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## Executive summary

Health Council of the Netherlands. *Screening for type 2 diabetes*. The Hague: Health Council of the Netherlands, 2004; publication no. 2004/16.

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### Request for advice

Type 2 diabetes is a serious disease which is widespread and can be effectively treated. Is it advisable to detect diabetes at an early stage by setting up a general screening programme? This question was put to the Health Council by the State Secretary of Health, Welfare and Sports. A Committee set up for this purpose has studied the effectiveness of screening for type 2 diabetes as a means of reducing complications and mortality. All mentions of diabetes in this summary refer to type 2 diabetes.

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### Incidence of diabetes

The number of people with diabetes has risen sharply in recent years. Major causes are the problems of overweight and the ageing population. In 2002 around 408,000 people with diabetes were known to general practitioners in the Netherlands. In a number of groups, diabetes is more prevalent than in the population as a whole. This applies, for example, in the case of certain ethnic groups (such as Hindustanis, Turks and Moroccans), overweight people and people with diabetes in the family. However, the increase in the number of registered cases of diabetes also stems from greater vigilance on the part of doctors especially general practitioners, who consequently recognise earlier that someone has diabetes or pre-diabetes (where blood glucose levels are already elevated).

There is, nevertheless, a large number of people with diabetes that has not yet been diagnosed and treated. The disease can, in fact, exist for a long time in the absence of any obvious symptoms. Elevated glucose levels are usually considered to be present for 10 years before the diagnosis of diabetes is made. Research in the 1990s suggested that for every known case there was another undiagnosed case. There are, however, no precise figures for the present.

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### **Complications in diabetes**

Diabetes is a serious disease which in many cases is accompanied by one or more complications. Damage to the small blood vessels leads to complications involving the eyes, kidneys and peripheral nerves (microvascular complications). These complications are the result of elevated blood glucose levels. The longer someone's blood glucose levels are elevated, the greater the risk that certain complications will occur. The large blood vessels (of the heart and brain, for example) can also be affected, which can result in a heart attack, brain haemorrhage or stroke (macrovascular complications).

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### **Treatment**

Blood glucose levels in diabetes patients can, however, be restored fairly effectively through various types of treatment. Complications caused by damage to the small blood vessels can, to some extent, be prevented. Some of the macrovascular complications, too, can be prevented by treating high blood glucose levels, but above all by treating high blood pressure (hypertension) and blood lipid abnormalities simultaneously.

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### **Effectiveness of screening**

No research exists into the usefulness of general screening for diabetes in reducing complications and mortality as a result of this disease. Based on research into treatment early in the disease process, however, it appears that general screening for diabetes may well produce health benefits.

Research does show, for example, that strict monitoring of blood glucose levels early in the disease process leads to a reduction in complications. No threshold value was found below which this reduction was no longer visible. In people with pre-diabetes – who, although they may display elevated blood glucose levels, cannot yet be said to have diabetes – it proved possible to postpone the onset of diabetes.

What does this tell us about the effectiveness of screening? Screening for diabetes leads to intervention in the disease process somewhere between pre-diabetes and early-

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stage diabetes. The greatest health benefit is to be derived in that period by preventing macrovascular complications. The possible health benefit to be gained by preventing problems with eyes, kidneys and nerves (microvascular complications) is probably much smaller.

How can that difference be explained? In the first place, macrovascular complications cause much higher mortality in people with diabetes than microvascular complications. Furthermore, there would appear to be a more effective treatment for macrovascular complications than for microvascular complications. This treatment is also effective for people with diabetes. Not only do these individuals frequently display risk factors for cardiovascular disease (e.g. hypertension and blood lipid abnormalities), but the diagnosis of diabetes also alerts doctors to these risk factors and will then form the basis for intervention.

Based on these findings, it is theoretically possible that general population screening may bring a health benefit. The extent of that benefit cannot be quantified with any certainty, however, since no comparative research has been performed with this objective in mind. A further possibility for screening is to select certain risk groups. How effective would this approach be in preventing complications? People with overweight and obesity often have a cluster of risk factors for cardiovascular disease. Besides having a markedly increased risk for diabetes, they tend, on average, to have hypertension and blood lipid abnormalities.

In view of this clustering, the Committee finds screening of people with overweight and obesity an attractive option, since they, of all people, potentially stand to derive a clear health benefit. This benefit can be realised by treating not only the diabetes itself but also the risk factors for cardiovascular disease. It goes without saying that lifestyle advice concerning exercise, healthy eating and stopping smoking should form part of the treatment. But even in the case of this high-risk group it has not, as yet, been scientifically established whether screening can, in fact, produce a health benefit and if so, how great that benefit might be.

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## **Conclusion**

The Committee does not believe it would be indicated to introduce general screening without first demonstrating its effectiveness. Furthermore, screening involves high costs and, invariably, some degree of inconvenience for the participants. Potentially, however, there is a considerable health benefit to be derived.

The Committee feels that comparative research needs to be soon conducted into the effectiveness of screening. If research into early detection of diabetes is focused on a high-risk group then the costs will be lower, whereas there is a relatively clear potential health benefit. People with overweight and obesity are frequently subject to various con-

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current health risks, one of which is untreated diabetes. It is therefore logical to contemplate screening this group first and to give closer consideration to that possibility. This research is relatively easy to carry out via the primary healthcare sector or the municipal health authorities. The first step is for overweight people who take part in the screening study to measure their own waistlines. If the waist measurement is too high, the blood glucose level will be determined via a laboratory. People with diabetes and people with pre-diabetes are then supervised and treated by the general practitioner. Adopting a more healthy lifestyle, reducing hypertension and improving the blood lipid profile will also be important goals in this process.

A further research option is to define a number of risk factors for cardiovascular disease for all people with high waist measurements, in which case diabetes would be just one of those factors. This is on account of the clustering of these risk factors in overweight people and the potential health benefit to be derived from treatment. Besides determining the blood glucose levels, it would then also be necessary to measure the blood pressure and lipid profile. Here too, the treatment would entail promoting a healthy lifestyle, lowering blood glucose levels and blood pressure, and improving the blood lipid profile. The Committee, realising that this research extends the request for advice by the State Secretary, anticipates that an even greater health benefit might be achieved using this approach. It might also be possible to undertake a closer investigation of the effectiveness of this option, which is geared more to preventing cardiovascular disease than diabetes.