Designed for the Management of Adults with Diabetes Mellitus across Wales: 
Consensus Guidelines

To Support Implementation of the Diabetes 
National Service Framework for Wales 
Quality Requirements

October 2008
Ministerial Foreword

The Welsh Assembly Government has shown commitment to people with diabetes across Wales by supporting many initiatives in the promotion and implementation of the Delivery Strategy of the National Service Framework for Diabetes in Wales. The Standards were launched in April 2002 and the Delivery Strategy in March 2003.

In 2003 the estimated prevalence of diabetes across Wales was 3.8% and by 2006/7 the prevalence rate recorded from the Quality and Outcomes Framework database had increased to 4.18%. It is estimated that there are 50,000 people with diabetes who remain undiagnosed in Wales.

The Delivery Strategy set the foundation for the planning and implementation of the 12 Standards of care and includes Action Plans designed to raise standards of diabetes care in Wales. Although some areas in Wales have developed their own local Management Guidelines many health professionals have requested All Wales Consensus Guidelines for the management of diabetes.

The All Wales Consensus Group - health care professionals working in partnership with people with diabetes, their carers, voluntary organisations and service users - have been responsible for the development of these Guidelines designed to provide support and to improve diabetes care across Wales.

Implementation of the Consensus Guidelines will assist in

- the planning of services;
- improved quality of services;
- reducing inequalities in diabetes care across Wales.

There is strong evidence that educating people with diabetes, their families and carers, in partnership with health care professionals, to improve self-management can delay the onset and progression of diabetes related complications and thereby improve health outcomes. Use of the Consensus Guidelines will help to achieve this objective in Wales.
I would like to thank all those who have been involved in developing the Guidelines with the ultimate aim of improving services and care for people with Diabetes in Wales which will assist the NHS to achieve the National Service Framework targets by 2013.

Edwina Hart, MBE AM
Minister for Health and Social Services
Introduction

Diabetes has already reached epidemic proportions world-wide, yet the number of persons affected is expected to double over the next 25 years. Currently in Wales, almost 5% of the population is known to have diabetes.

Diabetes is a chronic, non-communicable disease which has major short and long term adverse impact on both health and life expectancy.

The National Service Framework (NSF) for Diabetes in Wales was published in April 2003. The NSF is a key component in the drive to raising the quality and safety of care of persons with diabetes and underpins the Healthcare Standards for Wales, which set the level of quality that all healthcare organisations will be expected to achieve or be moving towards. The NSF Action Plans recommend that protocols be developed in order to achieve each of the 12 standards. Whereas some diabetes services have developed their own local protocols, the Welsh Assembly Government requested that reference consensus guidelines be developed to ensure equity of care for all people with diabetes throughout Wales.

In 2006, an All Wales Consensus Group was established consisting of health care professionals, managers and service users associated with diabetes care. Sub-groups were identified to develop guidelines for each of the 12 NSF standards. Thanks go to each and every member of these groups acknowledging their knowledge, expertise and commitment in developing the guidelines in their specific area. A special thanks to members of the diabetes patient reference groups across Wales who also have made a substantial contribution to this document.

The sub-group chairs:

Standard 1 & 2  Professor Rhys Williams
Standard 3  Helen Husband (Patient Education)
             Wendy Gane MBE (Patient Empowerment Group)
Standard 4  Dr. Dean Jenkins

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Standard 5 & 6  Dr. Lesley Lowes
Standard 7  Samantha McNamara
Gaynor Harrison
Standard 8  Ann Lewis
Standard 9  Dr. Julia Platts
Standard 10 & 11  Professor David Owens CBE (Eyes)
Dr. Philip Evans (Kidneys)
Lance Reed (Foot/Vascular)
Standard 12  Andy Bray
Lifestyle Advice  Helen Nicholls
Appendices  1 Eating for Life  (Patient Leaflet)
2 Helen Husband  (Education Checklist)
3 Professor Michael Lewis  (Dental advice)
4 Dr David Price  (Erectile Dysfunction)
5 Dr Marlise Poolman  (Palliative Care/
Management of Diabetes)

Special thanks also goes to Ms Jackie Dent, Lead Co-ordinator Diabetes NSF (Wales) (retired) for her outstanding commitment and dedication throughout the development of these consensus guidelines for the betterment of diabetes care across the whole of Wales.

Thanks also to my Co-Chair Dr Meurig Williams.

The consensus guidelines conform to current NICE guidance. As and when new guidance is published, this document will be amended to reflect best practice.

David Owens, CBE, MD, FRCP, FIBiol
Chair, All Wales Consensus Group on Diabetes Care Guidelines
Healthcare Standards for Wales set out the Welsh Assembly Government’s common framework of healthcare standards to support the NHS and partner organisations in providing effective, timely and quality services across all healthcare settings. The healthcare standards are used by Healthcare Inspectorate Wales (HIW) as part of their processes for assessing the quality, safety and effectiveness of healthcare providers and commissioners across Wales.

There are 32 healthcare standards, covering four domains - First Domain: The Patient Experience, Second Domain: Clinical Outcomes, Third Domain: Healthcare Governance and the Fourth Domain: Public Health and each standard within the domain describes the values that the domain represents. These are designed to deliver the improved levels of care and treatment the people of Wales have a right reasonably to expect. These standards will be taken into account by those providing healthcare, irrespective of the setting and communicated to patients/families in a way that meets their needs in terms of their linguistic, cultural, and educational background. Account will therefore need to be taken of these needs in the delivery of services.
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General Advice on Diet and Lifestyle Modifications

This section is referenced across all of the standards and provides a brief overview of the main lifestyle goals—diet, physical activity, weight management, smoking cessation and stress management. It is important that the person with diabetes plays an active role in defining their individual goals.

Diet and lifestyle changes should be discussed at each clinic visit. All healthcare professionals have a contribution to make in supporting the individual in making the appropriate lifestyle changes. Refer to Standard 3 ‘Empowering people with diabetes’ for information on patient education and self management pathways.

Note: The diet information referred to below is not appropriate for certain vulnerable groups such as frail elderly, people with increased nutritional requirements e.g., poor wound healing, underweight, and/or receiving palliative care.

These specialist groups should receive individualised advice from a registered dietitian.
Making Healthier Food Choices

The key to a healthy diet is

- Eating the right amount of food for the activity undertaken
- Eating a range of foods to ensure a balanced diet (A Healthy Eating information leaflet can be found in appendix 1)

A healthy balanced diet is based on The Eatwell Plate Model, formally referred to as the Balance of Good Health (Food Standards Agency http://www.food.gov.uk/multimedia/pdfs/bghbooklet.pdf). It should contain a variety of foods including fruit and vegetables, starchy foods; protein rich foods and dairy foods.

**Eat regular meals** which include some starchy carbohydrate foods such as bread, potatoes, pasta, rice, chapattis and breakfast cereals. Where possible choose wholegrain varieties.

**Aim for at least 5 portions of a variety of fruit and vegetables per day.** Choose from fresh, frozen, tinned, dried or juice. For what counts as a portion see the food standards agency website http://www.food.gov.uk/multimedia/pdfs/eatwell.pdf
**Making Healthier Food Choices (continued)**

**Reduce total fat intake, particularly saturated fat and trans fats.** Trans fats are usually derived from industrial hydrogenation of mono or polyunsaturated fat sources and are found in commercial biscuits, cakes and some spreads. Some epidemiological studies indicate that dietary intake of trans fats is positively related to the risk of cardiovascular disease, therefore they should be restricted. Choose foods that are rich in unsaturated fat instead e.g. olive or rapeseed oils, oily fish, nuts and seeds. Favoured spreads are those labelled low fat or high in monounsaturates.

**Limit sugar and sugary foods** Small quantities of sugar or sugary foods can be included as part of a healthy diet. Many foods that contain added sugar can also be high in calories so cutting down can help with weight management.

**Reduce salt intake** - no more than 6g salt (2.4 g sodium) per day. Approximately 75% salt eaten comes from processed foods e.g. breakfast cereals, ready meals, bread, soups, and biscuits. Intake of these foods should be restricted. This is especially important for those with raised blood pressure.

**Drink plenty of fluids** Aim for 2 litres of fluid daily, this equates to 8 large cups. Avoid drinking soft and fizzy drinks that are high in added sugar.

**Sweeteners and Diabetic Foods.** Nutritive sweeteners include polyols such as sorbitol, xylitol and isomalt. These tend to be found in processed foods e.g. chocolate, biscuits, chewing gum. These products are often labelled as ‘diabetic’ or ‘sugar free’. They should only be taken in moderation as they can be higher in saturated fat and the polyols can cause diarrhoea and flatulence.

Non nutritive sweeteners include aspartame, saccharine, acesulfame K, sucralose. They are virtually calorie free and do not affect blood glucose levels or contribute to dental caries.
**Moderate alcohol intake**

The quantity of alcohol recommended for people with diabetes is in line with that for the general population: Limit alcohol to 2 units per day for women (14 units per week), 3 units per day for men (21 units per week).

1 unit = ½ pint/300ml normal strength (3-4% ABV) beer or lager
= 1/3 pint/200ml strong (5.5% ABV) beer and lager
= 1 pub measure spirits (25-30ml)
= 1 very small glass wine (80-100ml).

A standard pub measure wine is 175 ml; a large pub measure is 250ml.

People with diabetes should be aware that alcohol increases the risk of hypoglycaemia. Therefore, they should

- avoid excess alcohol before eating a meal
- do not omit bedtime snack if usually taken
- never drink and drive
- do not routinely increase insulin

Alcohol is high in calories so restricting intake can help with weight management.
**Dietary Management of Dyslipidaemia**

A Mediterranean style diet is recommended. Increasing omega 3 fats, fruit and vegetables, whilst cutting down on saturated fat and partially replacing it with olive oil or rapeseed oil. An increased emphasis on fresh rather than ready prepared foods may be cardio-protective. Reinforce weight management advice where appropriate.

People should be advised to consume at least 7 g of omega 3 fatty acids per week. This equates to 2-4 portions of oily fish per week. Small amounts of omega 3 fatty acids are also found in dark green leafy vegetables, walnuts, almonds, soya products, linseed or rapeseed oil and omega 3 enriched foods.

There is some evidence to suggest that plant stenols or sterols added to food can reduce LDL cholesterol. These may be used as part of a healthy diet.

Soya protein (25g daily) included in a diet low in saturates and cholesterol may reduce the risk of coronary heart disease (CHD) by lowering blood cholesterol levels. Generally, one portion of soya product contains 6g soya protein.

For detailed advice on soya go to the Soya fact sheet on the BDA website http://www.bda.uk.com/foodfacts/

It is important to promote at least 5 portions of fruit and vegetables daily. Supplementation with antioxidant vitamins (B carotene, vitamin E and vitamin C) is not recommended.

Soluble fibre, which is found in oats and pulses (peas, beans, lentils), can help reduce cholesterol.

**Dietary Management of Blood Pressure**

Reinforce reduction in daily salt intake to less than 6g (2.4g sodium).

Reinforce need for weight management, alcohol restriction and need for physical activity.

Increase fruit and vegetables, aiming for 7 portions per day.

In the DASH (Dietary Approaches to Stop Hypertension) trial, a diet rich in fruit, vegetables and lower in fat, reduced blood pressure.
Dietary Management and Glycaemic Control

Monitoring carbohydrate, whether by carbohydrate counting, exchanges, or experienced-based estimation remains a key strategy in achieving glycaemic control.\textsuperscript{6} The use of glycaemic index and glycaemic load may provide a modest additional benefit over that observed when total carbohydrate is considered alone.\textsuperscript{6} People with diabetes should be encouraged to eat a variety of fibre containing foods, in line with the recommendations for the general population. Sucrose containing foods can be substituted for other carbohydrates in the meal plan. Care should be taken to avoid excess energy intake. For people on insulin therapy, if additional carbohydrates are eaten, a change in insulin dose may be required.\textsuperscript{6}

Stop Smoking Wales

People with diabetes should be informed of the serious additional risks associated with smoking and offered a structured stop smoking programme. Stop Smoking Wales service telephone no is 0800 085 2219 and the website address is http://www.wales.nhs.uk/sites3/home.cfm?orgid=754.
**Increasing Physical Activity**

People with diabetes should be encouraged to increase their physical activity, but only within their capability (see below), and to identify ways of incorporating it into their normal daytime routine. They should build up their activity and aim for at least 30 minutes of moderate intensity activity on 5 or more days of the week. Avoid more than 2 consecutive days without physical activity. Aerobic exercise is best—e.g., cycling, walking, swimming, dancing, gardening, housework. The activity should be sufficient to make them slightly short of breath but they should still be able to talk comfortably during exercise.

Before increasing the usual pattern of activity or starting an exercise programme, the person with diabetes should be assessed for conditions that might contraindicate certain types of exercise or predispose to injury, e.g., severe autonomic neuropathy, severe peripheral neuropathy and pre-proliferative or proliferative retinopathy. The person should also be advised on the impact physical activity will have on their blood glucose levels and to increase self-monitoring where appropriate.

There is strong evidence that being physically active can significantly reduce the risk of people with diabetes developing CHD.

Practitioners may wish to consider referring people with diabetes to the National Referral Scheme. This Welsh Assembly Government scheme enables health practitioners to refer patients to qualified exercise instructors for a 16 week structured exercise programme. Further information about the scheme can be found at [http://new.wales.gov.uk/dphhp/publication/improvement/food/exercise/exercise?lang=en](http://new.wales.gov.uk/dphhp/publication/improvement/food/exercise/exercise?lang=en).

**Stress and depression**

Stress and depression can influence dietary choices and detract from a healthy lifestyle. Stress and depression should be identified and treatment offered.
Achieving optimal weight and weight distribution

Overweight and abdominal obesity are associated with other risk factors including small dense LDL cholesterol, low HDL cholesterol, raised triglycerides, elevated blood pressure, insulin resistance and impaired glucose regulation. ¹

Advice on weight reduction if waist circumference is equal to or greater than ⁹:

<table>
<thead>
<tr>
<th>Waist Circumference (cm)</th>
<th>Caucasian (BMI &gt;25)</th>
<th>South-Asian (BMI &gt;22)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>94</td>
<td>90</td>
</tr>
<tr>
<td>Female</td>
<td>80</td>
<td>80</td>
</tr>
</tbody>
</table>

To effectively reduce weight is it important to have a moderate calorie restriction equivalent to a deficit of 600 Kcalories per day combined with an increase in physical activity. Calorie intake can be most efficiently reduced by limiting the consumption of high energy dense foods especially saturated fats.

Successful weight reduction requires sustained personal and family motivation and long term professional support ¹. For a detailed multidisciplinary weight management strategy refer to NICE guidance CG43 ¹⁰ http://guidance.nice.org.uk/CG43/guidance

A sustained weight loss of 0.5kg per week is a realistic objective, aiming to achieve 5-10% weight loss in the first year.

NICE guidelines currently recommend drug therapy be considered in obese people in conjunction with other dietary, physical and behavioural management strategies ¹⁰

Patient first line advice information is available at http://www.bda.uk.com/Downloads/weightlossApril2003screen.pdf
<table>
<thead>
<tr>
<th>Links to useful resources</th>
</tr>
</thead>
</table>
| **British Dietetic Association Food Facts Leaflets**  
http://www.bda.uk.com/foodfacts/ |
| **Diabetes and Sport advice**  
www.runsweet.com |
| **Food Standards Agency Resources**  
http://www.food.gov.uk/aboutus/publications/nutritionpublications/  
http://www.food.gov.uk/healthiereating/eatwellplate/  
http://www.food.gov.uk/multimedia/pdfs/eatwell.pdf |
| Hard copies of food standards agency resources are available free of charge |
| **British Heart Foundation**  
http://www.bhf.org.uk/keeping_your_heart_healthy/healthy_eating.aspx |
| **Diabetes UK**  
www.diabetes.org.uk |
| **Diabetes UK download resources**  
http://www.diabetes.org.uk/Documents/catalogue/WMP_A5_lay_leaflet_7500_Sept06.pdf  
| **ASH (Action on smoking and Health)**  
www.ash.org.uk |
| **Quitline (smoking)**  
http://www.quit.org.uk |
| **National Obesity Forum**  
http://www.nationalobesityforum.org.uk/ |
| **Welsh Assembly Government Eating for Life booklet. See appendix 1 for copy.**  
References


9. IDF Consensus worldwide definition of the metabolic syndrome: International Diabetes Foundation, 2006

Standard 1

Prevention of Diabetes

The NHS will develop, implement and monitor strategies to reduce the risk of developing Type 2 diabetes in the population as a whole and to reduce the inequalities in the risk of developing diabetes

Standard 2

Prevention and Early Detection of Diabetes

The NHS will develop, implement and monitor strategies to identify people who do not know they have diabetes
1 (Standards 1 & 2) Early Detection of Type 2 Diabetes. Detection and management of pre-Diabetes.

Identification of potential cases. One or more of the following risk markers:
- IGT/IFG (pre-diabetes);
- age ≥45 (≥35 high risk ethnic group) with both BMI ≥30 and hypertension;
- cardiovascular disease;
- polycystic ovarian syndrome;
- previous gestational diabetes;
- age ≥45 with family history of diabetes;
- those meeting criteria for metabolic syndrome.

Symptoms?  →  Risk assessment questionnaire.

Risk assessment questionnaire, Above threshold?  →  no  →  Annual risk assessment questionnaire

→ yes  →  Check fasting plasma glucose
(or proceed to OGTT if previous IGT/IFG or high risk)

- ≥7.0 mmol/l  If no symptoms repeat to confirm
- 6.8 - 6.9 mmol/l  Pre-diabetes high risk
- 6.1 - 6.7 mmol/l  Pre-diabetes low risk
- <6.1 mmol/l  Low risk

OGTT  →  + ve  →  Type 2 Diabetes

OGTT  →  + ve  →  Annual OGTT

IGT/IFG  →  Annual Fasting glucose

IGT Impaired Glucose Tolerance
IFG Impaired Fasting Glycaemia
OGTT Oral Glucose Tolerance Test
**Prevention and early detection of diabetes**

**Identification of potential cases**

Those with one or more of the following risk markers for type 2 diabetes should be assessed for diabetes:

- IGT/IFG (pre-diabetes);
- age ≥45 (≥35 high risk ethnic group) with both BMI ≥30 and hypertension;
- cardiovascular disease;
- polycystic ovarian syndrome;
- previous gestational diabetes;
- age ≥45 with family history;
- those meeting criteria for metabolic syndrome.

**IDF Consensus worldwide definition of the metabolic syndrome**

International Diabetes Foundation 2006:

Central obesity waist >94cm (37”) Caucasian men, >90cm (35.5”) South-Asian men, >80cm (31.5”) women (both Caucasian and South-Asian) plus two or more of:

- raised triglyceride (> 1.7 mmol/l) or on treatment;
- low HDL cholesterol (< 1.03 mmol/l in men, < 1.29 mmol/l in women) or on treatment;
- raised BP (≥ 130 mmHg systolic or ≥ 85 diastolic) or on treatment;
- raised fasting glucose (≥ 5.6 mmol/l) or diagnosed with type 2 diabetes.

People presenting with symptoms and a raised random glucose (≥ 11.1 mmol/l) do not need to undergo this testing strategy as they have already satisfied the criteria for diabetes. In such cases be aware of the possibility of other types of diabetes such as type 1 diabetes, Latent Autoimmune Diabetes of Adulthood (LADA), Maturity Onset Diabetes of the Young (MODY), diabetes secondary to pancreatitis and other conditions, as well as certain therapies, e.g. corticosteroids.
**Diabetes risk assessment questionnaire**

A number of risk assessment instruments exist. For example: American Diabetes Association “Diabetes Risk Test” (www.diabetes.org/risk-test.jsp); Wellsource, Health Risk Assessment and Wellness Systems (www.wellsource.com) and the Finnrisk and Cambridge Risk Scores. Further validation of these is required in UK populations.

Those who are at high risk should proceed directly to an OGTT. These would include individuals with previous gestational diabetes and/or a strong family history of diabetes.

**Classification**

A random plasma glucose is helpful: if <5.6 mmol/l - diabetes unlikely, if >11.1 mmol/l - diabetes present. If the random plasma glucose is between 5.5 and 11.1 mmol/l, there is a need for a fasting plasma glucose estimation.

*For reasons of simplicity, consistency and audit, a strong argument can be made for using fasting plasma glucose as the prime “classification” tool.*

Fasting plasma glucose is already on GP computer systems and can be searched for. Audit can determine (e.g. the proportion of patients in a practice with fasting glucose performed, what proportion of these was abnormal, how were particular results followed up etc).

A fasting plasma glucose of < 6.1 mmol/l is normal, but if the patient has been classified as being 'at risk', the fasting plasma glucose should ideally be repeated after 3 years.

A fasting plasma glucose of > 6.1 mmol/l indicates increased risk of large vessel disease. If the fasting plasma glucose is 6.1-6.7 mmol/l, the person is at low risk. If the fasting plasma glucose is 6.8-6.9 mmol/l, the person is at high risk and should undergo an OGTT and be followed up according to the result (see page 20).

Fasting plasma glucose is already on the GP computer systems and can be searched for. Audit can determine (e.g. the proportion of patients in a practice with fasting glucose performed, what proportion of these was normal, how were particular results followed up etc).
**Confirmation**

**Type 2 Diabetes**

A fasting plasma glucose of ≥ 7.0 mmol/l indicates diabetes if associated with symptoms (weight loss, thirst, polyuria) or in the absence of symptoms if confirmed on repeat testing. Similarly, a random plasma glucose ≥ 11.1 mmol/l also indicates the presence of diabetes.

‘Pre-diabetes’

A fasting plasma glucose of 6.1-6.7 mmol/l should be followed by an annual fasting glucose. A fasting plasma glucose of 6.8-6.9 mmol/l should ideally be followed by an oral glucose tolerance test (OGTT) because a significant proportion of these patients will be found to have diabetes by a 2 hour post fasting glucose. If no diabetes is found, the glucose tolerance test should ideally be repeated every three years.

**OGTT - methodology and diagnostic criteria**

The OGTT should be administered in the morning after at least three days of unrestricted diet (greater than 150 g of carbohydrate daily) and usual physical activity. Recent evidence suggests that a reasonable (30-50g) carbohydrate containing meal should be consumed on the evening before the test. The test should be preceded by an overnight fast of 8-14 hours, during which water may be drunk. Smoking is not permitted during the test. The presence of factors that may influence interpretation of the results of the test must be recorded (e.g. medications, inactivity, infection, etc.).

After collection of the fasting blood sample, the subject should drink 75 g of anhydrous glucose or 82.5 g of glucose monohydrate (or partial hydrolysates of starch of the equivalent carbohydrate content) in 250-300 ml of water over the course of 5 minutes. For children, the test load should be 1.75 g of glucose per kg body weight up to a total of 75 g of glucose. Timing of the test is from the beginning of the act of drinking. Blood samples must then be collected precisely at 2 hours from the start of the OGTT. Ensure person remains inactive during the period of the test.
### Management

All persons with IFG and/or IGT and diabetes should be offered lifestyle advice.

#### Pre-diabetes (IFG, IGT)

Assess if the person is overweight.

- **BMI**: ≥ 25 kg/m² if Caucasian or ≥ 22 kg/m² if South-Asian
- **Waist circumference**: ≥ upper limit
- 94 cm Caucasian men
- 80 cm Caucasian women
- 90 cm South-Asian men
- 80 cm South-Asian women
<table>
<thead>
<tr>
<th>Lifestyle</th>
<th>Not overweight</th>
<th>overweight</th>
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| Dietary advice | Total fat < 30% of energy intake  
Saturated fat < 10% of energy intake | Total fat < 30% of energy intake  
Saturated fat < 10% of energy intake  
Weight reduction 5 - 10% of body weight per year |
| Smoking advice | Stop           | Stop                                    |
| Physical activity | Increase. Where possible to 30 minutes per day up to 150 minutes per week of brisk walking or its equivalent. | Increase. Where possible to 30 minutes per day up to 150 minutes per week of brisk walking or its equivalent. |

**Follow-up**

For those individuals with risk markers, follow-up should be arranged as indicated below.

**Risk score below threshold**
Postal risk assessment questionnaire annually

**Pre-diabetes low risk**
Annual fasting glucose

**Pre-diabetes high risk**
Annual OGTT

**Normal glucose tolerance**
Annual risk assessment  
Questionnaire

**Type 2 diabetes**
Those persons confirmed to have type 2 diabetes should be offered care as per Standard 4.
Standard 3

Education & Self Management Pathways: Empowering people with diabetes

All children, young people and adults with diabetes will receive a service which encourages partnership in decision making, supports them in managing their diabetes and helps them to adopt and maintain a healthy lifestyle. This will be reflected in an agreed and shared care plan in an appropriate format and language. Where appropriate, parents and carers should be fully engaged in this process.
Patient Education & Self Management Pathway: Type 1 Diabetes

**Stage 1**
Diagnosis

**Stage 2**
Initial One-to-One assessment & patient support as required
Basic Information Package

**Stage 3**
6-week education review (see page 30)
› Agreed Care Plan
› Initiate Hand Held Record
› What Care to Expect

**Stage 4**
3-month education review
› Menu of options
› Preferred Education Structure

**Stage 5a**
6-months Group Education
› Agreed Structure of Education (see menu)
› Review of Handheld Record (to include copies of every interaction)

**Stage 5b**
6 months One-to-One Education
› Education Plan agreed
› Review of Handheld Record (to include copies of every interaction)

**Stage 6**
Annual Review & monitoring of outcomes
› Education/Belief/Empowerment Assessment
› Review of Handheld Record

**Stage 7**
Follow-up (Negotiated Timescales)
› Review of Handheld Record

**Stage 8**
Ongoing Support via Specialist Diabetes Team or where appropriate Primary Care Team and Review of Handheld Record
Standard 3: Education and Self-Management Pathways: Empowering people with diabetes

Patient Education and Self-Management Pathway: Type 1 Diabetes

Stage 1
At diagnosis patients with type 1 diabetes may only be able to take on board a limited amount of information. Therefore, only essential information should be provided initially (see stage 2). It would be helpful for the individual to be accompanied by a chosen companion (parent, carer, friend, colleague) to offer support if desired.

Stage 2
All patients diagnosed with type 1 diabetes should receive a one-to-one consultation accompanied by a locally agreed information package to include:

- Name and contact numbers of relevant Health Care Professionals (HCP)
- Out of Hours and Emergency contact details i.e. NHS Direct, Local Out of Hours service
- Information about the need to carry identification, diet/nutrition, insulin, hyperglycaemia, hypoglycaemia, blood glucose monitoring, and driving/insurance, supported by written information provided in an appropriate format for the individual;
- Details of Expert Patient Programme, if appropriate;
- Contact details of Diabetes UK Cymru (02920 668276) http://www.diabetes.org.uk/;
- Contact details of other appropriate Voluntary Organisations.

Further advice/support needs to be available between diagnosis and the 6 week review from a suitably qualified HCP in the form of telephone contact or face-to-face consultation based on individual need.
**Stage 3**

The patient and HCP working in partnership should share control of the 6 week education review consultation. The HCP should adopt a patient centred approach to the consultation and this might include:

- Assessment of self-management skills (which should be evaluated);
- Joint goal setting;
- Initiation of a hand held record, if available;
- An agreed follow-up plan and date for follow-up.

Written advice about what care to expect should be provided at this stage either using Diabetes UK or locally developed information - leaflets/documentation.

**Stage 4**

The 3 month education review might include discussion about individual learning styles and education needs, to agree a preferred education structure and also to determine whether group or one-to-one education is most appropriate for the individual.

A menu of options might include:

- An explanation of what education programmes are available locally i.e. structured education programmes (DAFNE) or other locally developed programmes (e.g. DAFYDD)
- A brief descriptor of each programme including comments from previous participants
- National exercise referral scheme (see page 15 and 40)

Once the preferred education structure and specific education programme has been agreed, referral/appointment should be arranged to commence delivery at stage 5.

**Stage 5**

All people with type 1 diabetes need to have access to up-to-date and appropriate information to facilitate self-management. Systems need to be in place to ensure people with type 1 diabetes have timely access to group (stage 5a) and/or one-to-one (stage 5b) education programmes dependent on individual
need. Some type 1 education programmes suggest that participants should have
gone through the ‘honeymoon’ period prior to attending such programmes; this
could be at anytime during the first year and varying between individuals.

Structured education is an integral part of diabetes care and people with diabetes
and carers should be informed of this (NICE, 2008). Currently DAFNE is the only
Nationally recognised structured education programme for type 1 diabetes and
there are only 2 centres in Wales running this programme (one in North Wales
and one in South-East Wales). Individual Trusts/LHBs may develop their own
courses. However these courses should meet the criteria set by the National
Diabetes Support Team (NDST, 2005) using their toolkit. Any structured education
programme developed should be fully evaluated to demonstrate effectiveness
(see stage 6).

Where a ‘One-to-One’ education programme is deemed appropriate and of equal
standard to meet the needs of the individual (stage 5), the HCP should adopt a
patient centred approach and ensure that all information provided to the patient
is timely and in an appropriate format. Clear follow-up arrangements should be
agreed with the person with diabetes (see checklist appendix 2).

**Stage 6**

The annual review needs to include an education review/assessment of self-
management skills and monitoring of outcomes. People with diabetes need to
know the content of the annual review which should be explicit in the education
programme provided. The outcomes of any education programme need to be
audited and might include:

- Biomedical results;
- Quality of life issues;
- Patient experience;
- The degree of self management achieved;
- National Diabetes Support Team (NDST, 2005).

**Stage 7**

Follow-up support following the first annual review will be determined by the
degree of self-management achieved with agreed negotiated timescales.
Stage 8

Ongoing support may be delivered by one or more members of the hospital/community based specialist diabetes team (Consultant, DSN, Diabetes Specialist Dietitian, Specialist Podiatrist, and Psychologist) as needed.

or

Where appropriate by a trained and supported Primary Care Team (GP, GP with a special interest (GPwSI), Practice Nurse, District Nurse, Community DSN or Dietitian).

Support for the Primary Care Team may be available via a hospital/community based specialist team.
Patient Education & Self Management Pathway: Type 2 Diabetes

Stage 1
New Diagnosis
- What care to expect

Stage 2
Initial ‘One-to-One’ Assessment & Basic Information Package
Initiate Handheld Record (optional)

Stage 3
- Agree Preferred Education Structure
- Agree Care Plan

Stage 3a
- Agree Group Education Package
  (see menu)
- Review of Handheld Record

Stage 3b
- Agree ‘One-to-One’ Education Package
  (see menu)
- Review of Handheld Record

Stage 4
Review and monitor outcomes on a ‘One-to-One’/group basis depending on need at:
- 3 months
- 6 months
- 12 months (Annual Review)
- Review of Handheld Record at each consultation

Stage 5
- Agree on ongoing Support via Primary Health Care Team or where appropriate
- Refer to Health Care Professional with appropriate diabetes training in - Secondary/Primary/Community Care
- Review of Handheld Record (optional)
Empowering people with diabetes

Patient Education and Self Management Pathway: Type 2 Diabetes

Stage 1

At diagnosis patients with type 2 diabetes may only be able to take on board a limited amount of information. Therefore, only essential information should be provided initially (see stage 2). It would be helpful for the individual to be accompanied by a chosen companion (family member, carer, friend, colleague) to provide support if desired.

Written advice about what care to expect should be provided at this stage either using Diabetes UK ‘What Care to Expect’ leaflet or a locally agreed alternative

Stage 2

The initial consultations should be on a ‘one-to-one’ basis - use a patient centred approach and include assessment of the individuals understanding and self-management skills. At this and each subsequent consultation people should be actively involved in goal setting and agree timescales for follow-up appointments. Consider initiating a handheld record. All patients diagnosed with type 2 diabetes should receive a locally agreed information package to include:

- Name and contact numbers of relevant Health Care Professionals (HCP);
- Out of Hours and emergency contact details i.e. NHS Direct, Local Out of Hours service;
- Information about the need to carry identification, diet/nutrition, smoking and physical activity/exercise recommendations, hyperglycaemia, hypoglycaemia (dependent on treatment) blood glucose monitoring, and driving/insurance, supported by written information provided in an appropriate format for the individual;
- Contact details of Diabetes UK Cymru (029 20668276);
- Details of Expert Patient Programme, if appropriate:
- Contact details of other appropriate voluntary organisations.
The written information pack may form part of the hand held record.

Advice/support needs to be available between diagnosis (stage 1) and the 3 month review from a suitably qualified HCP in the form of telephone contact or face-to-face consultation based on individual need.

**Stage 3**

In consultation with the person the preferred education option needs to be agreed through discussion to determine individual needs and preferred learning style - group (stage 3a) or ‘one-to-one’ (stage 3b) in order to enable informed choice.

A menu of options might include:

- An explanation of what education programmes are available locally i.e. structured education programmes (DESMOND, X-PERT) or other locally developed programmes conforming to National Diabetes Support Team (NDST) (2005) audit
- A brief descriptor of each programme including comments from previous participants
- National exercise referral scheme (see page 15 and 40)

Once the preferred education structure and specific education programme has been agreed, referral/appointment should be arranged.

All people with type 2 diabetes need to have access to up-to-date and appropriate information to facilitate self-management. Systems need to be in place to ensure persons with type 2 diabetes have timely access to either group (stage 3a) or one-to-one education (stage 3b) programmes dependent on individual need. Structured education is an integral part of diabetes care, and carers should be made aware of this requirement (NICE, 2008).

All structured education programmes should meet the criteria reviewed against the National Diabetes Support Team (NDST) (2005) using their toolkit (supported by the Welsh Assembly Government) and fully evaluated to demonstrate effectiveness with annual reinforcement and review (stage 4).

Where ‘one-to-one’ education is deemed appropriate to meet individual needs (stage 3b), the HCP should adopt a patient centred approach and ensure that all information provided (see appendix 2) is timely, of equal standard and in an appropriate format. The hand held record should be generated by or with the person with diabetes. Clear follow-up arrangements should be agreed.
Stage 4

Review and monitor outcomes at 3 months/6 months and 12 months for annual review. Timescales for recall will depend on individual need.

The annual review needs to include an education review/assessment of self-management skills and monitoring of outcomes. The outcomes of any education programme needs to be audited and might include:

- Biomedical results;
- Quality of life issues;
- Patients experience;
- The degree of self-management achieved;
- National Diabetes Support Team (NDST, 2005).

Stage 5

Follow-up support after the first annual review will be determined by the above outcomes which include the degree of self-management achieved and the agreed negotiated timescales for further review. Individuals should have access to regular education updates as required, either through a ‘one-to-one’ or group structured education follow-up programme.

Ongoing support should be provided by appropriately trained members of the primary care team (GP, GPwSI, Practice Nurse, District Nurse, Community Dietitian, Community DSN/Facilitator).

If the needs of the individual are more complex, additional support for the primary care team may be available via a community team or secondary care HCP’s (DSN/Dietitian/Podiatrist or Consultant).
Brief Descriptor of Education Programmes available in Wales

DAFNE (website www.dafne.uk.com)

DAFNE stands for Dose Adjustment for Normal Eating. It is a structured education programme for people with type 1 (currently) diabetes and provides people with the skills necessary to estimate the carbohydrate content of each meal in order to inject the right dose of insulin. DAFNE is based on:

- 2 injections of long-acting (background) insulin each day;
- Injecting quick-acting insulin each time food is eaten;
- Testing blood glucose levels before each injection.

DAFNE involves attending a 5 day training course, 9am-5pm Monday-Friday. The structured teaching programme is delivered to groups involving 6-8 participants and covers topics including carbohydrate estimation, self-monitoring of blood glucose (SMBG), insulin regimens, hypoglycaemia, illness and exercise.

DAFNE allows people to fit diabetes into their daily lifestyle, rather than changing their lifestyle to fit in with their diabetes with the aim of helping people to lead as normal a life as possible, while controlling their blood glucose levels and reducing the risk of long-term complications related to diabetes.

To date there are approximately 70 trained DAFNE centres across the UK with 2 in Wales - Royal Glamorgan Hospital, Llantrisant, South Wales and Glan Clwyd District General Hospital, Rhyl, North Wales. All centres enter data into a centrally monitored database.

BIDAC (Bournemouth Insulin Dose Adjustment Course)

DAFYDD (Dose Adjustment for your Daily Diet) and WIDAC (Wrexham Insulin Dose Adjustment Course) have been adapted from the Bournemouth structured education programme BIDAC (Bournemouth Insulin Dose Adjustment Course). BIDAC is a structured education programme for people with type 1 diabetes and has been running since 1999. It is delivered in groups involving 6 - 8 people for 1 day a week over a four week period. This enables the self-management skills to be put into practice and for the individuals to bring their own experiences back in to the group. The main aim is to teach the skills of insulin dose adjustment according
to the carbohydrate content. Other topics include hypoglycaemia, dealing with illness, managing exercise and preventing complications.

Each centre delivering the programme is responsible for meeting the NICE criteria and is supported by the Diabetes Education Network (DEN). The DEN offers support to centres delivering structured education in the UK. The Bournemouth team have provided some training in Wales although it is the responsibility of each centre delivering the course to maintain their own data collection and quality assurance arrangements as there is currently no all Wales central database.

**DESMOND (website www.desmond-project.org.uk)**

*(Diabetes Education and Self Management for Ongoing and Newly Diagnosed)* represents a new vision of care for people with type 2 diabetes integrating structured education with the clinical management of this chronic condition. DESMOND Newly Diagnosed is currently the programme of choice for many primary healthcare organisations across the UK, including Wales. It consists of 6 hours of education delivered by 2 HCP educators to a group of up to 10 people newly diagnosed with type 2 diabetes, who may choose to be accompanied by a partner, family member or friend. The course is informative, interactive, supported by specially developed materials and resources, and is above all, fun! It provides individuals with the range of information necessary at the early stage of their journey with diabetes, but most importantly it gives them the skills and tools for a good start in self managing the condition, through focussing on personal risk factors and individualised lifestyle choices. Educators delivering the course are formally trained, and mentored by a robust quality assurance and professional development process.

The DESMOND collaborative, a multidisciplinary group, are currently developing further modules for the DESMOND programme including DESMOND for minority ethnic groups, Foundation DESMOND for those with established diabetes, Prevention DESMOND for people with pre-diabetes, and the Ongoing module for lifelong self-management.
X-PERT Education Programme (website www.xpert-diabetes.org.uk)

The diabetes X-PERT programme was designed by Dr Trudi Deakin in conjunction with patients and the local branch of Diabetes UK. It is a 6 week group education programme (2 hours per session) based on the theories of patient empowerment and patient activation. The programme has been evaluated by means of a randomised control trial in East Lancashire and a part of the programme was specific for Urdu speaking South-Asian participants.

The X-PERT programme aimed to increase knowledge, skills and confidence so that individuals were able to make informed decisions regarding their diabetes self-management. Participants were then encouraged to set goals based on a five step empowerment model developed by Anderson and Funnell at the Michigan Diabetes and Training Centre, USA.

Participants were invited to each programme and approximately one-third of them came with a carer. Biomedical (glycated haemoglobin, blood pressure, lipid profile, BMI and waist circumference), lifestyle (self-management skills, physical activity levels and nutritional intake) and psychosocial (quality of life, treatment satisfaction and empowerment score) outcomes were collected from the ‘expert patients’ and control subjects at baseline and at 4 months and 14 months.

Significant differences were found in favour of the X-PERT Programme for biomedical, lifestyle and psychosocial outcomes. The philosophy and aims of the programme are to:

- Develop, monitor and evaluate a community-based, health professional-led, structured education programme for adults with type 2 diabetes
- Deliver the programme in a manner that allows participants to develop the skills, knowledge and confidence to identify their own problems and possible solutions concerning lifestyle and self-management of diabetes
- Improve quality of life, diabetes control and reduce the risk of developing secondary complications.
**Expert Patient Programme (website www.eppwales.org)**

The Expert Patient Programme (EPP) is a new way of helping people who are living with a long term health condition/s to self-care. EPP courses are based on developing the confidence and motivation of people to use their own skills, available information and professional services to take effective control over living with a long-term health condition. The courses are run over six weekly sessions of 2 ½ hours. The programme is lay-led and each of the tutors have personal experience of living with a long-term condition.

EPP courses are designed to run alongside condition specific patient treatment and education programmes delivered by NHS professionals. It is important to note the following:

- EPP courses are designed to enhance regular treatment and disease specific patient teaching and education programmes delivered by NHS professionals.
- The expertise of NHS professionals is just as important in treatment of chronic disease when people are taking part in EPP.
- EPP courses complement professional programmes by providing information about how people can help themselves.
- The course enables people to learn new skills and to feel confident about taking responsibility for working in partnership with health professionals.

The EPP is now available within each Local Health Board Locality across Wales.

**The National Exercise Referral Scheme**

The National Exercise referral scheme enables health professionals to refer patients to a fully qualified exercise professional for a 16 week structured exercise programme. All the instructors are qualified to meet National standards and are members of the Register of Exercise Professionals. The patient will be able to access a range of exercise opportunities and receive advice on how to build physical activity into their daily lives. A randomised controlled trial is being conducted to determine the effectiveness of the scheme in increasing physical activity levels and improving health alongside a health economy study to determine potential cost savings to the NHS.
Useful Website Addresses

DAFNE www.dafne.uk.com

DESMOND www.desmond-project.org.uk

Expert Patient Programme www.eppwales.org

X-PERT www.xpert-diabetes.org.uk

Diabetes Education Network www.diabetes-education.net/

Education and Self-Management: Bibliography

Carmarthenshire Tool Kit, Example of patient clinic letter;

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Department of Health/Diabetes UK, Structured Education Programme Improvement Tool, August 2006 (adopted in Wales 25th April 2007);

Designed for Life Wales Assembly Government 2005;

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Diabetes UK Position Statement, Involving People with Diabetes in Health Care, January 2003;

Global Guideline for Type 2 Diabetes, International Diabetes Federation 2005 p16-18;

Implementation of an effective outpatient intensive education programme for patients with type 1 diabetes J Everett, MPhil, RGN, E Jenkins, BSc(Hons), D Kerr, MD, FRCP, DACavan, DM, Practical Diabetes International, 2003 Vol 20(2), 51-55;

International Diabetes Federation, Diabetes Guidelines, Self care/patient empowerment, IDF Europe 1998;

National Service Framework for diabetes in Wales Delivery Strategy March 2003 p60;

Global Guideline for Type 2 Diabetes, International Diabetes Federation 2005 p16-18;

Merthyr/Cynon Diabetes Peer Support Programme, Merthyr LHB, Peer Support example of disease specific programme in Wales;

NICE guideline, The Management of Type 2 Diabetes, May 2008;

NICE guideline, Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults, July 2004;
NICE Diabetes (types 1 & 2) Patient Education Models (No. 60): The clinical effectiveness and cost effectiveness of patient education models for diabetes (April 2003) (adopted in Wales 2005);

Pontypridd & Rhondda NHS Trust & Rhondda Cynon Taff Local Health Board, Rhondda Diabetes Annual Review Service (DAReS), Example of patient letter 2003;

Standard 4

Clinical care of adults with diabetes

All adults with diabetes will receive high-quality care throughout their lifetime, including support to optimise the control of their blood glucose, blood pressure and other risk factors known to influence the development of the complications of diabetes

Patients with type 2 diabetes who are deemed to be ‘high risk’ should have a target total cholesterol of <4mmol/l and a target LDL of <2mmol/l.

Prescribers should refer to the British National Formulary (BNF) and Summary of Product Characteristics (SPC) for further information on each drug before they prescribe.
(Standard 4) Clinical Care of Adults with Diabetes

Initial assessment of type 2 Diabetes

Newly diagnosed or known case of type 2 Diabetes (non-pregnant)

Data collection:
Add to diabetes register
history and examination

screen for complications
document other conditions
(Ischaemic Heart Disease
(IHD) renal disease, etc.)

Multiple risk factor management
BP < 140/80
Total cholesterol < 5 mmol/L
LDL cholesterol < 3 mmol/L
HbA1c < 7% (< 6.5% in those with macrovascular disease)
Waist circumference < 94 cm men, < 80 cm women (< 90 cm in Asian men)
Anticipated therapy (if not contraindicated)
Smoking cessation
Screen for retinopathy
Screen for nephropathy
Screen for diabetic foot disease

NICE clinical guidance 66 (May 2008)
When setting target HbA1c:
• involve the person in decisions about their individual target level, which may be above that of 6.5% set for people with type 2 diabetes in general;
• encourage the person to maintain their individual target unless the resulting side effects (including hypoglycaemia) or their efforts to achieve this impair their quality of life;
• offer therapy (lifestyle and medication) to help achieve and maintain the HbA1c target level;
• inform persons with a higher HbA1c that any reduction in HbA1c towards the agreed target is advantageous to future health;
• avoid pursuing highly intensive management to levels of less than 6.5%.

Negotiate self-management priorities with the person with diabetes based on the following checklist of modifiable factors

HbA1c
Fasting and Postprandial glucose targets
Control of BP
Control of Lipids
Waist circumference
Weight
Lifestyle adjustments (Diet, Smoking, Alcohol, Physical Activity)
Guideline for the initial assessment of an adult with type 2 Diabetes

For each person newly diagnosed with type 2 diabetes, or a known case who presents for a first visit, screen for macrovascular and microvascular complications. People with type 2 diabetes may have had diabetes but not known about it for a number of years and may therefore have complications at first presentation. Negotiate an initial management plan with the patient. Consider alternative diagnoses carefully in those presenting less than the age of 25, in those who are lean or who have evidence of possible secondary causes of diabetes.

Data gathering

Gather information about the person with diabetes in a form that is compatible with the current NHS dataset for Diabetes.

Multiple risk factor management

Diabetes is associated with multiple modifiable risk factors for cardiovascular disease and microvascular complications. For the individual person with diabetes there are ideal targets based on current best evidence. These targets are different to the population or audit targets of the new General Medical Services contract which assumes a wide variation in the actual figures achieved. Any treatment target needs to be negotiated with the individual person.
**HbA1c target**

<table>
<thead>
<tr>
<th>Patient group</th>
<th>HbA1c target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most patients</td>
<td>&lt; 7% or individually agreed target</td>
</tr>
</tbody>
</table>

**NICE clinical guidance 66 (May 2008)**

When setting target HbA₁c:
- involve the person in decisions about their individual HbA₁c target level, which may be above that of 6.5% set for people with type 2 diabetes in general;
- encourage the person to maintain their individual target unless the resulting side effects (including hypoglycaemia) or their efforts to achieve this impair their quality of life;
- offer therapy (lifestyle and medication) to help achieve and maintain the HbA₁c target level
- inform a person with a higher HbA₁c that any reduction in HbA₁c towards the agreed target is advantageous to future health
- avoid pursuing highly intensive management to levels of less than 6.5%.

See the glycaemic control guideline for more information on achieving the target HbA₁c (Page 50-56).

**Self-monitoring of blood glucose**

See the self-monitoring of blood glucose guideline for more information on who should test and when they should test (page 50).

A fasting blood glucose target is useful for titrating basal insulin doses in people with Type 2 diabetes converting to insulin. There is growing evidence that reducing 2 hour post-prandial blood glucose is beneficial in patients with diabetes (IDF Guidelines, 2007).

**BP target**

Most patients with diabetes suffer cardiovascular complications and the most important modifiable risk factor for reducing this risk is blood pressure. When hypertension has been confirmed, antihypertensive drugs should be started and a BP target of < 140/80 should be adopted. This is likely to require several drugs in combination.

See the BP control guideline for more information on achieving the target BP (page 60-63).
**Lipids**

Modifying lipids, in particular LDL cholesterol is beneficial in people with diabetes. The targets are a total Cholesterol < 4 mmol/l and LDL cholesterol < 2 mmol/l (if 'high risk') or a 30% reduction in LDL cholesterol with treatment whichever achieves the lowest value.

See the diabetic dyslipidaemia guideline for more information on achieving lipid targets (page 64-66).
Glycaemic control guideline for adults with type 2 diabetes

- **Self-monitoring of blood glucose (SMBG)**

**Self-monitoring of Blood Glucose (SMBG)**
The rationale for and a precise monitoring plan needs to be discussed with each patient as part of their management.

**General advice:**
- Can help reduce short term and long term complications
- Supportive evidence from trials in type 1 and type 2 diabetes
- Encourages patient empowerment

**SMBG:**
- Usefulness during illness or treatment changes
- More reliable than subjective measures
- Not as reliable a guide to overall glycaemic control as HbA1c
- Essential before driving long distance

### Type 1 Diabetes

- SMBG is an integral part of management
- Education required for dose adjustment based on blood glucose results
- The majority should consider a ≥4 daily regimen of SMBG
- Increased frequency when risk of emergencies

### Diabetic pregnancy

- Type 1 and type 2 requiring insulin during pregnancy should have a ≥4 daily regimen.
  - Frequency may be higher in first trimester when risk of hypoglycaemia is greatest.
  - Diet controlled diabetes may also require ≥4 daily regimen.

### Type 2 Diabetes

<table>
<thead>
<tr>
<th>Intensive Insulin regimen</th>
<th>Type 2 Diabetes</th>
<th>Conventional Insulin regimen</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥4 daily regimen</td>
<td>Same as for type 1 Diabetes - ≥4 daily regimen. Daily fasting glucose required during titration of basal insulin. Postprandial glucose (2 hr) required for titration of meal related insulin. Stable control - 2 or 3 times per week, at varying times. Unstable control - at least once a day at varying times. Daily fasting glucose required during titration of basal insulin. At least once a day at varying times. Daily fasting glucose required during titration of basal insulin.</td>
<td>Stable control - 2 or 3 times per week, at varying times. Unstable control - at least once a day at varying times. Daily fasting glucose required during titration of basal insulin. At least once a day at varying times. Daily fasting glucose required during titration of basal insulin.</td>
</tr>
</tbody>
</table>

### Type 2 Diabetes

<table>
<thead>
<tr>
<th>Combined Insulin and Oral Hypoglycaemic treatment</th>
<th>Type 2 Diabetes</th>
<th>Diet &amp; Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypoglycaemia may be more common than assumed and SMBG will help reveal this - monitoring may be needed to adjust lifestyle changes and/or dose of secretagogue.</td>
<td>No need for routine monitoring. Glycaemic control best managed with HbA1c. Informed patients may use SMBG for certain periods to monitor lifestyle changes and need for oral hypoglycaemic agents.</td>
<td>No need for routine monitoring. Glycaemic control best managed with HbA1c. Informed patients may use SMBG for certain periods to monitor lifestyle changes or when needed to adjust oral medication or commence insulin therapy.</td>
</tr>
</tbody>
</table>

### Type 2 Diabetes

<table>
<thead>
<tr>
<th>Secretagogues</th>
<th>Type 2 Diabetes</th>
<th>Diet &amp; Physical Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>No need for routine monitoring. Glycaemic control best managed with HbA1c. Informed patients may use SMBG for certain periods to monitor lifestyle changes or when needed to adjust oral medication or commence insulin therapy.</td>
<td>No need for routine monitoring. Glycaemic control best managed with HbA1c. Informed patients may use SMBG for certain periods to monitor lifestyle changes and/or dose of secretagogue.</td>
<td>No need for routine monitoring. Glycaemic control best managed with HbA1c. Informed patients may use SMBG for certain periods to monitor lifestyle changes and/or dose of secretagogue.</td>
</tr>
</tbody>
</table>
Newly Diagnosed Type 2 Diabetes:

**Persons with newly diagnosed type 2 diabetes**
Assess patient’s psychosocial situation and lifestyle - see initial assessment guideline

**Lifestyle interventions plus**
Start metformin and titrate gradually over several weeks to maximum tolerated dose (2g per day);
Consider trial of extended absorption metformin if G.I. intolerance.

**Monitor HbA1c every 3 months until HbA1c <7% then at least 6-monthly if stable**
(or 3-monthly if change in treatment)

**Target HbA1c is <7% avoid pursuing highly intensive management to levels of <6.5%**

If metformin poorly tolerated or contra-indicated or glycaemic targets not achieved and if HbA1c target not achieved (min. 3 months)

**Options for treatment to vary according to individual circumstances.**
- Insulin secretagogues (Sulphonylureas)
- Thiazolidinediones (glitazones)
- GLP-1 mimetic (exenatide)
- DPP-IV inhibitors (gliptins)
- Insulin
Glycaemic control in adults with type 2 Diabetes

Undertake an initial assessment and decide target HbA1c - see Initial Assessment of Adults with Type 2 Diabetes guideline (page 46-49).

Type 2 Diabetes is a progressive disease which generally requires more intensive treatment to control hyperglycaemia as time progresses. The following stages indicate the therapies available as the disease progresses. In all cases consult the BNF for guidance on contraindications, adverse effects, drug interactions, dosing and titration.

Measure the HbA1c every 3 - 6 months. At each stage, if the glycaemic target is not met, then address the Diet and Lifestyle changes outlined on pages 9-18 and consider progressing therapy to the next Stage.

Patient empowerment

Patients should be empowered with appropriate information and education to encourage them to manage their own diabetes (see standard 3).

Employing empowerment techniques such as:
- Documentation of ‘self-management goals’
- Use of counselling techniques such as ‘motivational interviewing’ and helping individuals through the ‘stages of change’

Glucose control therapies

Stage 1

Metformin is normally the first choice oral therapy when blood glucose is inadequately controlled by lifestyle interventions alone. If metformin is not tolerated because of GI side effects, a trial of the extended absorption preparation should be considered. Metformin is contraindicated in renal impairment or where there is a risk of sudden renal impairment.

Insulin secretagogues should be considered as an alternative first line therapy if the person is not overweight or is unable to take metformin or if a rapid response is required because of hyperglycaemic symptoms.
Stage 2

Consider second line therapy - insulin secretagogues, thiazolidinediones (glitazones) or basal insulin therapy. The newer class of incretins may also be considered.

Metformin therapy to be continued provided it is well tolerated and not contraindicated.

Sulphonylureas

Prescribe a sulphonylurea (not glibenclamide) in addition to metformin when an insulin secretagogue is indicated. Educate the patient about the potential risk of hypoglycaemia, particularly if the person has renal impairment. Consider a rapid-acting secretagogue for persons with erratic lifestyles. Offer a once daily sulphonylurea if adherence is a problem.

Thiazolidinediones (glitazones)

Consider adding a thiazolidinedione to:

- The combination of metformin and a sulfonylurea if insulin therapy is likely to be unacceptable because of employment, social or recreational issues related to putative hypoglycaemia, injection anxieties, other personal issues, or obesity/metabolic syndrome
- A sulfonylurea if metformin is not tolerated
- Metformin, substituting the glitazone for the sulfonylurea only where the person’s employment or other issues make the risk of hypoglycaemia with sulfonylurea particularly significant

Glitazones are associated with increased risk of fluid retention, congestive heart failure (CHF) and fractures. Rosiglitazone, but probably not pioglitazone, may be associated with an increased risk of myocardial infarction. Both rosiglitazone and pioglitazone have been linked to an increased risk (approximately double) for fluid retention and CHF. Therefore, do not start or continue a glitazone if the person has evidence of CHF or is at higher risk of fracture. The increased risk of CHF does not warrant their removal as one of the possible second step medications, given that they cause less hypoglycaemia than some of the other second-step drugs.

Both rosiglitazone and pioglitazone have been associated with increased risk of fractures, mostly in the distal extremities. There is at present no definitive evidence
regarding increased or decreased risk of myocardial infarction with the two thiazolidinediones. The clinician should consider carefully whether to use this class of drug versus insulin or sulphonylureas as the second step.

Warn a person prescribed a thiazolidinedione about these potential risks and advise on the action to take if they develop. Do not commence or continue a thiazolidinedione in people who have evidence of heart failure, or who are at higher risk of fracture. When selecting a thiazolidinedione for initiation and continuation of therapy, take into account up-to-date advice from the relevant regulatory bodies (the European Medicines Agency and the Medicines and Healthcare products Regulatory Agency), cost and safety issues. Note that only pioglitazone can be used in combination with insulin therapy.

Combination oral therapy with metformin plus an insulin secretagogue, metformin plus a glitazone or an insulin secretagogue plus a glitazone is indicated when glycaemic control is inadequate on monotherapy. Triple therapy using a combination of all these drugs is a possible alternative option to starting insulin if glycaemic control is inadequate on dual therapy.

**Incretin agents**

A GLP-1 mimetic (exenatide) should be considered as an option in people inadequately controlled on combination therapy whose BMI is >35kg/m² in those of Caucasian descent (adjust as appropriate for other ethnic groups) and have specific psychological, biochemical or physical problems arising from high body weight, have inadequate glucose control on conventional oral agents after a trial of metformin and sulphonylurea and would otherwise start other high cost medication such as glitazones or insulin. Continue exenatide only if HbA1c is reduced by ≥1% in 6 months and weight loss is ≥5% at 1 year.

**DPP-IV inhibitors (gliptins)** These are black triangle drugs. The place of these agents in therapy has not been established. They may be suitable as alternative second line therapies in combination with metformin in those with 1) a previous history or future high risk of hypoglycaemia on insulin secretagogues, and 2) as a possible preferred option to glitazones but please refer to current NICE guidance.

**Insulin**

Adding insulin to the treatment of an adult with type 2 diabetes should be individualised. It should take account of the individual’s lifestyle and wishes, their technical abilities and local expertise within an agreed local policy.
Patients should be counselled on the benefits of insulin treatment, that frequent SMBG is required and that there is a significant risk of hypoglycaemia.

When the HbA1c target is still not achieved then re address lifestyle advice, assess and encourage compliance with oral medications and consider referral to secondary care. The following are suggested insulin initiation regimens.

**Basal insulin option**

This is particularly useful for patients with high fasting glucose measurements: Preference is to begin with Neutral Protamine Hagedorn (NPH) on a once or twice daily injection regimen. Patients should **continue to take metformin and insulin secretagogues**, and consider continuing pioglitazone for its insulin sparing effect. The insulin secretagogue dose may need to be reduced or the short acting secretagogue stopped if mealtime insulin is also given to prevent hypoglycaemia. Although pioglitazone is now licensed for use with insulin, this combination increases fluid retention and can be associated with heart failure and ideally should be discussed with an appropriately experienced clinician.

Consider a once daily long-acting insulin analogue if the person requires assistance to administer insulin injections or has significant episodes of hypoglycaemia, especially nocturnal hypoglycaemia.

Titration of the basal insulin should be according to a locally agreed treatment algorithm. If HbA1c remains over target (e.g. 7%) and/or experiencing hypoglycaemia then consider introduction of a mealtime (bolus) insulin.

**Basal Bolus option**

This is the addition of one, two or more mealtime short-acting insulin doses to a basal insulin regimen. It is useful for patients who have controlled their fasting blood glucose with a basal titration regimen who need additional mealtime cover if HbA1c >7% and 2 hour post prandial glucose measurements are consistently over 7.8 mmol/l. Patients should **continue to take metformin** but stop taking insulin secretagogues when introducing a meal time insulin.

**Pre-mixed insulin option**

This usually consists of two, or sometimes more, daily doses of pre-mixed insulin where HbA1c is >9%. A once daily regimen may be an option when starting therapy. Consider a premixed insulin analogue rather than pemixed human insulin preparations when insulin injection before a meal is preferred, hypoglycaemia is
a problem or there are marked postprandial blood glucose excursions. Premixed insulins are particularly useful for patients with stable lifestyles and those who would be less capable of managing a basal bolus regimen. Patients should continue to take metformin but stop taking insulin secretagogues.
Glycaemic control in adults with type 1 diabetes

New presentation or referral of type 1 diabetes?

Confirm diagnosis

Data collection:
Add to diabetes register; 
Take history and examination; 
Initiate screening for complications 
when indicated.

Support:
Reinforce lifestyle advice at every opportunity; 
Recognise and support psychological or social issues.

Insulin prescription
Treatment should be individualised and take account of individuals’ lifestyle, wishes and technical abilities. Different types of insulin are available.

Structured education
All patients should receive structured education and referral to a dietitian. 
See Standard 3 (page 27) and Diet & Lifestyle (page 9-18)

Glycaemic targets
Agree HbA1c target and, where possible, fasting and postprandial blood glucose targets.

Treatment failure
Review lifestyle advice, social circumstances and education requirements.

Recurrent hypoglycaemia
Consider referral for CSII pump therapy

Recurrent DKA
Support
Consider psychological and/or social support requirements

CSII pump
Consider referral for CSII pump therapy
Guidelines for the glycaemic control of adults with type 1 Diabetes

Insulin Prescription

Treatment should be individualised and take account of the person’s lifestyle, wishes and technical abilities. Multiple insulin injection regimen, in adults who prefer them, should be used as part of an integrated package of which education, food and skills training should be integral parts.

Patients should be counselled about the benefits of regular SMBG and how to prevent and treat hypoglycaemia.

Treatment options - insulin types

Different types of insulin are available for use:

- Short-acting insulins: these have an onset of action of 30 - 60 minutes and a duration of action of 8 - 10 hours;
- Rapid-acting insulin analogues: these aim to work like insulin normally produced to cope with a meal; they have an onset of action within approximately 15 minutes and a duration of action of 2 - 5 hours;
- Intermediate-acting insulins: these have an onset of action of approximately 1 - 2 hours, maximal effects between 4 and 12 hours and a duration of action of 16 - 24 hours;
- Long-acting insulin analogues: these can last for a longer period than intermediate -acting insulins; they are normally used once a day and achieve a steady-state level after 2 - 4 days to produce a constant level of insulin;
- Biphasic insulin is a mixture of rapid-acting insulin analogue or short-acting insulin together with intermediate-acting or long-acting insulin.

Target HbA1c <6.5%. SMBG is essential to arrive at the best level of control whilst minimising the risk of hypoglycaemia.

Tight glycaemic control may increase risk of hypoglycaemia.

Analogue insulins have a lower incidence of hypoglycaemia.
**CSII pump**

Continuous Subcutaneous Insulin Infusion (CSII) is an option for those in whom it has been impossible to maintain the HbA1c level ≥7.5% (or 6.5 % in the presence of microalbuminuria or features of the metabolic syndrome) without disabling hypoglycaemia. ‘Disabling hypoglycaemia’ is defined by NICE as “repeated and unpredictable occurrence of hypoglycaemia requiring third-party assistance that results in continuing anxiety about recurrence and is associated with significant adverse effect on quality of life.”

Refer to centres with CSII expertise available in Wales.

**Psychological or social support**

Patients requiring recurrent admissions to hospital, typically with Diabetic Ketoacidosis (DKA), are likely to require multi-agency support. See Standard 12.
Blood Pressure (BP) control

If BP exceeds 140/80 mmHg during at least two clinic visits, offer incremental treatment at 1 - 3 monthly intervals to meet the appropriate BP target

**Review medication** that increases BP (e.g. NSAIDs and tablets containing sodium)

Offer advice to help smokers **stop smoking**

**Lifestyle advice**
- Balanced, low fat diet rich in fruit and vegetables
- Reduce salt intake
- Reduce caffeine intake
- Reduce alcohol consumption
- Increase physical activity
- Weight reduction

**Target BP < 140/80 mmHg**
(If kidney, eye or cerebrovascular damage present then target is <130/80 see diabetic Kidney Disease Section).

Discuss treatment options and confirm compliance with patient during all stages of management

**Step 1**

\[ A^* \]

**Step 2**

\[ A + C \]

**Step 3**

\[ A + C + D \]

**Step 4**

Resistant Hypertension
Add B or spironolactone or an alpha blocker or furosemide

Exception report and refer to Secondary Care

Monitor blood pressure every 3 to 6 months, when control is established, or more frequently if clinically indicated

<table>
<thead>
<tr>
<th>A: ACE inhibitor/A2RB</th>
<th>B: Beta-blocker</th>
</tr>
</thead>
<tbody>
<tr>
<td>C: Calcium channel blocker</td>
<td>D: Diuretic (thiazide usually bendroflumethiazide)</td>
</tr>
</tbody>
</table>

*At step 1: 'A' preferred if patient has evidence of microalbuminuria or proteinuria 'D' or 'C' preferred in Afro-Caribbean patients. If there is a possibility of the person becoming pregnant, start with 'C'.*
**BP Control in adults with diabetes**

Patients with a BP of >140/80 (or >130/80 with evidence of end organ damage) should be offered intensified lifestyle advice in addition to the initiation of drug therapy. The treatment target when drug therapy has been initiated is 140/80. If kidney, eye or cerebrovascular damage present, set target at 130/80.

**BP Monitoring**

Blood pressure measurements can be made in the clinic, home setting or using ambulatory blood pressure monitoring (ABPM). When considering home BP readings and ABPM results are normally lower than clinic measurements and targets should therefore be adjusted.
## Compelling Indications and Contra-Indications for Anti-Hypertensive Drugs

<table>
<thead>
<tr>
<th>Class</th>
<th>Class of Anti-hypertensive Agent</th>
<th>Compelling Indication</th>
<th>Compelling Contra-indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha-blockers</td>
<td>Benign prostatic hypertrophy</td>
<td>Urinary incontinence, heart failure</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>ACE inhibitors</td>
<td>Heart failure, left ventricular dysfunction post MI or established coronary heart disease, nephropathy, secondary stroke prevention**</td>
<td>Renovascular disease*, hyperkalaemia</td>
</tr>
<tr>
<td>Angiotensin II receptor (A2RB) antagonists</td>
<td>Cough induced by ACE inhibitor</td>
<td>Renovascular disease*, hyperkalaemia</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Beta-blockers</td>
<td>Angina, myocardial infarction, heart failure post myocardial infarction</td>
<td>Asthma, COPD, heart block</td>
</tr>
<tr>
<td>C</td>
<td>Calcium channel blockers (dihydropyridine)</td>
<td>Older patients (≥ 55 years), isolated systolic hypertension</td>
<td></td>
</tr>
<tr>
<td>Calcium channel blockers (rate limiting)</td>
<td>Angina</td>
<td>Heart block, heart failure</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Thiazide diuretics</td>
<td>Older patients (≥ 55 years), isolated systolic hypertension, heart failure, secondary stroke prevention</td>
<td>Gout ***</td>
</tr>
</tbody>
</table>

* ACE inhibitors and angiotensin II receptor antagonists (A2RB) are sometimes used in patients with renovascular disease under specialist supervision. (Also see guideline on Diabetic Kidney Disease)

** In combination with a thiazide diuretic.

*** Thiazide diuretics may be necessary to control blood pressure in people with a history of gout, ideally used in combination with allopurinol.
Prescribing notes

- Titrate all drugs except bendroflumethazide (2.5mg daily) to a maximum tolerated dose before moving to the next step in the guidelines.

- If at any step the recommended drug class is contra-indicated or not considered appropriate, by-pass that step and move onto the next step.

- Refer to BNF (www.bnf.org) or Summary of Product Characteristics (http://emc.medicines.org.uk) for information on dosage, interactions, adverse events, cautions and precautions.

- Fixed dose combination therapies should not be considered for the initial management of blood pressure (step 1). They should only be considered at steps 2, 3 or 4 if compliance is a problem but it should be noted that in many instances the fixed dose combination therapy will be more expensive than the individual components.

Exception Reporting and Referral to Secondary Care

It should be appreciated that despite adopting best practice as outlined in this guideline, it may be difficult to achieve the specified targets in some patients with diabetes. In resistant cases of hypertension where a combination of three or more therapies does not generate an acceptable reduction in blood pressure, exception reporting and referral to Secondary Care is recommended. Always consider poor compliance as a reason for treatment failure and counsel patients accordingly.
Control of blood lipids (dyslipidaemia) in adults with diabetes

Who to treat with a statin?

1) All those with type 1 or type 2 diabetes ≥ 40 years
2) Those with type 1 or type 2 diabetes aged 18 - 39 years with at least one of the following:
   - Retinopathy (pre-proliferative/proliferative DR, maculopathy)
   - Nephropathy including persistent microalbuminaemia
   - HbA1c ≥ 9%
   - Hypertension
   - Total cholesterol ≥ 6.0 mmol/l
   - Features of metabolic syndrome
   - Family history of premature cardiovascular disease in first degree relative
3) Those at ‘high’ risk - e.g. see Diabetic Kidney disease section

Lifestyle: work with patient to:
Make healthy dietary change and increase physical activity
stop smoking and moderate alcohol

Monitor lipids every 12 months (or every 3 months after change in therapy)

Targets: Total Cholesterol < 4 mmol/l, LDL Cholesterol < 2 mmol/l (in line with current NICE guidance).
Start with simvastatin 40mg as per NICE guidance; if target not achieved titrate the dose to 80mg daily.

If statin not tolerated.
Consider fibrate or ezetimibe monotherapy if there is existing or newly diagnosed CV disease or increased albumin excretion rate.
HDL-C should not exceed 1.4 mmol/l

If LDL target not achieved after dose titration.
Change statin or combine with ezetimibe if there is existing or newly diagnosed CV disease or increased albumin excretion rate.
HDL-C should not exceed 1.4 mmol/l
Guideline for control of blood lipids (dyslipidaemia) in adults with type 1 and type 2 diabetes

Who to treat?

In people with diabetes statin therapy is recommended for:

- all those who are aged 40 years or more with either type 1 or 2 diabetes, and
- for people aged 18-39 years with either type 1 or 2 diabetes and who have at least one of the following:
  - retinopathy (pre-proliferative/proliferative DR, maculopathy)
  - nephropathy, including persistent microalbuminuria
  - poor glycaemic control (HbA1c > 9%)
  - elevated blood pressure requiring antihypertensive therapy
  - raised total blood cholesterol (> 6.0 mmol/l)
  - features of metabolic syndrome (central obesity and fasting triglyceride > 1.7 mmol/l (non-fasting > 2.0 mmol/l) and/or HDL cholesterol < 1.0 mmol/l in men or < 1.2 mmol/l in women)
  - family history of premature CVD in a first degree relative.
- those at ‘high’ risk - see Diabetic Kidney disease targets section.

Total cholesterol and LDL cholesterol targets are the main priority

<table>
<thead>
<tr>
<th>Targets</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>total cholesterol &lt; 4 mmol/l (as per current NICE guidance)</td>
<td>Statin/fibrate/ezetimibe</td>
</tr>
<tr>
<td>LDL cholesterol &lt; 2 mmol/l</td>
<td>or combination treatment</td>
</tr>
<tr>
<td>OR</td>
<td>see algorithm</td>
</tr>
<tr>
<td>A 30% reduction in LDL cholesterol with treatment - whichever achieves</td>
<td>‘High’ risk patients - see Diabetic Kidney</td>
</tr>
<tr>
<td>the lowest level</td>
<td>Disease targets</td>
</tr>
</tbody>
</table>
If already on a statin titrate the statin dose. If statin dose not tolerated consider changing the type of statin.

If still not controlled then consider statin plus ezetimibe combination therapy.

If statins not tolerated then consider a fibrate or ezetimibe monotherapy.

**Treatment of HDL cholesterol and triglyceride levels**

Other classes of lipid lowering drugs (fibrates, bile acid sequestrants, cholesterol absorption inhibitors, nicotinic acid, omega-3 fatty acids) should be considered in addition to a statin if the total and LDL cholesterol targets have not been achieved, or if other lipid parameters such as HDL cholesterol or triglycerides need to be addressed.

**Preferred HDL cholesterol (> 1 mmol/l in men > 1.2 mmol/l in women)**

- add fibrate combination therapy
- if fibrate not tolerated then add nicotinic acid combination therapy
  (nicotinic acid may be associated with a small deterioration in glycaemic control)

**Preferred fasting triglycerides (< 1.7 mmol/l)**

- Readdress glycaemic control and offer dietary advice.
- Add fibrate therapy
- If fibrate not tolerated consider Omega-3 fatty acids therapy

The evidence for combination therapy in dyslipidaemia is not as robust as that for statin therapy.

1. Nathan DM et al, Management of Hyperglycaemia in Type 2 Diabetes: A Consensus Algorithm for the Initiation and Adjustment of Therapy, Diabetologia 2006; (49) 1711-1721.


Standard 5

Clinical care of children and young people with diabetes

All children and young people with diabetes will receive consistently high-quality care and they, with their families and others involved in their day-to-day care, will be supported to optimise the control of their blood glucose and their physical development.

Standard 6

All young people with diabetes will experience a smooth transition of care from paediatric services to adult diabetes services, whether hospital or community based, whether directly or via a young people’s clinic. The transition will be organised in partnership with each individual and at an age appropriate to and agreed with them.

Standards 5&6 are published as a separate document:

“Designed for the Management of Type 1 Diabetes in Children and Young People in Wales”

Consensus Guidelines - Standards 5 & 6 Diabetes National Service Framework
Standard 7

Management of Diabetic Emergencies

The NHS will develop, implement and monitor agreed protocols for rapid and effective treatment of diabetic emergencies by appropriately trained health care professionals. Protocols will include the management of acute complications and procedures to reduce the risk of recurrence.
# Standard 7: Management of Diabetic Emergencies of Hypoglycaemia in a person with diabetes

## Person with suspected hypoglycaemia

**Symptoms:** hunger, sweating, palpitations, sweating, 'pins and needles' in lips and tongue, headache, tremor, anxiety, double vision, difficulty in concentration, confusion, vivid dreams, nightmares, seizures, unconsciousness.

**Findings:** if possible check capillary blood glucose to confirm hypoglycaemia

### Mild
- Tremor, anxiety, sweating, headache, palpitations and/or glucose < 4 mmol/l

### Moderate
- Behavioural change: confusion, drowsiness, slurred speech and/or glucose < 2.2 mmol/l

### Severe
- Unconscious or unresponsive, very aggressive, seizures and/or glucose < 1.5 mmol/l

## Mild

- Take lucozade, glucose tablets, followed by carbohydrate snack or meal.
- If able to swallow fruit juice, lucozade, Glucoshot, hypostop into mouth between cheek and gum followed by carbohydrate snack or meal

## Moderate

- Check airway, breathing and circulation
- **IV glucose** (if available)
  - 25g (use either 10, 20 or 50% dextrose) or
- **IM glucagon (GlucaGen®)** 1mg
  - (be aware of nausea/vomiting)
  - Followed by carbohydrate snack or meal when fully alert

## Severe

- Do not Overtreat

## If deteriorates admit to hospital

- Monitor blood glucose, review possible causes and follow-up plan

---

*Glucagon (GlucaGen®) is not suitable for all people with diabetes who suffer hypoglycaemia and is ineffective for individuals who experience repeated and frequent episodes of hypoglycaemia. It should not be used for people on sulphonylureas.*
Hypoglycaemia in people with diabetes

Introduction

Hypoglycaemia is a disabling condition affecting people with diabetes who take medication that directly lowers blood glucose such as sulphonylureas and especially insulin. The threshold for the onset of hypoglycaemic signs and symptoms can vary between individuals and is related to the overall level of glycaemic control and the duration of diabetes. People on intensive insulin regimens to manage their glycaemic control to tight targets are more prone to hypoglycaemia.

Furthermore, reduced awareness can be linked to alcohol consumption, beta blockers and the presence of autonomic neuropathy. A hypoglycaemic event is characterised by a blood glucose level ≤ 4 mmols/l regardless of the presence of any symptoms.

Signs and symptoms of hypoglycaemia

Autonomic (resulting from activation of the sympathetic nervous system)

- sweating;
- tachycardia;
- tremor;
- hunger.

Neuroglycopenic (resulting from impaired brain function due to lack of glucose)

- confusion;
- difficulty speaking;
- visual disturbances;
- atypical behaviour.
Correlation of symptoms and plasma glucose

<table>
<thead>
<tr>
<th>Plasma Glucose</th>
<th>Most common symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early (3.2 - 2.8 mmol/l)</td>
<td>Autonomic symptoms: difficulty in thinking, odd behaviour, headache, visual changes</td>
</tr>
<tr>
<td>Late (&lt;2.8 mmol/l)</td>
<td>Neuroglycopenic symptoms: drowsiness, confusion, speech difficulties</td>
</tr>
<tr>
<td>Severe (&lt;1.5 mmol/l)</td>
<td>Unconsciousness, unresponsiveness, aggression, coma, convulsions</td>
</tr>
</tbody>
</table>

Hypoglycaemia may also occur during sleep and is characterised by:
- vivid dreams or nightmares;
- unexplained sweating;
- feeling tired, irritable or confused on awakening.

Hypoglycaemia at night may go unnoticed by the person with diabetes but clues to the presence of nocturnal hypoglycaemia include reports from family members of the person having disturbed sleep and the evidence of raised fasting blood glucose in the morning.

Management of hypoglycaemia

The more severe the degree of hypoglycaemia the more urgent and aggressive the treatment should be. Blood glucose measurements should be always be recorded if possible.

Mild hypoglycaemia - blood glucose < 4 mmol/l

Individual conscious and co-operative:

Take 100ml full sugar drink e.g. Lucozade® or 3-4 glucose tablets e.g. dextrosol or glucotabs or 4-5 jelly babies or fruit pastilles.

If possible test blood glucose level 10-15 minutes after initial treatment (if not, monitor symptoms). If blood glucose is not >4mmol/l repeat the above process. Once blood glucose level is >4mmol/l ensure this is followed up with a complex carbohydrate snack, e.g. large banana or thick slice of bread.

Chocolate, or milk and sugar should not be given as the protein and fat content of the chocolate or milk will delay the absorption of glucose.
Even if there are no symptoms, glucose followed by a complex carbohydrate snack should be taken.

It is important not to over treat mild hypoglycaemia as the blood glucose level may rise sharply and cause symptoms of hyperglycaemia.

**Moderate hypoglycaemia - blood glucose < 2.2 mmol/l**

This level of hypoglycaemia is likely to be associated with behavioural change, confusion, slurred speech, drowsiness.

If the person is able to swallow then treatment can be provided as above. However, if the individual is not co-operative or semi-conscious GlucoGel can be used by placing the contents of one tube between the cheek and gum. Wait ten minutes, if no improvement repeat process, if the condition deteriorates call for medical assistance.

Glucagon 1mg injected intramuscularly (IM) or subcutaneously (SC) can be administered for those with type 1 diabetes (it is not recommended for those with type 2 diabetes as it stimulates further pancreatic insulin release). For those who are unable to swallow, unless they have a PEG or nasogastric tube, they should be managed as for severe hypoglycaemia (see below).

**Severe hypoglycaemia - blood glucose < 1.5 mmol/l**

This is a medical emergency as there is a risk of seizures and unconsciousness with the additional risk of complications of aspiration and injury. People with this level of hypoglycaemia would usually be unresponsive or unconscious and they may be very aggressive or have seizures. Treat urgently with intravenous glucose 25g (use either 10, 20 or 50% dextrose).

Where intravenous access is not available, or the person with diabetes is being assisted by a family member, then glucagon (GlucaGen®) 1mg can be given intramuscularly (Relatives or carers should be educated regarding the preparation and administration of glucagon and be made aware of the side effects).

**Be aware of the risk of nausea and vomiting following administration of GlucaGen® which can be hazardous if the person is not fully alert.**

Following treatment a complex carbohydrate snack e.g. large banana or thick slice of bread or a meal containing complex carbohydrate should be taken to avoid the recurrence of hypoglycaemia. Transfer to hospital for further management is advised.
Reviewing possible causes of hypoglycaemia

Following treatment an assessment should be made of the possible causes of hypoglycaemia. Consider referral to the DSN and dietitian.

Possible precipitating factors include:

- **Meals may have contained insufficient carbohydrate**, been missed or delayed. Excessive doses of insulin or oral hypoglycaemic agents may have been prescribed or taken. Nutritional advice may be required and/or adjustment of therapy.

- **Increased, especially unaccustomed physical activity.** People with diabetes should be educated about the risks of hypoglycaemia following excessive exercise and the need to adjust their treatment regimens according to their activity.

- **Excessive alcohol** can cause hypoglycaemia especially the morning after, which can occur up to mid day. People taking insulin should drink no more than three units for a man and no more than two units for a woman per day (see moderate alcohol consumption page 12).

- If drinking alcohol people with diabetes taking insulin should be advised
  - never to drink alcohol prior to eating a meal
  - never omit bedtime snack
  - never drink and drive

Additional advice should be tailored to the individual.

- **Renal or liver disease** increase the risk of hypoglycaemia and a full assessment of the person with diabetes is required if a new episode of hypoglycaemia occurs

- Unexplained hypoglycaemia can occur during the first trimester of pregnancy and may be the first indication that a young woman with diabetes may be pregnant

- **Surgery, trauma infection or stress** can also make hypoglycaemia more likely

- **Weight loss** will increase the likelihood of hypoglycaemia and will therefore necessitate changes in medication requirements of a person with diabetes
• In a person with unexpected weight loss and hypoglycaemia it is important to consider other causes such as malignancy, chronic disease and malabsorption. Coeliac disease and Addison’s disease are more common in people with type 1 diabetes

• Fictitious hypoglycaemia is a possibility that needs to be considered and psychological support provided when required

• Unawareness of hypoglycaemia may occur in people with diabetes. Additional education and management plans may be required to reduce the risk

**Reassess management plan**

Following an episode of hypoglycaemia it is important to reconsider the treatment targets in view of the person’s particular circumstances. There is an increased risk of injury during a hypoglycaemic episode particularly in people who are physically active and in the older person who is more at risk of fracture.

All people with diabetes at risk of hypoglycaemia or lack of awareness of hypoglycaemia should be warned not to drive or operate machinery.
Guideline on the management of diabetic emergencies: Acute hyperglycaemia (DKA and HONK)

**Person at risk**
Acute illnesses (e.g. infection, diarrhoea, vomiting)
Raised blood glucose
Missed insulin doses
Older person with undiagnosed/newly diagnosed diabetes.

All people with diabetes should have advice on **sick-day management**.
- When to contact the diabetes team
- Blood glucose goals and when to use supplementary insulin (if prescribed)
- Insulin (if prescribed) should NEVER be stopped although its dose may need adjusting
- Managing fever and treating infection
- Easily digestible liquid diet containing carbohydrates and salt
- Maintain fluid intake - avoid dehydration

**Hyperglycaemia only**
- Frequent glucose monitoring
- Check for ketones
- Watch for warning signs - drowsiness, abdominal pain, rising blood glucose, inability to drink, breathlessness
- If on insulin pump ensure access to needles and syringes for insulin in case of pump failure

**Diabetic Ketoacidosis (DKA) or Hyperosmolar non-ketotic coma (HONK)**
- Check airway, breathing and circulation
- Intravenous (IV) access
- Supplementary insulin
- Refer Specialist Diabetes team/Emergency Department
- Involve Obstetric team if pregnant
- Manage as per local Guidelines

Reassess management plan for glycaemic control
Hyperglycaemia in people with diabetes

Hyperglycaemic crisis is an important cause of morbidity and mortality in people with diabetes. It is possible to prevent deterioration to diabetic ketoacidosis (DKA) or hyperosmolar non-ketotic hyperglycaemia (HONK) if the ‘at risk’ person is identified early and managed appropriately.

Sick day rules

All people with diabetes should have advice on the management of their diabetes during acute illness. This should include information on what symptoms or readings should prompt the person to contact the diabetes team. It should also include a strategy for adjusting insulin doses during illness. All patients on insulin should be told of the importance of NOT stopping insulin during an acute illness. People with diabetes and their relatives should also know how to manage fever, recognise infection and maintain fluids and nutrition through illness.

Differentiating DKA from HONK

There are two major types of hyperglycaemic crisis in people with diabetes. The risk factors associated with each type, and the management is different. (See following table will help differentiate types of hyperglycaemia.) Remember that people with diabetes may have acidosis for reasons other than DKA and it is important not to delay involving the specialist diabetes team.

<table>
<thead>
<tr>
<th></th>
<th>Hyperglycaemia</th>
<th>Mild DKA</th>
<th>Moderate DKA</th>
<th>Severe DKA</th>
<th>Hyperosmolar non-ketotic coma (HONK)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma glucose (mmol/l)</td>
<td>≥ 15</td>
<td>≥ 15</td>
<td>≥ 15</td>
<td>≥ 15</td>
<td>≥ 30</td>
</tr>
<tr>
<td>Arterial pH</td>
<td>&gt; 7.30</td>
<td>7.25-7.30</td>
<td>7.00-7.24</td>
<td>&lt; 7.00</td>
<td>&gt; 7.30</td>
</tr>
<tr>
<td>Ketones</td>
<td>Variable</td>
<td>Positive</td>
<td>Positive</td>
<td>Positive</td>
<td>Small</td>
</tr>
<tr>
<td>Mental state</td>
<td>Alert</td>
<td>Alert</td>
<td>Alert/drowsy</td>
<td>Stupor/coma</td>
<td>Stupor/coma</td>
</tr>
</tbody>
</table>
Key features of DKA are polyuria, thirst, weight loss, and nausea. Coma may occur but is rare (< 10%). Be aware of abdominal pain especially in the younger person. Other signs that may be present include dehydration, hypothermia, tachycardia, hyperventilation (Kussmaul breathing due to acidosis), blurred vision and, classically, ketosis: acetone or ‘pear drop’ smell on breath. DKA can occur at any age.

HONK is usually associated with very high plasma glucose concentrations and little or no ketosis or acidosis. It typically occurs in the middle-aged or elderly person who may not be known to have diabetes.

**Management**

**Hyperglycaemia (alone)**

Marked hyperglycaemia requires adjustment of a person’s treatment regimen. In those on insulin this would require adjustment of the dose. In those on oral hypoglycaemic agents or diet alone may require temporary initiation of insulin therapy. Adequate fluid and calorie intake should be encouraged.

**DKA and HONK**

Manage these patients as medical emergencies. Check airway, breathing and circulation. Obtain intravenous access and give fluids and supplementary insulin. Refer to the emergency department and involve the specialist diabetes team at an early stage. In pregnancy DKA can occur at significantly lower blood glucose levels than for the general diabetes population. If the patient is pregnant the obstetric team should also be involved early (see Standard 9).
Standard 8

All children, young people and adults with diabetes admitted to hospital, for whatever reason, will receive effective care of their diabetes. Wherever possible, they will continue to be involved in decisions concerning the management of their diabetes.
Standard 8 Management of Diabetes in Hospital

Person with diabetes admitted to hospital
Written and/or verbal information given by staff trained in the care of people with diabetes.

Needs:
Encourage patient to be fully involved with their diabetes care whilst in hospital
Patient given choice to be referred to dietitian (provide appropriate dietary choices) and/or to DSN

Skills assessment:
Assessment carried out by nursing staff
Self-monitoring of blood glucose
Insulin / oral medication self-administration
Consider early referral to specialist diabetes dietitian and/or dedicated in-patient DSN service

Nutrition screening and written/verbal information about meals or snacks available in hospital. Refer to dietitian if indicated.

Maintain glycaemic control.
Avoid hyperglycaemia and hypoglycaemia.
Manage these complications using appropriate guidelines.

Perioperative management
(see pages 84-87)

Acute illness - use programmed/sliding scale insulin regimen. (refer to individual Trust local guidelines)

Discharge planning
Medication, equipment (supply and training), follow-up and ongoing care arrangements.
Management of diabetes in hospital

Information

Ideally, for planned admission to hospital people with diabetes would benefit from discussing how the procedure will affect their diabetes management with an appropriately trained health care professional. Verbal and/or written information should be provided to enable the person with diabetes to be fully involved with their diabetes care whilst in hospital. Consider early referral to DSN and/or dietitian.

All medical and nursing staff should be familiar with the inpatient care of people with diabetes. This will require attendance for mandatory training sessions.

Self-management

Patients should be encouraged to manage their own blood glucose monitoring and diabetes medication if possible during admission to hospital. However, this may not be appropriate for everyone. An assessment tool based on objective criteria should enable staff to identify those patients for whom inpatient self-management is both safe and appropriate.

All Trusts should have a policy for SMBG on wards and self-administration of medication/insulin, which includes safe sharps disposal. Trusts should have a policy to allow self titration of insulin against carbohydrate intake (people trained in the principles of DAFNE, DAFFYDD, and CSII).

SMBG is recommended if the following criteria are satisfied:-

- Normally performed at home
- Patient’s own measuring equipment is available
- Health care professional confirms correct technique
- Patient’s meter is quality controlled and results fall within 20% of those measured using ward glucose meter
- Method for safe sharps disposal has been agreed
Insulin self-administration is recommended if the following are satisfied:-

- Normally performed at home
- Patient’s own insulin and injection devices are available
- Patient’s own insulin is stored in a locked bedside locker
- Health care professional confirms correct technique for administration and recording
- Method for safe sharps disposal has been agreed

Oral drug administration is recommended if the following criteria are satisfied:-

- Normally performed at home
- Patient’s own medications are available and stored in a locked bedside locker
- Healthcare professional confirms correct self administration and recording

**Nutrition**

Nutritional screening should be carried out on admission (Welsh Risk Pool standard 23). All patients (or carers) should receive verbal and/or written information of what meals or snacks are available on the ward. Catering and dietetic departments should work in partnership and refer to current recommendations in menu planning. Dietetic and Catering services should refer to Nutritional Guidelines for Hospital Catering to ensure meals and snacks meet acceptable standards for quality, variety, nutritional adequacy and cultural diversity. Competent patients or nursing staff administering medication on the ward should ensure that insulin/oral regimens coincide with ward meal times as appropriate to aid optimal glycaemic control.

Refer patients as appropriate to the dietitian. These may include the following:

- Newly diagnosed patients
- Type 2 insulin conversions
- Nutritional support (e.g. sip feed and/or enteral feeding)
- Other therapeutic requirements (e.g. renal complications)
- Consistently poor appetite with or without weight loss
- Persistent hyperglycaemia
• Repeated hypoglycaemia
• Hyperlipidaemia
• Hypertension
• Obesity
• Patient request for referral

**Maintaining glycaemic control**

Record blood glucose four times daily (pre-meal and pre-bed) on a bedside chart. If optimal control is demonstrated, then frequency of monitoring can be reduced after 48 hours.

Review glycaemic control and adjust glycaemic treatments as necessary on a regular basis. If hypoglycaemia occurs, consider whether glycaemic treatment should be adjusted/reduced and review after 24 hours.

In ill patients (e.g. bacteraemia, myocardial infarction, persistent vomiting) it is often advisable to start an IV insulin infusion (50 units soluble insulin in 50 ml 0.9% sodium chloride if the blood glucose is > 13 mmol/l), often combined with potassium chloride. The insulin dosage should be adjusted hourly according to blood glucose levels, on a sliding scale.

**Perioperative management (see pages 84-87)**

It is important to establish good glycaemic control in all patients. This will reduce the risk of complications/infection following the procedure. Monitor blood glucose frequently during this time.

**Discharge Planning**

In addition to usual discharge planning patients with diabetes will require sufficient medication and/or equipment including; insulin delivery devices, needles, strips, lancets and sharps disposal information. If there has been a change to insulin delivery system, ensure that the patient is competent and confident in its use. If there has been a change of blood glucose testing meter ensure that the patient is competent and confident in the use of the meter and also that the frequency of monitoring has been agreed. Discharge planning must include appropriate referral to community services which may include: district nursing service, dietitian,
podiatrist and/or other services. It may also be necessary to refer to specialist diabetes services, consultant, DSN and specialist dietitian/podiatrist. Full and timely details must be included in the discharge information to all HCP’s or other agencies involved.

**Perioperative management**

- **Elective surgery in patients with diet-controlled diabetes**

<table>
<thead>
<tr>
<th>Preoperative assessment</th>
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</thead>
<tbody>
<tr>
<td>All patients with diabetes who are to have elective surgery require pre operative assessment which must include a review of their glycaemic status. Poor glycaemic control needs to be addressed prior to admission if necessary with insulin treatment. Specialist advice from secondary care teams or from community based teams may be necessary to achieve good control.</td>
</tr>
<tr>
<td>In exceptional circumstances it may be necessary to admit 1-2 days prior to surgery.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Postoperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check blood glucose every 2 - 4 hours</td>
</tr>
<tr>
<td>Continue IV insulin/dextrose/saline infusion if used preoperatively</td>
</tr>
<tr>
<td>Discontinue gradually when feeding resumed</td>
</tr>
<tr>
<td>If glucose control poor use subcutaneous insulin</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Day Case Surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>The preparation of the patient will depend on the type of surgery being undertaken, many procedures do not require preoperative starvation and there is minimal disruption to the patient’s diabetes management. It is necessary that policies are in place for the management of patients with diabetes during day case surgery. Patients with diabetes should be placed first on the list for day case surgery.</td>
</tr>
</tbody>
</table>
General Notes

Place patient first on morning operating list.

Insulin requirements are higher during cardiac surgery, patients on steroids, infection and obesity.

Avoid lactate containing fluids.

Emergency surgery with co-existing DKA - treat the DKA first and delay surgery if possible.

Perioperative management:
• Elective surgery in patients with diabetes on oral hypoglycaemic agents

Preoperative assessment

• In exceptional circumstances it may be necessary to admit 1-2 days prior to surgery.
• Assess for presence of complications of diabetes (retinopathy, nephropathy, cardiovascular disease, autonomic neuropathy)
• Discontinue insulin secretagogues
  • Long acting 48 hours before operation
  • Short acting 24 hours before operation
• Stop Metformin day before admission for surgery
• If poorly controlled stabilise using locally agreed insulin regimen.

Day of surgery

Day of Surgery
• Monitor blood glucose hourly and serum potassium every 2 - 4 hours

Minor surgery
• If fasting blood glucose < 8 mmol/l then no insulin, only normal saline
• If fasting blood glucose > 8 mmol/l treat as for insulin treated patients

Major surgery
• Treat as for insulin treated patients
**Postoperative**

- Check blood glucose every 2 - 4 hours
- Continue IV insulin/dextrose/saline infusion if used perioperatively
- Discontinue gradually when feeding resumed then reintroduce oral hypoglycaemic agents
- If glucose control poor use subcutaneous insulin before restarting oral hypoglycaemic agents

**General Notes**

Place patient first on morning operating list.

Insulin requirements are higher during cardiac surgery, patients on steroids, infection and obesity.

Avoid lactate containing fluids.

Emergency surgery with co-existing DKA - treat the DKA first and delay surgery if possible.

**Perioperative management:**

- Elective surgery in patients with diabetes on insulin

**Preoperative**

- It may be necessary to admit to hospital 1 - 2 days before operation for assessment and stabilisation.
- Use basal-bolus insulin regimen and check pre-prandial and post-prandial blood glucose.
- Assess for presence of complications of diabetes (retinopathy, nephropathy, cardiovascular disease, autonomic neuropathy)
- Reduce ‘basal’ insulin by 50% the night before surgery
**Day of surgery**

No subcutaneous insulin (patient should be on morning list).

Start insulin/dextrose/potassium infusion 1 hour before surgery (1l of Dextrose 5% with potassium chloride (KCl) added (see below)).

Before connecting to patient run 25ml through giving set.

Syringe pump ‘piggy-backed’ into dextrose 5%. In infusion pump 50 units insulin diluted to 50 ml with normal saline and infusion rate adjusted to deliver required units/hour.

Monitor blood glucose every hour and at end of surgery. Adjust insulin to achieve the desired range, 5 - 10 mmol/l.

Check serum potassium preoperatively and every 2 - 3 hours, if

- < 3.5 mmol/l add KCl 40 mmol to 1l dextrose 5%.
- 3.5 - 5.0 mmol/l add KCl 20 mmol to 1l dextrose 5%.
- Other IV replacement to be given by separate infusion.

**Postoperative**

- Check blood glucose every 2 - 4 hours.
- Continue IV insulin/dextrose/saline infusion until oral feeding resumed.
- If oral feeding not resumed in 48 hours start enteral feeding if gut functioning
- Total parenteral nutrition would not generally be considered until 5 days postoperatively.

**General Notes**

Place patient first on morning operating list.

Insulin requirements are higher during cardiac surgery, patients on steroids, infection and obesity.

Avoid lactate containing fluids.

Emergency surgery with co-existing DKA - treat the DKA first and delay surgery if possible.
Standard 9

Diabetes and pregnancy

The NHS will develop, implement and monitor policies that seek to empower and support women with pre-existing diabetes and those who develop diabetes during pregnancy to optimise the outcomes of their pregnancy.
Standard 9: Diabetes and Pregnancy

Pre-existing diabetes and gestational diabetes can affect pregnancy to increase risk to both the mother and baby. This guideline aims to outline minimum standards of care to reduce these risks.

This guideline is based on current practice in Wales, pre-existing Welsh guidelines, NICE guidelines for the management of pregnancy, SIGN, ADA, IDF and Diabetes UK guidelines as well as incorporating recently published randomised controlled trials.

Pre-pregnancy management

- All women of child-bearing age with diabetes should be aware of the need for pre-conception care and how to contact their diabetes team when contemplating a pregnancy.
- Diabetes control should be optimised pre-conception, with an HbA1c < 7% at conception.
- Refer to a dietitian for dietary advice regarding pregnancy and regular exercise advised.
- Smoking cessation and alcohol moderation advised.
- Teratogenic medication such as ACE Inhibitors and Statins should be stopped.
- Folic acid 5mg should be started.
- Blood pressure should be controlled.
- Albumin creatinine ratio should be measured and retinal screening performed.
- Rubella status should be checked.
- The risks of undertaking a pregnancy should be discussed in context, e.g. worsening retinopathy, worsening proteinuria.
- Women should be aware of the schedule of events in pregnancy.
- Women should be aware of how to contact their diabetes team when pregnant.
Management in pregnancy

Women should be managed by a multidisciplinary team comprised of a Consultant Diabetologist, DSN, Consultant Obstetrician, Midwife and Dietitian. The clinic should be combined in some way to ensure good communication between all groups and to reduce patient inconvenience. Access to obstetric scanning when needed should be available. Women should be seen at a frequency to meet their needs, generally every 2 weeks with access to specialist advice in between visits if required. The women, partners and carers should receive support and clear information.

The following recommendations are in addition to usual good antenatal care.

Glycaemic control in pregnancy

- The aim is for excellent glycaemic control with avoidance of severe hypoglycaemia throughout pregnancy to minimise complications.
- The target HbA1c is < 6.5%.
- The HbA1c should be measured monthly.
- Regular home blood glucose monitoring should be undertaken. The blood glucose targets are < 5.6 mmol/l pre-meal and < 7.8 mmol/l 2 hours post-meal.
- Women with type 1 diabetes will generally be on a basal bolus insulin regimen or an insulin pump.
- Insulin pumps should be offered if targets cannot be achieved without recurrent severe hypoglycaemia.
- Analogue insulins are not known to be harmful in pregnancy but experience is limited. Where optimal control cannot be obtained with traditional insulins they are recommended.
- In type 2 diabetes, the addition of metformin to insulin may be beneficial but stop metformin if there are any signs of foetal compromise.
- All women should have access to dietary advice from a registered dietitian.
- Unprovoked hypoglycaemia in the third trimester may herald placental insufficiency and very careful obstetric supervision is needed.
Screening in Pregnancy

- If no retinopathy is present, retinal screening should be performed each trimester. This should ideally be performed by digital retinal photography or slit lamp examination. Direct ophthalmoscopy can be used if these are not available.

- If retinopathy is present, ophthalmological surveillance throughout pregnancy is recommended.

- Microalbuminuria screening and electrolyte measurement should be performed on presentation.

- If microalbuminuria or nephropathy is present, these measurements should be performed each trimester.

- Post partum thyroiditis is more common in type 1 diabetes and thyroid function blood tests 3 months post partum may be considered.

Obstetric Ultrasounds

- The frequency of ultrasound examinations should be determined by clinical indication.

- A dating scan should be performed at booking and the usual anomaly scan should be performed.

- A detailed foetal cardiac scan should be performed around 22 weeks.

- Growth scans should be performed after 28 weeks at 2 to 4 weekly intervals.

Gestational Diabetes

Women presenting with one or more risk factors for gestational diabetes should be screened. This screening should occur as soon as the risk factor is present and again at 28 weeks if appropriate.

These risk factors are:

- A first degree relative with diabetes
- Glycosuria on 2 or more occasions
- Previous large babies (> 4kg)
- Macrosomia in current pregnancy (> 95th centile)
• Previous gestational diabetes
• BMI \(\geq 35\) on booking
• Polyhydramnios in current pregnancy
• Previous unexplained stillbirth
• Polycystic ovarian syndrome
• Ethnic groups e.g. Afro-Caribbean, Asian

A 75g oral glucose tolerance test should be performed:

Gestational diabetes is present if:
• the fasting glucose is \(\geq 6.0\) mmol/l \(\text{OR}\)
• the 2 hour glucose is \(\geq 7.8\) mmol/l

Women with gestational diabetes should receive dietary advice from a dietitian. Women with gestational diabetes should undertake SMBG, ideally 4 times a day, pre-meal and post-meal.

The following targets should be achieved (based on the ACHOIS study)

Fasting/pre-meal of \(< 5.5\) mmol/l
2 hours post-meal of \(< 7.0\) mmol/l \((< 8.0\) mmol/l after 35 weeks)

If 2 readings are above these parameters in a 2 week period, insulin should be commenced and titrated to achieve these targets.

HbA1c should be measured every month.

**Delivery Plans**

• Delivery should occur in a consultant led unit with a SCBU available if needed.
• Delivery plans should be made on an individual basis.
• Generally, those with pre-existing diabetes in pregnancy should be delivered before 40 completed weeks.

**Betamethasone**

If delivery is expected before 34 weeks then betamethasone should be given. If betamethasone is given, inpatient supervision to monitor glucose control is
needed. The blood glucose should be kept < 10mmol/l (intravenous insulin if necessary) and observation for ketosis should be undertaken.

**Cardiotocograph (CTG)**
- Abnormalities on CTG in a woman with diabetes needs more rapid intervention than in a woman without diabetes.
- Continuous foetal monitoring with CTG during labour is recommended.
- In difficult cases a biophysical profile may be helpful.

**Caesarean Section**
- Aim for vaginal delivery.
- If the expected weight of the baby is > 4.5kg, most obstetricians would advise Caesarean Section.
- If labour is slow to progress, Caesarean Section may be advised.

**Glycaemic Control in Labour**

The following is a guide and adjustments will be needed depending on clinical situation:

1. **Pre-existing diabetes or gestational diabetes treated with insulin:**

   Women with pre-existing diabetes or gestational diabetes treated with insulin should receive insulin and dextrose for normal, instrumental or Caesarean Section deliveries. This should be according to the local policy of that hospital. The aim is for normoglycaemia in labour to prevent neonatal hypoglycaemia.

   **Once the placenta is delivered:**

   **In type 1 diabetes and type 2 treated with insulin:**

   - The insulin rate is halved but the dextrose continues unchanged. Once eating and drinking, subcutaneous insulin can be commenced (with a 30 - 60 minute overlap) at pre-pregnancy insulin doses. If breast feeding, the insulin doses may need to be reduced further depending on blood glucose results in response to feeding.
In type 2 diabetes usually on oral medication:

- The insulin rate is halved but the dextrose continues unchanged.
- If breastfeeding, commence subcutaneous insulin (with a 30 - 60 minute overlap) using an insulin regime (type, frequency, dose) which has been planned by the patient and diabetes team when delivery plans discussed.
- If not breastfeeding, commence oral medication.

In women with gestational diabetes on insulin:

- Discontinue the intravenous insulin and dextrose once the placenta is delivered.

2. Gestational diabetes on diet alone:

No insulin is needed during labour but regular blood glucose monitoring should be undertaken.

3. Women on CSII (continuous subcutaneous insulin infusion):

If local expertise allows, these women (or their partner) can continue to manage their diabetes via the CSII during labour or Caesarean section. Otherwise they should be treated with intravenous insulin and dextrose as per local policy. The exception is when glycaemic targets are not being achieved, ketones are present or the patient is no longer able to take decisions regarding the pump (e.g. drowsiness, anaesthesia, distress etc). After the delivery of the placenta, pre-pregnancy basal rates are required. The pump should be sited away from the abdomen.

Postpartum Care

In gestational diabetes:

- Those with gestational diabetes should continue to monitor their blood glucose e.g. on 2 occasions twice a week.
- A 75g oral glucose tolerance test should be organised for 6 weeks post partum.
- Women should be advised of the future risk of type 2 diabetes. Women should be advised of measures to prevent this - a healthy diet, maintenance of a normal body weight and regular exercise.
• Women with previous gestational diabetes should be recorded on a register using a specific READ code.

• Annual screening for diabetes should be performed as recommended in Standard 2.

In pre-existing diabetes:

Those with type 1 and type 2 diabetes should have follow up arranged with their usual diabetes team.

**Neonatal Issues**

• The babies of mothers with diabetes should not be routinely admitted to the SCBU.

• The neonate should be screened for early hypoglycaemia and early feeding may be required (1 to 2 hours after delivery).

• Neonatal blood glucose should be checked every 3 hours until they are persistently > 2.6mmol/l.

**Nutrition and dietetic issues**

• All women with diabetes should have a dietary review by a registered dietitian.

• Adequate supporting literature should be provided in appropriate languages.

• The diet should provide sufficient calories and nutrients to meet the needs of the pregnancy and be consistent with maternal blood glucose target levels, which have been agreed.

• Food choices should concentrate on the need for micronutrient rich foods (fruit, vegetables and low-fat dairy products) rather than energy dense high-fat foods. Promotion of low glycaemic index foods will help in the blood glucose control.

• Active weight reduction is not advised; however if weight gain becomes rapid, dietary review should occur to stabilise or reduce the rate of weight gain.

• Women whose body weight is >120% ideal should be encouraged to lose weight prior to conception.
General dietary guidelines for pregnancy should be given including advice to avoid unpasteurised dairy products, under-cooked meats, liver and liver products and alcohol. Limit caffeine intake, wash fruit and vegetables thoroughly, avoid self-medication with vitamin supplementation with preparations with vitamin A.

**DKA in pregnancy**

- This serious condition threatens the life of both the mother and foetus. Rapid diagnosis and management is required.
- Any woman with type 1 diabetes who is admitted unwell in any way, vomiting, unable to eat or with high blood glucoses should be monitored for ketoacidosis with blood or urine ketone levels, urea and electrolyte levels, arterial blood gases and blood glucose.
- Ketoacidosis can develop at normal blood glucose levels in pregnancy.
- If diagnosed, use the local DKA policy and seek senior specialist advice.

**Lactation**

- Breast feeding should be encouraged with advice to reduce the risk of hypoglycaemia.
References - Standard 9


Standard 10 & 11

Detection and management of long-term complications - Diabetic Foot, Eye and Kidney Disease

Standard 10

All young people and adults with diabetes will receive regular surveillance for the long term complications of diabetes

Standard 11

The NHS will develop, implement and monitor agreed protocols and systems of care to ensure that all people who develop long-term complications of diabetes receive timely, appropriate and effective investigation and treatment to reduce their risk of disability and premature death.
Standards 10 & 11: Detection and management of long-term complications - Diabetic Foot Disease

Diabetic foot care pathway

**All people with diabetes should be offered routine annual foot assessment**

**Annual Review - Call and Recall**
To be undertaken by a person appropriately trained (National Minimum Skills Framework):
Primary care team, GP, Practice Nurse, District Nurse, DSN, Link Nurse, Health Care Worker, Podiatrist

**Risk Factors**
- Glycaemic control, hyperlipidaemia, hypertension, overweight, retinopathy, nephropathy, smoking, social & educational needs

**Foot Assessment**
- callus/corns, deformities, muscle strength, amputations, ulceration, scarring, condition of nails, footwear,

**Vascular Assessment**
- pedal pulses/Doppler (8 MHz), signs and symptoms

**Neurological Assessment**
- 10 g monofilament and 128 Hz tuning fork (Rydel Seiffer tuning fork) or neurothesiometer

### Low Risk
Normal sensation, palpable pulses, no foot pathology

**Annual Review**
Management by the primary care team
Basic Foot care Education/
Structured education
Empowerment for self care

### At Risk
Neuropathy or absent pulses or foot pathology or other risk factor
Community Podiatry

**Review 3-6 months**
Proactive education for care of the ‘At Risk’ foot.
Contact numbers for foot emergencies

### High Risk
Neuropathy or absent pulses and deformity or skin changes or previous ulceration/amputation
Specialist Podiatry Management

**Review 0-3 months**
Proactive specific foot care education
Assess footwear and insoles requirements
Contact numbers for foot emergencies

### Very High Risk
Ulcerated foot, acute cellulitis, sepsis -

**Urgent referral to MDT/ Podiatry Tissue Viability wound management team**

- Revascularisation
- Infection control
- Glycaemic Control/
  medical management
- Radiological investigations
- Offloading/pressure relief

### Multidisciplinary Diabetic Foot Clinic

**Acute foot problems, cellulitis, new or chronic ulceration, trauma, acute onset of pain with or without deformity**
(Charcot foot), infection, painful neuropathy

- Diabetologist & Diabetic Hospital Team
- Podiatrist
- Vascular Consultant & Vascular Team - (Dedicated pathway)
- Orthopaedic Referral (Dedicated Pathway)
- Plaster Technician (Dedicated Pathway)

**Orthotist - Specialist Footwear / Insoles**
- DSN Review HBA1c & Control
- Dietician (Dedicated Pathway)
- Pain Team (Dedicated Pathway)
- Tissue Viability Specialist
The holistic management of the foot in diabetes may involve many professions at any stage: Podiatrist, General Practitioner, Diabetes Consultant, DSN, District nursing, Practice Nursing, Vascular Surgeon, Foot and Ankle Trauma and Orthopaedic Surgeon, Physiotherapy, Clinical Psychology, Orthotics, Plaster Technician, Radiologist, Dietitian, Occupational Therapist, Pain team.

Information systems need to support the holistic management of patient with diabetic complications.

**Foot assessment for people with diabetes**

**Referral**

People with diabetes may present for foot assessment from a number of sources including the primary care team, community podiatry, district nursing, specialist/link nurses, by relatives or carers, other health professionals, other agencies or by the patient themselves.

**Primary foot assessment**

An assessment needs to be undertaken to evaluate the individual’s risk so that an appropriate management plan can be decided. This assessment is undertaken by a podiatrist, general practitioner, district nurse, DSN or diabetes link nurse.

It could also be undertaken by other health care staff that have been adequately trained and supervised for the initial assessment of diabetic feet.

**Risk factors**

- Social and Educational issues
- Diabetic kidney disease (nephropathy)
- Diabetic eye disease (retinopathy/maculopathy)
- Cardiovascular disease
- Glycaemic control
**Vascular assessment**

Pulses/Doppler (8 MHz) at dorsalis pedis and posterior tibial pulses.

History for symptoms of claudication or rest pain. (Edinburgh Claudication Questionnaire).

Examination of skin colour and temperature.

**Neurological assessment**

Calibrated 10 g monofilament test at three sites.

Vibration perception using a 128 Hz/Rydel Seiffer tuning fork.

Can also use neurothesiometer to assess vibration perception threshold.

**Clinical assessment**

Presence of foot pathology (foot deformity, previous surgery/fracture, previous amputations, previous ulceration, presence of scar tissue).

Corns callus.

Nail pathologies.

Muscle function, evidence of weakness.

Autonomic neuropathy - Wards Sign, dry skin - micro-circulatory changes.

Assessment of footwear and suitability of footwear.

Assessment of social and educational needs.

**Risk classification**

Classify the risk for the feet into the following categories:\(^{10}\).

**Low risk** (normal sensation, palpable pulses, no foot pathology).

**Increased risk** (neuropathy or absent pulses or foot pathology or other risk factor).

**High risk** (neuropathy or absent pulses AND deformity or skin changes or previous ulcer).

**Very high risk** (Ulcerated foot, acute cellulitis, sepsis, charcot's arthropathy).
Management plan

All patients should be given education regarding:

- footcare and footwear (verbal and printed)
- routine skin and nail care, self management
- advice on smoking cessation, weight management and lifestyle modification
- specific proactive detailed education and information relevant to their foot pathology or complications and the individual’s role in maintaining good foot health. e.g. All Wales ‘High Risk Foot Health Leaflet’
- contact details for foot emergencies

Protocols should be in place for emergency access to specialist healthcare professionals, including a provision for self referral within 24 hours.
Risk classification & management

Persons at low risk

Low current risk can be followed up by a primary care team. Feet should be re-examined at least annually, and the patient should be given education and advice regarding self care.

Persons at increased risk

At increased risk can be followed up by routine community podiatry care at 3 - 6 monthly intervals.

Persons at high risk

At high risk should be referred for regular Podiatry review or treatment by a HPC Registered Podiatrist which could be provided within Special High Risk Community/Intermediate Podiatry clinics where available or may require referral on to a multidisciplinary diabetic foot clinic depending upon local agreement.

This should include the provision of monitoring tissue viability combined with skin and nail care with individual frequency according to clinical need based upon risk of tissue breakdown and ulceration. Assess footwear and insoles requirements. This would normally be within a 0 - 3 month review process but would depend upon individuals podiatric, medical and service needs. Structured education should be tailored to individual risk.

Advanced vascular investigation by a podiatrist or HCP with specialist skills. It is essential that there is a referral process to allow rapid access to vascular specialist team where ischaemia is diagnosed.

Persons at very high risk - ulcerated foot, acute cellulitis, sepsis, acute charcot foot (arthropathy)

Very high risk should be urgently referred to multidisciplinary diabetes team/podiatry tissue viability wound management team (which would include access to diabetes care, podiatry, wound healing, vascular and orthopaedic surgery) or, if clinically indicated and available, a specialist foot ulcer clinic.
Ulcerated feet should be graded and staged using the University of Texas system \(^3\) as it is a better predictor of outcome than some others \(^4\).

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<tbody>
<tr>
<td>A</td>
<td>Pre or Post ulcerative lesion completely epithelialized</td>
<td>Superficial wound, not involving tendon, capsule or bone</td>
<td>Wound penetrating to tendon or capsule</td>
<td>Wound penetrating to bone or joint</td>
</tr>
<tr>
<td>B</td>
<td>Pre or Post ulcerative lesion completely epithelialized with Infection</td>
<td>Superficial wound, not involving tendon, capsule or bone with Infection</td>
<td>Wound penetrating to tendon or capsule with Infection</td>
<td>Wound penetrating to bone or joint with Infection</td>
</tr>
<tr>
<td>C</td>
<td>Pre or Post ulcerative lesion completely epithelialized with Ischaemia</td>
<td>Superficial wound, not involving tendon, capsule or bone with Ischaemia</td>
<td>Wound penetrating to tendon or capsule with Ischaemia</td>
<td>Wound penetrating to bone or joint with Ischaemia</td>
</tr>
<tr>
<td>D</td>
<td>Pre or Post ulcerative lesion completely epithelialized with Infection and Ischaemia</td>
<td>Superficial wound, not involving tendon, capsule or bone with Infection and Ischaemia</td>
<td>Wound penetrating to tendon or capsule with Infection and Ischaemia</td>
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</tr>
</tbody>
</table>
References


Standards 10 & 11 Detection and Management of long-term complications - Diabetic Eye Disease

Screening for diabetic retinopathy in people with diabetes

Diabetic Retinopathy Screening Service for Wales (DRSSW) in partnership with primary care, validates and maintains a diabetes register. All people with diabetes under primary care in Wales aged 12 years and over are eligible for diabetic retinopathy screening.

**Registration:**
All patients known to have diabetes and registered with a GP in Wales
GP to notify DRSSW using screening request form
With patient agreement complete demographic and clinical data

**Note:**
Screening not offered for persons with Impaired Glucose Tolerance (IGT)
Screening not offered to patients under ‘active’ treatment for diabetic retinopathy until discharged from hospital eye service (HES)

**Patient invitation**

**Screening event**

**Image capture**

**Grading and report. Communicate to patient, GP, optometrist and hospital diabetes team as required**

**Referral**

**Hospital eye service**

**Optometrist**

**DRSSW Database - Call and Recall**
The DRSSW will be notified of all persons known to have diabetes and registered with a GP in Wales. Notification is via a referral form for each individual patient, which requires patient, GP and where relevant, details of hospital based diabetes specialist. It is also necessary to indicate if the patient is under the care of an ophthalmologist for diabetic eye disease - this does not include glaucoma, cataract or age related macular degeneration. Information on the type and treatment/s for diabetes or other treatments is requested.

Screening will be offered to all consenting persons with diabetes from the age of 12 years. NO screening will be carried out in subjects with impaired glucose tolerance (IGT) or those under treatment/review of diabetic retinopathy by the HES.

Exclusion of persons with diabetes from the screening service include those deemed unfit by their GP, those who wish not to be screened by the service, or those who the screening team find difficult to screen due to a variety of reasons and subsequently confirmed with the Service’s Lead Clinician.
**Call and Recall system**

All individual requests for screening will be allocated a unique DRSSW reference number. The first appointment will be within 3-6 months of referral by GP.

**Invitation for screening**

Each person with diabetes who meets the screening inclusion criteria will receive an invitation to attend a venue according to their home address within 6 weeks of the proposed date. The invitation will be accompanied by an information leaflet describing the screening service, screening process itself (vision tests and retinal photography), contact details of DRSSW and a list of venues across Wales within their locality. Advice is also given not to drive soon after the screening due to the need to dilate the pupils to obtain good quality photographs of the retina as blurring of vision may last up to several hours. The patients are informed that if after screening they experience undue pain in one or both eyes, they should go to the hospital (emergency eye service or casualty department) in case they have developed glaucoma (acute angle closure) or an acute local inflammatory reaction requiring treatment. These reactions are rare occurrences and must be relayed to the screening team when attending the next screening appointment as abbreviated screening may be adopted (see below).

**Screening procedure**

When attending for screening, the patient will be met by a trained Health Care Assistant (HCA) who will confirm/establish the individual patient’s identity and explain the total process of screening to ensure the individual’s full understanding and complete the required questionnaire.

Prior to screening, the person with diabetes has to sign an informed consent form for each step of the screening procedure i.e. 1) taking the eye photographs (to include digital images) will form part of their confidential computerised health record, and 2) allowing the above information to be used for the purpose of clinical research, which will be anonymised for this purpose. The patient is free to consent or not to either or both of these requests. Following consent the HCA will take a brief clinical history, followed by a vision test, using the Snellen 3 metre chart. Tropicamide 1% drops are then instilled and the patient is asked to wait for 20 minutes to allow the pupils to dilate prior to the photographs being taken. A patient not wanting to have ‘eye drops’ for whatever reason (previous adverse
reaction, etc) may have an abbreviated screening procedure with only one image taken of each eye, instead of the normal two images per eye (see below).

**Retinal image capture**

The highly trained retinal photographers check the person’s identity and adequacy of mydriasis prior to photography with a desktop camera. The photographers take a minimum of 2 images per eye although, more images may be necessary for clinical or technical reasons e.g. if additional lesions are observed or the patient has been unable to remain still throughout the procedure and/or the camera has malfunctioned. Usual reasons for poor images include cataracts and inadequate dilatation.

The retinal images are stored temporarily on laptop computers which are attached to the cameras. At the end of each day the screening teams return to their bases and download the images from the laptop computers onto the DRSSW office system. The images are then downloaded onto a server at the DRSSW Central Office, having been placed in order of priority ready for grading.

**Grading and reporting**

A team of trained and trainee graders are housed at the DRSSW. The graders operate within their level of competence which is monitored regularly based on a structured Quality Assurance scheme. Urgent cases are prioritised and graded the same day or the day after the photographs have been taken. Supervision is provided by senior members of the team, assisted by a small team of clinicians including a GP, diabetologist and ophthalmologist on a sessional basis. Grading is carried out according to a nationally (UK) agreed grading protocol with additional refinements developed with ophthalmologists in Wales. Regular meetings are held to review progress and to discuss clinical issues relating to the service.

**Reporting the grading results**

After final grading has occurred, the results are sent to the person with diabetes with a more detailed letter for the GP and hospital based teams, e.g. Paediatric and Adult Diabetes Care Services. In addition, a report is also prepared for the optometrist and is enclosed with the patient’s own results (see below). Referral letters from the DRSSW to the HES are copied and sent to the person’s
GP. The DRSSW receives from the HES on a standardised form, the grading and management plan for the individual, serving also as a discharge letter with a timed request for the patient to re-enter the screening service.

**Integration of DRSSW, Hospital Eye and Optometric Services**

Persons found by the DRSSW to have a cataract, glaucoma or age related macular degeneration and not seen for 2 years or more for their normal eye check will be asked in their results letter to visit an optometrist for further examination. They will be instructed to take along with them a letter containing more detailed results for the optometrist. The optometrist accredited to carry out such an examination will report on their findings to the GP, DRSSW and where necessary, a referral will be made to the HES. When the patients are discharged from the HES, they will re-enter the DRSSW according to the recommendation of the hospital eye service.

The finding of certain lesions such as wet ARMD, central or branch retinal vein or arterial occlusions, melanoma, etc., will be referred direct from the DRSSW to the HES. This referral is usually preceded by an ophthalmic opinion at the DRSSW grading centre.

**General Remarks**

The service has been designed to concur with the recommendations of the National Screening Committee Report (1999)

http://www.nsc.nhs.uk/pdfs/secondreport.pdf

The key principle of the service is to provide an equitable and quality assured screening programme (risk prevention) for the presence of diabetic retinopathy for those persons with diabetes in Wales who fulfil the inclusion criteria along with a high quality hospital based assessment and treatment service. An essential element is to minimise the rate of non-attendance. All efforts must be made to encourage patient attendance at the designated appointment time/location. On request, the DRSSW will try to provide alternative appointments to better suit the patient.

The interval of screening in the future may vary from the current annual screening for all, to a stratified scheme based on risk. Any future change in this direction will require a robust call and recall infrastructure.
Standards 10 & 11: Detection and Management of Long-Term Complications. Diabetic Kidney Disease

Diabetic kidney disease care pathway

Annual estimated Glomerular Filtration Rate (eGFR) (MDRD*): serum creatinine dipstick urine for blood and protein (see below)

- Abnormal eGFR < 60 ml/min/1.73m²
  - is patient acutely unwell
    - NO
      - Are there urinary outflow symptoms?
        - NO
          - Has reduced eGFR been recorded previously
            - YES
              - REFER to nephrologists if eGFR < 30 ml/min/1.73m² or rate of decline ≥10% drop in 1 year
            - NO
              - manage illness and repeat eGFR
  - YES
    - move to next step

- eGFR ≥ 60 ml/min/1.73m² (<10% change in e-GFR*) - annual repeat

- eGFR ≥ 60 ml/min/1.73m² - USS renal tract & consider/plan referral to secondary care diabetes or nephrology unit †
  - Education, support, counselling (including integrated social care input) & dietary assessment
  - Commence pharmacotherapy. Aim for tight control of BP (with ACE/A2RB), lipids & glycaemia
  - Ensure managed by secondary care diabetes service
  - Screen for renal anaemia & bone disease
  - Smoking cessation counselling and support

- Monitor renal function by eGFR (frequency as per guidelines)
  - N.B. If rapid decline in eGFR, i.e. ≥10% drop in 1 year, refer to nephrology unit
  - If dipstick ≥ 1+ positive for proteinuria and haematuria, send MSU to laboratory.
  - If MSU -ve refer to nephrology unit to rule out glomerulonephritis.
  - If dipstick ≥ 1+ positive for proteinuria but no haematuria and alb:creat ratio >300 refer to nephrology unit

- REFER to nephrologists if eGFR < 30 ml/min/1.73m² or rate of decline ≥10% drop in 1 year

* MDRD - Modification of Diet in Renal Disease

† USS - Ultrasound Scanning

‡ Refer to nephrology unit if eGFR < 30 ml/min/1.73m² or rate of decline ≥10% drop in 1 year.
<table>
<thead>
<tr>
<th>Stage</th>
<th>Findings</th>
<th>Risk Group</th>
<th>Screening interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/2</td>
<td>eGFR ≥ 60</td>
<td>Normal or mild</td>
<td>Re-screen in 12 months</td>
</tr>
<tr>
<td>3</td>
<td>eGFR 30 - 59</td>
<td>Moderate kidney disease</td>
<td>Re-screen in 6 months (12 months if stable). Refer to secondary care.</td>
</tr>
<tr>
<td>4</td>
<td>eGFR 15 - 29</td>
<td>Severe kidney disease</td>
<td>Re-screen in 3 months (6 months if stable). Refer to nephrology.</td>
</tr>
<tr>
<td>5</td>
<td>eGFR &lt; 15 or on renal replacement therapy</td>
<td>End-stage renal disease (under nephrology care)</td>
<td>Re-screen 1 - 2 monthly (co-ordinated by nephrologists)</td>
</tr>
</tbody>
</table>

† see referral note page 117
Annual albuminuria screening process

Annual albumin:creatinine ratio (in all diabetic patients)

Raised Values
≥ 2.5 mg/mmol, males
≥ 3.5 mg/mmol, females

First high reading

YES
Ensure urine sample obtained under appropriate conditions (exclude UTI by urinary dipstick†)

Repeat early morning urine on 2 separate mornings to confirm level of microalbuminuria*
(Positive test - if 2 out of 3 samples elevated. Repeat samples tested one week apart. In the event of negative tests – return to annual screening)

NO

Established microalbuminuria or proteinuria

Titrate to highest recommended dose of ACE inhibitor/A2RB to target BP < 130/80 optimise HbA1c to 6.5-7.5%; commence statin and aspirin.
Urge smoking cessation.

+ve

If proteinuria persistent over 6-12 months arrange USS kidneys and refer to secondary care services

† If dipstick positive for leucocytes and haematuria, confirm presence of UTI with a MSU culture. Once UTI treated if haematuria persists refer to urology unit

* If proteinuria confirmed (alb/creat ≥ 30mg/mmol) in the absence of significant retinopathy investigate for non-diabetic causes

N.B. Refer to nephrologists if eGFR < 30 ml/minute or if non diabetic aetiology suspected e.g. short duration of diabetes, the presence of the nephrotic syndrome, collagen vascular disease, haematuria with a structurally normal urinary tract, or rapid worsening of GFR or proteinuria.
Nephropathy screening in adults with diabetes

Albumin:creatinine ratio (early morning), serum creatinine and eGFR (MDRD) should be measured in all adults with type 1 diabetes, and type 2 diabetes at presentation and annually thereafter.

Albumin:creatinine screening:

First high reading: Ensure urine sample obtained under appropriate conditions (early morning urine).

Repeat early morning urine on 2 separate mornings (separated by one week) to confirm level of proteinuria. Positive test if 2 out of 3 samples elevated. In the event of negative tests return to annual screening.

Transient microalbuminuria may present during fever, post-exercise, heart failure and poor glycaemic control. Albumin excretion may be underestimated in muscular individuals (increased creatinine) and overestimated in cachectic persons, during UTI and other diseases leading to inflammation of the kidney or renal tract.

If dipstick positive for leucocytes and haematuria, confirm presence of UTI with a MSU culture. Once UTI treated if haematuria persists refer to urology.

If dipstick ≥ 1+ positive for proteinuria and haematuria, send MSU. If MSU -ve refer to nephrology to rule out glomerulonephritis.

<table>
<thead>
<tr>
<th>Albumin: creatinine ratio (mg/mmol)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Microalbuminuria</td>
</tr>
<tr>
<td>Proteinuria</td>
</tr>
</tbody>
</table>

Estimated GFR (eGFR) and serum creatinine:

eGFR results (calculated from serum creatinine and patient’s age, sex and ethnicity) will be reported in chronological order by chemical pathology. The exact figure will be given only where it is < 90 ml/min. Otherwise the eGFR will normally only be reported as ≥ 90 ml/min.
**Lifestyle measures:**

a. Avoid cigarette smoking

b. Restrict dietary salt. (Unrestricted salt intake can virtually eliminate the antiproteinuric effect of an ACE inhibitor.)

c. All patients with chronic renal disease (stage 3: National Kidney Foundation) should undergo nutritional screening. Individuals identified as having an inadequate dietary intake should have identifiable causes corrected, in addition to receiving appropriate advice from a registered dietitian.

d. Advice on weight reduction if obese (and has not received this as a part of his/her diabetes care to date)

**Pharmacotherapy:**

a. Begin or titrate ACE or if intolerant A2RB to maximum tolerated dose irrespective of initial blood pressure. Check serum creatinine and potassium 2 weeks after initial dose and after subsequent increases in dose. A stable rise in creatinine of up to 20% or a 15% fall in eGFR does not require dose adjustment. If serum creatinine continues to rise then ACE/A2RB should be stopped and the possibility of renal artery stenosis considered.

b. Treat with Statin and attend to glycaemic control

c. Aspirin 75 mg od (given due to increased cardiovascular risk)

**Treatment Targets:**

**Blood pressure control**

Target blood pressure to:

- ≤ 140/80 in all diabetic patients
- ≤ 130/80 in microalbuminuria/proteinuria

**Glycaemic control**

HbA1c 6.5 - 7.5 %

The risk of hypoglycaemia increases as renal disease progresses. This needs to be balanced against the benefit of tight control.
**Lipids**

Commence lipid-lowering therapy unless contra-indicated in all patients with microalbuminuria or proteinuria.

Lipid targets:
- Total cholesterol - < 4 mmol/l
- LDL cholesterol - < 2 mmol/l
- HDL cholesterol - ≥ 1.0 mmol/l

**Renal anaemia**

Anaemia develops early in diabetic kidney disease (low stage 3 - GFR <45 ml/min/1.73 m²) and may be a factor in accelerated progression. This will be managed by nephrologists. Timely referral is essential. Patients with chronic renal impairment should achieve a haemoglobin of >11 g/dl within six months of being seen by a nephrologist but there is an upper limit beyond which risk may increase. Patients must be replete of iron to achieve and maintain haemoglobin whether receiving erythropoietin or not. Adequate iron is defined as serum ferritin >200 µg/l or transferrin saturation >20%.

**Renal bone disease**

Renal bone disease is also an early feature of diabetic kidney disease GFR<60 ml/min/1.73m² which is managed by nephrologists.

† Referral:

Consider/discuss referral to secondary care diabetes or nephrology service if there is a progressive decline in renal function, as demonstrated by an eGFR < 60 ml/min (Stage 3 chronic kidney disease).

Refer and/or discuss all diabetic patients with a nephrologist if eGFR < 30 ml/minute (even if it is not anticipated that renal replacement therapy will be appropriate); or if rate of decline of eGFR ≥10% drop in 1 year, or if non diabetic aetiology suspected e.g. short duration of diabetes, the presence of the nephrotic syndrome, collagen vascular disease, haematuria with a structurally normal urinary tract, or rapid worsening of GFR or proteinuria. For the referral pathway and protocol see the links for Nephrology/Welsh Renal Services National Service Framework pathway accessed on the Map of Medicine website (piloted in Gwent) on http://gwent.mapofmedicine.com
Standard 12

People with Diabetes and Multi-Agency Support

All people requiring multi-agency support will receive integrated health and social care
Standard 12: People with Diabetes and Multi-Agency Support

Stage 1
Person with diabetes requiring multi-agency support

Stage 2
Secondary Care
Diabetologists
DSNs, Dietitians,
Podiatrists &
Specialist paediatric services

Stage 2
Primary Care
GP
Practice Nurse
Nurse practitioners

Stage 2
Community Care
District Nurses
Community Dietitian,
& Podiatrists
Re-ablement teams
DRSSW

Stage 3
Community Support Team
Unified assessment
Local services directory
Diabetes care manager

Specialist Services
• Learning disability
• Mental Health Care
• Physical/sensory disability
• Children with disabilities
• Psychology services
• Palliative Care

Social Services
• Care in the Community
• Respite Care
• Care Packages
• Care Homes
• Benefits

Voluntary groups
• User Groups
• Carer groups
• Support groups
• Patient Advocate

Local Authority
• Housing
• Transport
• Schools
• Police
• Prisons

Local Health Board
• Pharmacies
• Optometrists
• Continuing Care
• Nursing homes
• Health Promotion
• Dentists

Standard 12 should be underpinned by the need for ongoing education, care planning and Unified Assessment within a clinical governance framework
**Stage 1**

Patient presents with complex social and health needs.

**Stage 2**

The patient is managed within primary care, secondary care or the community. Each patient receives information about Community Support.

**Stage 3**

Care Planning, with the patient’s consent, appropriate referrals are made (incorporating the Unified Assessment process, where used) to other health and social care services for multi-agency support and continuing specialist care service.

**Principles:**

All people with diabetes requiring multi-agency support will receive integrated health and social care.

<table>
<thead>
<tr>
<th>Objective 12.1</th>
<th>Actions</th>
<th>Performance</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure effective multi-agency support between health and social care.</td>
<td>Develop joint protocols to strengthen partnership working.</td>
<td>Diabetes management as part of integrated care and Unified Assessment process.</td>
<td>NHS Trusts LHBs Social Services Voluntary Organisations</td>
</tr>
</tbody>
</table>

Integrated care is defined by the Department of Health as the combination of health and social care services to ensure individuals get the right treatment and care that they need. It helps frontline organisations to work together to deliver flexible services that help people to remain in control and live independent lives.
For frontline staff integrated care implies:

- Working with individual service users to identify the whole range of their needs
- Knowing what else is available in the system and who else can help
- Working alongside other professional groups
- Taking responsibility for bringing in the right care or service, when it is needed
- Identifying a key worker who has access to the range of services needed
# Consensus

<table>
<thead>
<tr>
<th>Objective</th>
<th>Actions</th>
<th>Responsibility</th>
<th>Timescale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Community Support Team</td>
<td>An effective design for ensuring people with diabetes are empowered to manage their own diabetes and lead active and independent lives is a community support team</td>
<td>LHBs and NHS Trusts need to identify and case manage continuous unmet need; sourcing funding streams where necessary</td>
<td></td>
</tr>
<tr>
<td>2. Unified assessment</td>
<td>Directors of health services together with the directors of social services should take joint responsibility for Unified Assessment and should continue to aid its implementation in collaboration with primary care. Unified Assessment is the key to multi agency support. Unified Assessment should be underpinned by robust IT systems that allow shared access to those professionals working across health and social services boundaries. The diabetes care manager is not intended to replace Unified Assessment but rather to provide a single identifiable resource within each diabetes care team.</td>
<td>WAG Directors of social services Directors of health services</td>
<td>Ongoing</td>
</tr>
<tr>
<td>Objective</td>
<td>Actions</td>
<td>Responsibility</td>
<td>Timescale</td>
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</tr>
<tr>
<td>3. Local area service directory.</td>
<td>Map the local area and produce directory. Health and social care workers need to know what is available within the system and how to access levels of care. The directory would provide contact points for those services most frequently needed by people with diabetes and include examples of support services that may be required, e.g., benefits advice, social services, transport for disabled people, carer’s associations and the independent sector. Many of the services will be in place but these will not be known across boundaries.</td>
<td>Local Health Boards, NHS Trusts, Local authorities, social services and the voluntary sector should collaborate to compile the directory and identify funding streams to ensure it is regularly updated. The Directory must be owned and updated locally.</td>
<td>12 months and ongoing</td>
</tr>
<tr>
<td>Objective</td>
<td>Actions</td>
<td>Responsibility</td>
<td>Timescale</td>
</tr>
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<tr>
<td>4. Diabetes Care manager</td>
<td>Not all people with diabetes will require multi agency support. Those that do will by definition have more complex social and health needs. The most effective way of ensuring that people with diabetes have ease of access and equitable access to those services they require is through active case management. The care manager would be an experienced diabetes clinician. The care manager would serve as a single, identifiable source of expertise for those services that would benefit from an experienced diabetes specialist healthcare professional. Unified Assessment would be used to refer to the service most suited to needs. (Social services, voluntary sector, Local Authority, Specialist health services.)</td>
<td>Named case manager appointed through LHB/NHS Trust. Many LHBs and/or NHS Trusts will find that there is an experienced specialist diabetes health care professional, senior Diabetes Specialist Nurse or facilitator who could fill this role.</td>
<td>12 months and ongoing</td>
</tr>
<tr>
<td>Objective</td>
<td>Actions</td>
<td>Responsibility</td>
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<tr>
<td>5. Training in the fundamentals of health and social care. Joint training between health and social care staff</td>
<td>The designated case manager must have training in fundamentals of health and social care coupled with an understanding of the service models in place. To this end Health professions Wales must work with pre-registration and post registration educational providers to ensure that there are courses and conferences that encompass the learning needs of all who have responsibility for working across health and social services boundaries. This education to include; BSc/MSc modules, alongside shorter courses, conferences and joint training between health and social care staff to develop more effective ways of working.</td>
<td>Health Professions Wales WAG</td>
<td>12 months and ongoing</td>
</tr>
</tbody>
</table>
References - Standard 12

Derek Wanless 2004 Securing Good Health for the Whole Population HMSO.

The Wanless report “Securing Our Future Health: Taking A Long-Term View” 2002 HMSO.


NICE guideline, Type 1 diabetes: diagnosis and management of type 1 diabetes in children, young people and adults,

Appendices

1 Eating for Life (patient leaflet) 131
2 Diabetes Patient Education Checklist 139
3 Dental Issues 141
4 Erectile Dysfunction 143
5 Palliative Management of Diabetes 159
Eating for life

Eating to keep your heart healthy
You can eat less fat by

- Grilling, baking, microwaving or steaming instead of frying
- Choosing a low-fat margarine (look out for those that are high in Polyunsaturates and Mono-unsaturates
- Spreading butter thinly if you have to use it
- Choosing baked, boiled, mashed or new potatoes. Having chips no more than 1-2 times per week and choosing oven-baked or making your own using Polyunsaturated or Mono-unsaturated oil
- Cutting down on cakes and biscuits
- Using semi-skimmed or skimmed milk
- Choosing low-fat cheese
- Choosing low-fat yoghurts
- Choosing the leanest meat you can find
- Cutting visible fat off meat before cooking
- Cutting out pies and pasties
- Not eating the skin from chicken
- Choosing lean mince, and draining off excess fat when cooking
- Using more fish instead of meat.

**Fat**

When we think of dietary fats and the heart, we are mainly thinking of the effect that different fats have on our cholesterol (blood fat) level. We all have good and bad cholesterol going around in our blood.

**So, what’s the difference between fats?**

Saturated fat. All animal products are high in this: meat, butter, cheese, cream, full-cream milk and ghee. Saturated fat will increase your total cholesterol level.

**Polyunsaturated fat?**

It is found in pure vegetable oils such as sunflower oil/spread and also oily fish. Polyunsaturated fat can help to reduce your total cholesterol especially the ‘bad’ cholesterol.

**Monounsaturated fat?**

It is found in pure vegetable oils such as olive oil and rapeseed oil. It can help reduce your total cholesterol especially the ‘bad’ cholesterol and increase your ‘good’ cholesterol.

**Hearty tip**

Remember, all fats contain lots of calories, so use only small amounts.

<table>
<thead>
<tr>
<th>Have less fat</th>
<th>Be Healthy Fat</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>
Which fish are oily fish?

They are fish that contain good amounts of Omega 3 fat, a polyunsaturated fat that is very good for your heart.

These include mackerel, herring, kippers, sardines, sprats, pilchards, fresh or canned salmon and fresh tuna (not canned), trout.

It is a good idea to include more fish in your diet each week. It would be of extra benefit to have at least one portion of that fish as oily fish.

1 portion =

❤ 100g/4oz of fresh frozen or smoked fish.
❤ 1 small can, 1/2 medium can or 1/3 of a large can.

Fish oil supplements can be used if you don’t like oily fish. Ask your GP before using them.

Benefits of oily fish

Omega-3s

❤ Reduce the tendency of blood to clot and so reduce risks of a stroke
❤ Reduce blood pressure
❤ Improve kidney function
❤ Reduce the stickiness of blood, which helps the heart to pump regularly
❤ Improve blood fats
❤ Protect the arteries, which carry blood to the heart, from damage.

Hearty tip

Tinned mackerel in a tomato sauce, on wholemeal toast, is a great snack or light meal.

Eat more oily fish

Eat healthy
Why are fruit and vegetables good for your health?

- They contain vitamins that protect your heart. These are called antioxidants.
- They contain soluble fibre which helps to reduce your total cholesterol level.
- They contain insoluble fibre which helps keep your bowels healthy.
- They contain folate, a vitamin which on its own reduces your risk of heart disease.
- They contain a mineral, that can help lower blood pressure.
- They contain very little fat and are low in calories!!

What is a portion?

**Fruit**

- Small glass or individual carton of pure fruit (not squash), carrot or tomato juice.
- 1 whole fruit such as an apple or a banana
- 2 small fruits such as Satsuma/kiwi/plums
- 3 tablespoons of stewed/tinned fruit in natural juice.
- Half grapefruit
- 1 large slice melon
- Handful of grapes
- Handful of dried fruit

**Vegetables**

- 2 tablespoons of any vegetable, (fresh, frozen or canned), but not potato
- 1 medium tomato
- 1 bowl of side salad
- 1 large chunk of cucumber
- 3 sticks of celery

**Hearty tip**

Use fruit as a snack on the run. It’s the best convenience food going!

Aim for 5 portions of fruit & veg per day

Act healthy
Can I have my cake and eat it?
Sugar and sugary foods can be included in a balanced diet if you are sensible.

♥ Keep chocolates, sweets, chocolate biscuits and cream cakes for special occasions, because they contain lots of fat and sugar.

♥ Plain biscuits, fruit scones, fruit bread or flavoured sweet rice cakes are a better alternative if you want something sweet.

♥ Fresh, canned or dried fruit or sugar-free jellies can be eaten more regularly.

Take care with brands that are labelled as ‘low-fat’, because they are often higher in sugar and therefore not low in calories, and so not suitable for people with diabetes. Examples are ‘low-fat’ biscuits, cakes, yoghurts and ice cream. To help make a better choice see the food-labelling guide over the page.

Try not to ‘reward’ yourself with a sweet treat. Instead, write a list of things other than food that you would like as a reward for sticking to your healthy eating plan, such as a long bubbly bath.

What do I do when I need sugar?
Your body gets all the sugar it needs from the food you eat. It is very rare for people to have low blood-sugar levels, unless they have diabetes and are on medication. You do not need a ‘sugar fix’.

What makes you want to eat?
♥ Hunger: There are times when you are not physically hungry but you have the desire to eat. Eating three regular meals per day will give you all you need.

♥ Feelings: You may think of food more when you are bored, lonely, unhappy. Doing another activity for 10 minutes will distract you from the thought of food.

♥ Family & friends: What other people say can make you want to eat. Be confident and look after yourself.

♥ Triggers: Identify what triggers you to eat such as tea with biscuits, watching TV with chocolate or crisps, sweets in the cupboard for the grandchildren. If you give in to your trigger it becomes a habit that then becomes difficult to break. It takes time to break an old habit or build a new one. Change doesn’t happen overnight.

Remember: there are no ‘good’ or ‘bad’ foods, only good or bad eating habits.

Hearty tip

Dried fruit is a nutritious sweet snack.

Reduce sugar & sugary foods

Think healthy

Sugar
Why eat less salt?

Eating too much salt can cause high blood pressure, increasing your risk of heart disease. Everybody tends to eat too much salt.

Cut down on your salt intake
- Only add salt in cooking or at the table, NOT both. Pinch, don’t pour.
- Reduce your intake of snack foods (crisps, salted nuts).
- Reduce your intake of processed/convenience foods.
- Avoid using too many stock cubes.
- Add herbs and spices to family dishes for variety and flavour.
- Adding salt to food is usually a habit developed over years. Break the habit slowly by adding less and less salt to your food. Pass this lower-salt habit on to your family. Taste your food first before you add salt.

Can I use salt substitutes?

They can be used as an alternative, but they will not break the habit of using salt. You are better off using less ordinary salt and eventually cutting it out altogether.

Note: People with diabetes or any kidney problems should not use salt substitutes.

Salt

Guide to food labelling (BHF)

<table>
<thead>
<tr>
<th>A lot</th>
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<tr>
<td>10.0g of sugars</td>
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<tr>
<td>20.0g of fat</td>
<td>3.0g of fat</td>
</tr>
<tr>
<td>5.0g of saturates</td>
<td>1.0g of saturates</td>
</tr>
<tr>
<td>3.0g of fibre</td>
<td>0.5g of fibre</td>
</tr>
<tr>
<td>1.5g of salt</td>
<td>0.3g of salt</td>
</tr>
</tbody>
</table>

For foods eaten in large amounts, like ready meals, look at the ‘amount per serving’. For snacks, and other foods eaten in smaller amounts, look at the amounts ‘per 100g’.

Generally it is best to choose foods that are low in fat (especially saturated fat) and salt. If you have diabetes, take care with the amount of sugar, too.

Take care with claims on labels such as ‘reduced fat’, ‘lower fat’, ‘25% less fat’. These foods might be lower in fat than the normal food item but they can still be high in fat. Use the table above to help you check the label.

Some companies list Sodium as well as Salt content. Use the table above and look at salt content to save confusion.

The ingredients list will also give you an idea of what is in the product and in what quantity. The higher up the list of ingredients something is, the more of it is in the final product. If sugar is one of the first two items in the ingredients list, the product will contain lots of sugar.

You may take a little longer to shop when you first start checking labels, but the more you practice, the quicker you will become!
For a healthy heart, remember these five simple messages

**H**ave less fat.

**E**at more oily fish.

**A**im for 5 portions of fruit and vegetables per day.

**R**educe sugar and sugary foods.

**T**ake less salt, and moderate alcohol intake.

### Alcohol – How much?

- **1-2 units per day** protects you from heart disease.
- **More than 4 units per day** or binge-drinking can cause health problems.

### What is a unit?

- **1/2 pint of ordinary-strength beer, lager or cider.**
- **A single measure of spirits.**
- **A small glass of wine or sherry.**

**It is important to have 1-2 alcohol-free days per week.**

---

**Some helpful web links**

- Office of Chief Medical Officer – www.cmo.wales.gov.uk
- Food Standards Agency – www.food.gov.uk
- British Nutrition Foundation – www.nutrition.org.uk
- British Heart Foundation – www.bhf.org.uk
- British Dietetic Association – www.bda.com

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HEART

Heart
Eating for life

Funded by Welsh Assembly Government

Acknowledgments
Cath Washbrooke – Heart’ Ely
Rachael Slocombe – Barry Heart Health
Dorothy Debra – Cardiff and Vale NHS Trust
Welsh Assembly Government

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# Appendix 2

## Education Checklist

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<th>Hospital No:</th>
<th>Address:</th>
<th>Telephone:</th>
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<table>
<thead>
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<th>Date Explained</th>
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<tr>
<td>1. What is Diabetes?</td>
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<tr>
<td>2. Dietary Advice</td>
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<tr>
<td>a. Referred to dietitian</td>
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<tr>
<td>3. Blood glucose monitoring</td>
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<td>a. Interpretation of results</td>
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<tr>
<td>4. Oral Hypoglycaemic Agents</td>
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<td>10. Pregnancy/sex</td>
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<tr>
<td>p. Palliative Management (Appendix 5)</td>
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</table>
Appendix 3

Dental Issues relating to Diabetes

The term “periodontal disease” may be used to encompass a number of disorders that affect the supporting structures of the teeth, namely the gingivae, periodontal ligament and supporting alveolar bone. The term “gingivitis” is used when disease involvement is limited to the gingivae whilst “periodontitis” is applied when there is loss of periodontal ligament and destruction of the alveolar bone. All forms of periodontal disease are inflammatory in nature and as such have the potential to affect other body sites or systems via the circulation. In recent years, there has been considerable interest in the influence of periodontal disease not only on diabetes but also cardiovascular disease and preterm birth or low birth weight.

Influence of diabetes on periodontal health

It is generally accepted that poor glycaemic control in known diabetics increases the severity of gingival inflammation and periodontal destruction. Epidemiological studies and meta-analyses of diabetic populations have revealed that there are increased rates of alveolar bone loss and periodontal attachment in individuals with diabetes compared to non-diabetics. Conversely, it has been shown that achieving glycaemic control has a positive influence with a reduction in the rate of periodontal destruction. It has been proposed that this relationship is based on the fact that diabetes results in impaired neutrophil adherence, chemotaxis and phagocytosis, all of which may permit bacterial colonisation of the periodontal structures. Elevation pro-inflammatory cytokines and formation of advanced glycation end-products may also adversely influence events in the periodontal tissues.

Influence of periodontal health on diabetes

Recent studies have revealed that diabetics with periodontitis have a greater risk of poor glycaemic control over time compared to diabetic subjects without periodontal disease. A number of clinical trials have indicated that diabetics with periodontal disease demonstrate an improvement in glycaemic control following oral hygiene therapy (scaling and root planing combined with or without
adjunctive antibiotic therapy). The level of change is often 1% in the HbA1c test. Several mechanisms have been proposed to explain the impact of periodontal infection on poor glycaemic control. Firstly, there is strong evidence to show that periodontal disease produces an elevated systemic chronic inflammatory state reflected by an increase in serum C-reactive protein, interleukin-6 and fibrinogen levels. The presence of such inflammatory markers induces insulin resistance.

Patients should be made aware of the inter-relationship of periodontal health and glycaemic control, with an emphasis of the inflammatory nature of periodontal diseases and potential systemic affects of periodontal infection.

Undiagnosed diabetes may produce a complaint of dry mouth (xerostomia) or burning mouth and as such any patient complaining of these symptoms should be assessed for the presence of diabetes. In addition, diabetic patients are more likely to develop oral signs and symptoms of oral candidosis than non-diabetics. There is also an increasing awareness that a number of oral hypoglycaemic drugs can produce lichenoid reactions that can cause considerable discomfort within the mouth.
Appendix 4

Management of Erectile Dysfunction

Introduction

Erectile dysfunction (ED) affects approximately 20-40% of diabetic men (1-3). Although it is not a life-threatening condition, it is closely associated with many important physical conditions and has a significant impact on the quality of life of patients and their partners (4). All diabetes care services should offer treatment for ED and, as a result of the newer pharmacological treatments available, the management of ED is generally within the scope of primary care practice.

The aim of these guidelines is to provide evidence-based advice for primary and secondary care diabetes services in the management of ED in diabetic men. They have largely been based on the recently developed guidelines produced by the British Society of Sexual Medicine (eGuidelines.co.uk in press).

Initial assessment

Sexual history

A detailed description of the problem, including the duration of symptoms and original precipitants, should be obtained. Other factors that should be identified and recorded are:

- Presence of morning awakening erections and other spontaneous erections;
- Sexual desire, ejaculatory and orgasmic dysfunction;
- Previous erectile capacity;
- Partner issues e.g. menopause or vaginal pain;
- Current medication;
- Alcohol, smoking and illicit drug misuse.
Concurrent medical, psychiatric and surgical history should also be recorded, as should the current relationship status.

The use of validated questionnaires, particularly the International Index of Erectile Function (IIEF) or the validated shorter version of the SHIM (Sexual Health Inventory for Men) may be helpful to assess sexual function as well as the impact of treatments and interventions, but they are not routinely required.

**Physical examination**

All patients should undergo a physical examination. A genital examination is recommended, and is essential if there is a history of rapid onset of pain, deviation of the penis during tumescence, the symptoms of hypogonadism or other urological symptoms. A digital rectal examination of the prostate is not mandatory in ED but should be considered in the presence of genito-urinary symptoms.

Blood pressure and weight should be measured.

**Laboratory testing**

The management of ED often provides an opportunity to address the health and diabetes management of a man who had not received diabetes advice for many years. Therefore, the opportunity should be taken to assess diabetes control and other risk factors. HbA1c and urine microalbumen should be measured if appropriate. ED is an independent marker for cardiovascular risk, so serum lipids should be measured in all patients.

Hypogonadism is a treatable cause of ED that may also make men less responsive to phosphodiesterase type 5 (PDE5) inhibitors. Therefore a serum testosterone should be considered particularly if there is any loss of libido. If the serum testosterone level is borderline or low it should be repeated (on a sample drawn at about 9am) together with serum FSH, LH and prolactin. Referral to a specialist clinic should be considered if these results are abnormal.

Serum prostate specific antigen (PSA) should be considered if clinically indicated. It should be measured before commencing testosterone and at regular intervals during testosterone therapy.
Cardiovascular system and sexual activity

The risk factors for ED are very similar to the risk factors for cardiovascular disease and ED confers a 1.46 increased risk for cardiovascular disease (7,8).

The vast majority of men with coronary heart disease can safely resume sexual activity and use ED therapies (9). Education and appropriate counselling about sex should be given to all men with coronary heart disease, so that the majority can continue to enjoy this important aspect of their relationship. Men with unstable heart disease, a history of recent myocardial infarction, poorly-compensated heart failure or unstable dysrrhythmia are exceptions.

Guidance on the assessment and management of ED in the cardiovascular patient has been published by a UK expert group (9). The key points of this guidance are summarised below:

- The cardiac risk of sexual activity in patients diagnosed with cardiovascular disease is minimal in properly assessed and advised patients. Men in the low-risk group with stable but symptomatic cardiovascular disease should be advised that their risk of developing symptoms during sex should be equivalent to the risk when performing other routine tasks of daily living;

- The pro-active management of ED in the cardiovascular patient provides an ideal and effective opportunity to address other cardiovascular risk factors and improve treatment outcomes;

- Patients at low cardiac risk, as defined in Figure 1, should be managed in primary care;

- Patients at intermediate cardiac risk, as defined in Figure 1, should be re-evaluated, in primary or secondary care as appropriate, and assigned to either the low or high-risk group;

- Patients that remain in the group defined as high cardiac risk should not be offered treatment for ED in primary care. Such treatment may not be absolutely contra-indicated but their assessment and management should be supervised by a specialist team, which will probably include a cardiologist;

- There is no evidence that currently licensed treatments for ED add to the overall cardiovascular risk in patients with or without previously-diagnosed cardiovascular disease.
Penile abnormalities

Physical problems that cause ED, for example, phimosis, tight frenulum and penile curvatures, should be diagnosed clinically and are usually simple to treat surgically. Referral to a urologist should be considered.

Treatment

The primary goal of management of ED is to enable the individual or couple to enjoy a satisfactory sexual experience. This involves:

- Identifying and treating any curable causes of ED;
- Initiating lifestyle change and risk factor modification;
- Providing education and counselling to patients and their partners.

Lifestyle management

Reversible risk factors should be identified and addressed, but pharmacotherapy should not be withheld on the basis that lifestyle changes have not been made.

Reversible causes of ED

Hypogonadism and hyperprolactinaemia are the only relevant reversible causes of ED. The advice of an endocrinologist should be considered in these cases.

Hypogonadism and testosterone replacement therapy

The condition of androgen deficiency of the ageing male (sometimes referred to as the “andropause”) has received much media attention in recent years. Its management, indeed its existence, is a matter of considerable debate. There is limited evidence that the prevalence of this form of hypogonadism is increased in type 2 diabetes. However, the value of treating borderline hypogonadism seen in aging and diabetic men remains controversial. A report prepared by the Institute of Medicine suggested a man should only be considered hypogonadal if the morning serum testosterone on 3 occasions was < 6.9nmol/l and there was insufficient evidence to support androgen therapy if the serum testosterone was above this figure.
There is some evidence that treating borderline hypogonadism may enhance responsiveness to PDE5 inhibitors and should therefore be considered in men who fail to respond to a PDE5 inhibitor [6].

**Drug-induced ED**

A wide range of drugs has been implicated in ED. In many cases, the evidence for drugs having a direct causal relationship with some form of sexual dysfunction is relatively poor. In general, when managing ED in a diabetic man, there is little to be gained from changing medication unless there is a clear temporal relationship between starting the medication and the onset of the ED.

**Partner sexual problems and ED**

Men with ED should, ideally, be assessed with their partner so that co-existing sexual problems in the partner can be identified and addressed. Where this is not possible, enquiry should be made about partner sexual health and satisfaction.

Female partners with sexual function problems should be offered appropriate care. A relatively common problem experienced by females over 50 years of age whose partners have ED is oestrogen deficiency-related vaginal atrophy which is usually straightforward to treat.

**Psychosexual counselling and therapy**

Most diabetic men with ED are middle aged and have had a stable sexual relationship. Most can be managed within primary or secondary care with common sense advice. Referral to a qualified psychosexual therapist is not usually necessary unless there are problems in the relationship, depression, severe anxiety, loss of attraction, fear of intimacy or marked performance anxiety.

**First-line treatment**

**Oral therapy**

PDE5 inhibitors are the first line treatment of ED in diabetic men and should be offered to most diabetic men with ED unless there is a contra-indication. Three PDE5 inhibitors are presently available - sildenafil (Viagra®), tadalafil (Cialis®) and vardenafil (Levitra®). All three have been reported to have efficacy rates of
about 50-60% in diabetic men. The major difference in these drugs is that sildenafil and vardenafil are relatively short-acting drugs, having a half life of approximately 4 hours, whereas tadalafil has a significantly longer half life of 17.5 hours. PDE5 inhibitors require sexual stimulation in order to facilitate an erection. It is currently recommended that patients should receive 8 doses of a PDE5 inhibitor with sexual stimulation at maximum dose before classifying a patient as a non-responder.

Management of PDE5 inhibitors non-responders

Approximately 40% of diabetic patients do not respond to PDE5 inhibitors. Patients should be exposed to a minimum of 4 (preferably 8) of the highest tolerated dose of at least 2 drugs taken sequentially with adequate sexual stimulation. So-called failure may be due to suboptimal counselling at the initial consultation. Several measures are described in the literature to salvage patients, clearly identified as non responders:

- Re-counselling on proper use;
- Treatment of concurrent hypogonadism (see above);
- Occasionally patients may respond to one drug when another has failed;
- More frequent dosing regimens have been reported to improve response rates. In practice this is rarely possible as medication is often restricted.

If these measures fail to improve PDE5 responsiveness, second line treatments should be offered to the patient. Often this will mean referral to a specialist clinic.

Choice or preference between the different PDE5 inhibitors

Preference studies comparing the 3 PDE5 inhibitors have proved difficult to perform in a controlled “blinded” fashion as the drugs have different dosing instructions. Two studies have reported a preference for tadalafil as it confers the ability to get an erection long after taking the drug.

Safety of PDE5 inhibitors and drug interactions

There is no evidence that PDE5 inhibitors significantly increase cardiovascular risk. In fact, all three PDE5 inhibitors may have a beneficial effect on ischaemic heart disease.
All nitrates and other nitrate preparations, such as nicorandil, are absolutely contra-indicated with PDE5 inhibitors as the combination can cause catastrophic hypotension.

If angina occurs after taking sildenafil or vardenafil nitrates must be withheld for at least 24 hours and for at least 48 hours after tadalafil.

Nitrates convey no prognostic benefit [9] and if a man with IHD wishes to try a PDE5 inhibitor, the responsible clinician must consider replacement with other anti-anginal agents [26].

Co-administration of PDE5 inhibitors with antihypertensive agents may result in a small additive drop in the BP, which does not usually cause significant orthostatic hypotension.

PDE5 inhibitors should be used with caution in patients receiving alpha-blockers. The use of tadalafil with alpha-blockers is not recommended. Vardenafil should only be initiated at the lowest dose, only if the patient is stabilised on alpha-blocker therapy, and dosing of the two drugs should be separated by at least 6 hours (vardenafil can be used at any time with tamsulosin). Sildenafil should only be initiated at the lowest dose, only if the patient is stabilised on alpha-blocker therapy, and dosing of the two drugs should be separated by at least 4 hours. In practice these interactions are rarely of clinical significance when the drugs are not started simultaneously.

**Adverse events**

Safety data for PDE5 inhibitors are shown in Table 1.

**Second-line treatment**

**Vacuum erection devices**

The principle of vacuum erection devices is simple. A cylinder is placed over the penis, air is pumped out with an attached pump and the resulting tumescence is maintained by a constriction ring around the base of the penis.

- Vacuum devices are highly effective in inducing erections in diabetic men regardless of the aetiology of the ED [27];
- Reported satisfaction rates vary considerably from 35% to 84% [28;29];
• Long term usage of vacuum devices also varies but is considerably higher than for self-injection therapy;

• Most men who are satisfied with vacuum devices continue to use them long term [29];

• Adverse effects include bruising, local pain, and failure to ejaculate. Partners sometimes report the penis feels cold;

• Serious adverse events are very rare but skin necrosis has been reported.

Vacuum devices are contra-indicated in men with bleeding disorders or those taking anticoagulant therapy. They work best if the man and his partner have a positive attitude to them and sufficient time has been spent demonstrating their use. They can be prescribed under Schedule 2 and represent a very cost-effective way of treating ED, even though initial costs are high.

Intracavernous injection therapy

Intracavernous injection therapy is a highly effective therapy for ED and has been used for more than 20 years. However, it is not acceptable to some patients and their partners, and this may result in poor long-term compliance in those who do try it.

Alprostadil

Alprostadil (Caverject®, Viridal®) was the first and until recently was the only licensed drug approved for intracavernous ED treatment.

Alprostadil can be used in doses from 5-40 µg. The erection occurs typically 5-15 minutes after penile injection and frequently last 30-40 minutes, although the duration can be dose dependent. Two or three clinic visits are usually required to ascertain the correct dosage and teach the patient the technique. In patients with limited manual dexterity and in some other groups, the partner may be taught the technique. Partner participation in the consultation and training programme can be valuable and improve long-term compliance. Some patients prefer to use an automatic injection pen that avoids a view of the needle and can help with the fear of penile puncture.

Efficacy rates are high - around 70-80% in the general ED population and higher in those without vascular disease [30] but long term usage can be low with as many as 50% of patients stopping in the first 2-3 months [31,32]. Complications include penile
pain, priapism (1%) and fibrosis (2%) \(^{[33,32]}\). Contra-indications are few but include a history of hypersensitivity to alprostadil, a risk of priapism and bleeding disorders.

The requirement for specialist counselling and close follow-up means that in most cases patients need to be referred to a specialist clinic for intracavernosal therapy.

**Aviptadil and phentolamine injection**

Recently a combination of aviptadil (formerly known as vaso-intestinal polypeptide) and phentolamine (Invicorp\(^{®}\)) was approved and licensed in several European countries for ED.

**Intraurethral alprostadil**

A formulation of alprostadil in a medicated pellet (MUSE\(^{®}\)) is approved for the treatment of ED. Patients are told to void to make sure the urethra is moist, the pellet is inserted into the urethra via a small applicator and the penis massaged. Use of MUSE results in erections in approximately 30-60% of patients \(^{[33,34]}\). Side effects include penile pain (30-40%) and dizziness (2-10%). Little has been published on the use of MUSE in diabetic men but anecdotal experience has suggested the results are disappointing.

**Third line treatment**

**Penile prosthesis**

Penile prostheses are an effective treatment for ED in diabetic men and should be considered in patients who are unwilling to consider, fail to respond to, or unable to continue with medical therapy or external devices. They are particularly suitable if the ED is due to Peyronie’s disease or post priapism. All patients and their partners should be counselled pre-operatively.

**Other therapies**

Efficacy rates with apomorphine (Uprima\(^{®}\)) are lower than those reported for PDE5 inhibitors, and this product has now been discontinued in the UK.
Table 1. Adverse events reported with PDE5 inhibitor use

<table>
<thead>
<tr>
<th>Adverse event</th>
<th>Incidence (%)</th>
<th>Sildenafil (n=5918) (35)</th>
<th>Vardenafil (n=2203) (36)</th>
<th>Tadalafil (n=804) (37)</th>
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<tr>
<td>Headache</td>
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<td>Flushing</td>
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<td>Visual disturbance</td>
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Figure 1. Management algorithm according to graded risk adapted from (38)
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<th>Cardiovascular status upon presentation</th>
<th>ED management recommendations for the primary care physician</th>
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<td>• Controlled hypertension</td>
<td>• Manage within the primary care setting</td>
</tr>
<tr>
<td></td>
<td>• Asymptomatic ≤3 risk factors for CAD - excluding age and gender</td>
<td>• Review treatment options with patient and his partner (where possible)</td>
</tr>
<tr>
<td></td>
<td>• Mild valvular disease</td>
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</tr>
<tr>
<td></td>
<td>• Minimal/mild stable angina</td>
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</tr>
<tr>
<td></td>
<td>• Post successful revascularisation</td>
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<td></td>
<td>• CHF</td>
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</tr>
<tr>
<td>Intermediate risk</td>
<td>• Recent MI or CVA (i.e. within last 6 weeks)</td>
<td>• Specialised evaluation recommended (e.g. exercise test for angina, echo cardiogram for murmur)</td>
</tr>
<tr>
<td></td>
<td>• Asymptomatic but &gt;3 risk factors for CAD - excluding age and gender</td>
<td>• Patient to be placed in high or low risk category, depending upon outcome of testing</td>
</tr>
<tr>
<td></td>
<td>• LVD/CHF</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Murmur of unknown cause</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Moderate stable angina</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Heart transplant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Recurrent TIAs</td>
<td></td>
</tr>
</tbody>
</table>
### Grading of risk

<table>
<thead>
<tr>
<th>Cardiovascular status upon presentation</th>
<th>ED management recommendations for the primary care physician</th>
</tr>
</thead>
<tbody>
<tr>
<td>High risk</td>
<td>• Refer for specialised cardiac evaluation and management</td>
</tr>
<tr>
<td></td>
<td>• Treatment for ED to be deferred until cardiac condition established and/or specialist evaluation completed</td>
</tr>
<tr>
<td>Severe or unstable or refractory angina</td>
<td></td>
</tr>
<tr>
<td>Uncontrolled hypertension (SBP&gt;180 mmHg)</td>
<td></td>
</tr>
<tr>
<td>CHF</td>
<td></td>
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<tr>
<td>Recent MI or CVA (i.e. within last 14 days)</td>
<td></td>
</tr>
<tr>
<td>High risk arrhythmias</td>
<td></td>
</tr>
<tr>
<td>Hypertrophic cardiomyopathy</td>
<td></td>
</tr>
<tr>
<td>Moderate/severe valve disease</td>
<td></td>
</tr>
</tbody>
</table>

### Key

CAD = coronary artery disease  MI = myocardial infarction  
CVA = cerebral vascular accident  CHF = congestive heart failure  
LVD = left ventricular dysfunction  SBP = systolic blood pressure  
ED = erectile dysfunction  TIA = transient Ischaemic Attack
References


Tolra JR, Campana JM, Ciutat LF, Miranda EF. Prospective, randomized, open-label, fixed-dose, crossover study to establish preference of patients with erectile dysfunction after taking the three PDE-5 inhibitors. J Sex Med 2006 Sep;3(5):901-9.


Appendix 5

Palliative Management of Diabetes

1. General principles:

- Diabetes as a co-morbidity occurs more frequently in patients who are in the palliative phase of another disease, albeit cancer or any other life-limiting disease, than in the general population.

- Management of these patients should be individualised, and may alter depending on the stage of the disease. The need for flexibility is even greater given the multiple factors than may complicate glycaemic control in the palliative phase.

- Good diabetic control will help to avoid symptoms of hyper and hypoglycaemia and so maintain quality of life. Strict diabetic control may be less important because of a reduced emphasis on avoiding late diabetic complications in such patients with limited prognosis.

- In the context of advanced cancer or other disease, some factors may lead to hypoglycaemia, and/or decreased requirement for oral hypoglycaemics or insulin.

These include

- cancer cachexia;

- decreased food intake due to decreased appetite, dysphagia, nausea or vomiting;

- liver replacement by tumour;

- disordered gastrointestinal motility;

- patients on oral hypoglycaemics complicated by renal or hepatic failure;

- In the context of advanced cancer or other disease, some factors may however lead to hyperglycaemia, and/or increased requirement for oral hypoglycaemics or insulin.
These include:

- Direct effect of malignancy on intermediary metabolism;
- Insulin deficiency/resistance in pancreatic cancer;
- Commonly used drugs, including corticosteroids, diuretics (thiazide diuretics, furosemide), octreotide and risperidone;
- Other stresses, including infection.

- Treatment with corticosteroids is common in advanced malignancy (up to 40% of inpatient palliative care patients in studies). Although there is a wide variation in response to steroids between different patients, they are known to induce a dose-related adverse effect on glucose intolerance, causing hyperglycaemia. Any patient that is not known to have diabetes, and is taking corticosteroids for longer than 3 weeks, should have intermittent monitoring for hyperglycaemia.

- The metabolism and duration of action of oral hypoglycaemic agents are affected by the development of hepatic and renal failure. These agents have a long duration of action, and hypoglycaemia may persist 48-72 hours following discontinuation of these drugs, and this can be prolonged for up to 96 hours if renal or hepatic failure is present. Hepatic failure further complicates diabetic management because the normal response to hypoglycaemia is mediated, in part, by the liver.

- Treatment of hypoglycaemia is difficult in this patient population due to anorexia, vomiting, and reduced capacity for oral intake. Venous access may be difficult due to previous chemotherapy. Intramuscular glucagon will only be effective in patients who have sufficient glycogen stores for catabolism.
2. Important distinctions

A few issues need to be considered regarding management of diabetes in the palliative phase of any disease.

2.1 The patient’s position on the trajectory of disease (mostly oncological in nature): Management decisions may be quite different if the patient is expected to live for several or many months, rather than only days to weeks. Palliative care patients who are still active and enjoying a relatively good quality of life must undergo monitoring of glycaemic control closely enough to ensure that physical activities are not impaired by lack of energy due to glycaemic derangements. Both hyperglycaemia and hypoglycaemia can impair the quality of life of very sick patients and may alter mental status and interfere with interactions with family members. With terminally ill patients, the goal is to minimise investigations and maximise comfort. In either case, however, the goal of diabetic therapy is to maintain patient comfort and quality of life, rather than the control of blood sugar. To this end, it is reasonable to considerably loosen monitoring of glycaemic control and dietary restrictions, encouraging patients to enjoy eating.

2.2 The difference between an insulin-dependant diabetic (type 1) and insulin-treated (type 2) diabetic, and what would happen on stopping insulin: The type 1 diabetic will fairly rapidly develop DKA and would die if untreated, thus the need to continue daily insulin. The insulin-treated type 2 diabetic would (more slowly) develop a rise in blood sugar and would develop a HONK state if untreated. For terminal patients, the situation could be modified by minimal food and sugar intake.
3. Aims of treatment

3.1 Avoiding symptoms

A suitable target for blood sugars as quoted by some authors would be 7-17 mmol/l, thus avoiding hypoglycaemia and symptomatic hyperglycaemia (polyuria, thirst, nausea, vomiting, lethargy). If a patient has symptoms due to hyperglycaemia at this level, then tighter diabetic control may be necessary. Remember that a dry mouth is usually the result of drug treatment, and is not a good indicator of dehydration.

3.2 Minimising intervention

Reduce the frequency of SMBG testing and subcutaneous insulin injections accordingly.

3.3 Other measures that should be emphasised are relaxing dietary restrictions, good care of skin and feet, early identification and treatment of candidal and other infections, and monitoring the effects of steroids.
4. Dietary advice

Where the prognosis of a patient is good, they should be given the same dietary advice one would offer any patient with diabetes. However, they should be warned to seek advice if they begin to lose weight, as this will clearly have an influence on glycaemic control, and hypoglycaemic agents may need to be reduced or even stopped.

As the aim of treatment changes from preventing long-term complications to preventing symptoms, it becomes more appropriate to relax restrictions. Restrict diet if overeating: Do not impose a strict diet on a patient with advanced illness. It is more important to try and achieve a regular caloric input from one day to the next. As quality of life is the major concern in the terminally ill, patients should be encouraged to consume whatever foods they might wish, and insulin or oral hypoglycaemics can be adjusted correspondingly. It should also be noted that a change of diet to dietary supplements might represent a carbohydrate load and result in a need to change the insulin or oral hypoglycaemic dose.

It should be made clear to patients and their families that any relaxation of previous dietary advice should not be seen as giving up on the patient, but should be seen in the context of other factors influencing the patient’s diabetes.
5. Communicating with the patient and the family

Patients, known to suffer from diabetes, commencing high-dose corticosteroids (>4 mg dexamethasone/day) must be warned that their glycaemic control will worsen. Patients with diet controlled type 2 diabetes will usually need the addition of a sulphonylurea or insulin. Those with poorly controlled diabetes, despite high doses of oral hypoglycaemics, will need to be converted to insulin. Patients on insulin should have their dose increased on the day they commence the steroid and may need further adjustments.

Careful explanation may be required for the patient and family when insulin therapy is commenced. Many people with diabetes, especially those controlled on diet or oral agents alone, have feared the initiation of insulin therapy throughout their lives. The development of insulin-requiring hyperglycaemia consequent to corticosteroids or infection might be misinterpreted by the patient and family to indicate a sudden dangerous deterioration in the state of the diabetes. Thus, initiation of insulin therapy might carry an unexpected worrisome implication for the patient.

Alternatively, people with diabetes who have been fastidious throughout the course of their diabetes may view the physician’s apparent unconcern about slightly higher than usual blood sugars as a sign of neglect. Explanations should be provided about the concern for hypoglycaemia resulting from overly aggressive insulin or oral agents therapy. Similarly, it should be explained that loosening of dietary restrictions does not indicate that the physician is not concerned about the diabetes, but rather reflects quality of life as the overriding therapeutic goal.

Some would argue that unconscious patients will not experience symptoms if hyperglycaemic and that continued diabetic monitoring is unnecessary and intrusive; others feel that thirst or hyperventilation could occur. The conscious level of patients with advanced cerebral disease may fluctuate, further complicating management decisions. Continuing to administer insulin might be appropriate in these cases.

If the patient is near death, insulin therapy in the type 1 diabetic could be construed as life-prolonging therapy. Relatives accustomed to insulin being essential for the patient may question its withdrawal. A discussion might be initiated with the family about the possibility of discontinuation of insulin.
injections. No further monitoring of blood glucose is required should this decision be taken. A blanket policy of not performing these would be ethically difficult, and any management plan should be made as a team, in collaboration with the patient and family where possible.

A patient who has controlled their diabetes for many years and their family may both have strong convictions about diabetic management which need to be recognised and accepted. Management of the diabetes is changed because of the progressive deterioration in the patient’s general condition associated with advancing malignant disease. Patients and families need explanations and support as they come to terms with this.
6. Bibliography


Ford-Dunn S, Smith A, Quin J. Management of diabetes during the last days of life: attitudes of consultant diabetologists and consultant palliative care physicians in the UK. Palliat Med 2006; 20: 197-203


Further copies can be obtained from:

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