 4-6 insulin units every 4th day - use with caution with patients on small doses of insulin to a maximum of 10% of original dose</td>
</tr>
<tr>
<td>7.1-10mmol/l</td>
<td>Increase by 2-4 insulin units every 4th day</td>
</tr>
<tr>
<td>4-7mmol/l</td>
<td>No change</td>
</tr>
<tr>
<td>Less than 4mmol/l</td>
<td>Reduce dose</td>
</tr>
</tbody>
</table>

**DO NOT** increase doses if blood glucose <4mmol/l or symptoms of hypoglycaemia are present. If unsure, contact named healthcare professional.

The following examples of blood glucose profiles and insulin unit adjustments are based on the recommendations above.

- If caution is required, in connection with safety, use a conservative approach and titrate insulin by 2 insulin units every 4th day until agreed target is achieved.

**Example 1**

**CURRENT BLOOD GLUCOSE READINGS**

<table>
<thead>
<tr>
<th>Date</th>
<th>Insulin unit dose am</th>
<th>Insulin unit dose pm</th>
<th>Pre-breakfast mmol/l</th>
<th>Pre-lunch mmol/l</th>
<th>Pre-evening meal mmol/l</th>
<th>Pre-bed mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>12 CURRENT DOSE</td>
<td>8 CURRENT DOSE</td>
<td>12.4</td>
<td>17.2</td>
<td>18.0</td>
<td>14.0</td>
</tr>
<tr>
<td>2nd</td>
<td>13.6</td>
<td>15.0</td>
<td>17.8</td>
<td>15.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>13.3</td>
<td>16.2</td>
<td>17.4</td>
<td>14.8</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ACTION:** Using the dose adjustment table on page 25, test results are above 7mmol/l and both insulin doses need to be increased by 4 units, every 4th day until the target is achieved.

<table>
<thead>
<tr>
<th>4th</th>
<th>16 NEW DOSE</th>
<th>12 NEW DOSE</th>
</tr>
</thead>
</table>

[Back to top](#)
Example 2

CURRENT BLOOD GLUCOSE READINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Insulin unit dose am</th>
<th>Insulin unit dose pm</th>
<th>Pre-breakfast mmol/l</th>
<th>Pre-lunch mmol/l</th>
<th>Pre-evening meal mmol/l</th>
<th>Pre-bed mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>CURRENT 14 CURRENT DOSE</td>
<td>8 CURRENT DOSE</td>
<td>9.4</td>
<td>5.8</td>
<td>5.8</td>
<td>8.8</td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td></td>
<td>9.5</td>
<td>6.0</td>
<td>6.0</td>
<td>8.4</td>
</tr>
<tr>
<td>3rd</td>
<td></td>
<td></td>
<td>9.7</td>
<td>6.0</td>
<td>5.4</td>
<td>8.6</td>
</tr>
</tbody>
</table>

**ACTION:** Before lunch and before evening meal, test results are within an acceptable range BUT before bed and before breakfast, they are outside the acceptable range (4-7 mmol/l). Using the dose adjustment table on page 25, the morning insulin should be left unchanged and the evening insulin should be increased by 2 insulin units.

Example 3

CURRENT BLOOD GLUCOSE READINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Insulin unit dose am</th>
<th>Insulin unit dose pm</th>
<th>Pre-breakfast mmol/l</th>
<th>Pre-lunch mmol/l</th>
<th>Pre-evening meal mmol/l</th>
<th>Pre-bed mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>CURRENT 18 CURRENT DOSE</td>
<td>16 CURRENT DOSE</td>
<td>6.0</td>
<td>10.2</td>
<td>13.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2nd</td>
<td></td>
<td></td>
<td>5.8</td>
<td>10.4</td>
<td>10.9</td>
<td>5.4</td>
</tr>
<tr>
<td>3rd</td>
<td></td>
<td></td>
<td>5.6</td>
<td>10.7</td>
<td>12.1</td>
<td>8.6</td>
</tr>
</tbody>
</table>

**ACTION:** Before lunch and before evening meal blood test results are outside the acceptable range BUT before bed and before breakfast they are within the acceptable range.

Using the dose adjustment table on page 25, the morning insulin should be increased by 4 insulin units and the evening insulin left unchanged.

| 4th    | 22 NEW DOSE | 16 DOSE REMAINS THE SAME | |

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
Example 4

CURRENT BLOOD GLUCOSE READINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Insulin unit dose am</th>
<th>Insulin unit dose pm</th>
<th>Pre-breakfast mmol/l</th>
<th>Pre-lunch mmol/l</th>
<th>Pre-evening meal mmol/l</th>
<th>Pre-bed mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>8th</td>
<td>30 CURRENT DOSE</td>
<td>26 CURRENT DOSE</td>
<td>6.0</td>
<td>7.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9th</td>
<td></td>
<td></td>
<td>4.7</td>
<td>5.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10th</td>
<td></td>
<td></td>
<td>5.4</td>
<td>7.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11th</td>
<td></td>
<td></td>
<td>4.6</td>
<td>6.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ACTION:** All blood glucose values are within an acceptable range except before evening meal. The insulin dose should **NOT** be changed. **Increasing the morning insulin could cause hypoglycaemia before lunch.**

<table>
<thead>
<tr>
<th>12th</th>
<th>30 DOSE REMAINS THE SAME</th>
<th>26 DOSE REMAINS THE SAME</th>
</tr>
</thead>
</table>

Example 5

CURRENT BLOOD GLUCOSE READINGS

<table>
<thead>
<tr>
<th>Date</th>
<th>Insulin unit dose am</th>
<th>Insulin unit dose pm</th>
<th>Pre-breakfast mmol/l</th>
<th>Pre-lunch mmol/l</th>
<th>Pre-evening meal mmol/l</th>
<th>Pre-bed mmol/l</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th</td>
<td>22 CURRENT DOSE</td>
<td>18 CURRENT DOSE</td>
<td>5.5</td>
<td>3.8</td>
<td>4.5</td>
<td>6.0</td>
</tr>
<tr>
<td>10th</td>
<td></td>
<td></td>
<td>5.0</td>
<td>3.1</td>
<td>6.0</td>
<td>5.5</td>
</tr>
<tr>
<td>11th</td>
<td></td>
<td></td>
<td>5.2</td>
<td>3.4</td>
<td>6.1</td>
<td>5.3</td>
</tr>
</tbody>
</table>

**ACTION:** The blood glucose readings are below the acceptable range for before lunch on more than one occasion. Therefore **reduce** the morning dose by **2 insulin units**.

<table>
<thead>
<tr>
<th>12th</th>
<th>20 NEW DOSE</th>
<th>18 DOSE REMAINS THE SAME</th>
</tr>
</thead>
</table>

Back to top
Knowledge of Current Treatment

It is always important that individuals know what current treatment they are receiving for their diabetes. A supplies checklist will help individuals become more familiar with their new treatment:

- Type of insulin required (cartridges, pre-filled pens or vial)
- Injection syringes or delivery device and spare (for individuals not using pre-filled pens)
- Box of insulin pen needles - 4 and 6mm are usually the most common
- Sharps bin and method of safe disposal/re-issue
- Blood glucose monitoring strips and lancets - depending on type of blood glucose monitoring system used and guidance on frequency of testing
- Home blood glucose diary which includes details of recommended testing regimen reinforcing previous instructions
- Issue insulin passport

Multiple Daily Injection Regimen
(Most patients should be considered for a biphasic regime before a basal-bolus)

REGIMENS

Choice of background insulin
- Humulin I
- Insulatard
- Insulin Determir
- Insulin Glargine

Choice of mealtime insulin
- Actrapid
- Apidra
- Humalog
- Humulin S
- Novorapid
- FIASP (faster acting Novorapid)*

Please note some insulin, e.g. Actrapid, is only available in a 10ml vial so you will be restricted to the delivery device that can be used.

*FIASP (faster acting novorapid) – initiation by diabetes specialist team; switches to FIASP in the community should be discussed with consultant via advice/guidance, or diabetes MDT.

Indications for a multiple daily injection regimen:
- Patient choice/lifestyle
- Unable to achieve metabolic targets without hypoglycaemia on twice daily regimen

Start dose/regimen:
Introduce bolus insulin at mealtimes as indicated by the blood glucose profile. You may need to start with one meal, e.g evening meal, then later add insulin with breakfast and lunch which may lead to four injections a day.

TITRATION

Bolus insulin dose adjustment
Increase short/rapid acting mealtime insulin by 2 insulin units every 4th day until individual target is achieved.

Basal insulin unit dose
Continue with present long acting dose, again this may need to be adjusted according to fasting blood glucose levels. Increase insulin by 2 insulin units every 4th day until target fasting blood glucose is reached.

Depending on the blood glucose readings it may only be necessary to increase one of the mealtime insulin doses or it may be necessary to increase all the mealtime doses.
To reach blood glucose target at:
- LUNCHTIME adjust BREAKFAST insulin unit dose
- EVENING MEAL adjust LUNCHTIME insulin unit dose
- BEDTIME adjust EVENING MEAL insulin unit dose
- BEFORE BREAKFAST adjust background insulin unit dose

Twice Daily (BD) Insulin Regimen to a Multiple Daily Injection Regimen
Consider referral to the Diabetes Specialist Teams if needed.

For type 2 diabetes patients, continue Metformin, unless contraindicated (see page 10).

REGIMENS

Choice of background insulin
- Humulin I
- Insulatard
- Insulin Detemir
- Insulin Glargine

Choice of mealtime insulin
- Actrapid
- Apidra
- Humalog
- Humulin S
- Novorapid
- FIASP (faster acting Novorapid)*

}NICE recommendations should be adhered to

Indications for a multiple daily injection regimen:
- HbA1c not to target
- Unstable blood glucose profile
- Lifestyle

Start doses: Example:
Add together current twice daily insulin unit doses, e.g. Adult on Novomix 30, 40 insulin units am and 40 insulin units pm
Total dose = 80 insulin units
Reduce by 20% = 64 insulin units

Calculate percentage of dose that is long acting, e.g. 70% of 64 = 44 insulin units
To calculate the mealtime doses split remainder of the doses by 3, e.g. 64-44 = 20
20÷3 = approximately 7 insulin units per meal.

TITRATION

Bolus insulin dose adjustment
Increase short/rapid acting mealtime insulin by 2-4 insulin units every 4th day depending upon patient blood glucose profile until desired target is achieved, as agreed between patient and healthcare professional.

Basal insulin unit dose
Increase insulin by 2-4 insulin units every 4th day depending upon patient blood glucose profile until desired fasting blood glucose target is achieved, as agreed between patient and healthcare professional.

To reach blood glucose target at:
- LUNCHTIME adjust BREAKFAST insulin unit dose
- EVENING MEAL adjust LUNCHTIME insulin unit dose
- BEDTIME adjust EVENING MEAL insulin unit dose
- BEFORE BREAKFAST adjust background insulin unit dose

Back to top

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
New to a Multiple Dose Injection Regimen

For type 2 diabetes patients, continue Metformin, unless contraindicated (see page 8).

REGIMENS

Choice of background insulin
- Humulin I
- Insulatard
- Insulin Detemir
- Insulin Glargine

Choice of mealtime insulin
- Actrapid
- Apidra
- Humalog
- Humulin S
- Novorapid
- FIASP (faster acting Novorapid)*

Please note some insulin, e.g. Actrapid, is only available in a 10ml vial so you will be restricted to the delivery device that can be used.

Indications for a multiple daily injection regimen:
- HbA1c not to target
- Unstable blood glucose profile
- Lifestyle

Start dose
Start 8-10 units of background insulin. Introduce short/rapid acting insulin at mealtimes. Start with 4 insulin units.

TITRATION

Bolus insulin dose adjustment
Increase short/rapid acting mealtime insulin by 2 insulin units every 4th day depending upon/until desired pre-mealtime target is achieved.

Basal insulin unit dose
Increase insulin by 2 insulin units every 4th day until target fasting blood glucose is achieved. Depending on the blood glucose readings it may only be necessary to increase one of the mealtime insulin unit doses, or you may need to increase all the mealtime doses.

To reach blood glucose target at:
- LUNCHTIME adjust BREAKFAST insulin unit dose
- EVENING MEAL adjust LUNCHTIME insulin unit dose
- BEDTIME adjust EVENING MEAL insulin unit dose
- BEFORE BREAKFAST adjust background insulin unit dose

Human Insulin to Analogue Insulin Switch

ANIMAL INSULIN to HUMAN OR ANALOGUE INSULIN SWITCH
- Reduce each present insulin dose by 30%

Back to top
RAISING AWARENESS

All women with diabetes of child-bearing age (14-50) should be given education on diabetes and pregnancy. This should include advice on contraception, the importance of good diabetes control and review of medication prior to pregnancy, the risks of unplanned pregnancy and lifestyle advice. This advice can be given opportunistically, and at contraceptive and annual review appointments.

CONTRACEPTION

Most forms of contraception are suitable for women with diabetes, and the choice should depend on the women’s preference and individual risk factors.

ROUTINE CARE FOR WOMEN OF CHILD-BEARING AGE

Many drugs commonly used for diabetes and its complications are known or potential teratogenic drugs. As many women do not plan their pregnancies, they should only be used with caution, and informed consent should be sought before starting them in women of child-bearing age (aged 14-50). Examples include: ACE inhibitors, glitazones, statins, gliptins and GLP-1 mimetics.

PLANNING A PREGNANCY

All women with Type 1 and Type 2 diabetes who are planning a pregnancy should be referred to the Diabetes Preconception Clinic. Pregnancy planning has been shown to improve outcomes for both mother and baby. Start folic acid when possible three months before pregnancy.

Referral Criteria for Diabetes Pre-conception Clinic

1. All women with type 1 diabetes who are not already under secondary care

2. Women with type 2 diabetes:
   a. If Hba1c >53 on >2 consecutive occasions or
   b. On oral medication for diabetes (other than metformin) and/or for hypertension
   c. Micro- or macro-vascular disease

3. All women with diabetes who are referred for IVF or assisted conception, including clomifene therapy

Management of women with diabetes planning a pregnancy in primary care (well-controlled Type 2 diabetes on diet and metformin only):

1. If well-controlled with type 2 diabetes (Hba1c <53) on diet or metformin alone, then advise women to start folic acid 5 mg daily three months prior to trying for a pregnancy

2. Give diet and lifestyle advice

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
3. Medication review. Stop all medication contra-indicated in pregnancy e.g. statins, most antihypertensives, oral hypoglycaemic drugs other than metformin and SU. Use advice and guidance for further information.

4. Start home blood glucose monitoring, aiming for fasting below 6.0 mmol/L and two hour post meals below 7.8 mmol/L. Refer to pre-conception clinic if targets not achieved.

5. Advise women to continue taking metformin, and folic acid 5 mg daily until 13 weeks gestation.

6. Advise women to contact GP and midwife as soon as pregnancy is confirmed.
7. Refer urgently (before 8 weeks gestation) to joint diabetes antenatal clinic by phone.

**PREGNANCY**

A woman with diabetes who is pregnant should be referred urgently by phone and fax to the Joint Diabetes Antenatal Clinic, and any medication she is taking should be reviewed. If she is less than 13 weeks’ gestation, she should be commenced on folic acid 5mg od if not already taking it. For clinical advice on pregnancy and diabetes, contact Dr Solomon or Miss Meer.

**KEY CONTACTS**

**Diabetes Preconception Clinic:**
Dr Solomon’s Secretary: 01384 244489
Diabetes and Endocrine Centre: 01384 244399

**Joint Diabetes Antenatal Clinic:**
01384 244551 and ask to speak to a midwife
Dr Solomon’s Secretary: 01384 244489
Miss Meer’s Secretary: 01384 244335

[Back to top]
These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.

Primary Care Neuropathic Pain Guidelines

See [http://www.dudleyformulary.nhs.uk/page/28/4-central-nervous-system-guidelines](http://www.dudleyformulary.nhs.uk/page/28/4-central-nervous-system-guidelines) for more detail and see current BNF.

**First-line Treatment:** Offer oral Amitriptyline‡ or Gabapentin* unless painful diabetic neuropathy then see box bottom left below

**Amitriptyline:** start at 10mg/day, with gradual upward titration to an effective dose or the person’s maximum tolerated dose of no higher than 75mg/day (higher doses could be considered in consultation with a specialist pain service).

**Gabapentin:** starting dose 300mg daily (e.g. 100mg tds) for one week, then increase to 200mg tds for one week then 300mg tds for one week increasing as necessary to a maximum of 3600mg daily.

(Note: a quicker titration is indicated by the BNF but may lead to more patients experiencing side effects and subsequently stopping treatment. Advise patient to avoid abrupt withdrawal - taper off over at least 1 week)

‡ If Amitriptyline is effective but not tolerated, consider offering oral imipramine or nortriptyline as an alternative.

* If Gabapentin is not tolerated after gradual titration (preferably over 6-8 weeks, minimum 4 weeks), pregabalin (See current BNF) may be considered. Within hospital setting this initiation will be on consultant authority only.

**Second-line Treatment:**

If satisfactory pain reduction is not achieved with Amitriptyline, (or Nortriptyline or Imipramine), switch to, or combine with oral Gabapentin If satisfactory pain reduction is not achieved with oral Gabapentin, switch to, or combine with oral Amitriptyline. Dosage and titration should be same as in recommendations for first-line treatment.

**Third-line Treatment:**

If satisfactory pain reduction is not achieved with second-line treatment:
- Consider offering oral tramadol as third-line treatment instead of or in combination with the second-line treatment.

For Tramadol as monotherapy, start at 50 to 100mg/day, with upward titration if required to an effective dose or the person’s maximum tolerated dose of no higher than 400mg/day. If tramadol is used as combination therapy, more conservative titration may be required. If tramadol not effective, a trial of low dose morphine with gradually upwards titration may be considered, but bear in mind that neuropathic pain is not always opioid responsive.
- And refer the person to a specialist pain service and/or a condition-specific service
- Or refer when response with opioids is poor or ineffective

**Specific for people with painful diabetic neuropathy:**

If Amitriptyline ineffective or contraindicated: Duloxetine at 60mg/day (a lower starting dose may be appropriate for some patients), with upward titration to an effective dose or the person’s maximum tolerated dose of no higher than 120mg/day

**Post herpetic neuralgia – Lidocaine patch:**

Approval pending agreement of Chronic Pain Management Pathway for Specialist use only for first three months then continuation in Primary Care if proven benefit. Approval in principal but to be evaluated as part of the pain relief pathway.
People with Diabetes Requiring Annual Review Assessment

Practice to:
- Identify housebound patients from practice based diabetes register
- Arrange for blood tests/urine tests two weeks prior to review
- Consider care plan

Height/Weight/BMI/Waist Circumference
Blood Pressure
Home Blood Glucose Monitoring
Vaccination status (Pneumonia/Flu)

Foot Screening
- Neuropathy/10g monofilament
- Foot Pulses - Dorsalis Pedis, Posterior Tibial
- Foot deformity/callus/abnormalities

Eye Screening
- Digital Retinopathy Screening - Result recorded

Glycaemic control
- HbA1c
- Self-Monitoring of Blood Glucose
- Hypoglycaemia/Hyperglycaemia
- Medication - Concordance/side effects
- Injection sites/technique
- Ability to self-manage

Vascular
- Lipids profile
- Diet and exercise
- Smoking/alcohol

Renal
- Blood pressure
- eGFR
- Serum Creatinine/U+Es
- Albumin/Creatinine Ratio

Counselling required? e.g. Depression/erectile dysfunction.
Continuing education needs/Expert Patient Programme/Discovering Diabetes (for those new to Type 2 diabetes or those requiring more education)

All women of child-bearing age (14 years - 50 years) - review contraception

Agree Revised Plan of Care and Ongoing Review/Referral to patient education programmes

Follow local weight management guidelines where appropriate
Refer to Diabetes Foot Care Guidelines
Refer to Digital Retinopathy Guidelines
Follow Blood Glucose Monitoring Guidelines/Oral Hypoglycaemia Agent Pathway or Treatment Decision Flowchart for Insulin
For medication review follow Best Practice Guidelines
Follow Lifestyle Guidelines for Poor Glycaemic Control, Trust Guidelines for the Management of Dyslipidaemia/Smoking Cessation
Follow Hypertension Guidelines
If depressed - follow Depression Protocol
If considering pregnancy or pregnant, review safety of medication, e.g. Statins and ACE Inhibitor. Refer to joint Diabetes pre-conception/antenatal clinic, Russells Hall Hospital
Interim Review 3-6 Monthly as appropriate to individual patient needs
Diabetes Foot Screen Tool

Examine foot annually
Deformities? Check sensation (10g monofilament) GMS Check foot pulses GMS
Classify risk

LOW
Normal sensation + palpable pulses
Footcare education

INCREASED
Neuropathy + absent pulses or deformities/callus/corns
Refer to *Community Podiatry Service for 1 - 3 monthly review

HIGH
Neuropathy or absent pulses + previous ulcer/amputation
Refer to **Diabetes Specialist Podiatrist - Use Community Diabetes Team Referral available on the Intranet

ULCER/CHARCOT
See page 35

Definitions
Neuropathy: less than 5 sites felt on either foot. Ischaemia: less than two pulses felt on either foot.

Checklist

<table>
<thead>
<tr>
<th>Examination</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulses checked</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10g monofilament</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deformities present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other risk factors</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided
Examine foot annually
Deformities? Check sensation (10g monofilament) GMS Check foot pulses GMS
→ Classify risk

ARE THERE ANY EMERGENCY FEATURES?

- Gangrene
- Severe infection:
- Spreading cellulitis
- Abscess
- Systemic symptoms i.e. vomiting, loss of appetite, fever, high blood sugars

Any evidence of:
- Osteomyelitis?*
- Active Charcot arthropathy **
  (see below)

Refer immediately to Hospital Diabetes Multidisciplinary Foot Clinic (Monday - Friday, 8am-4:30pm). Contact Diabetes Centre, Tel/Fax: 01384 244399. If out of hours or weekend, refer via GP out of hours service to E.A.U

Refer to ** Diabetes Specialist Podiatrist within 24 hours - complete community diabetes team referral available on the intranet

If no resolution within 1 month, diabetes specialist podiatrist refers to hospital foot clinic

*Osteomyelitis
- Visible bone
- Ulcer probes to bone
- Radiological evidence

**Active Charcot foot
- Unilateral warm, red swollen foot in presence of neuropathy - no systemic signs of infection

Diabetes Foot Screen Tool

Footcare Team Contact Details
* Community Podiatry Service
Brierley Hill Health and Social Care Centre, Venture Way, Brierley Hill, West Midlands, DY5 1RU
Courier No: 30 Fax: 01384 321223

** Community Diabetes Specialist Podiatrists
Mob: 07721 881921 Mob: 07770 704161 Mob: 07920 587924
Brierley Hill Health and Social Care Centre, Venture Way, Brierley Hill, West Midlands, DY5 1RU
Tel: 01384 321420 Fax: 01384 321413

Hospital Diabetes Specialist Podiatrist
Diabetes and Endocrine Centre, North Wing, Russells Hall Hospital, Dudley, West Midlands,
Tel/Fax: 01384 244399
Pathway of Events for the Patient if Digital Diabetic Retinopathy Screening

<table>
<thead>
<tr>
<th>Pathway of Events for the Patient if Digital Diabetic Retinopathy Screening</th>
</tr>
</thead>
</table>
| **Primary Care**  
Existing OR New to the area OR Newly Diagnosed |
| Details of newly diagnosed patients/patient amendments to Retinal Screening Administration Team using the update form and sent to bhs-tr.retinal-administration@nhs.net or faxed to 01905 362781 |
| Patient takes part in digital screening and all images are sent to Heartlands Hospital Retinal Screening Centre where they are examined by specialist graders and, if necessary, clinicians |
| **Retinopathy confirmed that requires treatment/observation in the eye clinic?** |
| NO | YES |
| Patient will be recalled in 12 months time | Referral will be made to the Ophthalmologist |
| Results letter will be sent to the patient and the GP will be emailed |
| **GP updates practice system - QOF (Quality Outcomes Framework)** |

If no screening appointment is made by patient within 4 weeks - A Did Not Respond letter is generated to the patient to make an appointment

If no response after a further 4 weeks, A 2nd Did Not Respond letter is sent to the patient. If an appointment is not booked within 4 weeks of this letter, the GP will receive a letter requesting them to follow the patient up and encourage attendance for screening. Once screened, they will automatically be recalled back as appropriate

If a patient attends an Ophthalmologist for a diabetes retinal problem the retinopathy screening will be done in that clinic. When the patient has been discharged from the Ophthalmology clinic they will need retinopathy screening at one of the Retinal Screening Opticians, it is the responsibility of the Ophthalmologist to inform the Retinal Screening Administration Team. Should a patient be attending an Ophthalmologist for a different condition i.e. Glaucoma they will need their retinopathy screening undertaken at one of the Retinal Screening Opticians.

For further information, please contact the Screening Administration Team on 01905 362780 or email bhs-tr.retinal.administration@nhs.net

**Back to top**
HbA1c Conversion Chart

<table>
<thead>
<tr>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>31</td>
<td>6</td>
<td>42</td>
<td>7</td>
<td>53</td>
<td>8</td>
<td>64</td>
<td>9</td>
<td>75</td>
</tr>
<tr>
<td>5.1</td>
<td>32</td>
<td>6.1</td>
<td>43</td>
<td>7.1</td>
<td>54</td>
<td>8.1</td>
<td>65</td>
<td>9.1</td>
<td>76</td>
</tr>
<tr>
<td>5.2</td>
<td>33</td>
<td>6.2</td>
<td>44</td>
<td>7.2</td>
<td>55</td>
<td>8.2</td>
<td>66</td>
<td>9.2</td>
<td>77</td>
</tr>
<tr>
<td>5.3</td>
<td>34</td>
<td>6.3</td>
<td>45</td>
<td>7.3</td>
<td>56</td>
<td>8.3</td>
<td>67</td>
<td>9.3</td>
<td>78</td>
</tr>
<tr>
<td>5.4</td>
<td>36</td>
<td>6.4</td>
<td>46</td>
<td>7.4</td>
<td>57</td>
<td>8.4</td>
<td>68</td>
<td>9.4</td>
<td>79</td>
</tr>
<tr>
<td>5.5</td>
<td>37</td>
<td>6.5</td>
<td>48</td>
<td>7.5</td>
<td>58</td>
<td>8.5</td>
<td>69</td>
<td>9.5</td>
<td>80</td>
</tr>
<tr>
<td>5.6</td>
<td>38</td>
<td>6.6</td>
<td>49</td>
<td>7.6</td>
<td>60</td>
<td>8.6</td>
<td>70</td>
<td>9.6</td>
<td>81</td>
</tr>
<tr>
<td>5.7</td>
<td>39</td>
<td>6.7</td>
<td>50</td>
<td>7.7</td>
<td>61</td>
<td>8.7</td>
<td>72</td>
<td>9.7</td>
<td>83</td>
</tr>
<tr>
<td>5.8</td>
<td>40</td>
<td>6.8</td>
<td>51</td>
<td>7.8</td>
<td>62</td>
<td>8.8</td>
<td>73</td>
<td>9.8</td>
<td>84</td>
</tr>
<tr>
<td>5.9</td>
<td>41</td>
<td>6.9</td>
<td>52</td>
<td>7.9</td>
<td>63</td>
<td>8.9</td>
<td>74</td>
<td>9.9</td>
<td>85</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
<th>DCCT (%)</th>
<th>IFCC (mmol/mol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>86</td>
<td>11</td>
<td>97</td>
<td>12</td>
<td>108</td>
<td>13</td>
<td>119</td>
<td>14</td>
<td>130</td>
</tr>
<tr>
<td>10.1</td>
<td>87</td>
<td>11.1</td>
<td>98</td>
<td>12.1</td>
<td>109</td>
<td>13.1</td>
<td>120</td>
<td>14.1</td>
<td>131</td>
</tr>
<tr>
<td>10.2</td>
<td>88</td>
<td>11.2</td>
<td>99</td>
<td>12.2</td>
<td>110</td>
<td>13.2</td>
<td>121</td>
<td>14.2</td>
<td>132</td>
</tr>
<tr>
<td>10.3</td>
<td>89</td>
<td>11.3</td>
<td>100</td>
<td>12.3</td>
<td>111</td>
<td>13.3</td>
<td>122</td>
<td>14.3</td>
<td>133</td>
</tr>
<tr>
<td>10.4</td>
<td>90</td>
<td>11.4</td>
<td>101</td>
<td>12.4</td>
<td>112</td>
<td>13.4</td>
<td>123</td>
<td>14.4</td>
<td>134</td>
</tr>
<tr>
<td>10.5</td>
<td>91</td>
<td>11.5</td>
<td>102</td>
<td>12.5</td>
<td>113</td>
<td>13.5</td>
<td>124</td>
<td>14.5</td>
<td>135</td>
</tr>
<tr>
<td>10.6</td>
<td>92</td>
<td>11.6</td>
<td>103</td>
<td>12.6</td>
<td>114</td>
<td>13.6</td>
<td>125</td>
<td>14.6</td>
<td>136</td>
</tr>
<tr>
<td>10.7</td>
<td>93</td>
<td>11.7</td>
<td>104</td>
<td>12.7</td>
<td>115</td>
<td>13.7</td>
<td>126</td>
<td>14.7</td>
<td>137</td>
</tr>
<tr>
<td>10.8</td>
<td>95</td>
<td>11.8</td>
<td>105</td>
<td>12.8</td>
<td>116</td>
<td>13.8</td>
<td>127</td>
<td>14.8</td>
<td>138</td>
</tr>
<tr>
<td>10.9</td>
<td>96</td>
<td>11.9</td>
<td>106</td>
<td>12.9</td>
<td>117</td>
<td>13.9</td>
<td>128</td>
<td>14.9</td>
<td>139</td>
</tr>
</tbody>
</table>

Back to top

These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.
References

Blood glucose monitoring:


Bacon S et al. Self-Blood Glucose Monitoring for People with Type 2 Diabetes who are Treated by Diet and Exercise. Leaflet produced for South Western Staffordshire Primary Care Trust: 2004


Franciosis M et al. The Impact of Blood Glucose Self-Monitoring on Metabolic Control and Quality of Life in Type 2 Diabetic Patients. Diabetes Care 2001;24:1870-7


Prescribing Guidelines for Blood Glucose Testing for Type 2 Diabetes. Dudley PCTs. December 2004

Oral agents pathway:

2. Type 2 Diabetes NICE clinical guideline 87


Identification of diabetes and impaired glucose tolerance
Early identification of people with type 2 diabetes, June 2006 Diabetes UK

WHO definition; ‘Diagnosis and Classification of Diabetes Mellitus and its complications’

Insulin regimens and titration:


Birmingham Children’s Hospital NHS Trust (2005) Protocol for Change from BD Insulin to MDI Insulin

NICE Clinical Guidance 87 (May 2009): Type 2 diabetes: The management of Type 2 diabetes
Urgent insulin initiation pathway:


Diabetes foot screening tool:


Primary care neuropathic pain guidelines:

http://www.medicine.ox.ac.uk/bandolier/booth/painpag/Acutrev/Analgesics/Leagtab.html

Back to top
These are recommendations as of time of print and hyperlink/web addresses are provided to enable clinicians who are using them to update the information that has been provided.

Primary Care Diabetes Specialist Team
T: 01384 321420
F: 01384 321413

Secondary Care Diabetes Specialist Team
T: 01384 244399