Diabetes mellitus: diagnosis

The following is based on the World Health Organisation (WHO) 2006 guidelines.

Diabetes mellitus

If the patient is symptomatic:

- fasting glucose greater than or equal to 7.0 mmol/l
- random glucose greater than or equal to 11.1 mmol/l (or after 75g oral glucose tolerance test)

If the patient is asymptomatic the above criteria apply but must be demonstrated on two separate occasions.

In 2011 WHO released supplementary guidance on the use of HbA1c on the diagnosis of diabetes:

- a HbA1c of greater than or equal to 6.5% (48 mmol/mol) is diagnostic of diabetes mellitus
- a HbAlc value of less than 6.5% does not exclude diabetes (i.e. it is not as sensitive as fasting samples for detecting diabetes)
- in patients without symptoms, the test must be repeated to confirm the diagnosis
- it should be remembered that misleading HbA1c results can be caused by increased red cell turnover (for example anaemia, haemoglobinopathies and pregnancy)

Impaired fasting glucose and impaired glucose tolerance

A fasting glucose greater than or equal to 6.1 but less than 7.0 mmol/l implies impaired fasting glucose (IFG)

Impaired glucose tolerance (IGT) is defined as fasting plasma glucose less than 7.0 mmol/l and OGTT 2-hour value greater than or equal to 7.8 mmol/l but less than 11.1 mmol/l

Diabetes UK suggests:

- 'People with IFG should then be offered an oral glucose tolerance test to rule out a diagnosis of diabetes. A result below 11.1 mmol/l but above 7.8 mmol/l indicates that the person doesn't have diabetes but does have IGT.'

Side-effects of common drugs: diabetes drugs

The table below summarises characteristic (if not necessarily the most common) side-effects of drugs used to treat diabetes mellitus

Drug	Side-effect
Metformin	• Gastrointestinal side-effects • Lactic acidosis
Sulfonylureas	• Hypoglycaemic episodes • Increased appetite

	and weight gain • Syndrome of inappropriate ADH secretion • Liver dysfunction (cholestatic)
Glitazones	• Weight gain • Fluid retention • Liver dysfunction • Fractures

Diabetes mellitus: management of type 2

NICE updated its guidance on the management of type 2 diabetes mellitus (T2DM) in 2009. Key points are listed below:

Dietary advice

- encourage high fibre, low glycaemic index sources of carbohydrates
- include low-fat dairy products and oily fish
- control the intake of foods containing saturated fats and trans fatty acids
- limited substitution of sucrose-containing foods for other carbohydrates is allowable, but care should be taken to avoid excess energy intake
- discourage use of foods marketed specifically at people with diabetes
- initial target weight loss in an overweight person is 5-10%

HbA1c

- the general target for patients is 6.5%. HbA1c levels below 6.5% should not be pursued
- however, individual targets should be agreed with patients to encourage motivation
- HbA1c should be checked every 2-6 months until stable, then 6 monthly

Blood pressure

- target is < 140/80 mmHg (or < 130/80 mmHg if end-organ damage is present)
- ACE inhibitors are first-line

The NICE treatment algorithm has become much more complicated following the introduction of new therapies for type 2 diabetes. We suggest reviewing this using the link provided. Below is a very selected group of points from the algorithm:

- NICE still suggest a trial of lifestyle interventions first*
- usually metformin is first-line, followed by a sulfonylurea if the HbA1c remains > 6.5%
- if the patient is at risk from hypoglycaemia (or the consequences of) then a DPP-4 inhibitor or thiazolidinedione should be considered rather than a sulfonylurea
- meglitinides (insulin secretagogues) should be considered for patients with an erratic lifestyle
- if HbA1c > 7.5% then consider human insulin
- metformin treatment should be continued after starting insulin
- exenatide should be used only when insulin would otherwise be started, obesity is a problem (BMI > 35 kg/m^2) and the need for high dose insulin is likely. Continue only if beneficial response occurs and is maintained (> 1.0 percentage point HbA1c reduction and weight loss > 3% at 6 months)

Starting insulin

- usually commenced if HbA1c > 7.5%
- NICE recommend starting with human NPH insulin (isophane, intermediate acting) taken at bed-time or twice daily according to need

Other risk factor modification

- current NICE guidelines suggest giving aspirin to all patients > 50 years and to younger patients with other significant risk factors. However, recent evidence does not support this approach. The 2010 SIGN guidelines do not advocate the use of aspirin for primary prevention in diabetics
- the management of blood lipids in T2DM has changed slightly. Previously all patients with T2DM > 40-years-old were prescribed statins. Now patients > 40-years-old who have no obvious cardiovascular risk (e.g. Non-smoker, not obese, normotensive etc) and have a cardiovascular risk < 20%/10 years do not need to be given a statin. We suggest reviewing the NICE T2DM guidelines for further information.
- if serum cholesterol target not reach consider increasing simvastatin to 80mg on
- if target still not reached consider using a more effective statin (e.g. Atorvastatin) or adding ezetimibe
- target total cholesterol is < 4.0 mmol/l
- if serum triglyceride levels are > 4.5 mmol/l prescribe fenofibrate

*many local protocols now recommend starting metformin upon diagnosis