

# **NZSSD Position Statement on the diagnosis of, and screening for, Type 2 Diabetes**

Updated: September 2011

This 2011 statement is a guide for health practitioners and complements 2003 and 2009 formal guidelines produced by the New Zealand Guidelines Group. The recommendations offered here do not fulfill the requirements of a formal screening programme which would require recall and referral systems, and full treatment services to be in place prior to implementation. Nevertheless, they provide a practical means of opportunistically identifying at-risk individuals.

This statement does not apply to pregnant women and gestational diabetes.

## **Background**

Screening refers to the process of identifying individuals who are likely to have a particular disease in an asymptomatic population, then confirming whether screen positive individuals do or do not have disease by undertaking diagnostic testing and providing recommended treatment accordingly. Screening for type 2 diabetes and pre-diabetes states is justified because of the high and apparently increasing prevalence of the conditions [1], the clinical trial evidence of reducing risk of progression from pre-diabetes to type 2 diabetes by lifestyle measures and some drug treatments [2-4] and the reduction in risk of complications by early detection and treatment of those with undiagnosed diabetes. Screening for type 2 diabetes is not known to be associated with any significant physical or psychological harm.

New Zealand guidelines recommend that screening for type 2 diabetes be undertaken in conjunction with cardiovascular risk assessment [5]. NZSSD supports this approach and recommends additional opportunistic case finding amongst high-risk individuals in general practice and other clinical settings.

From 3 October 2011 New Zealand laboratories will report glycated haemoglobin (HbA1c) only in new International Federation of Clinical Chemistry agreed units of mmol/mol and will no longer report HbA1c as %. Conversion charts are available at [www.nzssd.org.nz](http://www.nzssd.org.nz).

In line with many international position statements [6], NZSSD now recommends the use of HbA1c to diagnose diabetes in most circumstances. Compared with an oral glucose tolerance test (OGTT) or fasting glucose alone, HbA1c offers substantial advantages of the lack of need for fasting, reduced biological variability and an equally good relationship with increased retinopathy and CVD risk [7,8].

The glucose-based criteria are also limited by high variability of blood glucose, particularly for the 2-hour value post OGTT. There are also issues relating to sample collection, processing and analytical requirements that are often poorly addressed. There is also concern regarding the validity of the standard 75g OGTT for all ages, sizes and genders. OGTTs are more expensive than HbA1c, as well as being laborious and time consuming for both patients and laboratories. HbA1c however can be misleading in some circumstances – e.g. falsely low in patients with increased red blood cell turnover or post blood transfusion and falsely high in some haemoglobinopathies as well as some ethnic differences in rate of Hb glycation [9].

The current glucose-based diagnostic criteria remain unchanged, but the NZSSD recommends that the OGTT should only be used when there is uncertainty about the validity of HbA1c measures in specific patients - for example in the presence of haemoglobinopathy or abnormal red cell turnover - or where there are special clinical reasons.

The relationship between HbA1c and risk for the presence of significant diabetic retinopathy at the time of diagnosis of diabetes is continuous, with significant risk above ~50 mmol/mol, and almost no risk below ~40 mmol/mol [10]. People with an HbA1c between 40 and 50 mmol/mol may show some mild background retinopathy at diagnosis, but are at minimal risk for significant/moderate retinopathy. This intermediate group is however at increased risk for cardiovascular disease [11].

## Who should be screened for type 2 diabetes?

The New Zealand Guidelines Group suggests that all those listed in Table 1 should be screened for type 2 diabetes as part of a full cardiovascular risk assessment [5]. The age at which screening should start is being reconsidered given the increasing prevalence of diabetes in younger age-groups, but currently remains unchanged from the 2003 CVD risk assessment and management guideline recommendation (**Table 1**).

In addition, NZSSD recommends undertaking opportunistic screening for type 2 diabetes, in those adults over 25 years of age:

- with ischaemic heart disease (angina or myocardial infarction), cerebrovascular disease or peripheral vascular disease, or
- on long-term steroid or antipsychotic treatment, or
- who are obese (BMI  $\geq 30$ ; or BMI  $\geq 27$  kgm<sup>-2</sup> for Indo-Asian peoples), or
- with a family history of early age of onset type 2 diabetes in more than one first degree relative or
- have a past personal history of gestational diabetes mellitus.

In addition, obese children and young adults (BMI  $\geq 30$  kgm<sup>-2</sup> or  $\geq 27$  kg m<sup>-2</sup> in Indo-Asian) should be screened if

- there is a family history of early onset type 2 diabetes or
- they are of Māori, Pacific or Indo-Asian ethnicity.

## Screening tests

A glycated haemoglobin (HbA1c) is the recommended diagnostic screening test. It should be measured by an accredited laboratory. Point-of-care assays are not sufficiently accurate for use in diagnosis nor is there a permanent record of the result. If it is not possible to measure HbA1c, or there are concerns about its validity, then a fasting plasma glucose is recommended [5]. A fasting glucose might also be measured at the time of CVD risk assessment of lipids.

## Diagnostic tests

The diagnosis of diabetes is made on the basis of a laboratory measured HbA1c or venous plasma glucose measurements (see **Table 2**).

- In symptomatic individuals an HbA1c  $\geq 50$  mmol/mol (and, if measured, a fasting blood glucose  $\geq 7.0$  mmol/l or a random glucose  $\geq 11.1$  mmol/l) is sufficient to establish the diagnosis of diabetes.
- In asymptomatic individuals the same criteria apply but, to confirm the diagnosis of diabetes, a confirmatory test (preferably HbA1c) is needed on a separate occasion.
- Those with an HbA1c of 41-49 mmol/mol and, if measured, a fasting glucose concentration of 6.1 - 6.9 mmol/l are categorized as 'pre-diabetes' (also called 'dysglycaemia' or 'borderline diabetes'). Patients with values in this range should be advised on diet and lifestyle modification (and from the age of 35 have a full cardiovascular risk assessment and appropriate management). HbA1c measurement should be repeated after 6-12 months [12].
- A HbA1c of  $\leq 40$  mmol/mol should be repeated at the next cardiovascular risk reassessment interval. Cardiovascular risk should be assessed and treated as per National guidelines.

Meeting these diagnostic criteria should result in a clear diagnosis of diabetes. A full cardiovascular risk assessment and appropriate CV and glycaemic management should follow. Additionally entry into microvascular screening programmes (retinal photography, microalbuminuria, eGFR, foot checks) should be commenced.

**Table 1**

**Age at which to start cardiovascular disease risk assessment in adults (NZGG 2009)**

**Screening intervals are 3-5 yearly depending on risk**

1.	Asymptomatic people without known risk factors: Men at age 45; women at age 55
2.	Māori, Pacific and Indo-Asian peoples*: Men at age 35; women at age 45 years
3.	Screening is recommended 10 years earlier in the presence of other known cardiovascular risk factors or in those at high risk of developing diabetes  Family history risk factors <ul style="list-style-type: none"><li>• Diabetes in first-degree relative (parent, brother or sister)</li><li>• Premature coronary heart disease or ischaemic stroke in a first-degree relative (father or brother &lt;55 years, mother or sister &lt;65 years)</li></ul> Personal history risk factors <ul style="list-style-type: none"><li>• People who smoke (or who have quit only in the last 12 months)</li><li>• Gestational diabetes</li><li>• Polycystic ovary syndrome</li><li>• Prior blood pressure <math>\geq 160/95</math> mm Hg</li><li>• Prior TC:HDL ratio <math>\geq 7</math></li><li>• Known borderline HbA1c (41-49 mmol/mol) or fasting glucose 6.1-6.9 mmol/l</li><li>• BMI <math>\geq 30</math> kg/m<sup>2</sup> or truncal obesity (waist circumference <math>\geq 94</math> cm in men or <math>\geq 80</math> cm in women)</li><li>• Estimated glomerular filtration rate (eGFR) <math>&lt; 60</math> ml/min/1.73m<sup>2</sup></li></ul>
4.	People with diabetes (annually from the time of diagnosis)

\* Indo-Asian= Indian, including Fijian Indian, Sri Lankan, Afghani, Bangladeshi, Nepalese, Pakistani, Tibetan.

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**Table 2**

**What to do following a screening test for type 2 diabetes**

<b>Result</b>	<b>Action</b>	<b>Why</b>
<b>Symptomatic</b>		
<b>HbA1c ≥ 50 mmol/mol</b> and, if measured, Fasting glucose ≥7.0 mmol/L Or Random blood glucose ≥11.1mmol/L	No further tests required	Diabetes is confirmed
<b>Asymptomatic</b>		
<b>HbA1c ≥ 50 mmol/mol</b> and, if measured, Fasting glucose ≥7.0 mmol/L Or Random glucose ≥ 11.1 mmol/L	Repeat HbA1c or a fasting plasma glucose	Two results above the diagnostic cutoffs, on separate occasions are required for the diagnosis of diabetes*
<b>HbA1c 41-49 mmol/mol</b> and, if measured, Fasting glucose 6.1–6.9 mmol/L	Advise on diet and lifestyle modification. Repeat the test after 6-12 months	Results indicate 'pre-diabetes' or impaired fasting glucose*
<b>HbA1c ≤ 40 mmol/mol</b> and ,if measured, Fasting glucose ≤6 mmol/L	Retest at intervals as suggested in cardiovascular risk factor guidelines	This result is normal

\* When HbA1c and fasting glucose are discordant with regard to diagnosis of diabetes, repeat testing at an interval of 3-6 months is recommended. The test that is above the diagnostic cut point should be repeated – if the second test remains above the diagnostic threshold then diabetes is confirmed. If the second result is discordant with the first then subsequent repeat testing at intervals of 3-6 months is recommended. Patients with discordant results are likely to have test results near the diagnostic threshold.

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