Development Programme for the Prevention and Care of Diabetes in Finland

2000–2010
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Finnish Diabetes Association
DIABETES CENTRE

Tampere 2001
The Finnish Diabetes Association would like to thank the Ministry of Social Affairs and Health, Finland, and Novo Nordisk A/S, Denmark, for their generous support for the publication of the National Diabetes Programme of Finland in English. Although the Finnish model is one of many in the field of diabetes, it will hopefully provide useful ideas also for other countries.
Diabetes is a growing public-health problem both in Finland and throughout the world. There is clearly room for improvement in the prevention of diabetes, its care practices and organization, as well as health outcomes.

In Finland, it has been estimated that 180,000 people have diabetes. According to current estimates, there will be over 300,000 people suffering from diabetes by the year 2010. This is mainly due to genetic factors and the increasing average age of the population. In addition, overweight and physical inactivity make people more susceptible to developing diabetes. Both diabetes and cardiovascular diseases can be decisively reduced through changes in lifestyle.

Although diabetes care in Finland is of a relatively high international standard, there is still a long way to go to achieve the goals set for care. In many people, diabetes is poorly or very poorly controlled. The care practices, care organization and health outcomes of diabetes should therefore be considerably improved in Finland.

The Development Programme for the Prevention and Care of Diabetes (DEHKO), drawn up under the coordination of the Finnish Diabetes Association, is a welcome initiative. A large number of researchers, experts, clinicians and other professionals practising in the field, as well as people with diabetes themselves, have participated in the preparatory work of the programme. The programme is ambitious and wide ranging, but the high prevalence of the disease and its impact on both public health and the national economy argue for such a multifaceted approach.

In municipalities and health-care units, the programme will help to invigorate and strengthen planning work as well as implementation and follow-up measures concerning diabetes prevention and care.

The focal point of the programme is the improvement of care, whereas the strategy relating to the prevention of diabetes and the programme for future measures requires further elaboration. In developing the population strategy of prevention, there is reason to take into account all previous experience, other stakeholders and the Health for All in the 21st Century programme that is currently under construction. The Target and Action Plan for Social Welfare and Health Care, which was approved by the Finnish Government in 1999, includes major activities relating to DEHKO, particularly with regard to diabetes education for health-care professionals, quality management and the evaluation of effectiveness. In the high-risk strategy for diabetes, practical forms of cooperation should be set up with the Action Plan for Promoting Finnish Heart Health.

I wish to thank those who have participated in the development of the programme and in particular the Finnish Diabetes Association for its large-scale preparatory work. It is my hope that the current consensus and cooperation, which has been so fruitful, will continue to expand to cover all the different players, both in the public sector and the business community, as well as within organizations whose contribution is essential to the improvement of the prevention and care of diabetes.

22 March 2000
Eva Biaudet
Minister of Health and Social Services
Development Programme for the Prevention and Treatment of Diabetes (DEHKO)

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Diabetes is a rapidly expanding public-health problem both in Finland and throughout the world. The disease is divided into two main types, type 1 diabetes and type 2 diabetes. The factor common to both types of diabetes is hyperglycemia and its subsequent harmful effects. Nonetheless, according to current medical understanding, they are clearly two different diseases. Both types of diabetes carry a high risk of serious complications.

**Diabetes Is Becoming Increasingly Common Throughout the World**

The number of people with diabetes is growing fast. Currently, there are more than 150 million people with diabetes in the world, and it has been estimated that the number will rise to 300 million by the year 2025.

Nearly 90 per cent of people with diabetes suffer from type 2 diabetes, and this group is rapidly increasing internationally. Although the increase in diabetes is most prominent in developing countries, the disease is also becoming more prevalent in Europe and the Nordic countries.

There are approximately 180,000 people with diabetes in Finland, of whom 150,000 have type 2 diabetes and 30,000 type 1 diabetes. In addition, the blood glucose of an estimated 50,000 people exceeds the limit value for diabetes. However, according to a population survey, these people have no symptoms and are not aware of having diabetes. The new diagnostic criteria of blood glucose (Table 1, page 8) will increase the need for diabetes care.

It is estimated that the number of people with type 2 diabetes will grow by 70 per cent by the year 2010, when the total number of people with diabetes will exceed 300,000. The most significant reasons for the rising prevalence of the disease are the increasing proportion of overweight people, physical inactivity and changes in the age structure of the population.

Since most people with type 2 diabetes are treated within primary health care, this disease is a major problem for primary health care. An intolerable problem for society can only be averted through efforts to prevent the disease and its complications.

The incidence of type 1 diabetes in Finland is the highest in the world, and it is increasing at an approximate rate of two per cent per year. Although the number of people with type 1 diabetes is considerably smaller than that of people with type 2 diabetes, its increasing incidence in small children, the long duration of the disease and the early occurrence of complications caused by poor care make type 1 diabetes a heavy burden for the individual and a major challenge for health care.
DEHKO 2000-2010

The Standard of Diabetes Care in Finland Is Unsatisfactory

Even though diabetes care in Finland is of a relatively high international standard, there is still a long way to go to achieve the desired goals. The study by Valle et al. which recently assessed the success of diabetes care in Finland demonstrated that only one-fourth of people with type 1 diabetes have optimal glycemic control, whereas approximately 50 per cent of them have unsatisfactory or alarmingly poor glycemic control. The figures are even bleaker with regard to people with type 2 diabetes: only 10 per cent have optimal glycemic control. The critical question here is why diabetes care has been unsuccessful.

With patient education, self-monitoring and adequate insulin treatment, it is possible today to maintain the blood glucose of people with type 1 diabetes at a relatively normal level, even in varying circumstances. With type 2 diabetes, the treatment of hyperglycemia is problematic because of the limited efficacy of the medicinal products in use.

Finnish people with type 2 diabetes additionally have very poor control of the most significant risk factors for cardiovascular disease, ie blood lipids and blood pressure. The modest outcome of treatment is also partially due to the poor execution of non-pharmacological therapy.

In the current situation, blood pressure and blood lipid levels are relatively frequently monitored, but this does not necessarily lead to further measures. Because effective and well-tolerated medications are available, careful treatment of hypertension and elevated blood lipid levels is a challenge to the primary health-care system. Similarly, it is worth investing in the treatment of hyperglycemia because its link to the incidence of microvascular complications is indisputable. In other words, we have the means to provide high-quality care, but the implementation of care fails.

What Is It that Costs in Diabetes Care?

Of all people with diabetes, approximately 75-80 per cent die of cardiovascular diseases. People with type 2 diabetes have a two to four times higher risk of coronary heart disease than the rest of the population, and their prognosis is poorer. The risk of cerebrovascular diseases and peripheral vascular disease is also significantly higher in type 2 diabetes.

Cardiovascular diseases are the main rea-
son for the high cost of diabetes care. According to the study on diabetes costs by Kangas, hospitalization forms the greatest expense, accounting for about 56 per cent of the total cost of diabetes care. Most of the hospital care of diabetes (73%) consists of the treatment of cardiovascular diseases.

According to current estimates, the costs will quickly increase in the future owing to the rapid growth in the numbers of people with type 2 diabetes. The future reduction of costs necessitates prompt recognition of the risk factors of cardiovascular diseases and their aggressive treatment.

**How Can Diabetes Care Be Improved?**

The Development Programme for the Prevention and Care of Diabetes (DEHKO) is an all-inclusive programme. Its primary focus is on type 2 diabetes which is the most problematic and currently causes the highest costs. DEHKO is not a treatment guideline for health-care personnel but a comprehensive development programme as a basis for practical care.

The main goal of the programme is the prevention of type 2 diabetes. This will be a long-term and demanding task, and it is suggested that an entirely separate plan be drawn up for the purpose.

The second most important task is to agree upon measures to reduce the risk of cardiovascular disease among people with type 2 diabetes. This requires a substantial change of attitude by the decision makers in the health-care field and the care providers.

The central message is that type 2 diabetes is by no means a "mild diabetic disease" but a fatal cardiovascular disease if all the risk factors are not properly treated.

The care organization has an essential role in implementing care. The expedient use of existing resources is the first step to be taken in improving care. The care of people with type 1 diabetes in the units of primary health care should be concentrated under physicians responsible for diabetes care or general practitioners who are familiar with diabetes. Type 2 diabetes care should be coordinated by a physician responsible for diabetes care and implemented by physicians with population-based responsibility. A smooth-running diabetes registry is required for monitoring the quality of care.

The training of health-care professionals is an essential part of the implementation of the action programme. Personnel with population-based responsibility have the highest priority.

The action programme also charts the problems in the care of type 1 diabetes and proposes means to improve the quality of care. The key objective is to promote self-care by increasing education and self-care training, as well as to ensure that individual care needs are met and necessary specialized services for a person with diabetes are provided.

An attempt is made through the action programme to reinforce the self-responsibility of people with diabetes for the success of their care, as well as their own ways of influencing the treatment of their disease. This also necessitates making better use of the existing service system and reassessment of the utilization of the care resources.

Successful implementation of the Development Programme for the Prevention and Care of Diabetes means enhanced quality of care, resulting in a marked improvement in the quality of life on an individual level and a decrease in the economic burden on a societal level.
2. OBJECTIVES, IMPLEMENTATION AND ASSESSMENT OF THE PROGRAMME

Objectives

The Development Programme for the Prevention and Care of Diabetes has eight objectives concerning the organization of care in 2000-2010:

- There will be a quality system of diabetes care in each care unit, a natural part of which is regular and comprehensive diabetes training within primary health care.
- Measures aimed at the prevention of type 2 diabetes will be a permanent function of primary health care.
- There will be a computerized diabetes registry in each care unit and in each district, as well as a national diabetes registry.
- The care organization for people with diabetes will be based on smooth-running care chains, shared responsibility for care between primary health care and specialized medical care, and flexible consultation practices.
- Each person with type 1 diabetes will have access to individual, high-quality self-care.
- All people with type 2 diabetes will receive sufficient education in self-care, and their cardiovascular risk factors will be treated along with their hyperglycemia.
- People with diabetes will have the skill required for self-care and have a high level of satisfaction with their care.
- The cooperation between the health-care system and the diabetes associations in supporting self-care will become established as a permanent form of activity.

The objectives concerning health outcomes targeted for 2010 are as follows:

- The glycemic control of people with diabetes will have improved so that at least 50 per cent of both people with type 1 and type 2 diabetes have optimal glycemic control, and no more than 30 per cent have unsatisfactory and 20 per cent poor glycemic control.
- The incidence of cardiovascular disease among people with diabetes will drop by at least one-third.
- The complications related to diabetes will decrease according to the objectives of the European St Vincent Programme:
  - leg amputations at least by half
  - diabetic retinopathy at least by one-third
  - diabetic nephropathy at least by one-third.

Implementation

The Finnish Diabetes Association will act as coordinator of the first part (1998-2002) of the Development Programme for the Prevention and Care of Diabetes, to be carried out in the primary health-care system by means of an extensive cooperative network.

The most important cooperative partners are Finnish diabetes experts, the Ministry of Social Affairs and Health, the Social Insurance Institution (KELA), National Public Health Institute, the National Research and Development Centre for Welfare and Health (STAKES), the Sub-Committee on Cardiovascular Diseases and Diabetes of the Adviso-
The first part of the programme is designed to proceed in three phases. The first phase focused on preparation of the action programme and its approval in the consensus meeting held on 19 January 2000. The second phase consists of publicity, training and marketing the action programme. In this phase, the evaluation of the baseline situation concerning the care and glycemic control of people with diabetes will be initiated, as well as the clarification of the options for creating a national quality monitoring system for diabetes care. In the third phase, the prevention programme for type 2 diabetes will be started and further measures will be proposed to carry the DEHKO action programme forward.

**Follow Up and Supervision**

The Finnish Diabetes Association will implement the programme in cooperation with decision makers and providers of health care. The Finnish Diabetes Association will organize consultation meetings for follow up, supervision and assessment, as well as appointing working groups when necessary.

There will be close cooperation with the Finnish Heart Association and the Action Plan for Promoting Finnish Heart Health. The Sub-Committee on Cardiovascular Diseases and Diabetes of the Advisory Board for Public Health and the diabetes working groups of the various hospital districts will act as the follow-up and supervision teams, whose support is essential to the success of the programme.

**Assessment**

The implementation and results of the first part of the DEHKO action programme are assessed at the end of each phase. At the end of the first part a total assessment of the implementation will be conducted, and 8-10 years later the effectiveness of the programme will be assessed in comparison with the baseline situation. The assessment is partially self-conducted and partially an audit by outside parties. The concepts and methods will be defined in connection with the first assessment. The assessment plan is presented in Appendix 1.
Diabetes care has been systematically developed in Finland for more than two decades. When the Sickness Insurance Act came into force in 1963, the preconditions of care were improved, but it was specifically the Mobile Clinic Research Programme conducted at the end of the 1960s by the Social Insurance Institution that raised awareness about the significance of diabetes as a major public-health problem. The Governmental Diabetes Committee was formed in 1974 as a result of an initiative by the Finnish Diabetes Association, and the report of the committee (Plan for Organizing Diabetes Care in Finland) was published two years later.

The committee report had a significant impact on the development of diabetes care: diabetes working groups were founded in hospital districts and a national diabetes nurse system was created. The National Board of Health issued guidelines concerning regional care provisions for diabetes in 1983. Guidelines were published in 1985 for the distribution of care supplies and equipment. Most of the regional care plans of the hospital districts were also published in the 1980s.

In 1989, the European St Vincent Programme for the development of diabetes care was launched by the International Diabetes Federation (IDF) and the World Health Organization (WHO) (Appendix 2). The Finnish Ministry of Social Affairs and Health was committed to the implementation of the objectives of the programme and appointed a liaison person to the St Vincent Action Programme for Finland.

In 1991, representatives of the Finnish Diabetes Association, the Ministry of Social Affairs and Health and the National Agency for Social Welfare and Health met to discuss the implementation of the St Vincent Programme and the WHO resolutions concerning diabetes in Finland. As a result of these discussions, the National Agency for Social Welfare and Health in 1992 appointed a special diabetes expert group with the task of improving diabetes care in Finland. The group was also designated to act as the follow-up group for the implementation of the St Vincent Programme in Finland.

However, due to various reasons, the work of the expert group was interrupted. Only in 1998 was a successor found to continue the work, when the Ministry of Social Affairs and Health created the Sub-Committee on Cardiovascular Diseases and Diabetes under the auspices of the Advisory Board for Public Health. The tasks of the sub-committee consist in monitoring the implementation of the Action Plan for Promoting Finnish Heart Health and the Development Programme for the Prevention and Care of Diabetes, as well as making proposals relating to the prevention of cardiovascular diseases and diabetes. The group also acts as the official follow-up group for the implementation of the St Vincent Programme in Finland.

Since the care organization of diabetes in Finland still has its basis in the provisions created over 20 years ago, it no longer meets the demands of today in many respects. The severity of type 2 diabetes and the problems associated with the disease were not brought into focus until the 1980s and 1990s, requiring an entirely new approach. On the other hand, the ongoing great changes and development projects in the Finnish health-care system call for a link to be established between diabetes care and the current reality of the health-care field as a whole.
The Role of the Finnish Diabetes Association in Improving Care

The Finnish Diabetes Association is one of the major public health organizations in Finland. The 108 local branches and three professional member organizations of the Finnish Diabetes Association have a total of over 56,000 individual members. The national activities of the Finnish Diabetes Association are concentrated in the Diabetes Centre, which is located in Tampere, as well as in five regional units. Since the end of 1970s, the Finnish Diabetes Association has been fulfilling the duties outlined by the Governmental Diabetes Committee and has become a central agent in improving diabetes care in Finland.

For over 20 years, the Diabetes Centre has been responsible for the diabetes education of nurses, as well as the self-care training of people with diabetes.

Since the 1970s, the Finnish Diabetes Association has also produced guidance and support material for both people with diabetes and health-care professionals, as well as national guidelines and recommendations for care and treatment.

In order to improve diabetes care and analyse the costs, the Finnish Diabetes Association commissioned the FinnDiab Study which was published in 1995.

The current National Diabetes Programme (Development Programme for the Prevention and Care of Diabetes) will be the focal area of the Finnish Diabetes Association for the next few years. Broad cooperation will take place with the authorities and health-care personnel in both the planning and implementation of the programme.

4. ORGANIZATION AND RESOURCES OF DIABETES CARE

In Finland, the public health-care system is responsible for diabetes care, with primary health care bearing the main responsibility. The initial care of adults with type 1 diabetes, the care of children, young people and pregnant women with diabetes, as well as the most severe diabetic complications, are the responsibility of the specialized medical care system.

Problems in the Current Situation

The quality and availability of diabetes care have not met demands in all respects in recent years. The adoption of the system of population-based responsibility in primary health care was an important change with regard to health-care policy and did improve the availability of care in general. With regard to diabetes, however, it worsened the situation in some parts of Finland. At the same time, geographical disparities in the availability, organization and quality of care have increased.

In addition, the recession of the early 1990s had an adverse impact on diabetes care, particularly in preventive health care. Many health-care centres had to give up the diabetes nurse system, or it was absorbed into other activities of primary health care.

There is marked variation in the position, duties and availability of a diabetes nurse, and some health-care centres have not appointed any physician or nurse to be responsible for diabetes care. At the same time, little
attention has been paid to the dissemination of information concerning up-to-date diabetes care as part of staff training.

The problems are most apparent in small health-care centres, but they occur even in the largest units of primary health care. In addition to the lack of services offered by a diabetes nurse, many health-care units provide inadequate access to the services of nutritionists and podiatrists, as well as poor oral health care for people with diabetes.

There are regional differences in the implementation and comprehensiveness of the screening for retinal changes, and in certain regions there are also problems concerning the clarity of the organization of diabetes care.

Regional diabetes working groups currently operate in 16 of the 21 hospital districts in Finland. There are also diabetes activities in other districts, but in one-fourth of hospital districts there is no party that coordinates regional cooperation.

Although the existing diabetes working groups function in diverse ways, on the whole they are quite active. The annual regional training sessions are the most visible form of activity, but in many places a great deal of work has also been done to develop care cooperation. Most of the regional diabetes care programmes were drafted in the 1980s and are therefore largely outdated. In the 1990s, only three of the hospital districts have either drawn up totally new care programmes or updated their former ones.

Few health-care units have methodically addressed the quality of diabetes care. Improvement of care is required in both type 1 and type 2 diabetes. Moreover, type 2 diabetes and its prevention should be given special attention when making decisions concerning health-care.

In some hospital districts, development projects concerning diabetes care have recently been started. Examples include the Care Chain of a Person with Diabetes Project in the Pirkanmaa Hospital District, the KAS-DIA Project in Kangasala that aims at improving the care of type 2 diabetes, a project for improving diabetic foot care in Eastern Finland and the regional diabetes registry project in the Kuopio University Hospital District.

The Care Organization

The Public Health Act and the Specialized Medical Care Act require that the public health-care system retain primary responsibility for organizing diabetes care. Occupational health-care and the private sector also have an important role of their own in the care organization.

In developing care, the principal rule is to improve the cooperation between primary health care and specialized medical care, an appropriate division of labour ("shared care model") and straightforward consultation opportunities in both directions.

The diabetic care of children, young people and pregnant women, as well as the treatment of severe complications, are concentrated in the specialized medical care system. However, since the primary health-care system has overall responsibility for the population in each region, the other forms of basic care (such as for infections) for these diabetic groups are generally provided in health-care centres.

The diabetes working groups of the hospital districts have a significant role in the improvement of regional diabetes care. There should be an appointed diabetes working group in each hospital district. A representative of people with diabetes as well as the different professionals should be included in the group. It is the duty of the diabetes working group to act as the regional coordinator of diabetes care and its development, as well as the organizer of regional training for health-care professionals (Appendix 3).

Because the care of people with diabetes requires cooperation among many different
players, it is appropriate for the central policies concerning the improvement of diabetes care to be worked out individually in each hospital district. In addition to quality work, the districts must take into account the sharing of the care, the functionality of the care chains, both problem-oriented and client-centred approaches and process thinking.

The role of the Finnish Diabetes Association in the care organization is further emphasized in disseminating information, organizing training courses for people with diabetes and diabetes education for health-care professionals and publishing (Appendix 4). The Finnish Diabetes Association also holds the leading position in coordinating and improving the quality of patient education. Its local branches throughout Finland support the self-care of people with diabetes in cooperation with health-care centres.

Care of People with Type 1 Diabetes in the Primary Health-Care System

Type 1 diabetes is present in all age groups. The care of children and young people, as well as other special groups of people with diabetes, is organized as outlined above. The initial care of people who are diagnosed with type 1 diabetes as adults usually takes place in a central hospital or in the diabetes outpatient clinic or ward of a regional hospital that has the adequate facilities.

The hospital that initiated the care is usually responsible for the care of the patient for one or two years, and the medical staff supervise and assist the person with diabetes in taking responsibility for his/her self-care and self-monitoring of the disease. When the situation has stabilized, the goals of initial care have been reached, and the person with diabetes is capable of taking the main responsibility for his/her own care, he/she can be transferred into the primary health-care system which must have sufficient facilities for type 1 diabetes care.

The individual with diabetes and the new care unit receive a case summary consisting of the current treatments, the care plan and any problems that have arisen during the course of the care. Those people with diabetes whose disease is exceptionally unstable, or who have serious complications, should continue to be treated primarily within the specialized medical care system.

The care of type 1 diabetes requires continual training of physicians and other personnel, active consultation with other relevant parties and a sufficient number of patients with type 1 diabetes in order to maintain experience and current knowledge of the disease. For this reason, these patients may be concentrated in the care of a physician (as an exception to the system of population-based responsibility) who has at least 20-30 persons with type 1 diabetes in his/her care.

Certain services can be procured from private specialists, who otherwise act primarily as consultants. The basic services of the public health-care system (laboratory, diabetes nurse, distribution of care supplies and equipment) should also be available to those people with diabetes who are treated by a private physician.

In Finland, several alternative models of organizing diabetes care must be applied to sufficiently take into account geographical, regional and other differences.

Care of People with Type 2 Diabetes in the Primary Health-Care System

As a rule, people with type 2 diabetes are treated within primary health-care. A physician responsible for diabetes care coordinates and develops the care, and physicians with population-based responsibility implement it. Special attention is paid to the prevention and early treatment of cardiovascular disease.

It is also important that physicians and nurses are sufficiently familiar with the princi-
amples of the prevention and treatment of over-weight and are aware of the problems in the care of diabetic nephropathy and foot complications. They should also understand the principles of the prevention of such complications and the significance of comprehensive screening for diabetic retinopathy.

The care of people with type 2 diabetes requires natural and flexible opportunities for consultations both within the health-care centre in question and with the specialized medical care system. The prevention of type 2 diabetes is also principally the responsibility of the primary health-care system. In prevention, both the population-based responsibility approach and general health education can be utilized.

Occupational health care is a central resource in risk factor monitoring and the treatment of cardiovascular diseases among people with type 2 diabetes. Occupational health care is also an essential part in prevention of diabetes.

Resources and Division of Responsibilities

Improving diabetes care is a necessity in order to ensure a better quality of life for people with diabetes and for the prevention of costly complications. The care organization holds an essential position in improving care. Because the resources of the health-care system will also be limited in the future, reassessment of current resources is essential at all levels of diabetes care. The most appropriate use of existing resources possible is the first step in care improvement.

A sufficient number of specialists working within specialized medical care must be ensured in order to organize and further develop the care of people with diabetes. The units responsible for the care of children with diabetes must be guaranteed better resources than has been the case to-date.

Each health-care unit that treats people with diabetes must have a diabetes team. This team should include at least a physician responsible for diabetes care (Appendix 5), a diabetes nurse (Appendix 6), a nutritionist (depending on the size of the population, Appendix 7) and a podiatrist (Appendix 8). A psychologist, a physical therapist or a physical education instructor could be included where necessary.

This team coordinates diabetes care, evaluates and improves the quality of care and trains other personnel. The person with diabetes is an equal member of the team with regard to his/her own care.

In the primary health-care system, there should be one full-time diabetes nurse per 300–400 diabetic patients and one nutritionist per 30,000 population.

As necessary, the nutritionist participates in patient education, is responsible for the nutritional training of other personnel and is the key player in the planning of lifestyle counseling.

Currently, there are permanent posts for podiatrists in only a few health-care units, and their number should be increased throughout the country in order to secure services for the prevention of foot problems.

Since it is not always possible for the units of the primary health-care system to arrange the services of a nutritionist or podiatrist on their own, these services can also be established jointly among several health-care centres or contracted out to private service providers.

The screening for retinal changes should be organized comprehensively using the method of fundus photography. Organizing regular check-ups of oral health is also the responsibility of the diabetes care unit, whereas the primary health-care system treats possible illnesses and conditions.

Improving the Quality of Care

The improvement of the quality of diabetes care must receive attention in all units in both primary health care and specialized medical
care. Establishing a smooth care chain, quality criteria for each care unit and a diabetes registry provides efficient tools for the improvement and assessment of the quality of the care.

Each unit’s own quality system need not be complicated. It should consist of a general description of the unit and guidelines for the care process of a person with diabetes, such as:

• resources (staff, etc)
• description of activities
• accessibility
• education
• patient satisfaction
• glycemic control

Training
In the basic and extended training of physicians and other care personnel, emphasis is put on increasing knowledge about diabetes. Through diabetes education for health-care professionals, know-how on modern diabetes care is ensured at all levels of the health-care system. Training should be organized both nationally and regionally, with regional training ensuring that local circumstances are taken into account.

The diabetes working groups of the hospital districts should bear the main responsibility for the organization and content of the regional training. Outside sponsorship is an option for funding. It is also important that employers enable personnel to participate in diabetes education for health-care professionals by reserving adequate financial allowances and substitute work staff.

5. COSTS OF DIABETES

Diabetes is an expensive disease for society. In Finland, the direct costs for the health care of people with diabetes were over FIM 5.2 billion (USD 1.0 billion at the European Central Bank average exchange rate for the year 1997) in 1997, most of which (approximately USD 570 million) was spent on hospital and long-term care. According to both Finnish and international research, the health care of people with diabetes is at least 2.5 times more expensive than the health care of age- and gender-matched control populations and about five times as expensive as the average for the entire population.

People with type 2 diabetes are heavy consumers of health-care services because of inadequate control of their glucose metabolism and insufficient treatment of their cardiovascular risk factors. The costs of the care of people with type 2 diabetes were 88 per cent of the total costs of diabetes care and totalled USD 876 million in 1997, and a significant part of this was caused by preventable cardiovascular diseases related to diabetes.

According to recent research, definite savings can be achieved through correct allocation of care, improvement in the productivity of the care organization and investment in the prevention of type 2 diabetes and its complications. As a result of these measures, the human suffering of people with diabetes and expensive hospital care can be reduced, and the trend in the cost of diabetes care can be corrected.
The Importance of Knowing the Cost Structure of Health Care

It is of great importance to be familiar with the cost structure of diabetes care because health-care costs are rapidly increasing, whereas economic resources are limited. If the cost structure and the cost-effectiveness of care are not properly understood, there is a danger of making savings in the wrong areas (e.g., distribution of self-care equipment), i.e., areas that have a decisive impact on reaching

### Table 2

Costs of health care for people with diabetes and their age- and gender-matched controls (USD * 1000). Helsinki 1997. The length of hospital stay was limited to 365 days/admission.

<table>
<thead>
<tr>
<th>Type of care</th>
<th>Type 1 diabetes</th>
<th>Type 1 controls</th>
<th>Type 2 diabetes</th>
<th>Type 2 controls</th>
<th>Total for diabetic population</th>
<th>Total for control population</th>
<th>Excess costs caused by diabetes</th>
<th>% of total excess costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital care with diabetes as a primary diagnosis</td>
<td>501</td>
<td>0</td>
<td>1108</td>
<td>0</td>
<td>1609</td>
<td>0</td>
<td>1609</td>
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<td>10920</td>
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<td>3223*</td>
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<td>2549</td>
<td>5174</td>
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<td>2399</td>
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*The expenditure for missing controls added as an average
diabetes care objectives but are of minor importance with regard to total costs. The costs caused by diabetes consist of direct costs (outpatient and hospital care, medications, self-care equipment and rehabilitation) and indirect costs (labour and productivity lost because of sick leave, early retirement and premature death), as well as psychosocial, or intangible, costs that are difficult to calculate (for instance the impact of diabetes on quality of life). In the decision-making process within health care, detailed knowledge of the direct costs of diabetes provides the greatest benefits.

**Research Findings Outline the Situation**

The direct and indirect costs of diabetes in Finland in 1989 were calculated in connection with the FinnDiab Study that was published in 1995. The direct costs were USD 298 million (79% of total costs), and the indirect costs were USD 79 million (21%).

The calculated direct costs of the care of people with diabetes accounted for 5.8 per cent of the total costs of health-care in 1989. The total costs of diabetes care were caused overwhelmingly (81%) by hospital care. However, at the time of study the costs of outpatient care could not be comprehensively determined, leading to overestimation of the proportion accounted for by hospital care.

The most recent information is based on research that investigated the utilization and costs of diabetes care in the Helsinki Hospital District. On the basis of the results, it has been possible to estimate the costs of the care of people with diabetes for the whole of Finland in 1997 while taking background factors into account.

The direct costs of the health care of people with diabetes in the entire country (USD 1.0 billion) were 11.0 per cent of the total health-care costs in Finland (USD 8.9 billion). Correspondingly, the share of hospital care (USD 570 million) was 6.4 per cent of the total costs. The costs were principally caused by the care of people with type 2 diabetes. (Table 2)

In Helsinki, the share of type 2 diabetes care was 88 per cent in the total costs of diabetes care and 94 per cent in the cost of hospital inpatient care of diabetes. The number of hospital inpatient days spent by people with diabetes was 1.8 times higher than among the corresponding age groups in general, accounting for 14.5 per cent of all hospital inpatient days of somatic care. The costs of diabetes-related hospital care of people with type 2 diabetes were mainly due to macrovascular complications (79%), whereas most of the costs for type 1 diabetes were related to microvascular complications (51%). (Figure 1)

![Figure 1](#)

**Figure 1.** Distribution of costs of hospital inpatient care for diabetes and its complications (%). (Diseases unconnected to diabetes and long-term care are not included.)

Figure 2 presents the distribution of diabetes costs according to the Helsinki Study. The share of outpatient care was 22.1 per cent. In
other words, the Helsinki Study was able to evaluate the costs of outpatient care significantly more comprehensively than the FinnDiab Study. Medication costs were 15.6 per cent of the total costs of care. They included all the medicines used by people with diabetes, whereas in the 1989 study only medicines for diabetes were included. The cost share of self-care equipment was 2.4 per cent.

According to the study, the health-care costs of people with diabetes residing in Helsinki totalled USD 74 million in 1997, which was 12.6 per cent of the final operating expenditure of the Helsinki Health Department, although it was not possible to calculate the costs of the dental care, occupational health care and mental health care of people with diabetes. The care costs of people with diabetes were 2.2 times those of the age- and gender-matched control population.

Calculating Cost-Effectiveness

Improvement of care always causes additional expenditure. Therefore, when decisions are made, information is needed not only about the direct costs of a disease but also about the cost-effectiveness of treatments and other health-care procedures. It is estimated that no more than 15 per cent of all health-care procedures are both life prolonging and cost saving. Thus, there is always a price for the additional years of life attributed to the care.

In health-care economics, cost-effectiveness is evaluated by calculating the cost of one life-year saved (LYS) or one additional quality-adjusted life-year (QALY) achieved by a given health-care procedure. In the case where the procedure used has no effect whatsoever on quality of life, the cost per LYS and cost per QALY are equal for practical purposes.

In Sweden, a limit value of SEK 200,000 (approximately USD 20,000) is used in deciding whether an intervention is cost-effective or not. In the USA, the following limit values have been used:

- highly cost-effective: less than USD 20,000/LYS or QALY
- relatively cost-effective: USD 20,000-40,000/LYS or QALY
- borderline: USD >40,000-60,000/LYS or QALY
- expensive: USD >60,000-100,000/LYS or QALY

Diabetes Care Is Cost-Effective

Efficacious care in high-risk individuals, such as people with diabetes, is generally always cost-effective regardless of the amount of care costs. There are several areas in diabetes care where cost-effectiveness is particularly evident:

1. Prevention of cardiovascular diseases among people with type 2 diabetes. In the
UKPDS Study, the cost of one life-year saved by lowering blood pressure was at most only GBP 720.

2. In the Nordic 4S Study, the cost of one life-year saved by lowering the blood cholesterol of Finnish people with diabetes was USD 2,524, which is clearly cost-effective. The procedure was much less cost-effective in people without diabetes (USD 8,201/LYS). Figure 3 demonstrates how in the 4S Study the effect was especially reflected in a reduction in hospital inpatient days of people with diabetes.

3. The use of aspirin to prevent myocardial infarction and stroke has also proven to be effective. In terms of cost-effectiveness, it can be cost-saving and is at least cost-neutral (at most USD 0/LYS).

4. The prevention and early detection of both diabetic retinopathy and diabetic nephropathy have been found to be cost-effective in the care of people with type 1 diabetes.

5. Intensive glycemic control was also found to be cost-effective in the DCCT Study (USD 20,000/QALY).

The care of type 1 diabetes will become costly if cuts are made in the key area, the distribution of equipment for self-monitoring of blood glucose: when self-monitoring by people with diabetes themselves diminishes, the burden of monitoring glucose balance falls on health-care units, and when, due to the shortage of health-care resources, the monitoring then falls to an insufficient level, complications consequently are apt to develop and the need for hospital care tends to increase.

Nevertheless, the cost-effectiveness of the care of type 1 diabetes can be markedly improved if savings in expenses can be achieved in the implementation and monitoring of care, for example, in comparison with the DCCT Study.

Prevention – the Key to Savings in Diabetes Costs

The message emerging from both Finnish and international research is unambiguous: complications can be prevented, and investing in their prevention brings remarkable savings to the current, very high hospital care costs. Moreover, the prevention of complications is always cost-effective.

The Helsinki Study showed that the increase in mean excess costs (USD per person per year) caused by diabetes was 24 fold in type 2 diabetes and 12 fold in type 1 diabetes after the patient had developed one or more complications (Figure 4). Patients without diabetic complications (69% of the study population) accounted for less than 10 per cent of the total excess costs caused by diabetes.
With their sheer number and multiple risk factors, people with type 2 diabetes are the key group with regard to costs. It is worth bringing their care up to date as set out in the DEHKO action programme.

Although the economic burden of the care of people with type 1 diabetes on society is not as heavy as that of type 2 diabetes due to the lower prevalence of the disease, it is still important to improve its health care and health-care organization. When inadequately treated, type 1 diabetes is always a life-threatening disease and, on an individual level, a costly one because of its severe consequences.

Only rational allocation of resources towards the prevention and all-inclusive care of type 2 diabetes can bring a solution to the problem of how to prevent the predicted explosive increase in the disease and the multiple rise in the costs of its health care. These measures should be directed to both the entire population and the groups at risk of type 2 diabetes. The savings achieved in health-care costs with the DEHKO programme can be readily reallocated to other sectors of health care.

### 6. CARE: A PART OF LIFE FOR A PERSON WITH DIABETES

Both type 1 and type 2 diabetes are diseases that last throughout the life of a person who has been diagnosed with them. Both diseases can be successfully treated so that it is possible to live a normal, full life in spite of the disease’s everyday presence.

The starting point in the care of diabetes is self-care by the person with diabetes because nobody else can control the disturbances in the continuously functioning energy metabolism. The daily care of diabetes is demanding and requires knowledge, skill, endurance and motivation. The health outcomes are primarily dependent on the practical care decisions made by the person with diabetes, and the responsibility for adapting the care to one’s own everyday life lies with oneself.

The person with diabetes and the health-care system have distinct roles. It is the task of the health-care system to make judgments on the most suitable care for the person in question and to provide him/her with education, medical follow up and support, as well as self-care equipment and drug prescriptions. The person with diabetes is responsible for his/her own daily care, taking the prescribed...
injections or other medications, measuring out the food intake, monitoring the blood glucose and, according to the results, making alterations to his/her care according to the agreed guidelines.

Diabetes indeed differs from most other diseases in that the person with diabetes is not an object of care but a decisive player in achieving the health outcomes. Hence, as far as their own disease is concerned, people with diabetes should also be seen as a resource for the health-care system.

Motivation from Peer Support

Peer support, ie mutual interaction among people with diabetes, is very important. Since diabetes is a life-long disease that evolves over the years, the lives of the person with diabetes and his/her immediate family are thoroughly intertwined with it. The care of diabetes takes place within everyday life, and the solutions people with diabetes themselves find are therefore also of great value to other people suffering from the same disease.

It is good to share ideas and discoveries, the management of everyday life, and the moments of success and failure in the care of diabetes; doing so helps both oneself and others.

The local branches of the Finnish Diabetes Association support the self-care of people with diabetes in many ways and work in increasing cooperation with the health-care system. Membership of the Finnish Diabetes Association and the Diabetes Magazine provide a regular channel for obtaining information and a support network for a person with diabetes, thus complementing the services of the health-care system in a way that benefits all parties.

The Role of Patients in Improving Diabetes Care

When striving for better health outcomes in the care of both type 1 and type 2 diabetes, the problems and solutions presented by people with diabetes themselves provide important background information and basic material to improve the care. The lack of motivation for care, for instance, which is often presented as the reason for poor health outcomes, was found to be a result rather than a cause in an analysis by people with diabetes themselves. On the basis of this finding, several propositions were made for improving the care system and the cooperation among people with diabetes, diabetes associations and the health-care system.

In the early 1990s, the Finnish Diabetes Association translated and published a booklet entitled Rights and Roles that was a part of the St Vincent Programme support material. A critical analysis of the booklet’s definition of the role of a person with diabetes shows that the views presented at the time are still, on the whole, in line with the current way of thinking.

However, in order to reinforce their self-care, people with diabetes wish to complement the definition of the patient’s role as follows:

- A person with diabetes is responsible above all to himself/herself for his/her own health; after all, diabetes must be taken into account every day and, in the end, the consequences of inadequate care are faced by the person himself/herself.
- Responsibility in self-care means that a person with diabetes really does comply with the knowledge given and acquired, is committed to self-care and strives to achieve the best glycemic control possible.
- A person with diabetes should actively participate in education, nurture a good care relationship and utilize the available services.
- The proper use, storage and servicing of the self-care equipment so that unnecessary costs are avoided are also the responsibility of the person with diabetes.
The parents of a child with diabetes are responsible for their child’s self-care and must attend to the cooperation and communication among the different parties that are part of the child’s environment (day care, school, hobbies).

A Person with Diabetes in the Care System

In the current financial situation of the health-care system it is all the more important that people with diabetes and the care personnel work together to detect inappropriate modes of operation and to find good and high-quality care practices.

With regard to cooperation, it is also important that people with type 1 or type 2 diabetes are accepted as equal experts and members of the diabetes teams concerning their own disease. In development projects on care practices, the experiences of people with diabetes are best utilized by including their representatives in working groups and committees. The cooperation between the health-care system and diabetes associations in supporting the self-care of people with diabetes should be reinforced in all possible ways.

7. LIFESTYLE MODIFICATION IN THE PREVENTION AND CARE OF DIABETES

In diabetes care, lifestyle modification can prevent complications or markedly delay their appearance, as well as decreasing the need for medication. Lifestyle is especially significant in the prevention of type 2 diabetes.

Essential to the health of a person with diabetes are smoking cessation, physical activity as an integral part of lifestyle and healthy eating habits. To lower the risks of cardiovascular diseases, attention must be paid particularly to lowering the intake of hard fats and energy in overweight people.

Smoking is extremely harmful for the heart and blood vessels. Smoking constricts blood vessels and predisposes to premature arteriosclerosis and coronary heart disease, as well as circulatory disorders of the brain and feet. Moreover, the minor renal lesions found in people with diabetes progress faster in smokers.

Physical activity has many beneficial effects on the metabolism and functions of the body. In addition to improving glucose metabolism, it has a favourable effect on lipid metabolism and blood pressure and improves muscle function, general functional capacity and mood. Furthermore, regular exercise also increases insulin sensitivity and corrects the glycemic control of type 2 diabetes. Exercise helps both in losing weight and keeping it under control.

With a proper diet, most metabolic disturbances can be simultaneously addressed. Increasing the intake of soft fats and decreasing the intake of hard fats down to one-third of the total fat intake lowers the LDL cholesterol level. Moreover, soft fats appear to have a favourable effect on blood pressure and insulin resistance.

Food that is high in carbohydrates and fibre, including both soluble and non-soluble fibres, has various positive effects on health. This kind of nutritional therapy increases insulin sensitivity, decreases the amount of LDL cholesterol in blood and adds to the sense of
being full after a meal. A reduced salt intake decreases blood pressure in some individuals. People with diabetes are more susceptible than others to the harmful effects of sodium.

Individual timing of meals can be used to influence the post-prandial increase in blood glucose level, sense of hunger and control of eating.

Limiting energy intake in people with type 2 diabetes corrects insulin resistance and high blood glucose, disturbances in lipid metabolism and high blood pressure. When high blood glucose is reduced, insulin secretion improves.

According to a study by Uusitupa, improved nutritional education in the early years of the disease can reduce the need for medication in people with type 2 diabetes down to one-third of what people receiving conventional care use. On a national level, corresponding results would mean annual savings of millions of US dollars. Nutritional education in the care of hypertension can result in savings of the same order if not larger.

Organizing Lifestyle Counselling

Achieving lifestyle changes through counselling requires a methodical approach and continuity (also between care units and levels of care) on the part of the care organization, use of a common language and agreement on common goals.

Diabetes care and education is teamwork. A physician, diabetes nurse or a nurse familiar with diabetes care and a nutritionist participate in nutritional education. It is important to agree upon the division of tasks in each care unit. The services of an expert in physical exercise are used when possible. Other resources and groups available in the area are methodically utilized in weight reduction and in guiding the patient to smoking cessation and physical activity.

The implementation of the nutritional education of a person with type 2 diabetes, monitoring of the success of the diet and continual motivation are primarily the task of the nurse who regularly meets the patient. A nutritionist familiar with diabetes care is a member of the diabetes team and acts as a consultant to the physician and the nurse. The contribution of the nutritionist is essential in the early stages of the education of all people with type 1 diabetes, all children with diabetes and their families.

Individual guidance given by a nutritionist is needed by those people with diabetes who have special problems in attaining glycaemic control or controlling their weight, multiple allergies limiting the use of basic foodstuffs, celiac disease, microalbuminuria or diabetic nephropathy, gastroparesis or other neuropathic problems with eating or the digestive system or multiple diseases that must be taken into account in their diet, or who are undergoing great changes in their life situation.

Know-how in nutritional education in the primary health-care system is enhanced by organizing a smooth consultation system. Moreover, a chain of nutritional education should be established (eg nurse with population-based responsibility -> diabetes nurse -> nutritionist).

Lifestyle Counselling

Familiarity with the lifestyle of a person with diabetes, particularly the habits of eating and physical activity, is essential when the need for alterations is discussed. Such information is always necessary in situations where starting insulin treatment or a medication that increases insulin secretion is being considered.

The goal of lifestyle counselling is to achieve permanent changes in the behaviour of the person with diabetes. Achieving and maintaining the changes demand persistence on the part of both the person with diabetes himself/herself and the care team. The effects produced by guidance on a single occasion are minor.
Permanent alterations in one’s own customs and habits are a great challenge to a person with diabetes, and only a few issues can therefore be focused on at the same time (see Chapter 8).

The method of group counselling is well suited to the lifestyle modification of people with diabetes. Issues for diabetic patients, such as basic information on a proper diet or physical activity, can be discussed in a group situation by utilizing the participants’ own experiences. Personal counselling sessions can concentrate on the practical attainment of the objectives. Counselling aimed at weight reduction and control, as well as smoking cessation, can almost always take place in a group setting.

Lifestyle counselling is the very first step in the care of people with type 2 diabetes. The counselling is started immediately after the disease has been diagnosed. Support and counselling concerning lifestyle is also continued in connection with transition to drug therapy.

**Realistic Aims**

The aims are agreed upon in a joint meeting with the person with diabetes, the physician and the diabetes nurse (and other professionals, as necessary), in which the diabetic patient’s own role in the care is clarified and such aims are identified as he/she can accept and commit himself/herself to. The person with diabetes should have basic knowledge of the disease, its seriousness and care, and the targets for lifestyle changes should be sufficiently low and tangible to allow them to be achieved.

The targets and commitments are recorded in the patient documents (and the diabetes registry), and their attainment is systematically monitored. According to need, the targets are revised, corrected or new additional targets are agreed upon.

**Special Features of Nutritional Education**

People with diabetes are recommended to have a diet similar to that of the rest of the population in terms of nutritional content. However, people with both type 1 or type 2 diabetes need specific dietary instructions in many respects (Nutritional Recommendations of the Finnish Diabetes Association).

**People with Type 2 Diabetes: Body Weight Determines the Focus of Lifestyle Counselling**

The target for people with type 2 diabetes is normal weight. Nevertheless, a weight loss of 5-10 per cent already has a positive effect, and in some cases it is enough to prevent putting on more weight.

If a person with type 2 diabetes is of normal weight, the counselling primarily concentrates on the attainment of a healthy diet, finding a suitable rhythm for meals and increasing physical activity. Diabetes cannot be treated by not eating. A substantial decrease in glucosuria causes weight increase unless the amount of food intake is somewhat reduced. In order to achieve good glycemic control, it would be useful to estimate the carbohydrate content of meals in the case of patients receiving sulphonylurea medication or insulin treatment.

In modification of the lifestyle of people with diabetes who are mildly or definitely overweight (body mass index, BMI, over 25), it is essential to reduce the energy content of the diet by decreasing the amount of food and fat intake and the use of alcohol, to find an appropriate rhythm for meals and to increase physical activity. In the care of obese individuals (BMI over 30), a very-low-calorie diet (VLCD) can be used to promote rapid weight loss. When VLCD is used, lifestyle counselling is just as important as when the person loses weight on a regular diet.
Weight-loss medication can be used to improve the results of weight reduction and to support the weight control phase. In these cases, alterations in eating habits also have great significance.

If a person with diabetes is not willing to lose weight, he/she may nevertheless be willing to make other changes in lifestyle and alter his/her diet in an otherwise healthier direction.

People with Type 1 Diabetes: Focus on Carbohydrates and the Diet as a Whole

The lacking insulin secretion in people with type 1 diabetes is corrected by replacement therapy. The type, dose and timing of insulin is adjusted to the meal rhythm and other activities of the person with diabetes as best as possible. It is essential to the success of the daily dosage of insulin that the person with diabetes himself/herself learns to understand the effects of insulin doses, different food-stuffs and the amount of food, as well as physical activity, on the blood glucose content.

For the care to be successful, it is necessary to estimate the amount of carbohydrates in each meal. In the care of type 1 diabetes, the whole diet and its fat composition, as well as physical activity and not smoking, are important.

Increasing Physical Activity

One of the key goals in the prevention of type 2 diabetes is the promotion of regular health and fitness exercise among the entire population. Exercise is also of great significance in the care of all people with diabetes. Over one-fourth of all Finnish people do not exercise at all on a weekly basis during their free time, and only one in seven people report exercising daily during their leisure time.

It is recommended that every adult spend at least 30 minutes a day on some form of exercise equivalent to brisk walking in terms of load. The exercise may be composed of several shorter periods. In order to maintain muscle strength, it is recommended that exercises involving all large muscle groups should be performed at least twice a week, for example at a gym.

The foundation for healthy habits of physical activity is laid in childhood and youth. The promotion of children’s and young people’s physical activity is therefore one of the most important long-term objectives in the prevention of type 2 diabetes.

According to epidemiological follow-up studies, the risk of developing type 2 diabetes is lower among people who exercise regularly on a weekly basis than among people who do not exercise. The protective effect of physical activity is dose dependent: the more frequent the exercise, the greater its protective effect.

According to a study conducted in the USA, the risk of developing diabetes was reduced by 6 per cent for each regular weekly exercise session corresponding to energy consumption of 500 kilocalories. Depending on an individual’s weight and speed, this amount is consumed during 60-90 minutes of walking. The amount of physical activity both during free time and at work decreases with age. The promotion of physical activity in 50 to 70-year-olds should therefore be given special emphasis in the prevention of type 2 diabetes.
The patient’s self-care, know-how, qualifications for and attitude towards care all have an impact on both health outcomes and the progression of the disease. Along with the professional care, the motivation for and learning of self-care by the person with diabetes himself/herself are prerequisites for good glycemic control and a full life. With diabetes this calls for continual education based on the needs of the person with diabetes, as well as encouragement and support from health-care professionals.

A multidisciplinary team is involved in the education of a person with diabetes. Such a team consists of a nurse, physician, nutritionist, podiatrist and, when necessary, a psychologist, social worker and physical therapist or physical education instructor.

Problems in the education of people with diabetes stem from inadequate resources, lack of consensus concerning objectives and the division of tasks, high staff turnover and lack of experience.

The Basics of Education

The empowerment philosophy in diabetes care stems from the understanding that it is the people with diabetes themselves who make the decisions concerning their own care on a daily basis. On the other hand, empowerment acknowledges that individuals have different capacities for assuming responsibility and allows goals to be set accordingly.

Education is the most essential part of diabetes care. It is integral to all professional care contacts with a person with diabetes. It implies professional and goal-oriented handling of issues concerning diabetes and its care in a situation of equality between the learner and the educator. Education is a continuous and methodical process, which, however, always proceeds according to the current situation. It is based on an evaluation of the educational needs of the person with diabetes, who is the key evaluator of these needs and setter of the goals. Education supports the learning process of the person with diabetes, whereby the knowledge and skills necessary for the care are reinforced, and the taking of responsibility for the care is gradually strengthened.

The working method is client centred so that the person with diabetes is encouraged to talk about those problems he/she considers to be the most essential. He/she is listened to and not interrupted. Interviews primarily consist of open-ended questions. The aim is to achieve change through a mutually agreed course of action.

Personal education is complemented by group education. In a group session, peer experiences can be shared and discussed, solutions to problems can be found, and new applications can be conceived. The group affects people's attitudes. "Healing" elements that support the process of adaptation to a chronic disease are an integral part of group work.

In a motivational discussion, the person with diabetes himself/herself evaluates the benefits and drawbacks of lifestyle alterations and sets his/her own goals, and the health-care professional encourages him/her to pursue them. Inner motivation is reinforced by the perception of being able to make choices, the optimal nature of the goals and the recognition and acceptance of the contradictions inevitably associated with the process.
In a client-centred education model that supports the control of diabetes, the following issues are emphasized:

- The care relationship is equal and based on shared expertise and responsibility.
- The person with diabetes recognizes the problems and learning goals.
- The person with diabetes is the final implementer of care and solver of problems, whereas the professional personnel are a resource.

- Education is intended to enable the person with diabetes to make conscious choices.
- Behavioural changes are achieved through inner motivation.

Assessment and Development of Education

The current quality philosophy emphasizes a process-oriented and client-centred approach, as well as active participation of health-care professionals in continual evaluation and development of their own work. (Appendix 9)

Client-centredness means that the effectiveness of the care is assessed

- in relation to changes in the health of the person with diabetes
- in relation to the views of the person with diabetes on how the care and education have supported the management of his/her health problem
- in relation to how satisfied the person with diabetes is with his/her care.

Education is assessed together with the person with diabetes during consultations and in connection with annual follow-up visits by determining, for instance, the following:

- the attainment of short-term and long-term care objectives
- the level of practical diabetes knowledge necessary in care
- care skills: self-monitoring and its utilization, evaluation and flexibility of eating, injection technique, anticipation and management of low blood sugar, etc.
- biochemical indicators: blood glucose in self-monitoring, glycosylated hemoglobin levels (HbA₁c), weight changes, blood lipids, blood pressure, etc.
- care practices: choices of foods, injection sites, use of medication, foot-care habits, footwear, etc.
- lifestyle: smoking, physical activity, etc.
- satisfaction with care and diabetes-related quality of life
- emotions and moods associated with diabetes, as well as difficulties experienced in life because of the disease

Key elements in improving and developing education are the assessment of one’s own work, development of educational skills, improvement of interactive and teamwork abilities, as well as appropriate and efficient use of available resources. (Appendix 10)

Increasing cooperation, training, sharing of experiences and research related to education, both nationally and internationally, helps the efficient use and correct allocation of limited resources.
Two metabolic disturbances are characteristic of type 2 diabetes: insulin resistance and low insulin secretion relative to blood glucose. People with type 2 diabetes are usually overweight and often suffer from hypertension, dyslipidemia and abnormalities of hemostasis and coagulation.

Metabolic syndrome precedes type 2 diabetes. It is caused by lifestyle (physical inactivity, overweight) and genetic factors. The syndrome has all the features of type 2 diabetes except hyperglycemia (Figure 5). Each element of metabolic syndrome significantly increases the risk of cardiovascular disease (coronary heart disease, stroke, peripheral vascular disease). However, the diagnosis of type 2 diabetes is still based on the detection of elevated blood glucose.

Characteristics suggestive of metabolic syndrome are more common in the Finnish population than among other European populations.

Approximately 15 per cent of people with type 2 diabetes have one of the rarer subtypes of the disease. It is essential to recognize these subtypes: late-onset type 1 diabetes, maturity-onset diabetes of the young (MODY) and mitochondrial diabetes.
How does type 2 diabetes develop?

Genetic factors (type 2 diabetes in the family)
Lifestyle (excess energy intake and physical inactivity)

Metabolic syndrome
- overweight
- abnormal lipid profile (high triglycerides, low HDL cholesterol)
- hypertension
- abnormal hemostasis and coagulation
- IGT (Table 1, page 8)

Type 2 diabetes
- hyperglycemia
- overweight
- abnormal lipid profile
- hypertension
- abnormal hemostasis and coagulation

Why Is Type 2 Diabetes the Centre of Focus in the DEHKO Programme?

It has only been understood since the 1980s that type 2 diabetes is associated with significant excess mortality from cardiovascular disease. Even with successful treatment of hyperglycemia it is not possible to correct disturbances of lipid metabolism, significantly lower LDL cholesterol levels, reduce blood pressure or correct abnormal hemostasis and coagulation.

Treatment of all risk factors for diabetes in addition to blood glucose control significantly reduces the burden of cardiovascular disease in type 2 diabetes. Many studies have also demonstrated the efficacy and cost-effectiveness of multifactorial intervention (Tables 3 and 4, page 32).

The major risk factors for cardiovascular disease are unsatisfactorily or poorly controlled in more than half of Finnish patients with type 2 diabetes (Table 3).

Wanted: a New Attitude and a Focus on Essentials

The greatest obstacle to good care is the prevailing perception of type 2 diabetes as a "mild disease" that can be treated by losing weight, a proper diet and oral medication, or, in the worst case, insulin treatment. Cardiovascular disease that occurs as the major complication is often treated only by endpoint procedures, such as angioplasty, bypass surgery or other arterial procedures. The prevention of these problems by risk factor management has been neglected. The knowledge and resources for active care are still often inadequate, and consultation networks between primary health care and the diabetes units of specialized medical care do not always function as desired.

To attain better results, the providers of diabetes care should adopt new attitudes, as well as absorbing and putting into practice knowledge acquired from the most recent research.
Table 3

Risk factors in patients with type 2 diabetes in Finland

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Unsatisfactory or poor control</th>
<th>Per cent of patients</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hyperglycemia</td>
<td>50%</td>
<td>HbA1c ≥ 8.5%</td>
<td>Valle et al* Diabetes Care 22: 575(579, 1999)</td>
</tr>
<tr>
<td>Particularly Dyslipidemia</td>
<td>45%</td>
<td>5-Trig &gt; 1.7 mmol/l</td>
<td>Bothnia Study 1999</td>
</tr>
<tr>
<td></td>
<td>63%</td>
<td>5-LDL &gt; 3.4 mmol/l</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>80%</td>
<td>&gt; 140/90 mmHg</td>
<td>National Public Health Institute (Tuomilehto)</td>
</tr>
<tr>
<td>Particularly Abnormal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hemostasis</td>
<td></td>
<td>&gt; 70%</td>
<td></td>
</tr>
</tbody>
</table>

*statistics based on a random sample (59 health-care centres, 17 hospitals) of 3,800 patients

Table 4

Effect of drug treatment of risk factors on cardiovascular events

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Study</th>
<th>Reduction*</th>
<th>Change in risk factor</th>
<th>Cost-effectiveness proven</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic hyperglycemia</td>
<td>UKPDS</td>
<td>−16%</td>
<td>HbA1c 7.9 → 7.0%</td>
<td>Yes de Sonneville: VU University Press, Amsterdam 1998</td>
</tr>
<tr>
<td></td>
<td>LIPID</td>
<td>−25%</td>
<td>LDL chol 3.6 → 2.6 mM</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>−19%</td>
<td>LDL chol 3.8 → 2.9 mM</td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td>UKPDS</td>
<td>−44%</td>
<td>BP −10/−5 mmHg</td>
<td>Yes UKPDS Study Group: BMJ 317; 720–726, 1998</td>
</tr>
<tr>
<td></td>
<td>CAPPP</td>
<td>−66%</td>
<td>BP −12/−10 mmHg</td>
<td></td>
</tr>
<tr>
<td></td>
<td>SystEur</td>
<td>−49%</td>
<td>BP −13/−3 mmHg</td>
<td></td>
</tr>
<tr>
<td>Abnormal hemostasis</td>
<td>Physicians</td>
<td>−60%</td>
<td>Use of aspirin</td>
<td>Cost of treatment: USD 12/year, does not require follow up unlike treatment of other risk factors + perhaps the most cost-effective way to decrease the incidence of cardiovascular diseases in people with diabetes</td>
</tr>
<tr>
<td></td>
<td>ETDRS</td>
<td>−17%</td>
<td>Use of aspirin</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Antiplatelet BIP</td>
<td>−20%</td>
<td>Use of aspirin</td>
<td></td>
</tr>
</tbody>
</table>

*myocardial infarction, stroke, coronary heart disease, need for bypass surgery, need for angioplasty, lower-limb amputations
The key steps to improve the care of people with type 2 diabetes are:

1. developing the care organization
2. increasing the knowledge of physicians and other health-care professionals about the cardiovascular burden associated with type 2 diabetes
3. educating patients
4. developing criteria to evaluate the quality of care

All the above aim at treating the risk factors for cardiovascular disease, the major cause of death of patients with type 2 diabetes.

Good Results with the Shared Care Organization Model

The organization of care and systematic evaluation of the quality of care play a fundamental role in attempts to improve care. A good example of this is the intensified care programme for people with type 2 diabetes that is currently in progress in the Netherlands. This programme, based on the “Amsterdam Shared Care Organization Model”, is entirely focused on improving glycemic control, however. In the Netherlands, as in Finland, the primary health-care system is responsible for the care of most patients with type 2 diabetes. In the shared care model, the physician responsible for primary health care consults an outpatient clinic specializing in diabetes care whenever treatment targets have not been achieved.

A computerized diabetes registry in the Amsterdam model is the primary tool to monitor how the treatment targets of cardiovascular risk factors are achieved in patients with type 2 diabetes. A regional diabetes coordinator is responsible for the registry itself and the monitoring of the quality of care. Glycemic control improved from very poor to good control in 50 per cent of patients already during the first two years of the programme. In Finland, the FINMIS and FINFAT studies have shown that in primary health care the glycemic control of patients with type 2 diabetes can be significantly improved with a new simple insulin treatment regimen.

The training of health-care personnel and improvement of the communication between primary health care and specialized medical care are essential in developing the organization of care of patients with type 2 diabetes. It is particularly important to arrange short-term, flexible consultation services to support general practitioners.

It should be possible to consult a specialized diabetes care unit in situations where complications have already appeared and also in situations where the treatment for risk factors has not been successful. Examples of such situations include:

- lack of resources to start insulin therapy in the primary health-care system
- poor glycemic control (HbA1c over 9%)
- failure to achieve treatment targets for blood pressure and blood lipids

Lifestyle Counselling Influences Many Risk Factors

Lifestyle counselling is the basis of the care of people with type 2 diabetes (see Chapter 7).
According to a nationwide survey, people with type 2 diabetes in Finland have very poor glycemic control. The national mean proportion of glycosylated hemoglobin (HbA<sub>1c</sub>), which reflects the average blood glucose level, was 8.6 per cent (Table 3, page 32).

### Criteria for Glycemic Control

The target levels for glycemic control in type 2 diabetes are as follows:

- **Optimal glycemic control:** HbA<sub>1c</sub> less than 7.0%, in patients receiving insulin treatment less than 7.5%
- **Unsatisfactory glycemic control:** HbA<sub>1c</sub> 7.5–8.9%
- **Poor glycemic control:** HbA<sub>1c</sub> over 9%

The normal range is 4.0–6.0%.

The treatment of hyperglycemia has an impact primarily on microvascular disease, as well as on the daily well-being of the patient with diabetes. The cornerstones of successful care are lifestyle counselling, use of optimal

### Treatment of hyperglycemia

<table>
<thead>
<tr>
<th>Fasting blood glucose (F-B-gluc)</th>
<th>Lifestyle modification and antihyperglycemic drug therapy (oral agents or insulin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting blood glucose F-B-gluc &gt; 15 mmol/l (F-P-gluc &gt; 17.3 mmol/l)</td>
<td>1. Lifestyle modification</td>
</tr>
<tr>
<td></td>
<td>2. If F-B-gluc remains &gt; 6.7 mmol/l for 3–6 months, start drug therapy:</td>
</tr>
<tr>
<td></td>
<td>• metformin if BMI &gt; 25 kg/m&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>• sulphonylurea if BMI &lt; 25 kg/m&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>• Glitazones are an option for a patient who does not tolerate metformin or gets side effects from metformin or sulphonylurea.</td>
</tr>
<tr>
<td></td>
<td>3. If F-B-gluc still remains &gt; 6.7 mmol/l, add a second oral drug.</td>
</tr>
<tr>
<td></td>
<td>4. If combination therapy with two oral drugs is unable to lower F-B-gluc to 6.7 mmol/l or less:</td>
</tr>
<tr>
<td></td>
<td>• stop sulphonylurea</td>
</tr>
<tr>
<td></td>
<td>• continue metformin</td>
</tr>
<tr>
<td></td>
<td>• start bedtime NPH or glargine</td>
</tr>
<tr>
<td></td>
<td>• teach self-adjustment of insulin dose</td>
</tr>
</tbody>
</table>

Note that good glycemic control (HbA<sub>1c</sub> < 7.5%) can not be achieved with bedtime insulin plus oral hypoglycemic combination therapy unless fasting blood glucose is reduced to 5.5 mmol/l or less.
doses of oral medication, rapid commencement of combination treatment with bedtime insulin and metformin (if tolerated) or another oral agent, as well as self-adjustment of the insulin dose based on self-monitoring of blood glucose.

The principles of management of elevated blood glucose are presented in detail in Lääkärin kasikirja ("Physicians’ Handbook", Duodecim Medical Publications Ltd., Helsinki). The DEHKO Type 2 Diabetes Working Group has drawn up the revised principles in cooperation with the editorial board. The same information is available in English on a CD entitled Evidence-Based Medicine Guidelines (also accessible at ). The CD is updated three times a year, and the principles presented in the current edition constitute the principal therapeutic recommendations for type 2 diabetes in primary health care. The recommendations will be reviewed annually. Table 5 (page 34) presents guidelines for the treatment of hyperglycemia.

Hypertension

The target level of blood pressure is 130/85 mmHg.

40-60 per cent of people with type 2 diabetes already have elevated blood pressure at the time of diagnosis. The UKPDS Study showed that effective treatment of hypertension significantly reduces and prevents the macrovascular and microvascular complications of diabetes, including the progression of retinopathy. Antihypertensive treatments are presented in Table 6.

Dyslipidemia

The risk of cardiovascular disease in patients with type 2 diabetes is so high that drug therapy for dyslipidemia is indicated to achieve target levels (see page 36) even when the patient does not have signs or symptoms of cardiovascular disease. It is possible to reduce mortality, cardiac events and the need for bypass surgery, as well as angioplasty and other procedures among patients with type 2 diabetes by lowering their LDL cholesterol levels (Table 4, page 32). To attain target levels, 70 per cent of patients with type 2 diabetes re-
quire drug therapy for an abnormal lipid profile. The 12345 rule serves as a convenient target for lipid-lowering therapy:

- HDL cholesterol > 1 mmol/l
- triglycerides < 2 mmol/l
- LDL cholesterol < 3 mmol/l
- total cholesterol/HDL cholesterol < 4
- total cholesterol < 5 mmol/l

The guidelines for treatment are presented in the following table.

### Table 7
#### Treatment of dyslipidemia

- Lifestyle changes are sufficient if LDL cholesterol level can be reduced to less than 3 mmol/l:
  - reduce weight, avoid fat, stop smoking, increase physical activity.
- Intensified treatment of hyperglycemia:
  - Treatment of hyperglycemia decreases serum triglyceride concentrations but does not usually decrease the LDL cholesterol concentration.
- Drug therapy should be started if
  - LDL cholesterol remains higher than 3 mmol/l.
  - LDL cholesterol is higher than 4 mmol/l and the patient belongs to the high-risk group.
  - triglyceride exceeds 10 mmol/l: use a fibrate as drug therapy and institute a very-low-fat diet.

### Abnormal Hemostasis and Coagulation

Aspirin therapy (100 mg) is recommended in all patients with type 2 diabetes unless there are contraindications. Aspirin is contraindicated in patients who are allergic to it or have hemophilia or other bleeding disorders, evidence of gastrointestinal or other bleeding, including acute bleeding associated with proliferative retinopathy. Treated proliferative retinopathy is not a contraindication to aspirin use.

The platelets of a person with type 2 diabetes stick to blood vessel walls more easily than in other people. Use of aspirin reduces cardiovascular events on average by 20 per cent in patients with type 2 diabetes.

The benefit of aspirin is indisputable in all patients with type 2 diabetes because the risk of bleeding caused by low-dose aspirin (1/10,000 patient-years) is infinitely small compared with the beneficial effects of the therapy on cardiovascular diseases (reduction of approximately 500 myocardial infarctions and strokes/10,000 patient-years). In Finland, most patients with type 2 diabetes are not currently using aspirin unless they have coronary heart disease. Aspirin therapy costs approximately USD 12 per year and does not require monitoring or screening of patients.

Physicians, other health-care personnel and patients with diabetes should be informed that aspirin therapy is the most cost-effective means of lowering the high prevalence of cardiovascular diseases among patients with diabetes.
Benefits from Multifactorial Intervention

The main goal of the care of patients with type 2 diabetes is to prevent the development and progression of cardiovascular disease by the above-mentioned four-point care programme targeted at hyperglycemia, hypertension, dyslipidemia and abnormalities in coagulation and hemostasis. Another important treatment target is smoking cessation. Drug treatment should not be initiated before the results of proper lifestyle counselling have been evaluated. On the other hand, type 2 diabetes can be considered a serious cardiovascular disease where drug therapy should not be unnecessarily postponed for too long.

A recent care study conducted in Denmark on patients with type 2 diabetes demonstrates that the best results are achieved with multifactorial intervention. In the study, some of the patients continued on conventional care, and some had each cardiovascular risk factor treated. The care team consisted of a physician, a nurse and a nutritionist.

During a period of four years, the study showed that in the group of patients receiving intensified care

- the incidence of diabetic nephropathy was reduced by 73%.
- disturbances of nerve function were reduced by 68%.
- retinal changes decreased by 55%.
- the cardiovascular event rate was significantly reduced.

To achieve the above results, the following alterations in care were required:

- a 15-fold increase in the use of lipid-lowering agents
- a 1.5-fold increase in the use of antihypertensive agents
- a twofold increase in the use of aspirin
- a 14-fold increase in insulin therapy

Similar measures should be undertaken in Finland to reduce the burden of microvascular and especially macrovascular complications and the costs associated with the treatment of these complications.
10. PREVENTION OF TYPE 2 DIABETES

Approximately 25 per cent of all Finnish people are diagnosed with type 2 diabetes before their 75th birthday. In addition, 10–20 per cent have impaired glucose tolerance (IGT). Currently, there are approximately 50,000 people with undiagnosed diabetes in Finland. People who have high blood glucose levels but do not yet show symptoms of diabetes are at greatly increased risk of developing cardiovascular disease.

Type 2 diabetes is associated with a strong genetic predisposition. It has not yet been possible to definitely identify the genes to which this susceptibility is linked. For the present, a hereditary tendency to develop diabetes can be established from the incidence of type 2 diabetes in the family. Although genes that expose an individual to a risk of diabetes are probably an essential factor in the development of the disease, activation of a genetic predisposition requires the effects of certain environmental factors, particularly lifestyle. The most significant factors are clearly overweight, abdominal obesity and physical inactivity.

As early as 1994 an expert group of the World Health Organization (WHO) drew up recommendations for the prevention of diabetes and its complications. These recommendations strongly emphasized the significance of launching prevention programmes for type 2 diabetes.

In Finland, there is a strong tradition of preventing chronic diseases. Mortality from cardiovascular diseases, for example, has been reduced by 60–70 per cent from the rate that existed 30 years ago.

The Basis of Prevention

The prevention of type 2 diabetes is based on controlling risk factors that can be influenced. In practice, prevention can be realized by targeting the measures at

1) people who are assessed as being at increased risk of developing type 2 diabetes
2) the entire population.

These two forms of prevention are not mutually exclusive but reinforce each other. In planning national measures for the prevention of type 2 diabetes, both approaches should be used simultaneously.

The High-Risk Strategy

Initially an attempt is made to find those people from the overall population who are at higher than average risk of developing type 2 diabetes (Table 8).

The blood glucose levels of people at high risk is measured in order to determine whether they already have asymptomatic diabetes. Random screening is not recommended as the primary means of detecting high-risk individuals in the general population.

If blood glucose testing shows levels exceeding the criteria for diabetes, the individual in question is referred for diabetes care services. In the case of people whose blood glucose levels do not reach the criteria for diabetes, attempts are made to bring alterable risk factors under as effective control as possible. The objective is for the blood glucose level not to rise over the years and for other risk factors for cardiovascular diseases to be identified and treated.
DEHKO 2000-2010

Determination of Diagnostic Criteria

In putting the high-risk strategy into effect, it is particularly important that the limit values used for both the diagnostic criteria of diabetes and the different levels of risk factors are clearly defined and based on research evidence.

A WHO expert group issued its recommendations on the diagnostic criteria for diabetes in September 1999 (Table 1, page 8).

Implementing Prevention

In the high-risk strategy, the resources of the health-care system (and other relevant parties, such as private organizations) are directed towards the risk groups with measures to enable the prevention of type 2 diabetes to be implemented. The reduction of risk factors (hypertension, abnormal lipid profile, overweight, physical inactivity) in all population groups, further follow up of gestational diabetes and effective health information are emphasized in particular. The specific objectives and measures are presented in Tables 9 and 10 on page 40.

Population Strategy

In Finland, it is highly likely that at least a third, if not half, of the population have genes that predispose them to type 2 diabetes. This means that in addition to the strategy targeted at people who are at high risk, measures aimed at the entire population are necessary.

The goals of the population strategy are to

1) influence health habits in such a way that the risk factors of diabetes among people who are currently young or middle-aged do not change adversely over the years, or that the change is as small as possible

2) change the distribution of known risk factors in the older age groups in such a way that they are either reduced or at least do not increase.

The population strategy is based on promoting healthy lifestyles that are significant to the prevention of type 2 diabetes as well as other chronic diseases. This requires attitudinal support from society through social norms and views within the community to encourage those measures that are implemented in the strategy targeted at the entire population.

Table 8

<table>
<thead>
<tr>
<th>High risk individuals</th>
<th>Detection</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Relatives of people with type 2 diabetes</td>
<td>Charting siblings and children</td>
</tr>
<tr>
<td>3. People with gestational diabetes</td>
<td>Utilization of the blood glucose control records also after giving birth</td>
</tr>
<tr>
<td>4. Individuals with elevated blood pressure</td>
<td>Determination of blood glucose and lipid levels at an early stage</td>
</tr>
<tr>
<td>5. Individuals with slightly elevated blood glucose</td>
<td>Follow up and lifestyle counselling</td>
</tr>
<tr>
<td>6. Individuals with overweight or abdominal obesity</td>
<td>Determination of blood glucose and lipid levels at an early stage</td>
</tr>
</tbody>
</table>
### Table 9. Objectives of prevention

<table>
<thead>
<tr>
<th>Indication</th>
<th>Objective</th>
</tr>
</thead>
</table>
| 1. Age                             | • prevention and treatment of overweight in children  
                                 | • risk factors kept at a low level, eg target weight is the same as the persons weight at 20–25 years of age  
                                 | • reducing the increase of risk factors                                                                                                                     |
| • children                         |                                                                                                                                                                                                          |
| • young people                     |                                                                                                                                                                                                          |
| • elderly people                   |                                                                                                                                                                                                          |
| 2. Blood glucose values            | • effective reduction of risk factors, assessment of the overall risk of cardiovascular diseases  
                                 | • prevention of increase in risk factors, assessment of the overall risk of cardiovascular diseases                                                     |
| • hyperglycemia and impaired glucose tolerance  |                                                                                                                                                                                                          |
| • normal blood glucose values      |                                                                                                                                                                                                          |
| 3. Cardiovascular risk factors     | • follow up of blood glucose, reduction of existing cardiovascular risk factors, smoking cessation                                                                                                        |
| 4. Relatives of people with diabetes | • dissemination of information, evaluation of diabetes risk with a score questionnaire                                                                                                               |
| 5. People with gestational diabetes| • weight control, monitoring of blood glucose  
                                 | • one year after giving birth: charting of family medical history, oral glucose tolerance test, blood pressure and blood lipid profile measures at the child welfare clinic or maternal health clinic |

### Table 10. Action recommended according to follow up data

<table>
<thead>
<tr>
<th>Indication</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. All values normal despite family medical history</td>
<td>• oral glucose tolerance test, weight, blood lipid profile and blood pressure after five years or in connection with routine health check-ups</td>
</tr>
</tbody>
</table>
| 2. Levels normal, but BMI over 25                                         | • individual follow up and lifestyle counselling  
                                 | • tests at 2–5 year intervals                                                                                                                                                                              |
| 3. Oral glucose tolerance test result normal, but type 2 diabetes present in close relatives, blood pressure and/or blood lipid values elevated | • referral to an appropriate care unit                                                                                                                                                                 |
| 4. Diabetes present in close relatives, impaired fasting glucose (IFG), impaired glucose tolerance in oral glucose tolerance test or blood values meet diabetes criteria | • referral for diabetes care                                                                                                                                                                            |
Measures directed against smoking in the prevention of cancer and successful education on dietary adjustments in the prevention of cardiovascular diseases are worth mentioning as good examples of this kind of population strategy.

The same basic principles, objectives and recommendations that are listed in the Action Plan for Promoting Finnish Heart Health, set up by the Ministry of Social Affairs and Health and the Finnish Heart Association, are largely also applicable at the level of the general population for the prevention of type 2 diabetes. The action programme is the outcome of cooperative work among the various parties involved. Further broad cooperation is planned in the implementation phase. The Finnish Diabetes Association works in close cooperation with the Ministry of Social Affairs and Health and the Finnish Heart Association in its own action programme.

Implementing Prevention

A strategy targeted at the whole population can be implemented through several different channels. It is essential that the majority of the population recognizes the extent and significance of diabetes as a public-health problem and that general social and cultural norms are established in line with the objectives of prevention. However, simply distributing information on health hazards and how to avoid them is not sufficient as a way of preventing chronic diseases.

The strategy requires special attention to be paid to the prevention of overweight and a marked increase in physical activity, as well as the promotion of healthy eating habits (see Chapter 7). Type 2 diabetes is a disease of slow onset, the prevalence of which increases with age. Its prevention therefore cannot be accomplished rapidly or with a single measure, and the activity must instead be methodical and sustained over a long period of time.

II. TYPE 1 DIABETES

Finland has the world’s highest incidence of type 1 diabetes (Figure 6, page 42). A total of 30,000 Finnish people have this type of diabetes, and 3,000 of them are under 16 years of age. A third of people with type 1 diabetes have developed the disease after reaching the age of 25, and of all people who develop diabetes after the age of 40, 10-20 per cent have type 1 diabetes. Approximately 450 children each year develop diabetes in Finland. This means that more than one child is diagnosed with diabetes every day.

Over the past 50 years, the incidence of type 1 diabetes in Finland has risen annually by over two per cent. In addition, the disease develops at an ever younger age: the number of children who develop diabetes before the age of five years is increasing at the fastest rate. Although prevention of the disease is also the most important goal with this type of diabetes, for the time being there are no known means of accomplishing this.
The most significant problems associated with type 1 diabetes in Finland are:

- poor health outcomes and subsequent complications
- insufficient education
- varied practices for monitoring care
- lack of resources, particularly with regard to the care of pediatric patients
- inflexibility and ignorance regarding the transition from young to adult patients

Natural History of the Disease

In type 1 diabetes, the pancreatic cells that secrete insulin are destroyed and insulin production in the body ceases. It is vitally important for the person with diabetes that this lacking hormone, which is essential to life, is replaced with insulin administered by injection. Care additionally requires insulin treatment, diet, physical activity and other factors to be harmonized with one another and their effects on the blood glucose level to be monitored. Treatments must also be adjusted where necessary so that the blood glucose level remains as normal as possible at all times, with no harmfully wide variations.

Once type 1 diabetes has been diagnosed, it is a life-long disease. The patient’s daily self-care and self-monitoring of blood glucose are decisive for health outcome. Insulin treatment is primarily given in the form of multiple injections.

When the care provided is successful, the person with type 1 diabetes manages in his/her life just as well as anyone else. However, long-term diabetes often causes serious complications, the development of which can be accelerated by hyperglycemia.

The most common of these complications are:

- retinal disease (diabetic retinopathy), which can result in blindness
- kidney disease (diabetic nephropathy), which may require dialysis treatment and kidney transplantation
- arteriosclerosis and obstructions of the coronary and cerebral arteries, which can result in myocardial infarction, stroke or gangrene in the legs
- disturbances to peripheral nerve function (diabetic neuropathy)

The complications of diabetes can be prevented by proper and prompt treatment. It is important already to aim at the prevention of complications in the care of child patients with diabetes because they have their whole life in front of them.

The Main Goals of Care

In most people with type 1 diabetes, poor glycemic control (HbA1c) represents a serious risk of complications. The development of care is
necessary in order to improve health outcomes and prevent complications. The main goals are:

- good glycemic control without hypoglycemia for every person with diabetes
- a skilled, professional diabetes team to support a patient with diabetes in all care units
- provision of the necessary basis for the self-care of a person with diabetes through appropriate self-care equipment and adequate education that is adapted to different age groups and needs
- promotion of self-care skills with adaptation training and diabetes camp activities
- introduction of new methods of care for the benefit of people with diabetes

The target levels for glycemic control in type 1 diabetes are as follows:

- optimal glycemic control: HbA1c less than 7.5%
- unsatisfactory glycemic control: HbA1c 7.5–8.9%
- poor glycemic control: HbA1c over 9%

The normal range is 4.0–6.0%.

Since type 1 diabetes is a life-long disease, there are several different stages, possible crises and other issues raised by the patient’s own life cycle. In addition to the general goals of care and education, there are other matters that must be considered, particularly among the different age groups of people with diabetes, especially in children and young people (Table 11, page 44).

Mental perseverance, patience and carefulness are required to carry out self-care. Continuous support from health-care personnel and ensuring that the requirements of self-care are met in all respects are therefore essential.

In practice, continuous support means wide-ranging education, a care chain that works well and regular follow up and assessment of health outcomes by the diabetes team, in which the person with diabetes or the parents of the child with diabetes are equal members.

**Self-Monitoring of Blood Glucose**

The self-monitoring of blood glucose by the person with diabetes, or the parents in the case of a child with diabetes, is fundamental to the care of type 1 diabetes. It is an essential requirement if the main factors of the care—insulin treatment, nutrition and physical activity—are to be integrated and if good glycemic control is consequently to be achieved.

Education provides people with diabetes and the parents of children with diabetes with the resources to make the necessary care adjustments based on the self-monitoring of blood glucose. The person with diabetes or his/her parents are encouraged to contact their diabetes team if any problems occur.

The self-monitoring of blood glucose requires appropriate monitoring equipment, such as a blood glucose meter and associated test strips. Without them, persons with diabetes cannot observe their blood glucose levels, which can vary considerably. The blood glucose level can only be monitored by frequent measurement.

Regular monitoring is needed to keep the blood glucose level as normal as possible so that serious complications are avoided.

Self-monitoring requires a distribution system of self-care equipment that works well, adherence to the recommendation of the Medical Advisory Board of the Finnish Diabetes Association in deciding on the amounts of glucose strips, and sufficient education on both the use of monitoring equipment and the interpretation and utilization of the results of glucose measurement. The blood glucose meter also requires frequent calibration so that reliable results are obtained.
Objectives of the care and education of people with type 1 diabetes

Good glycemic control without hypoglycemic episodes is the main goal in all age groups.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Objectives of care</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children</td>
<td>• physical, social and mental well-being; normal growth and development • support of friends and family • avoidance of severe hypoglycemia • keeping the risk of complications low • careful, continuous follow up</td>
<td>• well-organized initial and extended education for the whole family • follow up that supports self-care • intense cooperation between the care team and the family • particular attention paid to the growth, development and special features of the child • follow up visits as necessary in a place that best suits the needs of the family • involvement of grandparents, day-care personnel, school teachers and kitchen staff in education • possibility to participate in education in the form of a course before and during puberty</td>
</tr>
<tr>
<td>Adolescents</td>
<td>• tailoring the care to meet the needs of a young person • care that supports independence, self-care skills and taking responsibility • ensuring enough room for a young person’s normal development process • commencement of outpatient care according to local situation and resources • the care team is required to be flexible, to take an individual approach with the patient, to use modern care practices (new technology, computers, mobile phones, etc.) • flexibility, security and special attention to the transfer from the children’s outpatient clinic to the adult outpatient clinic</td>
<td>• methodical education according to the young person’s own facilities • initial education is the most essential; extended education is focused on the assessment of eating habits and independent and flexible administration of insulin treatment • special attention is paid to the realization and utilization of the self-monitoring of blood glucose levels • checking whether the education has been properly understood • group education (eg courses and camps for young people with diabetes) is very important</td>
</tr>
<tr>
<td>Adults</td>
<td>• acceptance of the disease, commitment to mutually set care objectives and good management of self-care • prevention of complications with thorough care and monitoring</td>
<td>• teaching the basic knowledge and skills gradually • the goal is the full understanding of one’s own responsibility in care and monitoring • management of the different factors of care and the means for an independent life • self-care training</td>
</tr>
</tbody>
</table>
The Care Organization

The care arrangements for people with type 1 diabetes are discussed in Chapter 4 (Organization and Resources of Diabetes Care). The care organization should be easily approachable; the care must be continuous and flexible; and the care personnel must be skilled professionals. Seamless cooperation between primary health care and specialized medical care is essential. Primary health care units responsible for the care of people with type 1 diabetes should consult specialized medical care when:

- the patient’s glycemic control worsens significantly (HbA1c value repeatedly too high and exceeding 8%) and cannot be brought under control with the resources of primary health care
- the person with diabetes develops a problematic tendency towards wide variation in blood glucose levels and/or hypoglycemia
- problems concerning the retinas, kidneys, coronary arteries or feet occur or become aggravated.

12. COMPLICATIONS OF DIABETES

The serious complications associated with diabetes significantly impair the patient’s quality of life and cause premature deaths.

The treatment of complications is the most expensive form of diabetes care, and their prevention should be invested in at every stage of care and on every level of the care organization. Poor glycemic control is a major factor contributing to the development of the complications of diabetes, in addition to other risk factors. More attention should therefore be paid to the quality, follow up and assessment of care.

Reducing the complications of diabetes is the most specific of the many objectives of the European St Vincent Programme initiated in 1989. According to these objectives, the following complications should be reduced in each European country:

- diabetic retinopathy by at least a third
- diabetic nephropathy by at least a third
- diabetes-associated lower-limb amputations by half
- cardiovascular morbidity and mortality in people with diabetes

In comparison with many other countries, Finland is highly advanced with regard to diabetes care. Yet studies show that Finnish people with diabetes have poor glycemic control and a high prevalence of complications. As a nation, Finland has committed itself to putting into practice the objectives of the St Vincent Programme, but there is still no comprehensive picture of the real numbers of diabetes-related complications or of the trend over the past ten years. This is due partly to the lack of local and regional diabetes registries.

There is already a kidney disease registry that works well and a fairly comprehensive registry of visual impairments in Finland, but the information concerning amputations and other complications of diabetes is still diffuse.
Cardiovascular Diseases

Atherosclerosis, characterized by thickening and hardening of arterial walls, causes obstruction of the coronary arteries, cerebral arteries and arteries of the lower limbs and can lead to dilation of the aorta. All of these cardiovascular diseases are more common in people with diabetes than among the rest of the population, and up to 75 per cent of diabetic patients die from them. The most common problem is coronary heart disease which can be manifested as sudden death, myocardial infarction, chest pain and heart failure.

As a source of costs in diabetes, cardiovascular diseases are in a class of their own (see Chapter 5).

In addition to its commonness, another important characteristic of coronary heart disease in people with diabetes is its seriousness. Myocardial infarction causes death and heart failure significantly more often in people with diabetes than in other people. A first infarction (which often occurs unexpectedly in a previously asymptomatic person) leads to death within a year in more than 40 per cent of diabetic men and in almost as large a proportion of diabetic women. There are few diseases as severe as this that occur in the middle-aged population.

The commonness and seriousness of coronary heart disease indicates that there is a great need for prevention. Studies have shown that prevention is effective. It is needed both before the disease emerges and in people who have survived it. In both cases, there are clear benefits to be achieved by treating disturbances of lipid metabolism, aspirin therapy, not smoking and other lifestyle alterations, as well as the careful control of blood pressure and blood glucose levels.

The boundary between the prevention and treatment of coronary heart disease is flexible because certain procedures that are usually considered as treatment both improve prognosis and alleviate symptoms. The principles of care of pre-existing heart disease are essentially the same in people with diabetes as in other people. As diabetic patients have a poorer prognosis, it is particularly important that no proven treatment method is omitted unless there are solid grounds for doing so.

The benefits of treatments that improve the patient’s prognosis are at least as great, if not greater, in people with diabetes than in non-diabetic people.

<table>
<thead>
<tr>
<th>Table 12: Treatments for coronary heart disease in people with diabetes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In long-term care</strong></td>
</tr>
<tr>
<td>• aspirin*</td>
</tr>
<tr>
<td>• beta-blockers (primarily beta-1-selective)*</td>
</tr>
<tr>
<td>• short-acting and long-acting nitrates</td>
</tr>
<tr>
<td>• calcium channel blockers</td>
</tr>
<tr>
<td><strong>In threatening Q-wave infarction</strong></td>
</tr>
<tr>
<td>• aspirin*</td>
</tr>
<tr>
<td>• thrombolytic therapy on customary grounds*</td>
</tr>
<tr>
<td>• immediate angioplasty as an alternative or complementary (when necessary) to thrombolytic therapy*</td>
</tr>
<tr>
<td>• insulin and glucose infusion*</td>
</tr>
<tr>
<td>• ACE inhibitor within 24 hours after symptoms occur if no contraindications*</td>
</tr>
<tr>
<td>• other treatment (heparin, beta-blockers, nitrates, etc.) as with other patients</td>
</tr>
<tr>
<td><strong>In an acute coronary syndrome (unstable angina and non-Q-wave infarction)</strong></td>
</tr>
<tr>
<td>• does not differ from the treatment of a non-diabetic person: aspirin, heparin, nitrates, consideration of invasive procedure; role of platelet glycoprotein IIb/IIIa inhibitors is becoming established in the care of high-risk patients</td>
</tr>
<tr>
<td><strong>Invasive procedure on the same grounds as with other patients</strong></td>
</tr>
<tr>
<td>• bypass surgery (in the most severe forms of the disease)*</td>
</tr>
<tr>
<td>• angioplasty (suggestion of greater benefits than usual when a stent and GP IIb/IIIa inhibitors are used)</td>
</tr>
</tbody>
</table>
The treatments that are beneficial in terms of prognosis, symptoms or both are listed in Table 12. It should be noted that the previous opposition to thrombolytic therapy of myocardial infarction and beta-blockers has proven to be unfounded. In myocardial infarction, the infusion of insulin and glucose and the early initiation of ACE inhibitors seem to benefit people with diabetes even more than other people. People with diabetes should be referred for consultation concerning coronary angioplasty and bypass surgery on the same grounds as other people.

Nephropathy

Approximately 30 per cent of people with type 1 diabetes and 25–50 per cent of people with type 2 diabetes develop diabetic kidney disease (nephropathy), which may lead to dialysis treatment and kidney transplantation. In diabetic patients, nephropathy is also associated with marked cardiovascular mortality. In people with type 1 diabetes, nephropathy increases this risk up to 40-fold. In recent years, there has been an alarming increase in the incidence of nephropathy in people with type 2 diabetes.

Diabetic nephropathy worsens the patient’s prognosis and shortens life span. According to the DCCT Study, however, nephropathy is preventable with intensified care.

The methods for detection and treatment of nephropathy have received special attention in recent years. Development has been most tangible in care strategy: the given care is more active than previously and it is started at an earlier stage, which makes it possible to slow the progression of the disease.

The earliest sign of nephropathy is the appearance of microalbuminuria. Its progression can be retarded by keeping blood glucose and blood pressure under control, reducing the share of protein in the diet and giving up smoking. These are also important measures in prevention of the development and worsening of renal insufficiency.

All people with type 1 diabetes must be tested for microalbuminuria annually after the onset of puberty, when they have had diabetes for at least five years. People with type 2 diabetes under 70 years of age must be tested once a year after being diagnosed with diabetes. Albuminuria should be measured even more often if the person with diabetes is hypertensive or has an elevated creatinine level.

If the person with diabetes is diagnosed with nephropathy, it is important to monitor microalbuminuria or macroalbuminuria, blood pressure and glycemic control every 2–3 months. The progression of nephropathy can be prevented with good glycemic control particularly in the early stages of the disease. Treating hypertension has an essential role in prevention: lowering blood pressure reduces the amount of proteinuria and slows the deterioration of renal function in both type 1 and type 2 diabetes.

The composition of the patient’s diet is also important because it can influence important factors of diabetic nephropathy: glycemic control, blood pressure levels, serum lipid values, overweight and, more directly, renal function and proteinuria. Limiting the amount of protein in the diet can retard the deterioration of renal function in both type 1 and type 2 diabetes.

The keys to the care and prevention of diabetic nephropathy are good glycemic control and the early and regular monitoring and timely treatment of microalbuminuria.

Retinopathy

The most common eye disease associated with diabetes is retinopathy. Untreated retinopathy is still the most significant cause of blindness in people with diabetes.

The prevalence of retinopathy increases with the duration of diabetes, so that 80 per cent of people with type 1 diabetes develop retinal changes within 20 years.
People with type 2 diabetes, particularly those treated with oral medication, have a lower prevalence of retinopathy (approximately 50 per cent after 10 years of diabetes). It is important that both the people with diabetes themselves and their physicians are aware of the risk and that the patients have regular retinal examinations.

Retinal changes remain asymptomatic for a long time. If changes are not detected before eyesight has already deteriorated significantly, the outcomes of treatment are often poor. Regular retinal examinations and the early detection of changes are therefore essential.

Retinopathy can be detected by ophthalmoscopy, provided that the examiner is knowledgeable and experienced and has proper equipment. Nevertheless, retinopathy is more reliably detected by fundus photography through a dilated pupil on either black-and-white or colour film. A fundus examination should be performed yearly, or less frequently at a physician’s discretion.

Timely and appropriately administered laser treatment usually prevents total loss of vision, but the loss of reading vision is not always avoidable. The sequelae of intraretinal hemorrhage, such as scar tissue that pulls at the retina, and in some cases retinal edema, are treated with vitreous surgery. If the treatment is to be successful, the indications for and appropriate timing of laser treatment should receive more attention than they do at present.

For the better prevention and treatment of retinopathy, the significance of frequent retinal examinations is emphasized in connection with the education of people with diabetes.

Fundus photographic screening has been shown to be effective in detecting diabetic retinopathy, as well as being an economical means of preventing visual disability. All hospital districts should consequently undertake systematic fundus photography of people with diabetes.

Diabetic Neuropathy

The occurrence of diabetic neuropathy is related to the patient’s age, duration of diabetes, microvascular diseases and poor glycemic control. Of all of the complications of diabetes, neuropathy is the most difficult with regard to both diagnostics and treatment.

Neuropathy usually arises as an asymptomatic disorder of the peripheral or autonomic nervous system. As the disease progresses, the patient develops clinical symptoms and, later on, other complications. The symptom profile and course of the disease vary on an individual level, although sensory symptoms can occur at all stages of neuropathy.

Neuropathy is associated with many symptoms that undermine the quality of life. First and foremost it predisposes the patient to foot ulcers, which in turn increase the risk of lower-limb amputation. The symptoms or sequelae of peripheral neuropathy include pain, sensory loss, balance disorders, foot ulcers and other foot injuries. The symptoms of autonomic neuropathy include vasomotor disorders, gastrointestinal motility disorders, genitourinary dysfunction, abnormal perspiration and impaired perception of hypoglycemia.

What Can Be Done?

The detection and diagnosis of a disease is essential for its appropriate treatment and the prevention of complications. The treatment of diabetic polyneuropathy can be started when the following conditions are met:

1. The patient has diabetes with a history of long-term hyperglycemia.
2. The patient’s predominant symptom/finding is sensorimotor neuropathy of the lower limbs.
3. Other causes of neuropathy have been excluded.

4. The diagnosis is supported by the presence of retinopathy and nephropathy of approximately the same degree of clinical severity. Diabetic peripheral neuropathy cannot be diagnosed solely on the basis of symptoms. The fact that the feet are examined at all is more important than the method of clinical examination. The clinical examination must include tests of sensorimotor function. Of the individual tests, the most highly recommended is the nylon monofilament test which has proved effective in detecting an impaired sense of touch. Inability to sense the touch of the nylon thread predicts the development of foot ulcer.

Autonomic neuropathy is difficult to investigate in the routine clinical setting, and it is essential to exclude any other conditions causing similar symptoms.

The presence of neuropathy should be determined annually, and if neuropathy is detected, the patient's feet must be inspected at every scheduled examination. A neuropathy patient is always at risk of developing foot problems regardless of the symptoms.

It is possible to diagnose diabetic neuropathy in a doctor's surgery without special investigations. The level of experience at the care unit is decisive with regard to the need for referral for further assessment. Specialized expertise is required to deal with complicated neuropathy, differential diagnostic problems and severe pain symptoms. These cases may necessitate electroneuromyographic (EMG) investigation in the routine clinical setting. The patient's foot must be examined at every scheduled examination. A neuropathy patient is always at risk of developing foot problems regardless of the symptoms.

Treatment of hyperglycemia has been shown to be decisively important both for the prevention of neuropathy and for slowing its progression. The patient's foot must be examined at every scheduled examination. A neuropathy patient is always at risk of developing foot problems regardless of the symptoms.

Foot Problems

Peripheral vascular disease and dysfunction of the nervous system expose diabetic patients to a 13-fold risk of lower-limb amputation in comparison with the rest of the population.

It was estimated in the study by Luther that approximately 500 full or partial lower-leg amputations are performed in Finland annually on people in whom they could have been avoided. Most of these patients have type 2 diabetes.

The Availability of Services Varies

In the study by Virpikari, in which the services, costs and development plans of foot care in health-care institutions were studied, it was found that foot care and foot therapy are not necessarily considered to be part of health care in some health-care units. Few health-care units include foot specialists in their diabetes teams.

There are only 40 full-time or part-time foot specialists in health-care units in Finland.
posts for podiatrists in Finland, half of them in the southern hospital districts. According to Virpiä's study, most health-care units did not spend any money in 1996 or budget any money for 1997 for foot-care services. Some of the institutions spent as little as 29 US dollars on these services in 1996, whereas some institutions funded them to the tune of more than USD 15,000.

**The Target of the St Vincent Programme Is Attainable**

It is quite possible to attain the St Vincent Programme target of reducing the number of lower-limb amputations by half. Preventive foot care and foot therapy in people with diabetes occupy a key position. The active implementation of these services requires more efficient distribution of information and training of health-care personnel, substantially better organization of foot-care and foot-therapy services and the education of people with diabetes in foot self-care.

The messages aimed at physicians and other health-care personnel should include the importance of regular foot examinations, the importance of recognizing feet at risk and expert care at every stage of foot problems.

The essential elements in recognizing a foot at risk are previous ulcers or amputations, impaired arterial circulation, neuropathy, foot deformities and the other serious complications of diabetes.

**Regular Examinations and Care of a Foot at Risk**

When a foot at risk has been detected in a person with diabetes, education on self-care must be intensified and the foot must be examined in connection with every scheduled check-up. Drug treatment that slows the progression of atherosclerosis, optimal glycemic control and smoking cessation assist in preventing serious damage. The person with diabetes is referred to a podiatrist (custom-made insoles, etc.) and, when necessary, special footwear is acquired.

In acute foot problems, the significance of promptly referring the diabetic patient to a specialist must be increasingly emphasized to general practitioners, and the patients themselves should be urged to seek professional advice as early as possible.

The basic training of physicians and nurses should include a section on the prevention and care of diabetic patients’ foot problems. The Recommendation on Diabetic Foot Care, drawn up by an expert group of the Medical Advisory Board of the Finnish Diabetes Association, should be at the disposal of every general practitioner. Even other health-care personnel, in addition to those involved in diabetes care, should be informed about foot problems and their care (a foot problem may arise when a person with diabetes is hospitalized in a department other than internal medicine). The chapter in the Physicians’ Handbook that deals with the prevention and care of diabetic foot problems should be updated regularly.

The foot-care organization should be developed by improving the accessibility of the services of podiatrists throughout the country either by creating more posts in hospitals and health-care centres or by increasing the purchase of foot-care services provided privately.

It is essential to establish a multiprofessional foot-care working group in every central hospital and to increase the capacity of vascular surgery.
I3. DIABETES AND PREGNANCY

Type 1 Diabetes

Every year, there are approximately 300 deliveries among women with type 1 diabetes in Finland. The number has more than doubled in the past 25 years, as a result of the continuous increase in the incidence of diabetes in Finland (see p. 42).

Perinatal mortality has decreased from over 30 per cent to 2–4 per cent in the past 50 years. However, even in centres specializing in the follow up and care of pregnant women with diabetes, perinatal mortality in women with diabetes is still 3–6 times higher than in the population as a whole. In the smaller maternity hospitals, the situation is even worse. Because perinatal mortality has not decreased over the past 25 years, the absolute number of perinatal deaths has clearly increased (Table 13). Approximately a third of the deaths are caused by malformations, a third by prematurity and a third by asphyxia.

The frequency of malformations among the children of women with type 1 diabetes is 5–8 per cent, which is 2–4 times more than among the general population. The problem is made even more serious by the fact that the malformations in the children of women with diabetes are clearly more severe than those among other children, which increases perinatal morbidity and mortality.

Poor glycemic control (high HbA1c) during early pregnancy explains a significant portion of the malformations among the children of women with type 1 diabetes.

The risk of malformations can be markedly decreased by improving diabetic women’s glycemic control before pregnancy. Recent studies demonstrate that the incidence of malformations is directly related to the HbA1c value during the first trimester of pregnancy. In addition, there is no indication of a threshold value above which malformations are more likely to occur.

This means that an attempt must be made to ensure that all pregnancies among women with diabetes are planned in advance, and that their glycemic control is as good as possible.

Table 13.

Perinatal mortality in type 1 diabetes patients at the Department of Obstetrics and Gynecology of the Helsinki University Central Hospital between 1951 and 1997 and annual perinatal mortality in Finland during the same period

<table>
<thead>
<tr>
<th>Year</th>
<th>Children, total</th>
<th>Children/ year</th>
<th>Stillborn</th>
<th>Died within 1 week of birth</th>
<th>Women with type 1 diabetes</th>
<th>Finland</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>%</td>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>1951-60</td>
<td>162</td>
<td>16</td>
<td>30</td>
<td>16</td>
<td>46</td>
<td>28.5</td>
</tr>
<tr>
<td>1959-68</td>
<td>231</td>
<td>23</td>
<td>25</td>
<td>23</td>
<td>48</td>
<td>20.8</td>
</tr>
<tr>
<td>1970-71</td>
<td>52</td>
<td>26</td>
<td>3</td>
<td>4</td>
<td>7</td>
<td>13.5</td>
</tr>
<tr>
<td>1975-80</td>
<td>279</td>
<td>47</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>2.2</td>
</tr>
<tr>
<td>1988-97</td>
<td>702</td>
<td>70</td>
<td>10</td>
<td>7</td>
<td>17</td>
<td>2.4</td>
</tr>
</tbody>
</table>

*annual mean (Finnish Statistical Yearbook 1997)
Gestational Diabetes

Gestational diabetes is defined as a disorder of energy metabolism that is detected for the first time during pregnancy. In other respects, there is unanimity about the criteria of gestational diabetes.

Diagnosis

In Finland, a 2-hour oral glucose (75 g) tolerance test is used in diagnosing gestational diabetes. The diagnostic criteria of gestational diabetes are based on the agreed abnormal values in the glucose tolerance test, not on the biological consequences (i.e. macrosomia of the fetus). Table 14 presents the diagnostic plasma glucose values based on a Finnish population survey.

The fact that venous whole blood, capillary whole blood or plasma are still used side by side in blood glucose measurement in Finland presents a problem. Measuring plasma glucose is the method to be recommended, and it is essential to agree upon uniform practice in this matter.

### Table 14

<table>
<thead>
<tr>
<th>Pathological glucose values (mmol/l)</th>
<th>Amount of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 h</td>
</tr>
<tr>
<td>Plasma</td>
<td>≥ 4.8</td>
</tr>
<tr>
<td>Venous whole blood</td>
<td>≥ 4.5</td>
</tr>
</tbody>
</table>

*97.5 percentile/values

(Recommendation of the Pregnancy Working Group of the Finnish Diabetes Association)

Follow up and Care

It is possible, even today, for the need for an oral glucose tolerance test not to be noticed until a woman arrives at a hospital to give birth. This kind of negligence can endanger the health of both the fetus and newborn, and the risk groups for gestational diabetes should therefore always be monitored.

Risk factors for gestational diabetes

- morning glucosuria
- overweight mother (BMI > 25)
- mother has previously given birth to an infant over 4500 g of weight
- macrosomic fetus
- mother 40 years of age or older
- gestational diabetes detected during previous pregnancy

If only one abnormal value is detected in the oral glucose tolerance test, the maternal health centre will give the mother nutritional instructions and a referral to the maternity outpatient clinic of the hospital where the birth is planned to take place. The outpatient clinic will then monitor the growth of the fetus and...
the mother’s compliance with her nutritional therapy.

Two routine visits (at approximately weeks 30 and 37 of gestation) at a maternity outpatient clinic are sufficient for women with diabetes treated with nutritional therapy because of their low risk of having a macrosomic fetus.

In case there are two or more abnormal values in the oral glucose tolerance test, the maternal health centre will refer the mother to a hospital where a 24-hour blood glucose profile is performed during nutritional therapy. It is recommended that blood glucose be measured every 4 h.

Insulin treatment is commenced if two of the preprandial values exceed 5.5 mmol/l, or if one value exceeds 5.5 mmol/l and one postprandial value exceeds 7.8 mmol/l. Approximately one-third of pregnant women who have two or three pathological values in the 2-hour oral glucose tolerance test need insulin treatment in addition to nutritional therapy for the rest of the pregnancy.

In cases where the 24-hour blood glucose profile indicates that insulin treatment is necessary (White’s class A/B), the mother will be admitted to a hospital specialized in care of the pregnancies and births of women with type 1 diabetes, for the initiation of treatment.

The risk of fetal death and macrosomia in these patients (>2 standard deviations [SD] above the mean for a Finnish reference population) is about the same as in patients with type 1 diabetes.

**Screening**

The most important aim of screening for gestational diabetes is to find those women who have a clearly increased risk of having a macrosomic fetus due to elevated blood glucose levels. According to the most recent international recommendations, it is sufficient to screen only those groups of women who are at risk of developing gestational diabetes. This principle has been followed in Finland for several years.

It is important that the 2-hour oral glucose tolerance test is conducted in full (with 0-hour, 1-hour and 2-hour values). If only one value out of the three is abnormal (5–6 per cent of pregnant women), nutritional therapy is sufficient. In these women, the risk of fetal macrosomia is no greater than in healthy women.

In cases where two or three of the oral glucose tolerance test values are pathological (1 per cent of pregnant women), it is necessary to start insulin therapy in addition to nutrition therapy (in 30 per cent of cases). The records of the Department of Obstetrics and Gynecology of Helsinki University Central Hospital show fetal macrosomia in 16 per cent of this group of patients.

**The Effect of Gestational Diabetes on Women’s Health Later in Life**

Gestational diabetes is primarily a risk factor for type 2 diabetes. Up to 50 per cent of women who have had gestational diabetes develop type 2 diabetes over the next 10–15 years. Approximately 10 per cent of women who have had gestational diabetes will go on to develop type 1 diabetes.

In the maternity hospital, mothers who have had gestational diabetes are provided with written instructions for future follow up and information on the symptoms of diabetes, as well as the benefits of diet, physical activity and normal weight. Health-care centres should recognize these women’s risk of developing type 2 diabetes later in their lives.
14. QUALITY IMPROVEMENT AND DIABETES REGISTRIES

A diabetes registry is an essential instrument for quality control and the assessment of care. As far as is known, no registry that works perfectly has yet been developed, but there are various versions of diabetes registries around the world. The DiabCare system developed in connection with the St Vincent Programme is in use in many countries but has not yet won broad acceptance.

According to a report by the National Research and Development Centre for Welfare and Health (STAKES) in 1996, there were about a dozen local or regional diabetes registries in Finland at that time, but their data content and technical structure varied widely. Approximately 70–80 per cent of health-care centres use electronic patient record systems (eg Sinuhe, Pegasos or Finstar). Patient record systems that are accessible through data networks and include electronic referral and feedback functions are currently under development in various hospital districts. The Association of Finnish Local and Regional Authorities has started a project aimed at creating uniform standards for all the systems currently under development. The revised discharge notification practice is well established at national level and operates smoothly.

The need for diabetes registries is clearly recognized in different quarters. Health-care units are expected to check the quality of their activities, which requires a good documentation and feedback system. Methodical collection of information at all levels is necessary in order to assess the implementation of the St Vincent Programme and to improve international comparability. Finland has a good reputation internationally for its diabetes research, and this reputation should also be nurtured in the quality control of diabetes care. There appear to be regional differences in the quality of diabetes care which have been observed in certain reports. The recognition of inequality and the needs for revisions can be facilitated by having a uniform system of documentation and feedback.

The Purpose of a Diabetes Registry

A diabetes registry makes it possible to monitor the provision of care at all levels of the care chain. A diabetes registry should be constructed at three levels:

At the operational unit level (health-care centres, occupational health care, hospitals, units specializing in diabetes care either in health-care centres or hospitals), the most important function of the registry is that diabetic patients can be identified, the quality of care can be monitored, and certain special measures, such as screening for retinopathy, can be undertaken in either a comprehensive or targeted manner. The registry also helps to identify people who fall outside the care chain and regular monitoring. A diabetes registry is part of the normal patient record system and answers the question as to whether the care is optimal with regard to a particular patient. In individual care situations, the registry can function as an aid to education, as well as a reminder system for undertaking agreed measures and attaining care objectives.

The registry also allows parameters to be monitored that describe the care of a person with diabetes on a long-term basis. In a care
situation, the care unit has access to both customised samples of desired information and annual feedback. A diabetes care information system could be employed as the primary software in units specializing in diabetes care (diabetes consultation centres, diabetes outpatient clinics).

At the regional level, the registry monitors and compares the quality and health outcomes of the services provided by different operational units. The registry can also help to improve communication between the units participating in the care. The registry is maintained by each hospital district and has two types of data flows:

1. A flexible flow of data concerning a patient’s care between his/her care units. The patient’s consent is required for the data transfer.

2. Summary data concerning the performance of the operational units, in which client identification is not required. This information is utilized in monitoring quality.

At the regional level, responsible persons appointed by the hospital districts are tasked with ensuring that information is filed in the registry at regular intervals, as well as reporting and providing feedback to the operational units. Feedback concerning the quality of care is given to the operational units in the form of benchmarking in relation to average levels in the district or in relation to other corresponding operational units.

At the national level, the registry provides information on how diabetes care is implemented in different parts of the country, pointing out regional differences and needs for improvement. The data on the quality of care relate to operational units, not to individual patients.

The person responsible for the national diabetes registry acts as a link to the regional level and to the National Research and Development Centre for Welfare and Health (STAKES), also checking the receipt of information, the commensurability of the data and the functionality of the registry system and taking care of reporting. Data relating to individual operational units (at least the indicators of the mean level of HbA1c and complications) are gathered from the regional registries once a year.

The Creation and Maintenance of a Diabetes Registry

A diabetes registry should be uncomplicated and straightforward to create on the basis of the present patient record systems or an associated diabetes follow-up system. The starting point consists of a ‘diabetes database’ at the hospital district level (it may be part of a regional diabetes care data system), the electronic patient record and laboratory software presently in use in the districts and the revised discharge notification system. The indicators that describe the provision and quality of care are recorded in the registry in a structured and comparable form.

At the operational unit level, the objective is to have all people with diabetes within the range of the registry. A diabetes nurse or physician responsible for diabetes care is appointed as the person responsible for the registry. He/she acts as a link and is responsible for the correctness of the data and the transfer of the data from the operational unit registry to the regional registry.

In the care situation of an individual patient, the data are registered as part of the normal electronic patient record system. The necessary data on the monitoring of care are recorded in a structured form in the system. (Appendix 11). The patient’s written consent is required for joint use of patient record data among the different service levels.

The electronic patient record systems of health-care centres and occupational healthcare units should allow data to be transferred...
to a regional registry. New patients are entered in the registry at the time when diabetes is diagnosed. Later on, the patient record database recognizes the diabetic patient and automatically activates the diabetes software. The data that describe the provision of the care and the attainment of the care objectives are gathered in the regional registry on a yearly basis.

In cases where there is no electronic patient record system in use at an operational unit, a manual registry is used. The annual data are then gathered by using a logging form. The responsible person takes care of filling in the form and sends it to the regional registry every year.

The data relating to a patient who has been in hospital care are directly transferred from the electronic discharge notification to the diabetes database, and other hospital information concerning the patient (e.g., case summary) is transferred to a broader diabetes data system with the patient’s consent.

Among people with diabetes, the information to be recorded should cover glycemic control, diabetic foot ulcers, amputations, laser surgery, visual impairment, blindness, myocardial infarctions, angioplasties, bypass surgery, strokes, initiation of dialysis treatment and kidney transplantations.

**Legislative Basis**

The following legislation concerning personal data protection and the processing of documents is relevant to setting up and maintaining of a diabetes registry: Personal Data Act (523/1999), Act on the Openness of Government Activities (621/1999), Decree on the Openness of Government Activities and Good Data Management Practice (1030/1999) and Act on the Status and Rights of Patients (785/1992).
15. RECOMMENDATIONS FOR ACTION

The recommendations have been collected in such a way that at the beginning there are **Key Actions** which, when put into effect, enable the whole programme to be implemented. After this, **Recommendations for Action According to Content** are presented for the improvement of diabetes prevention and care.

**Key Actors** refer to those organizations, authorities, working groups and professionals whose field of work is relevant to the recommendation in question. The recommendations for action are proposals made to these parties to start research on how to initiate the programme in their own organization/unit and what results can be achieved in cooperation with other parties.

The Finnish Diabetes Association together with its cooperative partners monitors the implementation of all the recommendations for action. Other relevant parties whose activities essentially include **Follow up** of the development work are also mentioned below.

The Finnish Diabetes Association and other parties connected with the action programme will implement it in accordance with the facilities and resources of their own organization. They will therefore also **schedule** their own activities according to their own circumstances. The Finnish Diabetes Association will promote the launching of the programme by publishing information and educational material about it which the care units can utilize in their activities.
## Recommended Key Actions and Follow Up

<table>
<thead>
<tr>
<th>RECOMMENDATION</th>
<th>KEY ACTIONS AND FOLLOW UP</th>
</tr>
</thead>
</table>
| 1. Prevention of type 2 diabetes is listed as one of Finland’s health policy objectives in the WHO Health for All in the 21st Century Programme. A national overall plan is outlined for the prevention programme, and the necessary funding is allocated to it. A broad public awareness campaign is organized to initiate prevention. | **Actors:** Ministry of Social Affairs and Health, Advisory Board for Public Health/Sub-Committee on Cardiovascular Diseases and Diabetes, Finnish Diabetes Association  
**Follow up:** Ministry of Social Affairs and Health, Advisory Board for Public Health/Sub-Committee on Cardiovascular Diseases and Diabetes, National Public Health Institute |
| 2. The non-pharmacological therapy of type 2 diabetes is improved, and annual monitoring of cardiovascular risk factors and treatment of cardiovascular diseases are organized in all care units of the primary health-care system. | **Actors:** chief physician, physician responsible for diabetes care, diabetes nurses  
**Follow up:** diabetes working group of the hospital district, Medical Advisory Board of the Finnish Diabetes Association, Sub-Committee on Cardiovascular Diseases and Diabetes |
| 3. The criteria for granting preferential reimbursement of drugs are altered to favour the lowering of cardiovascular risk factors. Lipid-lowering agents should be granted preferential reimbursement status for all diabetic patients who need them. People with diabetes should be able to start using antilipemic and antihypertensive drugs with preferential reimbursement on less strict indications than those required for non-diabetic people. | **Actors:** Ministry of Social Affairs and Health, The Social Insurance Institution  
**Follow up:** Finnish Diabetes Association and its Medical Advisory Board |
| 4. Uniform quality criteria for diabetes care are introduced in Finland, which all units that provide diabetes care (specialized medical care/primary health care) must meet as adapted to local circumstances. The proposal presented in Appendix 9 provides an example of the assessment of the quality of education. | **Actors:** National Research and Development Centre for Welfare and Health (STAKES), chief physician or medical director or physician responsible for diabetes care of the care unit/physician responsible for diabetes care, diabetes nurses  
**Follow up:** diabetes working group of the hospital district, provincial government, Finnish Diabetes Association |
| 5. In order to monitor, assess and improve quality, a three-level diabetes registry is established in Finland, consisting of operational unit registries, regional registries and a national registry. In order to put a national diabetes registry into effect, a survey of the current situation is carried out and a pilot project is initiated. | **Actors:** National level: Finnish Diabetes Association, National Research and Development Centre for Welfare and Health (STAKES), National Public Health Institute  
Regional level: hospital district, diabetes working group of the hospital district  
Operational units: medical director, physician responsible for diabetes care, diabetes nurse  
**Follow up:** hospital district, diabetes working group of the hospital district, Finnish Diabetes Association, National Research and Development Centre for Welfare and Health (STAKES), National Public Health Institute |
6. In order to make self-care possible, all people with diabetes are guaranteed individual and continuous education. The distribution of self-care equipment is appropriately organized following the recommendations of the Medical Advisory Board of the Finnish Diabetes Association and those of the Ministry of Social Affairs and Health (Appendix 12).

**Actors:** chief physician or medical director of the care unit, physician responsible for diabetes care, diabetes nurse  
**Follow up:** diabetes working group of the hospital district

7. Every health-care centre should have an appointed physician responsible for diabetes care and a diabetes nurse who coordinate diabetes care, training and quality control in their health-care centre. Each unit of specialized medical care should have an appointed diabetes team headed by a specialized physician in charge of diabetes care (the responsible physician). The services of at least a podiatrist, nutritionist, psychologist and physical therapist or physical education instructor should be at the disposal of the diabetes teams both in the primary health-care and the specialized medical care system. A person with diabetes is an equal member of the diabetes team in his/her care unit.

**Actors:** medical director, physician responsible for diabetes care, diabetes nurse, executive chief physician, chief physician of the unit of specialized medical care, director of the department or profit centre, person with diabetes  
**Follow up:** diabetes working group of the hospital district

8. Every hospital district should have an appointed diabetes working group, whose task is to improve and coordinate diabetes care (Appendix 3). In addition to the different care units (including occupational health care and the private sector), people with diabetes should be represented in the working group.

**Actors:** hospital district  
**Follow up:** hospital district, provincial government, Finnish Diabetes Association

9. Diabetes awareness and know-how is promoted in all sectors of health care.

a) Special attention is paid to the training of physicians and nurses in occupational health care and the population-based responsibility system.

b) A diabetes education programme is set up for physicians.

c) Nurses' professional education in diabetes care and education is developed in line with the Key Role of the Diabetes Nurse Project.

d) A multiprofessional training programme in education is established.

**Actors:** health-care centre, hospital district, Finnish Diabetes Association, medical speciality societies, medical schools, Association of Finnish Diabetes Nurses, Association of Clinical and Public Health Nutritionists in Finland, Finnish Association of Podiatry, pharmacies, biomedical industry, Finnish Diabetes Education Study Group (DESG)  
**Follow up:** health-care centre, hospital district, diabetes working group of the hospital district

10. Cooperation between the specialized medical care system and the primary health-care system is further developed to be a two-way channel and more flexible than at present especially with regard to consultation options. A comprehensive and high-quality care chain for the care of people with diabetes is created in all hospital districts (Appendices 13-16).

**Actors:** hospital district, diabetes working group of the hospital district  
**Follow up:** diabetes working group of the hospital district, Finnish Diabetes Association
### PROPOSITIONS FOR ACTION ACCORDING TO CONTENT

#### Care organization and resources

- **The monitoring of the quality and results of care is improved in order to detect diabetic complications at an early stage and prevent them with the aid of regular annual check-ups.**
  - The cooperation among care units is made more flexible so that appropriate care for a person with diabetes can be started without delay in a care unit at the right level.
  - **Actors:** care unit, hospital district
  - **Follow up:** care unit, hospital district, diabetes working group of the hospital district

- **In order to assess the resources for efficient care and education, the requirement for diabetes nurses, podiatrists and nutritionists is analysed.**
  - The requirement for diabetes expertise within the health-care personnel is determined.
  - **Actors:** Finnish Diabetes Association, Ministry of Education, National Board of Education, Ministry of Social Affairs and Health
  - **Follow up:** Ministry of Social Affairs and Health, Sub-Committee on Cardiovascular Diseases and Diabetes of the Advisory Board for Public Health

- **A foot-care team is appointed in every central hospital (Appendix 8).**
  - **Actors:** executive chief physician, diabetes working group of the hospital district
  - **Follow up:** hospital district, diabetes working group of the hospital district

- **Regular centralized fundus photography of diabetic patients is arranged in each hospital district yearly or, if deemed appropriate, less frequently.**
  - **Actors:** hospital district
  - **Follow up:** health-care centres, hospital district, diabetes working group of the hospital district

- **Oral health care for people with diabetes is arranged in health-care centres in a similar way as for other special groups.**
  - **Actors:** health-care centre
  - **Follow up:** diabetes working group of the hospital district

- **A comprehensive system is set up for the quality control and development of the equipment used in monitoring care.**
  - **Actors:** manufacturers of care equipment, care units, diabetes working group of the hospital district
  - **Follow up:** care units, hospital district, diabetes working group of the hospital district

#### Care: a part of life for a person with diabetes

- **The cooperation between the health-care system and the local branches of the Finnish Diabetes Association is enhanced throughout Finland particularly with regard to the dissemination of information, training peer support activities and the provision of self-care and monitoring of its resources.**
  - **Actors:** persons responsible for diabetes care in health-care centres, local branches of the Finnish Diabetes Association
  - **Follow up:** regional secretaries and regional committee of the Finnish Diabetes Association

- **The expertise of people with diabetes is utilized in the development of care practices and new care equipment.**
  - **Actors:** persons responsible for diabetes care in all care units, manufacturers of care equipment
  - **Follow up:** local branch and regional committee of the Finnish Diabetes Association
### Education

- **On the basis of programmes and methods already in use, a basic model of education is developed to be locally adapted.**
  - **Actors:** DESG (Finland), Association of Finnish Diabetes Nurses, Finnish Diabetes Association
  - **Follow up:** DESG (Finland)

- **A uniform national ‘diabetes pass’, i.e. a model of monitoring care that is an adaptation to Finnish circumstances of a European model, is introduced.**
  - **Actors:** Finnish Diabetes Association, diabetes working group of the hospital district
  - **Follow up:** Finnish Diabetes Association, care unit, diabetes working group of the hospital district

### Prevention of type 2 diabetes

- **The units of the primary health-care system outline a plan of how to recognize high-risk individuals and implement preventative measures.**
  - **Actors:** health-care centres, occupational health care
  - **Follow up:** care units, diabetes working group of the hospital district

- **The Action Plan for Promoting Finnish Heart Health is applied in the prevention of type 2 diabetes, particularly with regard to meals in institutional settings, foodstuff symbols, training and communication.**
  - **Actors:** Finnish Diabetes Association, Finnish Heart Association, Advisory Board for Public Health, National Nutrition Council
  - **Follow up:** Finnish Diabetes Association, Finnish Heart Association, other parties concerned, Advisory Board for Public Health/ Sub-Committee on Cardiovascular Diseases and Diabetes

- **The physical activity of the entire population is promoted by enhancing the cooperation among the health-care system, sports organizations, schools and public health organizations. Systematic prevention of obesity is initiated.**
  - **Actors:** public health organizations, sports organizations, Ministry of Education, Ministry of Social Affairs and Health/Department for Promotion of Welfare and Health, Fit for Life Programme
  - **Follow up:** Advisory Board for Public Health/ Sub-Committee on Cardiovascular Diseases and Diabetes, Fit for Life Programme, Ministry of Social Affairs and Health, Ministry of Education

### Type 1 diabetes

- **The education of people with type 1 diabetes is improved in all age groups to achieve better control of the disease and to avoid the complications of diabetes.**
  - **Actors:** all care units dealing with type 1 diabetes
  - **Follow up:** operational unit, regional registry

- **The availability of special services for children and young people is ensured, and the smooth transfer of these patients at the correct stage of their development to the care of a high-quality unit responsible for adults with diabetes is guaranteed.**
  - **Actors:** hospital district: physician responsible for diabetes care in the care unit, diabetes nurse, diabetes working group of the hospital district
  - **Follow up:** diabetes working group of the hospital district
16. The Composition of the Working Groups

**Care Organization and Resources**

Chairperson: Professor Matti Uusitupa
Secretary: Mr. Keiju Pääskynkivi, Secretary of DEHKO
Dr Stig Bergkulla, Internist
Ms Leena Etu-Seppälä, Secretary General of DEHKO
Dr Jorma Huttunen, Managing Director
Ms Liisa Hyvärinen, Diabetes Nurse
Professor Tero Kangas
Dr Jorma Kivelä, Medical Director
Dr Heikki Oksa, Chief Physician
Dr Seppo Salo, Chief Physician
Mr Marjatta Stenius-Kaukonen, Member of Parliament

**Diabetes Cost**

Chairperson: Professor Tero Kangas
Ms Liisa Etu-Seppälä, Secretary General of DEHKO
Mr Unto Häkkinen, Research Manager
Professor Sirkka Keinänen-Kiukaanniemi
Professor Antero Kesäniemi
Professor Timo Strandberg
Professor Jaakko Tuomilehto
Professor Hannes Yki-Järvinen

**The Role of a Person with Diabetes**

Chairperson: Ms Tuula Lehto, Organization Manager
Western Finland:
Mr Jorma Kataja, DrTech, Assistant Professor
Mr Hannu Kosonen, Technician
Mr Erkki Puukkula-Kaarinen, Accountant
Mrs Irmeli Salmen, Social Counsellor

Eastern Finland:
Mr Teuvo Forvesius, Radio Mechanic
Mr Erkka Ollila, Municipal Director
Mr Immo Varis, Traffic Foreman
Mrs Marja-Leena Väisänen, Executive Manager

Central Finland:
Ms Seija Ahola, Health Inspector
Ms Aune Nieninen, Tax Official
Mrs Irma Virpis, Pupil

Northern Finland:
Mr Eino Heikkila, Diabetes Nurse
Mr Raija Hyyönen, Practical Nurse
Ms Raija Makela, Financial Manager
Mr Ensio Raitha, Engineer

Education

Chairperson: Dr Pirjo Ilanne-Paakka, Internist
Secretary: Mr Ossi Himanen, Nurse Educator

Southern Finland:
Mr Erkki Rantanen, Paramedic
Ms Marja Puomio, Education Coordinator
Ms Kristiina Salonen, Diabetes Nurse
Ms Tuula Simell, Senior Research Fellow

Type 2 Diabetes

Chairperson:
Professor Hannele Yki-Järvinen

Secretary:
Ms Elinna Haapa, Nutritionist

Dr Timo Kubvuka, Medical Director
Ms Leena Kahkonen, Nurse Educator
Dr Helena Leivinen, Specialist in Primary Care
Ms Irmeli Liukkonen, Teacher in Podiatry
Ms Lorna Pikkonen, Diabetes Nurse
Ms Lorna Ryynä, Assistant Chief Physician
Professor Tapani Rönnemaa
Dr Mikko Syvänen, Assistant Professor

Prevention of Type 2 Diabetes

Chairperson:
Professor Jaakko Tuomilehto

Secretary:
Ms Tarja Sampo, Communications Manager

Dr Johan Eriksson, Assistant Professor
Dr Michael Fögelborn, Executive Director
Ms Amni Isokalla, Department Manager
Ms Sirkka-Liisa Kudjoi, Diabetes Nurse
Mr Kepha Mihlunpalo, Senior Research Fellow
Dr Perri Muula, Chief Physician
Mr Jaana Lindström, Research Assistant
Mr Mikko Paykkä, Project Manager
Professor Aila Rissanen

Type 1 Diabetes

Chairperson:
Professor Olli Simell

Secretary:
Ms Marja Ojala, Responsible Nurse Educator

Dr Per-Henrik Groop, Assistant Professor
Mr Rami Hakkinen, Diabetes Nurse
Dr Jorma Komulainen, Pediatrician
Mr Elke-Magi Lammi, Diabetes Nurse
Dr Iiro Pirttiniemi, Medical Director
Ms Jari Pitkänen, Nutritionist
Dr Kaaja Sauvala, Specialist in Primary Care
Dr Juha Salvo, Internist
Dr Jukka Tufvesson, Internist

Diabetes Registries

Chairperson:
Professor Sirkka Keinänen-Kiukaanniemi

Secretary:
Ms Marja Puomio, Education Coordinator

Dr Carola Grönhagen-Riska, Medical Director
Dr Paula Kemppainen, Internist
Dr Jorma Lahtela, Assistant Professor
Mr Mikko Nenonen, Development Manager
Dr Antti Reunanen, Assistant Professor
Dr Juha Tuominen, Assistant Administrative Chief Physician
Dr Markku Vahatalo, Specialist in Primary Care

Other Contributors

Lifestyle Counselling
Ms Elinna Haapa, Nutritionist
Ms Liisa Heinonen, Nutritionist

Complications of Diabetes
Cardiovascular Diseases
Dr Mikko Syvänen, Assistant Professor
Nephropathy
Nephropathy Recommendation by the Finnish Diabetes Association
Retinopathy
Professor Leila Laatikainen
Diabetic Neuropathy
Professor Lea Niskanen
Foot Problems
Professor Tapani Rönnemaa
Diabetes and Pregnancy
Professor Kari Teramo
17. Appendixes

Appendix 1  Assessment Plan of the DEHKO Programme
Appendix 2  St Vincent Programme
Appendix 3  Duties of the Diabetes Working Groups of Hospital Districts
Appendix 4  Role of the Finnish Diabetes Association in the Care System
Appendix 5  Duties of the Physician Responsible for Diabetes Care
Appendix 6  Role and Duties of the Diabetes Nurse
Appendix 7  Duties of the Nutritionist in the Care of People with Diabetes
Appendix 8  Duties of the Podiatrist
          Duties of the Foot-Care Team
Appendix 9  Proposal for Quality Criteria for Education
Appendix 10 Skills Required for the Care of People with Diabetes in Primary Health Care
Appendix 11 Proposal for the Content of the Diabetes Registry
Appendix 12 Recommendations by the Medical Advisory Board of the Finnish Diabetes Association and the Ministry of Social Affairs and Health on the Distribution of Self-Care Equipment and Supplies

Diagrams of Care Chains

Appendix 13 Care Chain of the Person with Type 2 Diabetes
Appendix 14 Care Chain of the Person with Type 1 Diabetes (Children and Young People)
Appendix 15 Care Chain of the Person with Type 1 Diabetes (Adults)
Appendix 16 Diabetic Complications, Foot Problems
## ASSESSMENT PLAN OF THE PROGRAMME

### (1) ASSESSMENT AT BASELINE

 Assessment period: cross section of year 2000  
 Time of assessment: year 2000

<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of satisfaction of Finnish people with diabetes with the care they receive Quality of self-care</td>
<td>questionnaire and/or interview study</td>
<td>the data are collected using an internationally comparable model</td>
<td>study report</td>
<td>findings published</td>
</tr>
<tr>
<td>Organization of diabetes care in the health-care system</td>
<td>case study</td>
<td>case data</td>
<td>case study report</td>
<td>findings published</td>
</tr>
<tr>
<td>Glycemic control of Finnish people with diabetes</td>
<td>repetition of the 1994 cross-sectional study on the glycemic control of diabetic patients</td>
<td>research data from 1994 and 2000</td>
<td>study report</td>
<td>findings published</td>
</tr>
<tr>
<td>Prevalence of diabetes-related complications</td>
<td>cross-sectional study</td>
<td>existing registry and research data</td>
<td>study report</td>
<td>findings published</td>
</tr>
<tr>
<td>Diabetes care in Finland</td>
<td>cross-sectional study</td>
<td>review of other research on diabetes care, its results and the care organization in Finland</td>
<td>review report</td>
<td>other research is monitored during the course of the programme</td>
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</tbody>
</table>
## Appendix 1

### (2) ASSESSMENT OF PHASE I / ACTION PROGRAMME

**Assessment period:** 5/1998–1/2000  
**Time of assessment:** 3–5/2000

<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process of constructing the action programme</td>
<td>self-assessment</td>
<td>material produced by the Coordination Committee and the working groups, questionnaire to the members of the working groups</td>
<td>Assessment Report for Phase I (English Summary)</td>
<td>Sub-Committee on Cardiovascular Diseases and Diabetes, Board of the Finnish Diabetes Association, Medical Advisory Board of the Finnish Diabetes Association, distribution of the report to the parties involved and cooperating partners, St Vincent Programme, IDF, WHO, findings published</td>
</tr>
<tr>
<td>Phase I finances</td>
<td>self-assessment</td>
<td>programme accounts</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Cooperative relationships</td>
<td>self-assessment</td>
<td>number, quality and results of contacts</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>External communications</td>
<td>self-assessment</td>
<td>press clippings, bulletins, publications</td>
<td>&quot;</td>
<td>&quot;</td>
</tr>
<tr>
<td>Published action programme</td>
<td>outside assessment</td>
<td>printed action programme</td>
<td>&quot;</td>
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</tr>
</tbody>
</table>
## Assessment of Phase II / Dissemination of Information, Training and Marketing Related to the Action Programme

**Assessment period:** 2/2000–12/2000  
**Time of assessment:** 1–3/2001

### OBJECT OF ASSESSMENT

<table>
<thead>
<tr>
<th>In-house operations by the Finnish Diabetes Association</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
</table>
|                                                        | self-assessment      | • documents produced in the process of implementation  
|                                                        |                      | • processing of the programme in the administration and management of the association  
|                                                        |                      | • meeting of the diabetes working groups of the hospital districts | Assessment Report for Phase II (English Summary)  
|                                                        |                      |      |        |        |

- Sub-Committee on Cardiovascular Diseases and Diabetes
- Board of the Finnish Diabetes Association
- Medical Advisory Board of the Finnish Diabetes Association
- Distribution of the report to the parties involved and cooperating partners
- St Vincent Programme
- IDF
- WHO
- Findings published

### Cooperative relationships

- self-assessment  
- number, quality and results of contacts

### External communications

- self-assessment  
- press clippings  
- bulletins  
- publications

### Development of organizational activities of the Finnish Diabetes Association

- self-assessment  
- activities and material produced for local branches  
- questionnaire to local branches

### Phase II finances

- self-assessment  
- programme accounts
## Appendix 1

(4) ASSESSMENT OF PHASE III / CAMPAIGN FOR THE PREVENTION OF TYPE 2 DIABETES AND FURTHER ACTION

**Assessment period:** 11/2000–12/2001  
**Time of assessment:** 1–3/2002

<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| In-house operations by the Finnish Diabetes Association | self-assessment       | documents produced in the process of implementation  
|                                               |                      | processing of the programme in the administration and management of the association  
|                                               |                      | meeting of the diabetes working groups of the hospital districts | Assessment Report for Phase III (English Summary) | Sub-Committee on Cardiovascular Diseases and Diabetes  
|                                               |                      |                                            |                                            | Board of the Finnish Diabetes Association  
|                                               |                      |                                            |                                            | Medical Advisory Board of the Finnish Diabetes Association  
|                                               |                      |                                            |                                            | distribution of the report to the parties involved and cooperating partners  
|                                               |                      |                                            |                                            | St Vincent Programme  
|                                               |                      |                                            |                                            | IDF  
|                                               |                      |                                            |                                            | WHO findings published |
| Cooperative relationships                     | self-assessment       | number, quality and results of contacts   | "                                           | "                                                                 |
| External communications                       | self-assessment       | press clippings  
|                                               |                      | bulletins  
|                                               |                      | publications | "                                           | "                                                                 |
| Development of organizational activities of the Finnish Diabetes Association | self-assessment       | activities and material produced for local branches  
|                                               |                      | questionnaire to local branches | "                                           | "                                                                 |
| Phase III finances                            | self-assessment       | programme accounts | "                                           | "                                                                 |
### Overall Assessment of the Programme

**Assessment period:** 1998–2001  
**Time of assessment:** 1–5/2002

<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| Planning of the programme | outside assessment | Assessment Reports for Phases I, II and III  
written documents concerning the programme  
questionnaires, interviews, discussions | Final Report for the Programme of 1998–2002 and further action for 2003–2010 (English version) | Sub-Committee on Cardiovascular Diseases and Diabetes  
Board of the Finnish Diabetes Association  
Medical Advisory Board of the Finnish Diabetes Association  
distribution of the report to the parties involved and cooperating partners  
St Vincent Programme  
IDF  
WHO findings published |
| Implementation of the programme (including external communications, training, cooperative relationships, etc) | outside assessment | Assessment Reports for Phases I, II and III  
written documents concerning the programme  
questionnaires, interviews, discussions | |
| Programme finances | outside assessment | Assessment Reports for Phases I, II and III  
final accounts and accounting material | |

**Appendix 1**
## Appendix I

### Assessment of the Effectiveness of the Action Programme I

#### Assessment period: 1998–2001


<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of awareness of the risk of type 2 diabetes among the general population</td>
<td>• Gallup poll</td>
<td>• poll data</td>
<td>study report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>Organization of diabetes care in the health-care system</td>
<td>• case study</td>
<td>• case data</td>
<td>case study report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>National system of monitoring care</td>
<td>• self-assessment</td>
<td>• analysis of situation</td>
<td>report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>Awareness among the health-care personnel of diabetes, the programme and related published material</td>
<td>• questionnaire and interview</td>
<td>• questionnaire and interview data</td>
<td>report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>Development of the local and regional activities of the Finnish Diabetes Association</td>
<td>• self-assessment</td>
<td>• documents on local and organizational activities</td>
<td>report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>Recommendations of the action programme</td>
<td>• self-assessment</td>
<td>• recommendations of the action programme and level of adoption</td>
<td>report</td>
<td>inclusion in final report</td>
</tr>
<tr>
<td>Diabetes care in Finland</td>
<td>• review of other research in 2000–2005 on diabetes care, its results and the care organization in Finland</td>
<td>• other research</td>
<td>review report and comparison report</td>
<td>findings published</td>
</tr>
<tr>
<td>Awareness among the members of the Finnish Diabetes Association of the programme and their own views about its impact on their well-being</td>
<td>• questionnaire</td>
<td>• questionnaire data</td>
<td>report</td>
<td>inclusion in final report</td>
</tr>
</tbody>
</table>
### Appendix 1

#### (7) ASSESSMENT OF THE EFFECTIVENESS OF THE ACTION PROGRAMME II

**Assessment period:** changes between the cross-sectional studies of 2000 and 2005  
**Time of assessment:** 2005

<table>
<thead>
<tr>
<th>OBJECT OF ASSESSMENT</th>
<th>METHOD OF ASSESSMENT</th>
<th>DATA</th>
<th>OUTPUT</th>
<th>ACTION</th>
</tr>
</thead>
</table>
| Level of satisfaction of Finnish people with diabetes with the care they receive; quality of self-care | questionnaire and/or interview study             | • the data are collected using an internationally comparable model  
• data from 2000 and 2005                                      | study report                                      | findings published  |
| Organization of diabetes care in the health-care system       | case study                                        | • case study data from 2000 and 2005                              | case study report   | findings published  |
| Glycemic control of Finnish people with diabetes              | repetition of cross-sectional study on the glycemic control of people with diabetes | • data from 1994, 2000 and 2005                                 | study report        | findings published  |
| Prevalence of diabetes-related complications                  | cross-sectional study                              | • existing registry and research data                              | study report        | findings published  |
A Diabetes Programme in Action

Delice Gan

The St Vincent Declaration was born of the belief that action had to be taken to tackle the growing human and economic burden of diabetes in Europe. The Declaration, signed in St Vincent, Italy, in 1989, was the result of a joint initiative of the European Region of the International Diabetes Federation and the European Regional Office of the World Health Organization (WHO/Euro).

The vision that brought the St Vincent Declaration to life encompassed the fundamental recognition that the major players in the healthcare sector had a common interest in the promotion of quality diabetes care. As a result, the first meeting brought together people with diabetes, healthcare professionals, diabetes associations, governments and related industry. This approach also ensured the support of diabetes organizations and governments in the implementation of national programmes to fulfil the objectives of the Declaration. The St Vincent Declaration has become the framework upon which diabetes care policies and strategies have subsequently been based in most European countries.

The Declaration contained two primary goals and 10 target areas which sought to improve the quality of life of people with diabetes. The specific targets included:

- improving the detection and control of diabetes;
- raising public awareness of the opportunities of prevention of diabetes and its complications;
- promoting self-care for people with diabetes;
- ensuring that care of children with diabetes is provided by specialist teams, and that their families are given the necessary support;
- supporting centres of excellence in diabetes care, education and research;
- promoting the independence of people with diabetes;
- removing discrimination against people with diabetes;
- reducing diabetes complications such as blindness, kidney disease and amputations;
- setting up information systems to enable health authorities to monitor and control the quality of healthcare; and
- promoting international collaboration.

Recent surveys suggest that the principles of the St Vincent Declaration are as valid today as they were in 1989. Nonetheless, the success and widening of interest for this initiative require an evolution of its structure and targets as reiterated in the Istanbul Commitment.
Duties of the Diabetes Working Groups of Hospital Districts

- Improvement and coordination of diabetes care within each hospital district
- Setting of care objectives
- Monitoring and assessment of the health outcomes
- Participation in the development and maintenance of the regional diabetes registry
- Improvement of cooperation between primary health care and specialized medical care
- Harmonization and monitoring of the distribution of self-care equipment
- Arrangement of regional training for care personnel
- Assessment of the need for resources and issuing of guideline recommendations (personnel, equipment, etc)
- Lobbying with regard to medical and political decisions concerning diabetes
Role of the Finnish Diabetes Association in the Care System

HAVING NATIONAL INFLUENCE
1. The Finnish Diabetes Association acts as an advocate for people with diabetes at the national level for the improvement of diabetes care.
2. It is the task of the Finnish Diabetes Association to promote public awareness and knowledge of diabetes and participate in the public debate on diabetes issues.
3. The Medical Advisory Board and other expert groups of the Finnish Diabetes Association issue recommendations on diabetes care.
4. The main function of the Association's the Diabetes Centre is to act as a centre of expertise on the education of people with diabetes.

DIABETES EDUCATION OF CARE PERSONNEL AND SELF-CARE TRAINING FOR PEOPLE WITH DIABETES
5. The Diabetes Centre arranges national diabetes courses (self-care training) for people with diabetes of all ages, as well as their immediate family.
6. The Diabetes Centre arranges multidisciplinary education on diabetes care and patient education to all professional groups and care teams involved in the care of people with diabetes. This also includes tailored training programmes and consultation activities that may take place right in the care unit.

COMMUNICATIONS AND PUBLISHING ACTIVITIES
7. The Finnish Diabetes Association publishes journals and newsletters and produces material to support good care and education for people with diabetes and their family and friends, as well as for professionals and students in the health-care and nutrition sectors. In addition, material for people who belong to the risk groups for type 2 diabetes is provided.
8. Through its public relations activities, the Finnish Diabetes Association strives for better diabetes awareness among both the general public and the key groups of decision makers in health care. The Association is responsible for the national information campaigns on the prevention of type 2 diabetes.

IMPROVING THE QUALITY OF DIABETES CARE
9. The Finnish Diabetes Association participates in improving the quality of diabetes care for instance by conducting a survey on the conditions for setting up a national diabetes registry.
10. The Association will establish a prize that is awarded annually to a unit of primary health care that has excelled in the development/effectiveness/quality of diabetes care. The prize will include a monetary award.

ORGANIZATIONAL ACTIVITIES
11. The 108 local branches of the Finnish Diabetes Association are a major resource in supporting the self-care of people with diabetes. Versatile development of the cooperation between the local branches and the health-care system is one of the Finnish Diabetes Association's main goals.
12. At the regional level, the five regional committees and regional secretaries of the Finnish Diabetes Association provide support to both the health-care system and the local branches of the Association.
13. People with diabetes are represented in the diabetes working groups of each hospital district.
Duties of the Physician Responsible for Diabetes Care in the Primary Health-Care System

Together with the diabetes physician of a central hospital:

• to be responsible for planning diabetes care
• to participate in organizing training for professionals at the regional level
• to act as the link in quality assessment
• to distribute information in his/her own care unit about the general diabetes-related issues of the central hospital

Together with a diabetes nurse:

• to maintain the diabetes registry of the care unit (in the way recommended in this action programme)
• to be responsible for the quality of diabetes care in his/her own health-care centre
• to make development proposals for improving the care of people with diabetes
• to motivate health-care staff to provide good and high-quality care
• to arrange group education for people with diabetes

Duties of the Physician Responsible for Diabetes Care in a Large Unit and in the Specialized Health-Care System

There may be several physicians responsible for diabetes care, e.g. one in each line of activity.

• to oversee the care programme
• to assess the care chain for the person with diabetes (quality tools)
• to arrange the regular meetings of the diabetes team and maintain team spirit
• to ensure adequate facilities for diabetes care in the other units of his/her institution or organization
• to compile diabetes-related statistics
• to promote diabetes care in the planning of activities and financial planning and act as an expert in the preparation of procurement decisions
• to be a member of the diabetes working group of the hospital district
Role and Duties of a Diabetes Nurse

<table>
<thead>
<tr>
<th>POST</th>
<th>OPERATIVE LEVEL</th>
<th>KEY ROLE</th>
<th>DUTIES</th>
<th>USE OF WORKING TIME</th>
</tr>
</thead>
</table>
| Diabetes Nurse | unit of specialized medical care, healthcare centre, outpatient clinic, hospital ward | responsibility at unit level, coordinator, training of other healthcare staff, education | Responsibilities on unit level, such as:  
- coordinating diabetes care in the unit  
- maintenance of diabetes registry, quality control of care  
- activities of the diabetes team  
- improvement of diabetes care in his/her own unit  
Training and public relations, such as:  
- training of other staff  
- promoting awareness among the population about diabetes and its consequences  
Cooperation, such as:  
- maintaining contacts with other organizations that provide diabetes care and with local branches of the Finnish Diabetes Association  
- cooperation with the social service  
- maintaining contact with the diabetes working group of the hospital district  
- developing multiprofessional cooperation  
Consultation activities, such as:  
- arranging phone consultation for patients  
- arranging consultation possibilities for the staff of hospital wards, occupational health care, home nursing and home help services  
Education, such as:  
- individual basic and further education of patients  
- organizing further education and appointments for diabetic patients who are transferred from specialized medical care to primary health care | full-time or part-time |
<table>
<thead>
<tr>
<th>Role</th>
<th>Setting</th>
<th>Responsibility/Responsibility</th>
<th>Education, such as:</th>
<th>Consultation activities, such as:</th>
<th>Cooperation, such as:</th>
<th>Cooperation, such as:</th>
<th>Health education, such as:</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Nurse Responsible for Diabetes Care      | health-care centre with population-based responsibility | responsibility on unit level, coordinator, training of other health-care staff, education | - individual basic and further education of patients  
- organizing further education and appointments for diabetic patients who are transferred from specialized medical care to primary health care | - phone consultation with patients  
- arranging his/her own consultation channels | - maintaining contacts with other organizations that provide diabetes care and with local branches of the Finnish Diabetes Association  
- cooperation with the social service  
- developing multiprofessional cooperation | - cooperation with the social service  
- developing multiprofessional cooperation | - promoting awareness among the population about diabetes and its effects | full-time or part-time |
| Nurse with Population-Based Responsibility| health-care centre subunit with population-based responsibility | education | Education, such as:                                                                                           | Consultation activities, such as:                                                                 | Cooperation, such as:                                                                                     |                                                                                                           |                                                                                                           | part of working time |
| Other nurses                              | own care unit                                     | participation in the care of people with diabetes                 | Diabetes care in conjunction with the management of other health problems                                      |                                                                                                           |                                                                                                           |                                                                                                           | small part of working time |

A diabetes nurse is a nurse specially self-educated and formally trained in diabetes care and employed at a central hospital, health-care centre, outpatient clinic, or hospital department.

A nurse responsible for diabetes care is a nurse specially self-educated and formally trained in diabetes care and employed at a health-care centre with population-based or local responsibility.

These two types of nurses have similar key roles and job descriptions. It is important to appoint a diabetes nurse or a nurse responsible for diabetes care to each health-care unit.
Duties of the Nutritionist in the Care of People with Diabetes

**Primary Health Care:**

- to be a member of the diabetes team
- to train and provide consultation to other staff
- to educate people newly diagnosed with type 1 diabetes
- to educate people with type 1 or type 2 diabetes in situations that require specialist know-how of nutritional therapy (see pages 26–27) and Nutritional Recommendations of the Finnish Diabetes Association 1999, if not undertaken by specialized medical care
- to act as an expert in nutritional therapy for diabetes:
  - in organizing nutritional therapy for diabetes in his/her own area and own care unit
  - in planning meals at school and work
  - in the care of old people
  - in planning meals in other institutional settings
- to update and monitor the educational material used in nutritional education
- to participate in the planning and implementation of projects aimed at the prevention of diabetes
- to participate in improving and monitoring the quality of nutritional therapy in his/her own health-care centre/area

**Specialized Medical Care:**

- to be a member of the diabetes team
- to educate people newly diagnosed with type 1 diabetes
- to participate in monitoring the care of children with diabetes
- to educate people with type 1 or type 2 diabetes in situations that require specialist know-how of nutritional therapy (see pages 26–27)
- to train and provide consultation to other staff
- to act as an expert in nutritional therapy for diabetes:
  - in organizing nutritional therapy for diabetes in his/her own area and own care unit and in hospital wards and outpatient clinics
  - in developing meal services in cooperation with catering organizations
- to update and monitor the educational material used in nutritional education
- to participate in improving and monitoring the quality of nutritional therapy in his/her own hospital/area
Duties of the Podiatrist in the Care of a Person with Diabetes

• to act as an expert in foot care in the diabetes team
• to educate and encourage clients in the self-care of the feet both individually and in groups
• to be responsible for high-quality foot care, including management of skin and nail problems and treatment of ulcers
• to provide preventative and maintenance care in the form of off-loading (shoe inlays and toe shields)
• to guide and encourage clients to exercise and, together with a physical therapist, provide preventative and function-maintaining care of the lower limbs, mobility aids and footwear
• to provide footwear therapy (therapeutic shoes and individually made special footwear) in cooperation with an orthotist-prosthetist and appliance manufacturers
• to prepare digital prostheses, participate as a member of a team in fitting lower-limb prostheses and provide exercise education
• to train and instruct personnel within health care and the social service
• to develop the speciality of foot care and to promote the foot care of people with diabetes in his/her own unit/area according to the patients’ risk classification

In the primary health-care system, the emphasis is on preventative activities, basic education on self-care of the feet, screening for feet at risk, and implementation of foot care according to the patients’ risk classification in cooperation with home nursing and specialized medical care, as well as training of other personnel. In the care chain, the primary health-care system also undertakes to monitor patients transferred from specialized medical care.

In specialized medical care, the focus is on the care of severe foot problems, rapid availability of consultation, arrangement of further care and patient monitoring together with the primary health-care system and home nursing, as well as the improvement of foot care at the regional level in cooperation with the diabetes working group.

Duties of the Foot-Care Team

• Preventative activities: education, guidance, training, screening for and follow-up of patients at risk
• Provision of consultation: low consultation threshold, regular meetings at short intervals
• Examinations and care: multidisciplinary and multiprofessional management of each patient, targeting and coordination of care, referrals for care and follow-up
• Development of a regional system of monitoring foot care and arrangement of quality control
Proposal for Quality Criteria for Education

**Outcome criteria reflect changes brought about by education.**

1. The person with diabetes will understand, depending on his/her individual capabilities, how diabetes affects his/her body and the significance of maintaining a healthy lifestyle:
   - He/she will be able to describe the basics concerning his/her own care, as well as the relationships between diabetes and its complications.
   - He/she will be able to recognize, prevent and treat potential acute problems (hyperglycemia or hypoglycemia) and complications that may develop over a longer period of time.
2. The person with diabetes will understand the various options in his/her care and their consequences:
   - He/she will make choices that promote the achievement of good glycemic control.
   - In his/her decisions concerning diabetes, he/she will be capable of situation-specific problem-solving.
   - When necessary, he/she will alter his/her lifestyle to attain better health.
3. The control of the patient’s diabetes will be improved: blood glucose, glycosylated hemoglobin, serum lipid levels, blood pressure, weight.
4. The number of diabetes-related emergency department visits and hospital care days will be reduced.
5. Diabetes-related absences from school or work will be reduced.
6. People with diabetes will know how to utilize health-care services expediently:
   - Detection of the risk factors for diabetic complications (eg participation in fundus photography)
7. The care unit personnel and patients will be familiar with the risk factors for diabetes and will be aware of the means by which it is possible to prevent or delay the development of diabetes and its complications:
   - Information about factors contributing to the development of diabetes and its complications will be broadly available.
   - The care unit personnel and patients will perceive diabetes as a disease.

**Structural criteria reflect the resources required for the implementation of education.**

1. There will be sufficient and professional human resources to carry out education.
2. There will be premises, an environment and facilities for the implementation of education such as are required and support the learning process.
3. Teamwork will be emphasized in the implementation of education.
4. The professional skill of educators will be regularly assessed and enhanced.

**Process criteria reflect the practical implementation of education.**

1. Education will be based on the expectations of people with diabetes and on a continuous assessment of their needs.
2. Education will be client-oriented and based on up-to-date principles of learning and education.
3. Education will be a continuous process carried out in cooperation with the other parties involved in the care of the person with diabetes. The team responsible for the implementation of education will have a commonly agreed division of labour, congruent aims and a uniform work philosophy.
4. Education will be professional and ethical. It will emphasize a positive attitude to life and interaction on an equal basis.
5. The effectiveness and quality of education will be regularly assessed, and the services will be reviewed as necessary on the basis of the assessment.
Skills Required for the Care of People with Diabetes in Primary Health Care

**Practical diabetes care**
- Adoption of a care model that supports the control of diabetes
- Up-to-date theoretical knowledge
  - Etiology, clinical presentation, basics of care, development of complications, their clinical picture and principles of care
- Care and follow up of type 2 diabetes and uncomplicated type 1 diabetes
- Screening for and detection of complications and their treatment and monitoring in primary health care
- Understanding of the special features of diabetes in children and management of emergency situations
- Recognition of the need for expert consultation
- Self-assessment of one’s own work and assessment of the work of the diabetes team

**Education**
- The adult as a learner
- Knowledge of the psychology of lifestyle formation and lifestyle changes
- Mastery of the client-oriented educational process and motivational interaction that support the management of diabetes
- Flexible application of educational methods and tools
- Assessment of the learning results of the person with diabetes and self-assessment of one’s own educational work

**Diabetes and eating**
- Nutritional Recommendations of the Finnish Diabetes Association
- Effects of different nutrients on blood glucose, weight control, blood pressure, and blood lipid levels
- Physiology of weight reduction, psychology of eating behaviour, and practical implementation of weight control education
- Nutritional history taking and evaluation
- Education of people with type 2 diabetes on the amount and quality of fats and reduction of energy intake
- Education of people with type 1 diabetes on adapting their meal rhythm, energy intake, energy consumption, and carbohydrates to insulin activity
- Identification of needs for special education
- Special education on losing weight, weight control group, diabetes nurse, nutritionist

**Foot care**
- Knowledge of the mechanism, predisposing factors, and prevention of foot problems in diabetes
- Foot examination and identification of patients at risk
- Education on self-care of feet, minor foot injuries, and cuts and proper footwear
- Treatment of mycotic infections
- Recognition of and education on foot at risk
- Local antibiotic and off-loading therapy for foot infections in primary health care
- Recognition of critical ischemia
- Identification of a need for care and education provided by a podiatrist
- Identification of the need to consult the foot-care team at the central hospital
- Postoperative care and follow up of vascular and surgical procedures
- Arrangement of supply of technical aids

**Physical activity**
- Knowledge of the general health-promoting effects of physical activity
- Education on weight-loss exercise, health exercise, and fitness training
- Utilization of exercise in the care of type 2 diabetes
- Adaptation of physical activity to the meals and insulin treatment of people with type 1 diabetes
- Prevention of hypoglycemia in connection with physical activity
- Knowledge of the exercise restrictions caused by diabetic complications
- Education on purchasing and using proper footwear
Proposal for the Content of the Diabetes Registry

### Visit information

- **Date**
- **Identity code**
- **Municipality code**
- **Type of diabetes**
  - Type 1
  - Type 2
  - Gestational diabetes
- **Other**
- **Year of diagnosis**

### Care

- **Insulin** year started
- **Nutritional therapy only** year started
- **Oral drug** year started
- **Combination therapy** year started
- **Antidiabetic drug** year started
- **Antihypertensive drug** year started
- **Aspirin** year started

### Weight, Height -> BMI

### Blood pressure

### Smoking

### Fundus photography/ophthalmoscopy date

### Biochemical parameters

- **HbA1c**
- **Lipids**
  - serum total cholesterol
  - serum HDL cholesterol
  - serum triglycerides
  - serum LDL cholesterol
- **Microalbuminuria** µg/min
  (or normal/abnormal value)
- **Proteinuria** g/24 h
- **Creatinine** µmol/l

### Endpoint events

- **Year of diagnosis/date of procedure**
- **Myocardial infarction/coronary artery bypass grafting/angioplasty**
- **Stroke**
- **Foot ulcer neuropathic/ischemic**
- **Amputation** below/above ankle
- **Laser treatment/blindness**
- **Dialysis (starting)**
- **Death**
1. Strips for monitoring blood glucose

People with diabetes treated with insulin need an average of 50 strips/month. The average need of people with diabetes treated with oral agents or nutritional therapy is on average 5-10 strips/month. In the monitoring of the blood glucose of people with type 2 diabetes, the need for supplies varies according to individual needs. Children with diabetes, labile insulin-dependent adults and pregnant women with diabetes have a substantially greater need for monitoring. Similarly, in the initial stage of diabetes, the need for monitoring is greater than average. The patients' individual needs must be reasonably taken into account in the supply of strips.

2. Blood glucose meters

Blood glucose meters for long-term use are purchased by the person with diabetes him/herself. However, it should be possible to borrow meters flexibly in the initial stage of the disease, when balancing blood glucose and during pregnancy. Because most of the hospitals in Finland have already transferred or are transferring to the system of measuring glucose levels in serum/plasma rather than whole blood, using meters that determine the serum/plasma glucose level should be favoured in the future. The selection of meters should also take into account the increasing use of PC-based download programs for blood glucose meters.

3. Urine test strips

People with diabetes treated with insulin Urine glucose only needs to be monitored in exceptional cases where the person with diabetes is not measuring his/her blood glucose. In these cases, the average requirement is 20 strips/week, and generally strips that measure only the urine glucose are sufficient. However, children and labile insulin-dependent adults have a greater need for monitoring.

People with diabetes treated with insulin need an average of 50 strips for monitoring ketone levels/month (the smallest package available for distribution).

People with diabetes treated with oral agents or nutritional therapy The need for monitoring the urine glucose of people with diabetes treated with oral agents or nutritional therapy is an average 5–10 strips/month if they are not monitoring their blood glucose.

4. Insulin syringes, pens and needles

In principle, disposable syringes and needles are meant for one injection only, but in favourable circumstances they can be used safely for 4–6 injections or for 1–3 days. Small children are an exception, and it is recommended that the equipment should only be used once because of injection pain and accuracy of dosage. In the case of multiple-use insulin pens, one pen is needed for each type of insulin. All types of insulin pens currently on the market should be available, and a new pen should be given to replace a pen broken in normal use.

Generally, there is no need to use wipes to cleanse the skin before an injection, but people with diabetes who work in particularly dirty conditions or have other reasons to cleanse the skin form an exception. There must be justification from the attending physician to obtain skin-cleansing wipes.

Equipment and supplies for insulin pump therapy

According to the commonly agreed division of duties, the unit that provides the care for the person with diabetes purchases and overhauls the insulin pump. The need for supplies for an insulin pump (special batteries, belts, cases, infusion supplies, refill ampoules of insulin) varies according to individual needs.
DEHKO 2000-2010

To those mentioned under Distribution below

DELIVERY OF CARE SUPPLIES AND EQUIPMENT BY HEALTH-CARE CENTRES

According to the Public Health Act (66/1992), it is the duty of the municipality to be responsible for public health work. As part of public health work, the municipality must provide medical services for its residents. In accordance with Section 2 of the Public Health Act, the Ministry of Social Affairs and Health sends this letter concerning the distribution of care supplies and equipment to the municipalities and joint municipal authorities that maintain health-care centres. This letter does not concern technical aids of which there are separate regulations, for example, in the Public Health Act, the Decree on Medical Rehabilitation (801/1991) and the Act on Client Fees in Social and Health-Care Services (74/1992). This recommendation has been drawn up in cooperation with the Association of Finnish Local and Regional Authorities. In the process of preparing this recommendation, representatives of certain municipalities and joint municipal authorities that maintain health-care centres have been heard, as well as representatives of patients’ organizations.

The distribution of equipment and supplies for the care and follow up of certain long-term diseases without charge to the patients according to their individual needs is an established part of the medical care provided by health-care centres. Previously, the practice was organized in detail on the basis of letters of instructions issued by the National Board of Health. Since the letters of instructions were rescinded in the early 1990s, health-care centres have generally continued to act according to these principles.

A well-functioning distribution of care equipment improves the conditions for patients’ self-care and promotes patients’ commitment to their care, resulting in better health outcomes. Consequently, patients’ ability to work and functional capacity improve, as well as the quality of their lives, and the risk of complications and the need for consultation visits to a physician are reduced. In addition, this has effects with regard to the health-care costs of society.

The Ministry of Social Affairs and Health recommends that the health-care centres maintained by municipalities and joint municipal authorities distribute such care equipment and supplies to people with long-term diseases in outpatient care as are necessary for the care and monitoring of their disease or its sequelae according to the following principles.

The distribution of supplies and equipment necessary for the care and monitoring of patients’ diseases from a health-care centre to the patient must at all times be based on individual need, which is determined by the attending physician. The health-care centre physicians decide upon the commencement of distribution.

The distribution is commenced if the need for care supplies and equipment is assessed as being of a long-term nature, in general lasting more than three months. Generally, supplies and equipment to meet the need for three months are handed out at a time, and the need for them and whether they are appropriate are always assessed when they are handed out. Distribution and use are monitored on an individual basis. The equipment will be available at the health-care centre or is delivered at the home of the patient, for instance in connection with home nursing. The supplies and equipment are handed out free of charge, and no deductibles, handling charges or any other fees are to be levied. The Ministry of Social Affairs and Health, as well as the provincial governments, will monitor the implementation of the distribution of care supplies and equipment.

Examples of care supplies and equipment of this type are listed in Appendix 1.

Terttu Huttu-Juntunen, Minister
Pekka Järvinen, Government Counsellor

DISTRIBUTION: Municipalities and joint municipal authorities that maintain health-care centres

FOR INFORMATION: Hospital districts, Helsinki University Central Hospital
National Authority for Medicolegal Affairs
Provincial governments
The Association of Finnish Local and Regional Authorities
Chancellor of Justice
Parliamentary Ombudsman
Parliamentary Committee of Social Affairs and Health
The National Research and Development Centre for Welfare and Health (STAKES)
Association of Voluntary Health, Social and Welfare Organisations
Appendix 13

Very high blood glucose and/or symptoms linked to it (fasting blood glucose above 20 mmol/l)

Assessment of overall risk.

Lifestyle counselling, preparation for self-care education on self-care, monitoring, consideration of drug therapy (glucose/lipids/blood pressure/aspirin)

Treatment and monitoring of diabetes and the risk factors for cardiovascular disease

- Bedtime (insulin) combination therapy
- Antilipemic medication
- Aspirin
- Antihypertensives

Distribution of care equipment

Investigation of long-term (six months) poor health outcome

Self-care training and early rehabilitation

Diagnosis of diabetes/metabolic syndrome, assessment of the risk of cardiovascular disease

Proper care setting

Primary health care, private sector, occupational health care

Department of internal medicine*, inpatient ward of health-care centre, short-term inpatient care

Primary health care, private sector, occupational health care

Primary health care, occupational health care

Department of internal medicine*, outpatient care as a rule, Diabetes Centre

Diabetes Centre, local branches of the Finnish Diabetes Association, care units

* Central hospital, district hospital, city hospital

Care Chain of a Person with Type 2 Diabetes
Appendix 14

Primary health care: suspicion of a new case of diabetes

Urgent referral

Diagnosis of diabetes

Treatment of ketoacidosis

Commencement of diabetes care

Education on self-care

Diabetes care and monitoring

Distribution of care equipment

Preventative health care

Self-care training courses, family courses, clubs for young people

Transfer to adult diabetes care

Proper Care Setting

Pediatrics unit

Pediatric hospital ward or pediatric outpatient clinic

Pediatric hospital ward or pediatric outpatient clinic

Pediatric hospital ward or pediatric outpatient clinic

Unit familiar with diabetes care for children or young people

Primary health care

Child welfare clinic, maternal health centre, school health care

Diabetes Centre and local branches of the Finnish Diabetes Association, hospitals

Department of internal medicine or other unit familiar with diabetes care

Care Chain of a person with Type 1 Diabetes

(Child and Young Person)
Care Chain of a Person with Type 1 Diabetes (Adult)

Setting

- Central hospital
- Department of internal medicine*
- Primary health-care, private sector, occupational health care
- Primary health care
- Diabetes Centre, hospitals, primary health care, local branches of the Finnish Diabetes Association
- Department of internal medicine*, outpatient care as a rule, Diabetes Centre
  *central hospital, district hospital, city hospital

Proper Care Setting

1. **Suspicion of a new case of diabetes** referred to a department of internal medicine* without delay
2. **Diagnosis of diabetes**
3. **Treatment of severe ketoacidosis**
4. **Commencement of insulin therapy, basic education**
5. **Preparation for self-care (basic education), consultation visits for 1–2 years**
   - Transfer to permanent care unit requires mastery of self-care
6. **Diabetes care and monitoring**
7. **Distribution of care equipment**
8. **Self-care training course (recommended), self-care support group**
9. **Investigation of poor health outcome**
Diabetes Complications

Person with diabetes

Changes in the fundus (severe background retinopathy, proliferative retinopathy, maculopathy)

Coronary heart disease, mild circulatory problem in lower limbs, hypertension, microalbuminuria

Acute cardiovascular complications (heart, brain, lower limbs), refractory cardiovascular disease, proteinuria*, elevated creatinine**

*urinary protein excretion rate > 3 g/24 h
**serum creatinine > 150 mmol/l

Proper Care Setting

Ophthalmology unit

Primary health care, private sector, occupational health care

Department of internal medicine*

*specialized medical care

Diabetes-Related Foot Problems

Proper Care Setting

Diabetes care and monitoring

Minor foot problems

Severe foot problems

Problematic neuropathy, eg aches and pains

Consultation visit with podiatrist

Foot care team within specialized medical care

Neurology unit within specialized medical care, primary health care, private sector
REFERENCES

To Decision Makers and Health-Care Providers


History of Diabetes Care Arrangements in Finland


Costs of Diabetes
Appendix 18

Care: a Part of Life for a Person with Diabetes

Lifestyle Modification in the Prevention and Care of Diabetes

Education
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