INTERNATIONAL CURRICULUM FOR DIABETES HEALTH PROFESSIONAL EDUCATION

Consultative Section on Diabetes Education

International Diabetes Federation

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International Curriculum for Diabetes Health Professional Education

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‘A curriculum is a document that describes the totality of a learning experience and is designed to achieve specific education goals’

(Berg, 1982)

Foreword

The mission of the International Diabetes Federation is to promote diabetes care, prevention and a cure worldwide.

The lack of trained health professionals and programmes to train health professionals continues to be cited by many member organizations of the International Diabetes Federation (IDF) as the most critical issue impeding the delivery of high quality diabetes education and care. In 2002, the IDF Consultative Section on Diabetes Education published a curriculum that could be used by all members of IDF. Contributions came from all regions and thus reflected the global needs of the Federation. The curriculum has been used in full to conduct comprehensive programmes or in part for short workshops. It has been readily adapted to meet the different and special needs of local health professionals, institutions and organizations.

It is the philosophy of the Consultative Section on Diabetes Education that to provide high quality diabetes education, health professionals must have a sound clinical understanding. Consequently, in the curriculum there is considerable emphasis placed on the pathophysiology and clinical management of diabetes. In this way, diabetes education delivered by well trained health professionals becomes integrated with clinical care, forming the key to successful self-management.

As we review and revise this curriculum in 2008, new and innovative approaches to diabetes management and education are appearing. So this document must be a living one that can evolve as new evidence becomes available. This revision includes two new modules. And while further issues are yet to be covered, we hope that this curriculum will continue to serve as a step towards increasing health professionals' knowledge and understanding, thus resulting in better care for those living with diabetes.

Marg McGill
Senior Vice President, IDF
Chair of the IDF Consultative Section on Diabetes Education

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Introduction

In designing a curriculum, teaching and learning theories, creativity, fun and experiential learning should be incorporated. A comprehensive curriculum is fundamental to the education of a well prepared and clinically effective diabetes educator. It is consistent with the International Diabetes Federation Consultative Section on Diabetes Education's (DECS) concept of diabetes education and part of the vision of the International Diabetes Federation (IDF) to empower people with diabetes and healthcare team members in an effort to improve preventive strategies and diabetes outcomes. In addition, a curriculum can serve as a mechanism to facilitate the delivery of global diabetes education standards, provide for consistent preparation of healthcare team members, and support the development of a dynamic discipline that has academic and clinical integrity.

Background

The need for consistent preparation of diabetes educators has been recognized within IDF for a number of years. This has been supported anecdotally by many requests for assistance to develop educational programmes and conduct educational workshops for health professionals from many countries worldwide.

Therefore, an international curriculum will:

- Recognize a common framework for health professional education programmes
- Support a common standard of practice based on the International Standards for Diabetes Education initially developed by DECS in 1998, revised in 2003 and in 2008
- Provide good quality diabetes education that allows in-built review processes, benchmarking, and the identification and targeting of best practices
- Be consistent with the expected role of diabetes educators
- Prepare diabetes educators for an advanced level of practice.

The recognition process for education programmes by DECS, whereby curricula are assessed against the structure, process and outcome standards identified in the International Standards for Diabetes Education, is an external review process which complements the internal evaluation that is an integral part of any curriculum.

It is understood that many countries have well planned and structured training programmes for diabetes educators. In most countries, however, administrators and providers are just

beginning to recognize the integral part diabetes education plays in the management of diabetes – that every diabetes care intervention is an educative process and that specific education is required to enable health professionals to be effective diabetes educators. Within these areas, training programmes and curricula are necessary to prepare people for the role of diabetes educator. Diabetes education is a specialty and requires knowledge and competence at an advanced level if it is to be delivered effectively. Therefore, an international curriculum will assist government leaders/ decision makers and healthcare providers to appreciate the complexities involved in delivering effective diabetes education, as well as the specific knowledge, talents and role required of the diabetes educator as a specialist practitioner and effective member of the diabetes healthcare team.

The last decade has seen the role of the diabetes educator extend beyond the provision of education to include advanced clinical skills that encompass clinical assessment, complication assessment and management, medication adjustment and research. In some countries the nurse practitioner role and other advanced practice roles have emerged and developed. These practitioners are highly skilled clinicians who have an extended scope of practice at an advanced level. These advanced practices include initiating medications, referral to specialists and ordering diagnostic investigations. Where these health specialists exist, the curriculum must be designed to prepare them to work safely and effectively at the advanced level. Some advanced skills are included in this curriculum where indicated by *; others, such as prescribing medication, have not been addressed.

This document was developed to assist individuals and organizations to prepare education programmes for diabetes educators. It should be considered in the context of the legal, regulatory, professional and cultural requirements of individual countries. The curriculum framework outlined in this document is a guide only.

In 2006, DECS published a series of slides, 'Diabetes education modules', to provide the curriculum with supplementary didactic material. Nineteen modules that address the curriculum objectives, each with PowerPoint slides and teaching notes, are available at the IDF website (www.idf.org). In each section of this document for which slides have been produced, you will see a reference to the IDF website, where they can be downloaded.

A curriculum

In developing a curriculum it is important to:

- Involve key stakeholders
- Suit the target audience
- Ensure the content reflects current practice and where possible is evidence-based or at least consensus-based
- Review the curriculum regularly to accommodate change
- Link theory to practice.

Guiding principles

The curriculum will need to demonstrate that it:

- Supports students to gain knowledge, and develop skills and competence to deliver diabetes education
- Has processes in place to recognize prior diabetes learning
- Has processes for collaboration with relevant organizations, associations and other bodies where appropriate – for example, by providing clinical experience
- Integrates theory, research* and clinical practice, and uses reflective practice, problem-solving and decision-making skills
- Is standard- /competency-based
- Has appropriate resources to deliver the curriculum, including the quantity and quality of clinical experience and supervision
- Is delivered by a teacher and faculty with the appropriate education and qualifications to teach the subjects allocated to them
- Has procedures in place to approve and monitor facilities where clinical experience is undertaken
- Equips students to deal with professional issues, role conflict and the delivery of diabetes education according to the role they are expected to perform
- Is clearly defined in the context of the particular society and healthcare system in which the programme is to be delivered.

* Research refers to the evaluation, utilization and implementation of research findings in practice, as well as undertaking and collaborating in the development of original research projects.

Glossary of terms

Clinical experience

The course documentation must demonstrate how the student will acquire knowledge about diabetes and the clinical skills necessary to apply theory in the practical or clinical setting, and gain competence in the clinical field. Clinical experience should take place under the guidance/supervision of an experienced diabetes educator working in an interdisciplinary diabetes care team.

Competence

Competence refers to the ability to correctly perform procedures and carry out the core components of the diabetes educator role. At the end of the course students should not require supervision in their practice but will require support and mentoring.

Curriculum document

A detailed plan for the educational programme describes the overall aims of the course, the content (usually divided into topics/modules, each with its own set of objectives), how students are selected, details about the faculty and resources, references/texts, evaluation processes and, where appropriate, the process for allocating recognition of prior learning. It also outlines information about the

infrastructure of the organization offering the programme.

A curriculum document is not a detailed lesson plan. However, the lesson plan should be consistent with the curriculum document, contain specific details about the content and be able to meet the stated goals, objectives and learning outcomes.

Diabetic

The word 'diabetic' should not be used as a noun; the terms 'person with diabetes' or 'people with diabetes' should be used. 'Diabetic' can be used to refer to inanimate objects, such as 'diabetic foods' or diabetes-related complications, such as 'diabetic retinopathy'.

Education provider

The person or organization delivering the educational programme

Faculty

The personnel who teach the curriculum

Flexibility of the course

In order to facilitate access to a course, there should be flexibility with respect to content, accessibility and the mode of delivery. It should be delivered at a level and appropriate standard for the country in which it is to be delivered.

Module

A specific section of the curriculum that contains details about the aims, objectives, learning outcomes and teaching strategies, length of time devoted to the module, any self-directed learning, and evaluation processes about a single topic. A module can also be known as a 'unit' or 'subject'.

Recognition

Recognition of educational programmes is a process whereby the Consultative Section on Diabetes Education examines a curriculum to ensure that it will prepare diabetes educators to function competently and safely in healthcare systems and services, thereby assuring students, consumers, healthcare providers and governments that the course is delivered at an appropriate standard and is recognized by IDF. Recognition is conferred on courses that meet the standard for a period of 3 years. After that time re-recognition must be sought. Visit the IDF website for further details at www.idf.org. Note: 'recognition' refers to courses, not individuals.

Recognition of prior learning

Prior learning refers to knowledge and competence already acquired before undertaking the diabetes educator programme. Each programme must demonstrate clearly how it will incorporate recognition of prior learning where appropriate. Clear guidelines on how credit will be given for previous experience of diabetes education and any appropriate units of study undertaken in other educational settings must be shown.

DECS curriculum framework

Purpose of the curriculum framework

While allowing for a variety of curricula approaches and support for innovation and change, the information contained in the international curriculum framework is intended to serve as a:

- Guide to education providers and faculty involved in developing courses offering education to diabetes educators
- Basis for assessing curricula submitted to DECS for recognition
- Vehicle for ensuring diabetes educators are prepared for the role they are expected to perform
- Method of ensuring that a basic standard of diabetes education is met.

The criteria include the major areas that need to be considered and included when preparing a curriculum for a proposed course or programme for training healthcare professionals.

Organization and administration

- The curriculum should contain a statement indicating that the philosophy and overall objectives of the course are compatible with those of IDF, the education provider and the country in which the programme is to be conducted
- There should be adequate human and material resources available to deliver the course that are commensurate with the financial resources of the organization
- The curriculum should be administered by an experienced course coordinator.

Students

Students enrolled in the course should meet the normal requirements and selection process of the education provider and country concerned, and these should be described in the curriculum document. Students should have a health professional background.

Faculty and support staff

- A course coordinator should have overall responsibility for organizing and ensuring the smooth delivery of the course
- Faculty members should be academically and professionally qualified in the areas in which they teach and have experience working in an interdisciplinary diabetes team
- There should be enough faculty members to:
  - teach the subjects in the curriculum

– provide adequate guidance, supervision and support for students, especially in the clinical areas where collaboration with experienced practitioners in the clinical area is important.

A curriculum vitae containing a list of the qualifications and experience of each faculty member should be included in the curriculum.

Preparation of the curriculum documentation

a) Successful completion of the course should lead to a qualification in diabetes education, however recognized/styled in the individual country concerned.

b) The curriculum should be based on a philosophy that takes into account the IDF International Standards for Diabetes Education, the competencies and relevant professional codes of conduct, ethical standards and educational requirements of the relevant professional associations, education providers and governments of the country in which the curriculum is to be delivered. The philosophy should be clearly articulated in the curriculum document.

c) There should be a rationale that clearly identifies the need to train diabetes educators and demonstrates that there has been consultation with key stakeholders and consumers. It should reflect the contemporary health issues and expectations of the country in which the curriculum is to be delivered.

The curriculum content

Any curriculum document designed to prepare diabetes educators should:

- Have a strong clinical and research focus (evidence-based care)
- Reflect the core components of the diabetes educator role:
  – Clinical practice
  – Education, which includes prevention at every level, and health promotion
  – Counselling and behavioural change techniques
  – Research and quality improvement/audit processes
  – Administration/management, which incorporates leadership
- Include content that addresses professional preparation for the role:
  – How the diabetes educator, other health professionals and non-medical people work with each other, including responsibilities and professional boundaries
  – Working in an interdisciplinary team, which includes conflict resolution and negotiation.

Specific content

The specific content should be arranged into modules or subjects. Each module should contain:

- Goals, objectives and learning outcomes for the module

- An outline of the content to be covered
- The teaching strategies to be used
- The assessment procedures and whether or not an examination is required to show completion of the programme
- How much time is devoted to theory and how much to clinical practice/experience
- Details of the proposed student workload for the overall course, and for each module – how much time the student will spend in class, in the clinical situation, and doing homework and assignments
- How theory and practice relate to each other
- The assessment tools, including how clinical competence will be determined (copies of assessment tools should be provided as an appendix to the curriculum)
- The prescribed and reference books, journals and other materials recommended for each subject, which should be accessible to the participants or supplied to them by the education provider.

Evaluation

- Details about how the course will be evaluated, including evaluation by the students, teachers and clinical supervisors. Copies of these evaluation tools should be provided in an appendix.
- The arrangements for ongoing and periodic curriculum review should be described if the course is to be offered on an ongoing basis.

The educational facility

The physical facilities in which the course is to be conducted should be adequate to the needs of the students and the country, and could include:

- Classrooms and conference rooms
- Access to appropriate reference material and equipment such as computers and those required for clinical and metabolic control and treatment
- Didactic materials including audiovisual equipment
- Office accommodation for academic and support staff.

An outline of the physical facilities should be included in the curriculum document. It is acknowledged that facilities will vary between countries.

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International Diabetes Federation Consultative Section on Diabetes Education. *Guidelines for Recognition of Diabetes Education Courses and Materials for the Education of Health Professionals*. IDF. Brussels, 1999. (www.idf.org)

Module I-1

The role of the diabetes educator

Overview	Diabetes educators are an integral part of the diabetes management team. The role of the educator is to enable people with diabetes to manage their diabetes-related health to the best of their ability, to allow them to make choices and take actions based on informed judgment, and to enhance the quality of life of the person with diabetes. While diabetes educators may come from a variety of health professions, each member of the diabetes team is expected to integrate the educator role into their professional practice. This means that some skills will be common to all team members. Refer to Module 1-2, Team management.
Goals	To understand that educators are a part of a team, which includes the person with diabetes at its centre, and that their role is to work with other team members to improve people's self-care ability, health and quality of life
Objectives	After completing this module the participant will be able to: • Describe the role of diabetes educators in their particular settings • Discuss the educator role in the professional practice of each team member • Discuss the expanding clinical role, as well as the advanced practice role, of diabetes educators • Describe the mentorship role and its importance in the development of new educators • Differentiate between the roles and contribution of a professional diabetes educator and a non-medical educator • Discuss the importance of continuous professional and self-development and methods of updating skills and knowledge in the field • Discuss methods of collaboration with the interdisciplinary healthcare team • Discuss how to become a diabetes educator • Discuss the issue of recognition or certification of diabetes educators as it applies in their country

Teaching strategies	Discussion with experienced diabetes educators Writing a reflective paper on becoming a diabetes educator
Suggested time	1 hour
Who should teach this module	Diabetes educators from different professions, such as a nurse, dietitian or pharmacist
References	American Association of Diabetes Educators Task Force. The scope of practice, Standards of practice, and Standards of professional performance for diabetes educators. *Diabetes Educ* 2005; 31: 487-511. Barlow S, Crean J, Heizler A, et al. Diabetes educator: assessment of evolving practice. *Diabetes Educ* 2005; 31: 359-72. Diabetes Educators Section Task Force. *Standards for diabetes education in Canada*. Canadian Diabetes Association. Toronto, 2005. Funnell MM, Brown TL, Childs BP, et al. National standards for diabetes self-management education. *Diabetes Care* 2008; 31 (Suppl 1): S97-S104. Norris SL, Chowdhury FM, Van Le K, et al. Effectiveness of community health workers in the care of persons with diabetes. *Diabet Med* 2006; 23: 544-56. Philis-Tsimikas A, Walker C, Rivard L, et al. Improvement of diabetes care of underinsured patients enrolled in Project Dulce: a community-based, culturally appropriate, nurse case management and peer education diabetes care model. *Diabetes Care* 2004; 27: 110-5. Soundarya M, Asha A, Mohan V. Role of a diabetes educator in the management of diabetes. *International Journal of Diabetes in Developing Countries* 2004; 24: 65-8.

Detailed content for this module is available as a slide presentation at www.idf.org

Module I-2

Team management

Overview	This module aims to provide participants with the opportunity to consolidate their understanding of the social, educational, dietary and psychological requirements of people with diabetes and how these are to be met by using an interdisciplinary approach to care. The module acknowledges the importance of the discrete roles played by each team member but also discusses the need for team members to extend traditional roles if specialized team members, such as dietitians or podiatrists, are not available. The module also emphasizes the importance of providing ongoing education in diabetes care for all team members, and establishing common protocols and management goals.
Goals	• To provide participants with an understanding of how the needs of people with diabetes can be met with an interdisciplinary care approach • To highlight the roles of the health professionals involved in providing diabetes care • To emphasize the blended and overlapping nature of roles in a fully integrated team
Objectives	After completing this module the participant will be able to: • Discuss why an interdisciplinary and/or a multidisciplinary approach is needed in the management of diabetes • Identify the roles of various members working within an interdisciplinary team – such as generalist doctors, specialist doctors, nursing personnel, podiatrists, dietitians, psychologists • Discuss the role of the coordinator and the person with diabetes within the team • Identify ways in which the roles of different team members can overlap and complement each other • Appreciate the importance of respect for all members of the team including the person with diabetes • Discuss the importance of interdisciplinary communication, such as team meetings and case conferences

	• Identify the ongoing educational needs of team members in order to enable them to function in an interdisciplinary environment at their best capacity, and to allow them to contribute to team initiatives • Discuss the need for a common protocol to ensure all members of the team work towards the same goal and use a common framework to avoid confusing people with diabetes, duplicating care or miscommunication • Discuss the importance of evaluating the performance of all team members
Teaching strategies	Case study that demonstrates interdisciplinary care – highlighting the medical, social, dietary and psychological requirements of a person with diabetes Group discussion regarding different approaches to interdisciplinary care Role play to demonstrate the different behaviours and approaches of team members Clinical placement within an interdisciplinary team
Suggested time	Formal session: 1-2 hours Clinical placement: 1 week
Who should teach this module	An interdisciplinary diabetes care team
Evaluation of learning	Completion of a plan for adopting interdisciplinary care in the participant's own setting
References	Adeleye JO, Agada NO, Balogun WO, et al. Diabetes care in Nigeria: time for a paradigm shift. *Afr J Med Med Sci* 2006; 35: 155-9. Bayless M, Martin C. The team approach to intensive diabetes management. *Diabetes Spectrum* 1998; 11: 33-7. Franz MJ, Monk A, Bergenstal R, Mazze R. Outcomes and cost-effectiveness of medical nutrition therapy for non-insulin-dependent diabetes mellitus. *Diabetes Spectrum* 1996; 9: 122-7. Funnell MM, Brown TL, Childs BP, et al. National standards for diabetes self-management education. *Diabetes Care* 2008; 31(Suppl 1): S97-S104. Hennings J. Diabetes in pregnancy: lessons for the multidisciplinary team. *Journal of Diabetes Nursing* 1998; 2: 77-8, 83-4. International Diabetes Federation Consultative Section on Diabetes Education. *International Standards for Diabetes Education*. IDF. Brussels, 2003. (www.idf.org/webdata/docs/International%20standards)

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Module I-3

Teaching and learning

Overview

Teaching skills are integral to the effectiveness of the diabetes educator. Education involves much more than giving out information; educators should have a good understanding of the theories and processes of education and be able to apply this knowledge in practice.

Education is an ongoing process of assessment, planning, implementation and evaluation. High quality diabetes education is not totally dependent on the availability of 'high-tech' resources; a knowledgeable person, with excellent communication skills (speaking and listening), is all that is required.

Diabetes education needs to be individualized – reflecting the uniqueness of each person. What should be learned and how it should be learned vary from person to person. Educational strategies can range from minimal telephone contact to a comprehensive programme as the situation requires.

Goals

- To provide participants with the knowledge and skills of the education process to enable them to be effective diabetes educators
- To develop excellent communication skills
- To allow participants to reflect on their own learning process and practice teaching
- To provide an overview on the importance of assessing readability of handout materials for people with diabetes

Note: this module refers to adult learning. For more on how children learn, refer to Module IV-1, Diabetes in children and adolescents.

Objectives

After completing this module the participant will be able to:

Learning theories and concepts

- Differentiate between teaching and learning
- Identify barriers and enabling factors to teaching and learning
- Explain the importance of diabetes self-management education (therapeutic patient education)

- Discuss the theoretical concepts of adult learning principles, such as learning readiness and methods (Knowles, 1984), and social learning theories (including Health Belief Model and Self-efficacy Theory), and give examples of how these concepts can be applied in practice

Assessment

- Describe the key components of a learning needs assessment, which may include: demographic, cultural, environmental and psychological factors, attitudes and beliefs, current health practices, stages of development, socio-economic resources
- Describe how to undertake a learning needs assessment
- Determine a person's readiness and capacity to learn
- Identify three general styles of learning and discuss how to assess them
- Identify the role of the family/support people in the educational process

Planning

- Adapt and develop programme content to be culturally sensitive
- Differentiate between the three domains of learning – cognitive, affective and psychomotor
- Demonstrate skills in behavioural goal setting
- Discuss how to select the teaching methods that fit with different learning styles
- Develop the content for a comprehensive educational programme for people with diabetes
- Demonstrate the ability to prioritize the teaching of content according to people's need and readiness
- Discuss the importance of using available resources in the planning of an educational programme

Implementation

- Describe how to use each teaching method most effectively (lecture, individual, small group)
- Demonstrate how to manage group dynamics and group learning
- Demonstrate effective communication skills, such as active listening, conveying empathy, patient-directed goal-setting, clear presentation of information, use of non-verbal cues
- Demonstrate giving positive feedback to people with diabetes and enhancing self-efficacy

- Demonstrate providing education that is individualized to the person's needs

Evaluation

- Refer to Module I-7, Evaluation
- Distinguish between different types of evaluation, structure, process, content, outcomes, impact and programme
- Discuss evaluation methods, including how to evaluate the programme and the participants' achievements in terms of the learning goals
- Design an instrument to evaluate the participants' satisfaction with the programme
- Discuss the barriers to conducting a programme evaluation

Health education materials

- Discuss the concepts of literacy and health literacy and their impact on learning
- Explain strategies for teaching people with low literacy or low health literacy skills
- Assess educational materials for their readability and consequent appropriateness of use
- Develop culturally specific health education materials that are suitable to the population in general
- Develop health education materials for the low literacy group

Special populations

- Describe teaching strategies for people who are either visually or hearing compromised
- Discuss teaching strategies that would be appropriate for people with disabilities and special needs
- Discuss culturally and age appropriate teaching strategies

Teaching strategies

Reflection on personal learning experiences – positive and negative

Role plays to perform teaching and learning

Short lecture to highlight teaching and learning theories

Teaching practice in various situations – to individuals and groups, lectures, telephone counselling

Video recording of the teaching practice for self review and peer review

	Observation of others teaching Assessment of existing health education resources for reading level, cultural appropriateness Preparation of a course outline, to include assessment, objectives, planning and evaluation*
Suggested time	Theory: 6 hours Clinical practice: 24 hours (3 days)
Who should teach this module	Education specialist, diabetes educator
Evaluation of learning	Demonstration of good communication skills Demonstration of teaching practice Assignment – development of a teaching plan or course outline*
References	Antai-Otong D. *Nurse-client communication: a life span approach*. Jones and Bartlett Publishers. Sudbury, 2007. Assal JP, Golay A, Visser AP. *New trends in patient education: a trans-cultural and inter-disease approach*. Proceedings of the Patient Education 2000 Congress. Geneva, 2000. Bartlett E (Ed). At last, a definition. *Patient Educ Couns* 1985; 19: 237-39. Bastable SB. *Essentials of patient education*. Jones and Bartlett Publishers. Sudbury, 2006. Belton AB, Simpson N. *The how to of patient education*. RJ and Associates. Streetsville, 2003. (www3.sympatico.ca/rn.simpson/bookorder.html) Deakin TA, Cade JE, Williams R, Greenwood DC. Structured patient education: the diabetes X-PERT Programme makes a difference. *Diabet Med* 2006; 23: 944-54. Doak CC, Doak LG, Root JH. *Teaching patients with low literacy skills* 2nd edition. Lippincott. Philadelphia, 1996. Fisher EB, Brownson CA, O'Toole ML, et al. Ecological approaches to self-management: the case of diabetes. *A J Public Health* 2005; 95: 1523-35. Genev NM, Flack J, Hoskins PL, et al. Diabetes education: whose priorities are met? *Diabet Med* 1992; 9: 475-579. Kim S, Love F, Quistberg DA, Shea JA. Association of health literacy with self-management behavior in patients with diabetes. *Diabetes Care* 2004; 27: 2980-2. Knapp H. *Therapeutic communication: developing professional skills*. Sage Publications. Los Angeles, 2007. Knowles M. *The adult learner: a neglected species*. Gulf Publishing Co. Houston, 1984. Lacroix A, Assal JP. *Therapeutic education of patients*. Vigot. Paris, 1998.

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* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module I-4

Psychosocial and behavioural approaches

Overview	Diabetes is a chronic illness that impacts upon every aspect of the life of people and families affected by diabetes. In children and adolescents, diabetes can interfere with normal psychological and social development and complicate family functioning. People with diabetes are faced with the challenge of self-regulating their diabetes, while living a full and fulfilling life. Learning to perform diabetes self-care activities and integrate these health behaviours in daily life, in the face of other responsibilities and life stresses, is psychologically complex and burdensome. Acute and chronic diabetes complications can negatively affect the persons' well-being and ability to function. People differ in their appraisal of, and ability to effectively cope with, the demands of diabetes self-management. Subgroups of people with diabetes are psychologically more vulnerable than others and warrant special attention. Therefore, due to the complexity of making behavioural changes, educators require, as well as teaching skills, a good understanding of the psychosocial impact of diabetes on daily living, and knowledge of behavioural sciences in order to enhance people's ability to cope.
Goals	• To highlight the impact of diabetes, and the psychosocial needs of people with diabetes and their family • To provide participants with knowledge and skills to enhance the psychological well-being and diabetes self-management of people with the condition using a patient-centred approach • To encompass behavioural approaches, and emotional support in self-management education
Objectives	After completing this module the participant will be able to: • Describe the psychosocial impact of diabetes and its treatment on the person and individual's family members • Identify professional attitudes and behaviours that are helpful/ not helpful to people with diabetes

- Recognize that:
  - adjustment to diabetes is ongoing and needs to be addressed in the early stages and throughout the life cycle
  - living with diabetes often requires changes to lifestyle that are difficult for most people with diabetes to achieve and sustain
  - diabetes-related stress is common, particularly fear of hypoglycaemia and long-term complications
  - diabetes-related distress is common and can persist for years after the diagnosis, manifesting itself as anger, fear and frustration
  - clinical depression is more prevalent among people with diabetes than the general population
  - people can use different cognitive and behavioural strategies to cope with the demands of diabetes- and treatment-related stresses
  - the paradigmatic shift towards an empowerment based approach is more appropriate in self-managed illnesses, such as diabetes than a compliance/adherence approach
  - educational interventions that incorporate behavioural and affective components are more effective
- Discuss cognitive, emotional, behavioural and social barriers to self-care, and strategies to address these
- Identify and offer appropriate emotional and behavioural support to people with diabetes and their families within the context of diabetes education
- Discuss strategies and approaches that have been shown to help people trying to change lifestyle behaviours
- Discuss the differences in terms of approach and strategies between the compliance approach and empowerment approach
- Incorporate strategies and approaches appropriate for helping people make behaviour change into practice in order to effectively facilitate individual and group education and care
- Identify prevalent psychological disorders among people with diabetes that warrant special attention and specialized mental healthcare (such as depression, anxiety, eating disorders, substance abuse), and understand the impact on emotional well-being, self-management behaviours and clinical outcomes

	• Discuss community understanding and attitudes to diabetes • Discuss the support services available to people with diabetes and their families
Teaching strategies	Short lecture to explain theoretical concepts and current evidence on the effectiveness of self-management education Activities to simulate living with diabetes (such as following diet, giving injections, self-monitoring blood glucose for 3 days) and chronic diabetes complications (such as wearing cataract goggles, walking on ice, etc.). It is critical to point out that these activities do not give people a real understanding of what it is like to have diabetes; they merely provide some experience with the physical/ clinical care of diabetes. Interactive workshop, including role play and problem-solving through case study Interactive session with person or people living with diabetes
Suggested time	2-3 hours
Who should teach this module	Psychologist, diabetes educator, people with diabetes
Evaluation of learning	Analysis of the interaction between persons with diabetes and professionals after a role play
References	Anderson RM, Funnell MM, Arnold MS. Using the empowerment approach to help patients change behavior. In Anderson BJ, Rubin RR (Eds). *Practical Psychology for Diabetes Clinicians* 2nd edition. American Diabetes Association. Alexandria, 2002. Anderson B, Funnell M. *The art of empowerment: stories and strategies for diabetes educators* 2nd edition. American Diabetes Association. Alexandria, 2005. Anderson BJ, Rubin RR (Eds). *Practical psychology for diabetes clinicians. How to deal with the key behavioural issues faced by patients and health care teams.* American Diabetes Association. Alexandria, 1996. Bandura A. *Self-efficacy, the exercise of control.* WH Freeman and Company. New York, 1997. Barlow J, Wright C, Sheasby J, et al. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns* 2002; 48: 177-87. Brown SA. Interventions to promote diabetes self-management: State of the science. *Diabetes Educ* 1999; 25(Suppl): S52-S61. Donie JF. The relationship between diabetes and depression: improving the effectiveness of case management interventions. *Lippincott's Case Management* 2004; 9: 177-83.

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Piette JD, Glasgow RE. Education and self-monitoring of blood glucose. In Gerstein HC, Haynes RB (Eds). *Evidence-based diabetes care*. BC Decker. Hamilton, 2001.

Piette JD, Richardson C, Valenstein M. Addressing the needs of patients with multiple chronic illnesses: the case of diabetes and depression. *Am J Manag Care* 2004; 10: 152-62.

Piette JD, Weinberger M, McPhee SJ. The effect of automated calls with telephone nurse follow-up on patient-centered outcomes of diabetes care: a randomized, controlled trial. *Med Care* 2000; 38: 218-30.

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Roter DL, Hall JA, Merisca R, et al. Effectiveness of interventions to improve patient compliance: A meta-analysis. *Med Care* 1998; 36: 1138-61.

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Detailed content for this module is available as a slide presentation at www.idf.org

Module I-5

Community awareness, promotion and prevention

Overview	An increase in community understanding of the special needs of people with diabetes is essential. Diabetes health professionals should also promote strategies for the primary prevention of type 2 diabetes. Many of the strategies used to meet these goals are designed not only to bring about positive change in an individual's behaviour but also to increase the understanding of the community and dispel myths surrounding diabetes. Changes occur most readily and permanently when environment, home, work and recreation activities enable people to reinforce change.
Goals	• To provide participants with an understanding of the community's knowledge and attitudes towards diabetes • To provide participants with an understanding that community strategies need to reflect the differences between type 1 diabetes and type 2 diabetes • To provide participants with strategies for health promotion and the primary prevention of type 2 diabetes
Objectives	After completing this module the participant will be able to: • Describe the general public's knowledge of and attitudes towards diabetes • Identify the health priorities and resources needed for diabetes in the country • Discuss the use and applicability of various intervention activities in relation to promoting diabetes health, such as screening programmes, educational programmes, counselling, telephone hotlines, the media, school- and workplace-based programmes • Describe the concepts of primary, secondary and tertiary prevention • Describe the value of screening programmes and school and workplace awareness programmes • Interpret research relating to the primary prevention of type 2 diabetes • Describe the levels of health promotion in individuals, communities and organizations, and public policy and practice

	• Discuss approaches to health promotion – medical, behavioural change, educational, client-centred, and societal change • Discuss the role of advocacy and communication skills in influencing policy making* • Use epidemiological data to justify preventive strategies* • Interpret country-specific surveillance data on the prevalence of diabetes and risk factors for the development of diabetes in the community*
Teaching strategies	Interactive workshop, discussion
Suggested time	2 hours
Who should teach this module	Health promotion professional, diabetes educator, member association personnel
Evaluation of learning	15-minute presentation of a proposed health promotion activity
References	Chiasson JL, Josse RG, Gomis R, et al. Acarbose for prevention of type 2 diabetes mellitus: The STOP-NIDDM randomized trial. *Lancet* 2002; 346: 393-403. Cottrell RR, Girvan TJ, et al. *Principles and foundations of health promotion and education*. Allyn and Bacon. Boston, 1999. Katz J, Peberdy A. *Promoting health: knowledge and practice*. Macmillan Press Ltd. London, 1997. Kemm J, Close A. *Health promotion: theory and practice*. Macmillan Press Ltd. London, 1995. Nutbeam D, Harris E. *Theory in a nutshell: a guide to health promotion theory*. McGraw-Hill. Sydney, 1999. Pan X, Li G, Hu Y, et al. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance: The Da Qing IGT and Diabetes Study. *Diabetes Care* 1997; 20: 537-44. Raczynski JM, DiClemente RJ. *Handbook of health promotion and disease prevention*. Kluwer Academic/Plenum Publisher. New York, 1999. Scott D, Weston R. *Evaluating health promotion*. Stanley Thornes Ltd. Cheltenham, 1998. The Diabetes Prevention Program Research Group. The Diabetes Prevention Program. *Diabetes Care* 2002; 23: 2165-71. The DREAM Trial Investigators. Effect of rosiglitazone on the frequency of diabetes in patients with impaired glucose tolerance or impaired fasting glucose: a randomized controlled trial. *Lancet* 2006; 368: 1096-105.

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* Indicates objectives at an advanced level

Module I-6
Research

Overview

The purpose of this module is to introduce research as a core component of the role of the diabetes educator. The module should be designed to cater for students with little or no research training. It should emphasize the role of research in diabetes education and management as a change agent. It should also encourage the students to reflect on their practice and develop skills in critical thinking.

The module is included in the knowledge that the majority of students will not be formally involved in conducting research. However, they will all need specific skills to be able to assess research papers and use new information in their practice. The role of research for the individual student should be discussed with respect to:

- Professional development
- Increasing knowledge
- Developing project management skills
- Developing critical appraisal and reflective practice skills
- Improving practice
- Evidence-based practice
- Making presentations and/or publishing

Goals

- To provide participants with an understanding of research principles
- To provide participants with skills to read and critically analyse scientific literature
- To provide participants with increased understanding of the importance of using research evidence in clinical practice

Objectives

After completing this module the participant will be able to:

- Discuss the three major research methods – qualitative, quantitative and quality management/audit
- Critique research literature, including assessing bias

	• Interpret basic statistical results • Describe ethical issues in research, including informed consent • Discuss current research in diabetes prevention and management involving new technologies and therapies • Describe how the research evidence is interpreted and used in practice in order to improve evidence-based diabetes management • Identify the major steps in the research process, including reviewing the literature* • Describe basic methods of statistical analysis* • Write basic research reports and communicate results*
Teaching strategies	Analysis of a published article Group discussion Practice – searching a database
Suggested time	4 hours
Who should teach this module	Doctor, scientist, educator with research skills
Evaluation of learning	Critique of a published piece of research Develop the outline for a research plan*
References	Bowers D, House A, Owens D. *Understanding Clinical Papers* 2nd edition. John Wiley and Sons. Chichester, 2006. De Vaus D. *Surveys in Social Research*. Allen & Unwin. St Leonards, 1991. Glanz K, Rimer BK, Lewis FM (eds). *Health Behavior and Health Education: Theory, Research, and Practice* 3rd edition. John Wiley and Sons. Chichester, 2002. Harris SB, Webster-Bogaert SM. Evidence Based Practice Guidelines. In *Evidence-Based Diabetes Care*. Gerstein HC, Xaynes RB (Eds). BC Decker. Canada, 2001: 48-61. Meyer G, Köpke S, Lenz M, et al. Evidence-based medicine for diabetes educators: a pilot study. *Diabet Med* 2007; 24: 901-5. Munro BH. *Statistical Methods for Health Care Research* 5th edition. Lippincott Williams and Wilkins. Philadelphia, 2004. Neutens JJ, Rubinson L. *Research Techniques for the Health Sciences* 3rd edition. Benjamin Cummings. San Francisco, 2001. Polgar S, Thomas SA. *Introduction to Research in the Health Sciences* 5th edition. Churchill Livingstone. Edinburgh, 2007. Shi L. *Health Services Research Methods* 2nd edition. Delmar Cengage Learning. Albany, 2007.

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* Indicates objectives at an advanced level

Module I-7
Evaluation

Overview	Evaluation is a process by which practice can be justified. Evaluation can be used to assess learning and other outcomes, assess and improve the practice of healthcare professionals and programmatic effectiveness, assess a programme's viability, and justify expenditure. All diabetes educators should understand that evaluation is integral to programme planning and implementation, and should be incorporated into the educational plan from the beginning. Teaching should be evaluated at the individual level (did the person with diabetes learn or make behaviour changes?), and at the programme level (did the programme meet the needs of the participants?).
Goal	To have an understanding of the different types of evaluation and when they are best used
Objectives	After completing this module the participant will be able to: • Identify the purpose of evaluation • Discuss the need to evaluate all aspects of the educational programme, structure, health outcomes, cost-effective outcomes • Discuss methods of evaluating an individual's learning – open-ended questioning, return demonstration, storytelling • Discuss the importance of using validated questionnaires • Discuss the use of skills checklists • Describe the difference between formative and summative evaluation • Discuss the importance of making evaluation a positive, rather than threatening, experience for the participant • Describe how evaluation results could be used to improve existing programmes and plan new diabetes education programmes • Discuss the concept of continuous quality improvement (CQI), how measures can be integrated into day-to-day practice and the benefit to be derived • Give examples of methods to conduct evaluations of structure, process and outcome

Teaching strategy	Small group work
Suggested time	1-2 hours
Who should teach this module	Diabetes educator
Evaluation of learning	Development of an evaluation plan
References	Cooper HC, Booth K, Gill G. Patients' perspectives on diabetes health care education. *Health Educ Res* 2003; 18: 191-206. Ellis SE, Speroff T, Dittus RS, et al. Diabetes education: a meta-analysis and meta-regression. *Patient Educ Couns* 2004; 52: 97-105. Glasgow RE, Osteen VL. Evaluating diabetes education. *Diabetes Care* 1992; 15: 1423-1. Jenkinson C, McGee H. *Health status measurement*. Radcliffe Medical Press. Oxford, 1998. Knight KM, Dornan T, Bundy C. The diabetes educator: trying hard, but must concentrate more on behaviour. *Diabet Med* 2006; 23: 485-501. Larme AC, Meyer JS, Pugh JA. Use of qualitative methods to evaluate diabetes education programs. *Diabetes Educ* 1998; 24: 499-500, 504, 507-8. Norris SL, Engelgau MM, Narayan KMV. Effectiveness of self-management training in type 2 diabetes: a systematic review of randomized controlled trials. *Diabetes Care* 2001; 24: 561-87. Peyrot M. Evaluation of patient education programs: How to do it and how to use it. *Diabetes Spectrum* 1996; 9: 86-93. Rankin SH, Stallings KD. *Evaluating patient education.* In Patient Education, Principles and Practice, 4th edition. Lippincott Williams and Wilkins. Philadelphia, 2001: 323-48. Rhee MK, Cook CB, EL-Kebbi I, et al. Barriers to diabetes education in urban patients: perceptions, patterns, and associated factors. *Diabetes Educ* 2005; 31: 410-7. Worral PS. Evaluation in health-care education. In Bastable SB (Ed). *Nurse as educator: principles of teaching and learning*. Jones and Bartlett Publishers. Sudbury, 1997.

Module II-1

Diagnosis, classification and presentation of diabetes

Overview	In the past, diabetes was considered to be a single disease. However, it is now clear that diabetes is a heterogeneous metabolic disease caused by many different mechanisms. Diabetes is now categorized based on differences in its aetiology, natural history and clinical characteristics.
Goal	To provide participants with a sound knowledge of the different metabolic disorders of glucose metabolism, the pathogenesis of these, their clinical characteristics and diagnostic criteria
Objectives	After completing this module the participant will be able to: • Define diabetes mellitus • Discuss the incidence and prevalence of diabetes globally and locally • Differentiate between the disorders of glycaemia: impaired glucose tolerance and impaired fasting glucose, type 1 diabetes, type 2 diabetes, other specific types of diabetes (such as MODY, LADA, steroid-induced diabetes), gestational diabetes, diabetes that occurs secondary to other chronic disease in childhood – such as cystic fibrosis, haemoglobinopathies • Understand the difference between type 1 diabetes and type 2 diabetes in terms of clinical presentation, patient characteristics and pathogenesis • Describe the role of genetic and environmental factors and immunology in the development of type 1 diabetes • Describe the role of genetic and environmental factors, obesity, insensitivity to insulin and insulin deficiency in the development of type 2 diabetes • Describe the emerging trend of type 2 diabetes in young people • Identify the laboratory investigations used to diagnose diabetes and their appropriate use (fasting blood glucose, post-meal blood glucose, oral glucose tolerance test) • Describe factors that can affect the accuracy of laboratory investigations

	• Discuss the appropriate use of the following tests: c-peptide, insulin antibodies, islet cell antibodies and GAD antibodies assays, as well as urinalysis (urine glucose and ketones) and HbA_{1c} estimation • Explain the World Health Organization diagnostic criteria for the different disorders of glycaemia • Describe the natural history of diabetes, including primary and secondary failure of oral blood glucose-lowering agents
Teaching strategies	Case studies, lecture
Suggested time	Lecture: 1-2 hours Case studies: 1-2 hours
Who should teach this module	Diabetes educator, endocrinologist
Evaluation of learning	Successful completion of case studies
References	American Diabetes Association. Clinical practice recommendations 2008. *Diabetes Care* 2008; 31(Suppl 1). Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2003 clinical practice guidelines for the prevention and management of diabetes in Canada. *Can J Diab* 2003; 27(Suppl 2). Chiasson JL, Josse RG, Gomis R, et al. Acarbose for prevention of type 2 diabetes mellitus: The STOP-NIDDM randomized trial. *Lancet* 2002; 346: 393-403. Delahanty LM, Halford BN. The role of diet behaviours in achieving improved glycaemic control in intensively treated patients in the Diabetes Control and Complications Trial. *Diabetes Care* 1993; 16: 1453-8. Diabetes Control and Complications Trial Research Group. Effect of intensive diabetes treatment on the development and progression of long-term complications in adolescents with insulin dependent diabetes mellitus: Diabetes Control and Complications Trial. *J Pediatr* 1994; 125: 177-88. Diabetes Control and Complications Trial. Epidemiology of diabetes interventions and complications research group intensive diabetes therapy and carotid intima-media thickness in type 1 diabetes mellitus. *N Engl J Med* 2003; 348: 2294-303. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; 329: 977-86. Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among US adults: findings from the third National Health and Nutrition Examination Survey. *JAMA* 2002; 297: 356-9.

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Isomaa B, Almgren P, Tuomi T, et al. Cardiovascular morbidity and mortality associated with the metabolic syndrome. *Diabetes Care* 2001; 24: 683-9.

Pan X, Li G, Hu Y, et al. Effects of diet and exercise in preventing NIDDM in people with impaired glucose tolerance: The Da Qing IGT and Diabetes Study. *Diabetes Care* 1997; 20: 537-44.

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UK Prospective Diabetes Study Group. Intensive blood-glucose control with sulphonylureas or insulin compared with conventional treatment and risk of complications in patients with type 2 diabetes. *Lancet* 1998; 352: 837-53.

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World Health Organization. *Laboratory diagnosis and monitoring of diabetes mellitus*. WHO. Geneva, 2002. (http://whqlibdoc.who.int/hq/2002/9241590483.pdf)

Detailed content for this module is available as a slide presentation at www.idf.org

Module II-2
Pathophysiology

Overview	Diabetes is a chronic disease, characterized by hyperglycaemia. It is caused by deficient insulin production, insensitivity to the action of insulin, or a combination of both of these. Knowledge of the relationship between glucose, insulin and counter-regulatory hormones and glucose homeostasis is important to understand these defects and how they result in abnormal glucose and fat metabolism.
Goal	To provide the participants with an understanding of normal pathophysiology and the defects that lead to abnormal glucose metabolism
Objectives	After completing this module the participant will be able to: • Describe the structure and function of key organs, such as the pancreas, liver, muscle, adipose tissue, kidney, etc. • Describe the basic physiology of digestion, absorption and metabolism • Describe the relationship between blood glucose and insulin in healthy people including gluconeogenesis, glycogenolysis, lipolysis and ketogenesis • Describe normal insulin synthesis and secretion • Understand the hormonal, metabolic and neural control of insulin production and secretion • Discuss insulin action • Explain the role of insulin receptors • Explain the incretin system and its importance in glucose regulation • Discuss the effect of insulin and counter-regulatory hormones on fuel homeostasis (carbohydrate, fat and protein) • Describe the results of insulin deficiency and its effects on lipid and protein metabolism, as well as carbohydrate metabolism • Discuss how increased blood glucose levels lead to diabetes complications, including the polyol pathway, oxidative stress, glycation and protein kinase C

	• Describe the effect of defective insulin action or 'insensitivity to insulin' (also known as 'insulin resistance') in terms of genes, adiposity, gender, diet, exercise, hyperglycaemia, drugs and infection • Discuss the characteristics of the metabolic syndrome and the importance of its being recognized and treated
Teaching strategies	Lectures Self-directed learning
Suggested time	Lecture: 2 hours
Who should teach this module	Endocrinologist, diabetes educator
Evaluation of learning	Examination or assignment
References	Alberti KG, Zimmet P. Definition, diagnosis and classification of diabetes mellitus and its complications. Part 1: diagnosis and classification of diabetes mellitus provisional report of a WHO consultation. *Diabet Med* 1998; 15: 539-53. Alberti KG, Zimmet P, Defronzo RA, Keen H (Eds). *International textbook of diabetes mellitus* volume 1, 2nd edition. John Wiley and Sons. Chichester, 1997. Atkinson MA, Maclaren NK. The pathogenesis of insulin-dependent diabetes mellitus. *N Engl J Med* 1994; 331: 1428-36. King H, Aubert RE, Herman WH. Global burden of diabetes, 1995-2025: prevalence, numerical estimates and projections. *Diabetes Care* 1998; 21: 1414-31.

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-1

Self-management

Overview

Self-management is the cornerstone of overall diabetes care. Optimal outcomes can only be achieved if the person with diabetes is willing and able to manage their disease on a daily basis, for life. It is important that healthcare professionals are aware of the psychological, emotional and economic impact of diabetes when providing education and care. While advances in care and technology give people more tools to manage their disease it also increases the burden on, and the expectations of, people with diabetes.

People with diabetes have a right to expect high quality care from experienced, trained professionals, a patient-centred approach, and access to services, equipment, medical supplies and hospitalization if required.

People with diabetes have a responsibility to manage their condition on a day-to-day basis, communicate with their healthcare professionals periodically throughout the year, and seek advice when necessary. Wherever possible, self-monitoring of glucose should be an integral part of a self-management plan.

Healthcare professionals should be aware of monitoring HbA_{1c}, fasting and post-meal blood glucose, and setting target levels in collaboration with every person with diabetes. Achieving targets for blood glucose requires a close partnership between the person with diabetes and a multidisciplinary team of healthcare professionals.

The Diabetes Attitudes, Wishes and Needs (DAWN) study showed that people who experienced psychological stress at the time of diagnosis continued to have difficulty with self-management and feeling confident in their abilities as many as 15 years later.

An area of importance in self-management is the transition from paediatric to adult care. This process is often poorly implemented by both health professionals and young people. Refer to the following modules: I-2, Team management; I-4, Psychosocial and behavioural approaches; IV-1, Diabetes in children and adolescents.

Goals

- To improve the quality of life of people affected by diabetes (the primary goal of diabetes care)
- To provide participants with an understanding of:
  - the disease from the perspective of the person with diabetes

- personal costs
- economic costs
- psychosocial costs
- effective self-management skills from the day of diagnosis
- ways to facilitate access to services
- ways to facilitate the transition from childhood to adolescence and into adult care
- the special needs of older adults

- To provide participants with an understanding of the need to advocate on behalf of young people with diabetes to reduce discrimination against them in school, the workplace and their daily lives

Objectives

After completing this module the participant will be able to:

- Discuss the impact of living with diabetes
- Accept that self-management is a life-time process for people with diabetes
- Promote self-care as integral to effective management
- Assist people with diabetes to become competent in self-care behaviours that are appropriate to their needs such as urine and blood glucose monitoring, self-examination of feet and proper foot care, attending annual complication assessment
- Recognize and assess barriers to self-care, including psychosocial concerns and issues
- Together with the person with diabetes, determine personal targets for treatment – including blood glucose, lipid values, blood pressure, HbA_{1c}, meal planning and physical activity
- Adopt an approach to education and management that is individualized to the needs of the person
- Recognize that different people manage their diabetes in different ways
- Prepare young people for the transition from the paediatric setting to the adult environment
- Teach people the importance of regular contact with both the medical practitioner and the other members of the diabetes health team, and the need for regular education updates
- Recognize the importance of ongoing self-management support for all people with diabetes

	• Identify how healthcare professional can evaluate people's self-management skills and the outcomes of self-management – including quality of life, patient satisfaction and reaching the targets of diabetes management • Assist people to develop self-confidence to advocate for their rights when dealing with health professionals and in their daily lives
Teaching strategies	Experiential learning: hands-on experience with meters and insulin delivery devices Discussion with a person with diabetes Attend diabetes camp
Suggested time	1-2 hours
Who should teach this module	Diabetes educator, person with diabetes, local member organization
Evaluation of learning	Group discussion of experiential learning
References	American Diabetes Association. Standards of medical care in diabetes. *Diabetes Care* 2008; 31: S12-S54. Anderson RM, Funnell MM. *The art of empowerment: stories and strategies for diabetes educators*. American Diabetes Association. Alexandria, 2000. Bergenstal R, Callahan T, Johnson M, et al. Management principles that most influence glycemic control: a follow up study of former DCCT participants. *Diabetes* 1996; 45 (Suppl 2): 124A. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diab* 2003; 27(suppl 2). Ceriello A, Hanefeld M, Leiter L, et al. Postprandial glucose regulation and diabetic complications. *Arch Intern Med* 2004; 164: 2090-5. IDF Clinical Guidelines Task Force. *Guideline for management of postmeal glucose*, International Diabetes Federation. Brussels, 2007. IDF Clinical Guidelines Task Force. *Global guideline for type 2 diabetes*. International Diabetes Federation. Brussels, 2005. Jones H, Edwards L, Vallis TM, et al. Changes in diabetes self-management behaviors make a difference in glycemic control: the Diabetes Stages of Change (DiSC study). *Diabetes Care* 2003; 26: 732-7.

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-2

Blood glucose-lowering agents

Overview

Diet and exercise are the first line of treatment for all people with type 2 diabetes, including young people. However, due to the natural history of type 2 diabetes, 50-75% of those affected are unlikely to achieve normal glucose levels through these measures alone. The microvascular complications of diabetes are associated with the duration of diabetes and poor control. Therefore, it is well accepted that blood glucose-lowering agents should be commenced earlier in the treatment plan, when they are most effective, rather than later.

Incretin mimetics and DPP-4 inhibitors are now available in some countries. These medications have more than one action that results in improved glucose control.

Goal

To provide the participant with an understanding of the different blood glucose-lowering agents used to treat type 2 diabetes, and why particular agents are chosen in preference to others

Objectives

After completing this module the participant will be able to:

- Identify appropriate treatment aims when using blood glucose-lowering agents
- Discuss the natural progression of type 2 diabetes and the resulting need for medications and/or insulin therapy
- Discuss the role of blood glucose-lowering agents in the management of type 2 diabetes
- Describe the different blood glucose-lowering agents available (secretagogues, biguanides, thiazolidinediones, incretin mimetics, DPP-4 inhibitors and alpha glucosidase inhibitors), their mechanisms of action and maximum dosage
- Discuss how and when to take the different agents
- Describe the potential for hypoglycaemia when using secretagogues. Refer to Module III-6, Short-term complications
- Describe the need for caution when using long-acting sulphonylureas in elderly people. Refer to Module IV-4, The older adult

	• Describe the possible side effects and potential problems associated with the use of secretagogues, biguanides, thiazolidinediones, alpha glucosidase inhibitors, incretin mimetics and DPP-4 inhibitors • Discuss the need for titration of dosage to lessen the risk of side effects • Describe the specific contraindications to the use of each type of agent • Identify the appropriate time to commence, and type of medication to use, in different clinical situations • Discuss strategies for improving medication taking behaviours • Discuss the benefits of combining blood glucose-lowering agents at less than maximal dosages • Discuss the use of incretin mimetics and DPP-4 inhibitors in people with type 2 diabetes • Describe the action of incretin mimetics and DPP-4, their potential side effects and contraindications • Describe the adjustment of oral agents and the use of combination therapy – such as using insulin and oral agents together • Discuss the use of oral medication in children with type 2 diabetes • Describe the management plan for a person who has not reached target levels with the above agents. Refer to Module III-3, Insulin therapy
Teaching strategies	Case studies with discussion and feedback Self-directed learning
Suggested time	Case studies: 2 hours
Who should teach this module	Endocrinologist, diabetes educator, pharmacist
Evaluation of learning	Successful completion of case studies
References	Ahmann AJ, Riddle MC. Current blood glucose lowering medicines for type 2 diabetes. *Postgrad Med* 2002; 111: 32-46. Amylin Pharmaceuticals Inc and Eli Lilly and Company. *Byetta Clinical Data.* (www.byettahcp.com/hcp/hcp200_byetta_clinical_data.jsp)

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Detailed content for this module is available as a slide presentation at www.idf.org

Module III-3

Insulin therapy

Overview	People with type 1 diabetes require daily insulin therapy for life. Currently, the majority of children and adolescents with diabetes have type 1 diabetes. As the shift continues towards intensifying diabetes management in order to reduce or delay the onset of complications, more and more people with type 2 diabetes will have insulin added to their blood glucose-lowering medications or given in lieu of oral medications. The UK Prospective Diabetes Study (UKPDS) demonstrated that in order to achieve better control more than 50% of people with type 2 diabetes require additional medicines such as insulin therapy after 5 years to achieve targets. Therefore, insulin therapy should never be used as a threat in the context of poor control. It is a consequence of the natural progression of type 2 diabetes. Insulin regimens are varied and should be tailored to the goals and lifestyle of the person with diabetes.
Goal	To provide participants with an understanding of insulin therapy in people with type 1 diabetes, type 2 diabetes, gestational diabetes and other types of diabetes – such as steroid-induced diabetes
Objectives	After completing this module the participant will be able to: • Discuss the health professional's barriers to initiating insulin • Discuss the person with diabetes' barriers to commencing insulin • Differentiate between the various types of insulin • Discuss the duration of action of different types of insulin • Identify the source of insulin available in the participants healthcare setting – pork, beef, human recombinant DNA, analogues • Identify the factors affecting insulin requirements and absorption • Demonstrate the preparation and administration of insulin using different methods, including syringes, pens, pumps • Discuss the care of insulin and strategies for storing insulin in different parts of the world • Describe the side effects of insulin treatment, including hypoglycaemia, insulin oedema, weight gain, lipohypertrophy and lipoatrophy

	• Discuss insulin therapy in combination with oral agents in people with type 2 diabetes • Explain the benefits of intensifying insulin therapy in type 1 diabetes and type 2 diabetes • Discuss the benefits and challenges of different insulin regimens • Identify the appropriate type of insulin and regimen to use in different clinical situations • Identify individualized treatment goals in terms of blood glucose levels, HbA_{1c}, weight management and lipids • Identify strategies that could assist the person to overcome any fears associated with commencing/continuing insulin therapy • Understand the principles of insulin dosage adjustment • Teach people how to adjust their insulin dosages in order to achieve their targets for blood glucose control • Discuss the adjustment of insulin for special events, such as sick days, travel, physical activity, surgery, religious or cultural events • Discuss the management of insulin for pump users* • Discuss the importance of the specialized team in the management of pump therapy*
Teaching strategy	Case studies – may include: type 2 diabetes commencing insulin therapy; newly diagnosed type 1 diabetes; intensive insulin therapy; adjusting insulin according to blood glucose records
Suggested time	Case studies: 2 hours
Who should teach this module	Endocrinologist or diabetes educator
Evaluation of learning	Successful completion of case studies
References	American Diabetes Association. *Medical management of type 1 diabetes* 5th edition. ADA. Alexandria, 2008. American Diabetes Association. Clinical practice recommendations 2008. *Diabetes Care* 2008; 31(Suppl 1). Campbell RK, White JR Jnr. *Medications for the treatment of diabetes*. American Diabetes Association. Alexandria, 2000. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2003 Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diab* 2003; 27(Suppl 2).

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* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-4

Physical activity

Overview	Regular physical activity is important for everyone; it is particularly beneficial in the management of type 2 diabetes. While exercise is important to improve general health and well-being in people with type 1 diabetes, it also requires that people be more proactive in adjusting their daily management regimen. The potential benefits of a physically active lifestyle for people with diabetes include increased physical fitness, improved glycaemic control, improved lipid levels, reduced risk of cardiovascular disease, decreased adiposity and enhanced psychological well-being. However, exercise is not without risks, and the recommendation that people with diabetes participate in an exercise programme is based on the premise that the benefits must outweigh the risks and barriers. 'Physical activity' and 'exercise' are used interchangeably in this document.
Goal	To provide participants with knowledge regarding the methods and conditions that can optimize the benefits and minimize the risks of regular exercise for people with diabetes and assist them to address personal barriers to exercise
Objectives	After completing this module the participant will be able to: • Describe the characteristics of aerobic physical activity and resistance training, and give examples of each • List the beneficial effects of regular exercise in people with type 1 diabetes and people with type 2 diabetes • Identify suitable recommendations for the intensity, duration and frequency of exercise • Identify the appropriate investigations to be completed by people at risk prior to starting an exercise programme • Describe the nutritional management around low, medium and intense forms of exercise • Describe the physiological consequences of exercise training in people with type 1 diabetes and people with type 2 diabetes • Discuss the effects of exercise in relation to insufficient and excessive circulating insulin

	• Understand the differences between metabolic and cardiovascular fitness targets • Discuss the importance of correctly adjusting energy expenditure (frequency, intensity, duration of exercise) with the individual's clinical status and personal preferences • Discuss the risk, prevention and treatment of exercised-induced hypoglycaemia in people on insulin or oral blood glucose-lowering agents • Recognize the prolonged effects of exercise in people with type 1 diabetes and the subsequent risk of hypoglycaemia many hours after the activity • Recognize that many people experience barriers to initiating and continuing to exercise • Assist people to identify strategies that may help them increase their amount of daily activity • Assist people to identify strategies to help them continue exercising over the long term • Describe alternatives to exercise for people with micro- or macrovascular complications of diabetes • Describe alternatives to exercise in people with current or previous foot disease, ulceration, Charcot's arthropathy • Describe alternatives to exercise in people with physical limitations, such as arthritis, amputation
Teaching strategies	Lecture Interactive groups
Suggested time	Lecture: 1-1½ hours
Who should teach this module	Physician, nurse, exercise physiologist or physical therapist
Evaluation of learning	Short assignment Development of an exercise plan
References	American College of Sports Medicine. American College of Sports Medicine position stand. The recommended quantity and quality of exercise for developing and maintaining cardiorespiratory and muscle fitness in healthy adults. *Med Sci Sports Exerc* 1990; 22: 265-74. American Diabetes Association. Clinical practice recommendations 2008. *Diabetes Care* 2008; 31(Suppl 1).

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* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-5

Nutrition therapy

Overview

Effective nutritional therapy in diabetes has major benefits for both short- and long-term diabetes outcomes. However, changes in eating habits can be difficult to achieve. The aim of this module is to provide a theoretical framework that is directly linked to effective practical nutritional management in order to positively influence diabetes outcomes. A key component of delivery by diabetes educators is sensitivity to and awareness of social, cultural, religious and psychological status and backgrounds.

Nutritional education needs to include an individual nutritional assessment to achieve optimum glycaemic control and reduce cardiovascular risk. Guidance should be provided on recommended daily intakes of protein, carbohydrate, fat (saturated fat, poly and monounsaturated fat, n-3 and n6 fatty acids), fibre and antioxidants.

Nutritional changes are often difficult to achieve. Therefore, diabetes educators should be able to assess willingness and ability to make changes; to provide information and support to facilitate healthy nutritional choices by the person with diabetes.

Goals

- To provide the diabetes educator with basic strategies and skills to assist and motivate people with diabetes to meet their nutritional needs
- To provide participants with an understanding of nutrition therapy that involves:
    - Appropriate energy and nutrients for optimal growth, development and health
    - Strategies for achieving or maintaining a healthy weight
    - Strategies for achieving and maintaining optimal glycaemic control by balancing food intake with insulin, metabolic requirements and physical activity
    - Reducing the risk of microvascular complications through optimal glycaemic control
    - Prevention and treatment of acute complications of insulin therapy, such as hypoglycaemia, hyperglycaemia illness and exercise-related problems

- Reducing the risk of macrovascular complications by achieving targets through meeting nutritional recommendations
- Preserving social and psychological well-being
- Respect for social and cultural eating patterns

Objectives

After completing this module the participant will be able to:

Basic principles of a healthy diet

- Clearly describe a well balanced diet for people with diabetes – protein, fat (saturated, monounsaturated and polyunsaturated fatty acids), carbohydrate, sucrose, alcohol, vitamins and antioxidants, minerals and trace elements and sodium recommendations
- Discuss the reasons behind the nutrition recommendations (referring to evidence-based guidelines), and applying them to the local population
- Identify the familial, social and cultural influences on the eating styles of the local population – consider ethnic groups (health professionals providing nutritional advice should explore food in the context of the individual and their culture and society when assessing nutritional needs)
- Identify the social and psychological influences on food choices
- Identify the availability of healthy food choices
- List the indigenous staple foods
- List the carbohydrate content of common foods
- Identify the glycaemic index of foods and its importance in post-meal effects on blood glucose levels
- Identify the role of sugars, alternative sweeteners, and diabetic foods in healthy eating, and identify the safe daily intake of each sweetener
- Describe how to read food labels

Nutritional assessment

- Prepare a logical structure for the assessment
- List the problems that might be encountered when taking nutritional histories and assessing results

Use of clinical data in setting dietary goals

- Assess body mass index (BMI), waist-to-hip ratio and biochemical indices – for example, glycaemic control (HbA_{1c}), lipids (LDL, VLDL, HDL and total cholesterol, triglycerides), renal function (glomerula filtration rate, potassium, sodium, phosphate)
- Collaborate with the person to identify nutritional priorities considering food preferences, age, diet, medical, biochemical and anthropometric factors

Effective nutritional information

- Collaborate with the person to identify realistic nutrition-related goals, based on the current dietary habits of the person and the family, socio-economic issues, cultural and religious practices, daily routine and schedule, work/school/family demands and exercise habits
- Identify, consider and address common dietary beliefs and misconceptions about nutrition and diabetes (in the UK, for example, it is believed that people with diabetes ought not to eat bananas) – these differ between countries
- Consider the ethnicity, culture, age and lifestyle of the person with diabetes
- Consider the psychosocial issues affecting the person and their family and carers – refer to Module I-4, Psychosocial and behavioural approaches
- Consider physical activity and working patterns

Different educational methods

- Explain the importance of models, such as the food pyramid, plate model and hand jive, to teach healthy eating principles
- Explain the various methods of teaching carbohydrate assessment and monitoring carbohydrate counting levels 1, 2 and 3; carbohydrate estimation; portions; glycaemic index; qualitative diet; meal planning approach; signposting/signal system; free diet
- Identify local educational models used when providing nutritional education to people with diabetes
- Discuss the benefits and negative aspects of each type of system and their relationship to glycaemic control and suitability for individuals

Specific nutrition-related needs of children, adolescents and adults with type 1 diabetes

- Adults
  - Discuss quality-of-life issues and maintain psychosocial well-being
  - Describe how to prevent hypo- and hyperglycaemia
  - Describe how to tailor the insulin profile to the person's nutritional therapy
  - Appreciate and understand blood glucose monitoring in relation to the nutritional/meal plan and insulin profile
  - Discuss the effects of alcohol on blood glucose levels
  - Discuss physical activity, blood glucose levels and appropriate dietary intake
- Children (refer to Module IV-1, Diabetes in children and adolescents)

  In addition to the nutritional aims above:
  - Describe the constantly changing need for the adjustment of insulin and adequate energy in relation to growth and development
  - Describe the reasons why nutritional goals are based on an individual's diabetes management goals
  - Appreciate age-related issues or problems (including toddler food refusal, children's parties, peer pressure, insulin omission and specifically omission of insulin by teenagers, religious and cultural influences, constantly changing eating fads, fast foods) – these will differ between countries
  - Appreciate the problems encountered by teenagers, such as peer pressure on eating patterns and lifestyle – these will differ between countries
  - Appreciate the importance of behaviour and other psychosocial issues in children and adolescents, which may influence adherence to a management regimen – refer to Module I-4, Psychosocial and behavioural approaches

Specific nutrition-related needs of people with type 2 diabetes

- Adults
  - Achieve and maintain realistic weight loss through a weight-management programme – if desired and appropriate. If necessary, support it by liaison with other programmes, such as exercise programmes

- Identify the relationship between weight loss and total energy restrictions, insensitivity to insulin and insulin requirements
- Recognize that a 5-10% weight loss will improve glycaemic control, blood pressure, and serum lipid levels
- Prevent obesity
- Prevent hypo- and hyperglycaemia
- Manage dyslipidaemia
- Promote psychosocial well-being and self-esteem
- Identify the effects of meal spacing on blood glucose levels and weight in type 2 diabetes
- Identify the relationship between nutritional intake and micro- and macrovascular complications
- Manage hypertension by effective weight management and sodium restriction for appropriate people
- Encourage physical activity
- Appreciate the cultural meaning of obesity in different societies

• Children (refer to Module IV-1, Diabetes in children and adolescents)

- Identify the increasing incidence of type 2 diabetes in children and adolescents
- Identify ethnic minority groups that have a high prevalence of type 2 diabetes in childhood
- Describe the importance of healthy eating for weight loss in children and adolescents
- Design a suitable weight-reduction programme for a child – including adequate nutrients, a behavioural programme for the family, parental role modelling and lifestyle change*
- Identify other agencies to facilitate healthy food options and increased physical activities, such as schools, after-school clubs
- Identify the various genetic types of diabetes, such as MODY, and give appropriate healthy eating advice if the child is not overweight

Specific nutrition-related needs pre-conception, in gestational diabetes, and during and after pregnancy

(refer to Module IV-2, Gestational diabetes)

- List the important nutrients in meal planning for advice pre-conception, in gestational diabetes, and during and after pregnancy
- Discuss the importance of achieving glycaemic targets prior to and during pregnancy
- Identify the outcomes for the child and mother if glycaemic control is poor
- Give nutritional advice post-pregnancy as needed, for instance regarding breastfeeding and a healthy weight
- Stress the importance of avoiding hypoglycaemia when breastfeeding
- Provide nutritional counselling for gestational diabetes considering the above objectives and national guidelines
- Help people determine how to redistribute carbohydrates in response to glycaemic load
- Discuss the differences between the management of pregnant women with type 1 diabetes and those with type 2 diabetes

Specific nutrition-related needs of older adults, including those living in care facilities (refer to Module IV-4, The older adult)

- Recognize that older adults may have specific nutritional problems
- Discuss glycaemic targets for older people and if and when they should be adjusted according to the health of the individual
- Recognize that people in institutions and care homes do not have direct control over their eating patterns and the availability of food
- Discuss other factors, such as poor dentition, weight loss, lack of appetite, poor eyesight or dementia, that can affect diabetes management
- Recognize that poor glycaemic control will result in high complication rates in older adults, and surveillance of complications may be poor compared to that of younger people
- Discuss the possible need for increased social care and practical help, as well as the importance of liaison with other agencies

Specific nutrition-related needs of people from ethnic groups

- Discuss the eating patterns of people from all cultures within the given population
- Discuss the influence of culture and religion on eating patterns and beliefs about various foods
- Identify local foods and medicines that may be taken as alternative forms of medication and be able to give evidence-based advice about the effectiveness, safety and contraindications
- Produce information and leaflets that are culturally sensitive and suitable for the population – for example, photographs of foods are more appropriate where literacy is an issue
- Identify and address whether other nutritional problems exist in the given population

Nutritional information during religious and cultural festivals

- Identify the religious and cultural festivals in the region and identify the implications for diabetes – for example, fasting and feasting
- Give guidance on adjusting the timing of meals and drinks and medication

The nutritional needs of dyslipidaemia in diabetes*

- Explain the links with type 1 diabetes and type 2 diabetes
- Describe the importance to cardiovascular risk of total fat, saturated fat, monounsaturated fat, polyunsaturated fat, and trans fatty acids
- Describe the importance to cardiovascular risk of fish oils
- Identify foods that are rich in omega 3 fatty acid – including vegetarian sources
- Describe the relationships between fats and obesity
- Describe the role of cholesterol-lowering spreads and functional foods

Eating disorders*

- Identify the high incidence and prevalence of abnormal eating habits and eating disorders (anorexia nervosa, bulimia nervosa, binge eating) in young people with diabetes
- Appreciate the antecedents to dysfunctional eating, eating disorders and their prevalence within the given country and population

- Recognize the potential for insulin omission and weight control
- Recognize and address stress eating
- Give guidance on therapeutic strategies when eating disorders are diagnosed
- Identify diagnostic tools, such as questionnaires, that are suitable for identifying eating disorders
- Recognize when it is necessary to refer to a specialized mental health unit

Coeliac disease*

- Describe the increased risk of coeliac disease associated with type 1 diabetes
- Discuss the pros and cons of screening for coeliac disease
- Identify whether any information is available for people with diabetes and coeliac disease
- Contact organizations that support people with coeliac disease
- Prepare a list of gluten-free products that are readily available in the country
- Understand the implications of the requirements of other nutrients – calcium to tackle or prevent osteoporosis, extra iron at diagnosis, high antioxidants due to increased cancer risk
- Appreciate the practical difficulties of the food constraints involved in diabetes and coeliac disease, and provide practical food alternatives
- Prepare selected foods that are gluten-free and taste them

Suitable resources and information for the needs of local people with diabetes

- Recognize suitable resources for all ages for type 1 diabetes and type 2 diabetes
- Identify and use current local/national/international evidence-based guidelines
- Identify and use local/national/international support organizations and networks

Teaching strategies

Lectures, demonstrations, practising reading food labels, supermarket/shop tours, measuring BMI and waist circumference, identifying local resources, tasting sessions

Problem-solving through case studies, discussion groups, workshops (with adults, children and adolescents with diabetes)

Suggested time	10 hours
Who should teach this module	Dietitian who specializes in both paediatric and adult diabetes
Evaluation	• Demonstrate how to take the dietary history of a person with diabetes • Collaborate to develop self-directed behavioural goals related to nutrition • Assess the emotional concerns and the cultural, familial, religious and ethnic influences related to nutritional status and habits • Produce suitable resources and information based on evidence-based guidelines for the needs of people with diabetes in the local area (collaborating with other local health professionals) • Identify the different cultures within the population and produce suitable literature and teaching aids (these may include translated leaflets, videos, food models, audio tapes) • Be aware of the networks that exist, and communicate with other health professionals that are involved with nutritional management of diabetes • Identify local, national and international support organizations and enable the person with diabetes to contact them; be able to advise on the credibility of recommended organizations
References	American Diabetes Association. Nutrition recommendations and interventions for diabetes 2008: A statement of the American Diabetes Association. *Diabetes Care* 2008; 31(Suppl 1): S61-S78. Allgrove J, Swift PGF, Greene S (Eds). Evidence-based paediatric and adolescent diabetes. Blackwell BMJ Books. Oxford, 2007. Aslander-van Vliet E, Smart C, Waldron S. Nutritional management in childhood and adolescents diabetes. *Pediatr Diabetes* 2007; 8: 323-39. Australian Paediatric Endocrine Group. The Australian Clinical Practice Guidelines on the Management of Type 1 Diabetes in Children and Adolescents. APEG. Westmead, 2005. (www.chw.edu.au/prof/services/endocrinology/apeg) Canadian Diabetes Association Clinical Practice Guideline Expert Committee. Nutrition Therapy, Type 1 Diabetes in Children and Adolescents. In *Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada*. CDA. Toronto, 2003. (http://www.diabetes.ca/cpg2003/chapters.aspx) Delahanty LM, Halford BN. The role of diet behaviours in achieving improved glycaemic control in intensively treated patients in the Diabetes Control and Complications Trial. *Diabetes Care* 1993; 16: 1453-8. Delahanty LM. Clinical significance of medical nutrition therapy in achieving diabetes outcomes and the importance of process. *J Am Diet Assoc* 1998; 98: 28-30.

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UK Prospective Diabetes Study Group. Response of fasting plasma glucose to diet therapy in newly presenting type 2 diabetic patients (UKPDS 7). *Metabolism* 1990; 39: 905-12.

* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-6

Short-term complications

Overview	Short-term complications are either hypoglycaemia or hyperglycaemia and are a common cause of hospitalization. Hypoglycaemia can cause loss of consciousness and seizures; hyperglycaemia can result in diabetic ketoacidosis or hyperosmolar hyperglycaemic state. Short-term complications are often preventable. Therefore, people with diabetes need to know the causes, signs and symptoms, treatment and prevention strategies to minimize the risk of developing these complications.
Goal	To provide participants with an understanding of hypoglycaemia and hyperglycaemia, the consequences and the need to assist the person with diabetes to implement strategies to prevent their occurrence
Objectives	After completing this module the participant will be able to: **Hypoglycaemia** • Describe the fear that people with diabetes and their relatives have of hypoglycaemia and how this impacts on diabetes management • State the causes of hypoglycaemia, recognizing that in many cases the causes cannot be identified • Describe the difference between adrenergic and neuroglycopenic signs and symptoms • State the signs and symptoms of hypoglycaemia, recognizing that these may change from time to time and person to person, but also within individuals over periods of time • Discuss preventive strategies for hypoglycaemia, including individual nutritional and physical exercise management • Discuss the treatment of mild and severe hypoglycaemia • Discuss the use of glucagon • Discuss the increased risk of hyperglycaemia after an episode of severe hypoglycaemia • Discuss the cause, risk, signs and symptoms and management of nocturnal hypoglycaemia

- Recognize the need to increase community awareness of hypoglycaemia, particularly in specific groups, such as teachers, sports coaches, police officers and other emergency-service personnel
- Discuss the risk of prolonged hypoglycaemia in older adults
- Discuss the causes of hypoglycaemia unawareness and management strategies
- Discuss methods to improve the recognition of hypoglycaemia
- Discuss the legal implications and safety aspects of driving a motor vehicle and using heavy equipment

Diabetic ketoacidosis (DKA)

- State the causes of DKA
- State the signs and symptoms of DKA
- Discuss preventive strategies for DKA
- Discuss treatment of DKA
- Recognize that recurring DKA may be a sign of a social or psychological problem, and discuss strategies for addressing such problems

Hyperosmolar hyperglycaemic state (HHS)

- Describe people most at risk of developing HHS
- Discuss preventive strategies for HHS
- State the signs and symptoms of HHS
- Discuss treatment of HHS
- Discuss the mortality rate for HHS
- Recognize the decreased cognition that occurs in the immediate recovery period and the need for supportive education

Management of home emergencies

- Recognize the critical importance of *never* omitting insulin administration in type 1 diabetes when the person has an intercurrent illness
- Recognize the impact on blood glucose of different types of illness, such as fever or malabsorption
- Describe the need for regular testing of blood glucose and ketones during an acute illness
- Recognize the need to adjust insulin according to blood glucose levels and ketones

	• Discuss strategies for managing illness when blood or urine testing materials are not available • Discuss strategies for supplying sufficient carbohydrate when appetite is poor • Recognize the need to drink enough water and liquids for rehydration, and decreasing activity, when blood glucose is high • Describe when medical or hospital intervention is necessary • Describe the local guidelines for insulin therapy and carbohydrate management during sick days
Teaching strategies	Lecture and case studies
Suggested time	2 hours
Who should teach this module	Diabetes educator
Evaluation strategies	Question and answer Quiz Case study review Plan for managing sick days
References	American Diabetes Association. *Medical management of type 2 diabetes* 5th edition. ADA. Alexandria, 2006. American Diabetes Association. *Medical management of type 1 diabetes* 5th edition. ADA. Alexandria, 2006. American Diabetes Association. *Therapy for diabetes mellitus and related disorders* 4th edition. ADA. Alexandria, 2007. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Clinical Practice Guidelines for the Prevention and Management of Diabetes in Canada. *Can J Diab* 2003; 27(suppl 2). Clarke WL, Cox DJ, Gonder-Frederick LA, et al. The relationship between non routine use of insulin, food, and exercise and the occurrence of hypoglycaemia in adults with IDDM and varying degrees of hypoglycemic awareness and metabolic control. *Diabetes Educ* 1997; 23: 55-8. Cox DJ, Gonder-Frederick LA, Kovatchev BP, et al. Progressive hypoglycaemia's impact on driving simulation performance. Occurrence, awareness and correction. *Diabetes Care* 2000; 23(2): 163-70. De Beer K, Michael S, Thacker M, et al. Diabetic ketoacidosis and hyperglycaemic hyperosmolar syndrome - clinical guidelines. *Nurs Crit Care* 2008; 13: 5-11.

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Detailed content for this module is available as a slide presentation at www.idf.org

Module III-7

Long-term complications

Overview

While the underlying pathophysiology and management of both of the major forms of diabetes differ, a common feature is the development of long-term micro- and macrovascular complications, such as retinopathy, nephropathy, macrovascular disease and peripheral and autonomic neuropathy. These complications are associated with increased morbidity and mortality.

The predictors for the development of microvascular complications are duration of diabetes and poor metabolic control. However, the progression of these complications can be reduced by prompt and intensive treatment. Therefore, strategies must be in place for their early detection.

As type 2 diabetes can be present for many years before diagnosis and up to 30% of people already have a complication at diagnosis, the assessment of complications should begin at diagnosis and annually thereafter. Adults with type 1 diabetes should be assessed within 5 years of diagnosis and annually thereafter.

Goals

- To develop a comprehensive understanding of the pathophysiology of micro- and macrovascular complications
- To provide participants with an understanding of their role in recommending and advocating for early screening and prompt treatment, and in some cases performing screening for complications
- To discuss the implications of monitoring and treating long-term complications
- To understand the psychological consequences of long-term complications for the individual and the family members
- To discuss the necessity of being honest and adopting a positive approach to the prevention and management of complications, and of not using scare tactics and threatening messages

Module III-7a

Diabetic retinopathy

Objectives

After completing this module the participant will be able to:

- Counsel parents of children, adolescents and adults about the risks of developing retinopathy and strategies to reduce the risk
- Reassure the person that blurred vision associated with poor metabolic control is likely to be transient and will be resolved with improved control
- Describe the epidemiology of diabetic retinopathy, including rates of incidence and prevalence
- Describe predictors of the development of retinopathy and the natural history of the disease
- Identify the normal anatomy of the eye
- Discuss the importance of testing visual acuity
- Describe the need for regular screening through dilated pupils
- Discuss the effect on vision of all stages of retinopathy
- Describe the role of fluorescein angiography
- Describe the information that should be given to people with diabetes regarding the use and side effects of fluorescein angiography
- Describe the information required to inform people with diabetes about the benefits and side effects of laser therapy
- Describe the increased frequency in the development of cataracts at an earlier age in people with diabetes
- Describe the management of retinopathy during pregnancy
- Describe the psychosocial impact of visual loss for the person with diabetes and their relatives (refer to Module I-4, Psychosocial and behavioural approaches)
- Investigate the resources available in the community for the visually impaired
- Describe the different grades of retinopathy and the characteristic clinical features of each grade*

	• Know the importance of intensive glycaemic and blood pressure control and laser therapy in influencing the development or progression of retinopathy* • Describe the current intravitreal medical treatments for retinopathy* • Describe the role of blood pressure treatment in the management of retinopathy and macular oedema • Discuss the rationale for laser therapy and the clinical trials that provided evidence for this form of therapy – including the Early Treatment Diabetes Retinopathy Study (ETDRS) and the Diabetic Retinopathy Study (DRS)* • Know that early treatment with laser therapy is more effective in preserving vision if the visual acuity is better than 6/24* • Describe the different patterns of laser therapy* • Discuss the consequences of vitreous haemorrhage and the role of vitrectomy* • Discuss the increased risk of exacerbating retinopathy in special circumstances, such as following cataract surgery or with some forms of strenuous exercise*
Teaching strategies	Lecture Experiential learning Visit eye clinic if possible
Suggested time	Formal session involving case study: 1-2 hours
Who should teach this module	Doctor, diabetes educator, ophthalmologist, representative of an organization for the blind/visually impaired
Evaluation of learning	Role play discussing the implications for a person with newly diagnosed retinopathy Name at least one community resource for the visually impaired
References	Klein R, Klein BEK, Moss SE, et al. The Wisconsin Epidemiologic study of diabetes retinopathy III. Prevalence and risk of diabetic retinopathy when age at diagnosis more than 30 years. *Arch Ophthalmol* 1984; 182: 527-32. Klein R, Klein B, Moss SE, Linton KL. The Beaver Dam Eye Study. Retinopathy in adults with newly discovered and previously diagnosed diabetes mellitus. *Ophthalmology* 1992; 99: 58-62. Mitchell P. Development and progression of diabetic eye disease in Newcastle 1977 to 1984: rates and risk factors. *Aust NZ J Ophthalmol* 1985; 13: 39-44.

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Ohkubo Y, Kishikawa H, Araki E, et al. Intensive insulin therapy prevents the progression of diabetic microvascular complications in Japanese patients with non-insulin-independent diabetes mellitus: a randomized prospective 6-year study. *Diabetes Res Clin Pract* 1995; 28: 103-17.

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* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-7b

Diabetic nephropathy

Objectives

After completing this module the participant will be able to:

- Counsel parents of children, adolescents and adults about the risks of developing nephropathy associated with poor glycaemic control
- Describe the epidemiology of diabetic nephropathy including rates of incidence and prevalence
- Describe predictors of the development of nephropathy and the natural history of the disease
- Describe the various levels of renal involvement, including hyperfiltration, micro- and macroalbuminuria, chronic kidney disease
- Discuss the transient nature of microalbuminuria and the causes of transient increases in albumin excretion
- Discuss the diagnostic tests used in screening for kidney disease
- Discuss the impact of microalbuminuria in type 1 diabetes and type 2 diabetes
- Know that microalbuminuria is a marker for vascular dysfunction and possibly vascular disease
- Describe the use of estimated glomerula filtration rate (eGFR)
- Describe the various intervention studies demonstrating the benefits of improving glycaemic control – including the Diabetes Control and Complications Trial (DCCT) and UKPDS
- Describe the relationship between hypertension and the progression of kidney disease in diabetes
- Describe the importance of blood pressure control in the prevention and management of diabetic kidney disease
- Describe the various intervention studies demonstrating the benefits of improving hypertension – including the Lewis, PRIME, CALM, and HOPE studies
- Know that ACE inhibitors and angiotensin II receptor blockers (ARBs) are first-line treatment, if available, for people with diabetic kidney disease

	• Describe the clinical features of chronic kidney disease • Describe the impact of lifestyle factors, such as excessive intake of salt or alcohol, on blood pressure • Describe possible dietary changes with the progression of kidney failure • Know the need for reducing insulin requirements in chronic kidney disease • Know that kidney transplantation is a treatment option for some people • Describe the psychosocial impact of chronic kidney disease on people with diabetes and their relatives (refer to Module I-4, Psychosocial and behavioural approaches) • Investigate the resources available in the community • Describe the differences between peritoneal and haemodialysis*
Teaching strategies	Lecture Experiential learning
Suggested time	Formal session involving case study: 1-2 hours
Who should teach this module	Endocrinologist, diabetes educator, renal nurse, nephrologist
Evaluation of learning	Role play discussing the implications for a person with newly diagnosed kidney disease and the required management
References	Andersen S, Brochner-Morteusen J, Parving H. Kidney function during and after withdrawal of long-term irbesartan treatment in patients with type 2 diabetes and microalbuminuria. *Diabetes Care* 2003; 26: 3296-302. Berl T, Hunsicker LG, Lewis JB, et al; Irbestartan Diabetic Nephropathy Trial. Collaborative Study Group. Cardiovascular outcomes in the Irbesartan Diabetic Nephropathy Trial of patients with type 2 diabetes and overt nephropathy. *Ann Intern Med* 2003; 138: 542-9. Canadian Diabetes Association Clinical Practice Guidelines Expert Committee. Canadian Diabetes Association 2003 Clinical Practice Guidelines for the prevention and management of diabetes in Canada. *Can J Diab* 2003; 27 (Suppl 2): S66-S71. Clark CM Jr, Lee DA. Prevention and treatment of the complications of diabetes mellitus. *N Engl J Med* 1995; 332: 1210-7. Diabetes Control and Complications Trial Research Group. The effect of intensive treatment of diabetes on the development and progression of long-term complications in insulin-dependent diabetes mellitus. *N Engl J Med* 1993; 329: 977-86. Finne P, Reunanen A, Stenman S, et al. Incidence of end-stage renal disease in patients with type 1 diabetes. *JAMA* 2005; 294: 1782-7.

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UK Prospective Diabetes Study Group. Tight blood pressure control and risk of macrovascular and microvascular complications in type 2 diabetes (UKPDS 38). *BMJ* 1998; 317: 703-13.

* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-7c

Diabetic neuropathy

Objectives

After completing this module the participant will be able to:

- Counsel adolescents and adults about the risks of developing neuropathy
- Define the different types of poly- and mononeuropathies associated with diabetes – including motor, sensory, autonomic, truncal and cranial nerve
- Describe the impact of autonomic neuropathy on various organs
- Describe the impact of autonomic neuropathy on quality of life (refer to Module I-4, Psychosocial and behavioural approaches and Module III-9, Diabetes and sexual health)
- Describe the role and function of the sensory and motor nerves
- Describe the signs and symptoms of diabetic peripheral neuropathy
- Describe the features of painful diabetic neuropathy
- Differentiate between painful diabetic neuropathy and other causes of peripheral pain
- Explain the significance of the asymptomatic insensate foot
- Describe the impact of gastroparesis on metabolic control and the management of gastroparesis*
- Describe the metabolic and structural abnormalities that occur in diabetic peripheral neuropathy and the suggested physiological pathways of those abnormalities*

Assess the diabetic foot

- Describe the effect of diabetes on blood vessels, nerves and joints
- Define those factors that place the foot at risk of ulceration
- Define the 'high risk foot'
- Describe how these factors can lead to amputation
- Perform non-invasive tests, elicit relevant history, and observe for clinical signs and symptoms of peripheral vascular disease

- Perform and understand the results of non-invasive tests such as biothesiometer or monofilament, obtain a history of the associated symptoms, and observe clinical signs of peripheral neuropathy
- Perform routine assessment of mechanical factors, such as foot deformity
- Assess nail and skin integrity
- Assess the presence of claudication and resting pain
- Assess people's ability to care for their feet
- Interpret the results of a person's assessment to determine a management plan

Provide preventive foot care

- Define the appropriate self-care practices to be taught to people with diabetes and vascular disease and/or loss of sensation:
  - selecting and wearing appropriate footwear
  - first aid for minor skin breaks, tinea, dry skin, etc.
  - safe exercise
  - daily foot inspection
  - where and when to seek appropriate medical attention
- Describe the treatment of common minor foot problems, such as tinea, skin fissures, dry skin, calluses, corns and ingrown toenails

Assess foot problems

- Describe the aetiology of:
  - neuropathic foot ulceration
  - ischemic foot ulceration
  - mixed aetiology (neuroischemic) foot ulcers
- Identify the features of each type of ulcer
- Describe the treatment goals for each type of ulcer
- Understand principles of moist wound healing and the stages of normal wound healing
- Understand the factors that delay wound healing in people with diabetes
- Understand the indications for, and application of, locally available wound dressing
- Identify the signs and symptoms of infection in a diabetic foot

	• Understand the importance of appropriate control of infection • Employ simple strategies to reduce the pressure (known as offloading) on the wound to facilitate healing • Understand the safe indications for wound debridement • Describe the role of relevant investigations, such as wound swabs and x-rays, in the management of foot ulceration • Describe optimum nutritional intake to facilitate wound healing • Describe local referral pathways for wound management • Understand the impact on quality of life for people with insensate feet, foot problems or amputation (refer to Module I-4, Psychosocial and behavioural approaches) • Describe the presentation and pathophysiology of Charcot's arthropathy* • Assess and monitor the Charcot foot to determine the stage of the disease as acute, subacute or chronic* • Describe the treatment for acute, subacute and chronic Charcot's arthropathy*
Teaching strategies	Lecture, theory, practical demonstration and group participation for clinical assessment of neuropathy Visit multidisciplinary foot clinic if available
Who should teach this module	Doctor, diabetes educator, podiatrist, wound care consultant
Evaluation of learning	Role play demonstrating neurological assessment Student-facilitated teaching of foot care for high risk feet
References	Albright AL. Exercise precautions and recommendations for patients with autonomic neuropathy. *Diabetes Spectrum* 1998; 11: 231-7. American Diabetes Association. Report of the expert committee on the diabetic foot. *Diabetes Care* 1997; 30(Suppl 1): S91-S97. Apelqvist J, Bakker K, van Houtum WH, et al. International consensus and practical guidelines on the management and the prevention of the diabetic foot. International Working Group on the Diabetic Foot. *Diabetes Metab Res Rev* 2000; 16 (Suppl 1): S84-S92. Armstrong DG, Todd WF, Lavery LA, et al. The natural history of acute Charcot's arthropathy in a diabetic foot specialty clinic. *Diabet Med* 1997; 14: 357-63. Boyko EJ, Ahroni JH, Stensel V, et al. A prospective study of risk factors for diabetic foot ulcer. The Seattle Diabetic Foot Study. *Diabetes Care* 1999; 22: 1036-42. Connor H. The St Vincent amputation target: the cost of achieving it and the cost of failure. *Practical Diabetes International* 1997; 14: 152-3.

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Gilden JL. Orthostatic hypotension in individuals with diabetes. *Diabetes Spectrum* 1998; 11: 237-41.

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* Indicates objectives at an advanced level

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-7d

Macrovascular disease

Overview	Although microvascular and neuropathic complications can impede the quality of life of a person with diabetes, macrovascular disease causes the most morbidity and mortality. Studies in this area have found that people with diabetes are at least 2 to 4 times more likely to develop macrovascular disease, compared to the general population. This increased risk is particularly striking in women, especially for coronary heart disease. The increase in vascular disease in diabetes occurs in all major vascular systems – cardiovascular, cerebrovascular and peripheral.
Goals	• To understand the significant impact of morbidity and mortality from macrovascular disease in people with diabetes • To understand that diabetes is more than a blood glucose disease; it is also a disease with significant macrovascular risk
Objectives	After completing this module the participant will be able to: • State that manifestations of macrovascular disease vary between different ethnic groups • State that macrovascular disease comprises coronary heart disease, cerebrovascular disease and peripheral arterial disease • Describe silent ischemia, angina, transient ischemia attacks (TIAs), claudication and resting pain • Discuss the increased risk of a macrovascular event in people with diabetes • Describe how diabetes increases the risk of cardiac failure • Discuss the relationship between hyperglycaemia and increased macrovascular risks demonstrated in the Epidemiology of Diabetes Interventions and Complications (EDIC) and post-monitoring studies • Recognize central obesity as a marker for increased vascular risk • Describe risk factors and the additive effects of multiple risk factors

	• Describe the increased risk of macrovascular disease in the presence of microalbuminuria/nephropathy, and the need for intensive management of macrovascular risk factors • Describe the different types of lipids and targets for treatment • Discuss the role of nutrition in primary and secondary prevention • Discuss the role of lifestyle factors in therapy (regular exercise, smoking cessation, sustained weight loss for the overweight) • Discuss the role of HMG-CoA reductase inhibitors in reducing the chance of a macrovascular event within 6 months of beginning therapy in people with established heart disease • Describe the role of lowering blood pressure in reducing the risk of stroke and cardiac failure • Discuss the benefits of intensive management of dyslipidaemia and hypertension, even in elderly people • Discuss the use of aspirin in secondary prevention • Describe the clinical trials that give some evidence for the treatment of macrovascular risk – including MicroHOPE, HOT, 4S, UKPDS, Heart Protection Study, ACCORD, CARDs, ADVANCE*
Teaching strategy	Problem-based learning involving case studies
Suggested time	1 hour
Who should teach this module	Endocrinologist, diabetes educator, cardiologist
Evaluation of learning	Assignment describing the importance of risk reduction strategies in type 1 diabetes and type 2 diabetes Design a care plan for an overweight person with type 2 diabetes who has family history of heart disease (what assessments would be performed?)
References	Alberti GK, Zimmet P, DeFronzo RA, Keen H. *International textbook of diabetes mellitus* 2nd edition. John Wiley and Sons. Chichester, 1997. American Diabetes Association. Treatment of hypertension in adults with diabetes. *Diabetes Care* 2004; 27(Suppl 1): S80-S82. Arch J, Korytkowski M. Strategies for preventing coronary heart disease in diabetes mellitus. *Diabetes Spectrum* 1999; 12: 88-95. Birkenhager WH, Staessen JA, Gasowski J, de Leeuw PW. Effects of antihypertensive treatment on endpoints in the diabetic patients randomised in the Systolic Hypertension in Europe (Syst-Eur) trial. *Nephrol* 2000; 13: 232-7.

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Scandinavian Simvastatin Survival Study Group. Randomised trial of cholesterol lowering in 4444 patients with coronary heart disease; the Scandinavian Survival Study. *Lancet* 1994; 344: 1383-9.

SHEP Cooperative Research Group. Prevention of stroke by antihypertensive drug and treatment in older persons with isolated systolic hypertension. Final results of the Systolic Hypertension in the Elderly Program (SHEP). *JAMA* 1991; 265: 3255-64.

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US Department of Health and Human Services. *The 7th Report of the Joint National Committee on prevention, detection, evaluation and treatment of high blood pressure* (JNC 7). National Institutes of Health. Washington, 2003.

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Detailed content for this module is available as a slide presentation at www.idf.org

Module III-7e

Sleep disorders

Overview	Snoring is an everyday occurrence for many people. However, for 1 in 50 adults, it becomes much worse, affecting the person's ability to work and increasing the risk of accidents. Obstructive sleep apnoea is characterized by multiple brief interruptions of breathing during sleep, despite continued inspiratory effort. Sleep apnoea is more common in people who are overweight or obese. People with sleep apnoea have a higher risk of cardiovascular disease as well as psychosocial problems.
Goals	• To understand the significance of being overweight and the risk of sleep apnoea • To understand how obesity can lead to a narrowing in the upper airway structure due to an accumulation of subcutaneous or periluminal fat deposits on the pharynx, or fatty infiltration around the neck • To understand the significance of sleep apnoea for risk factors for heart disease, such as hypertension, dangerous arrhythmias and decreased cardiac output • To understand how reduced oxygen and increased carbon dioxide levels in the blood negatively impact pre-existing conditions such as chronic obstructive pulmonary disease (COPD)
Objectives	After completing this module the participant will be able to: • State that sleep apnoea is a significant health problem in overweight and obese people • Discuss the significance of a collar size greater than 43 cm • Describe how snoring can progress to sleep apnoea when the throat muscles become so floppy during sleep that the airway behind the tongue collapses

	• State why a person does not have a restful night's sleep even though he or she has not been awake during the night • Discuss the relationship between sleep apnoea and working, driving or operating machinery during the day • Describe the relationship between sleep apnoea and diabetes • Discuss various ways of diagnosing sleep apnoea • Discuss the importance of an assessment tool for diagnosing sleep apnoea • Discuss sleep studies in diagnosing sleep apnoea • Discuss various methods that were used to treat this problem in the past, such as being anaesthetized and having a tube inserted into the trachea • Discuss non-invasive ventilation • Discuss continuous positive airway pressure (CPAP) • Discuss other treatments • Discuss the importance of nutrition counselling for people with sleep apnoea • Describe how weight loss and reducing alcohol intake can help • Discuss research studies on sleep apnoea
Teaching strategies	Problem-based learning Case study
Suggested time	30 minutes
Who should teach this module	Diabetes educator
Evaluation of learning	Design an assessment tool for diagnosing sleep apnoea
References	Foster G, Nonas C. *Managing obesity: a clinical guide*. American Dietetic Association. Washington, 2004. IDF Task Force on Epidemiology and Prevention. *The IDF consensus statement on sleep apnoea and type 2 diabetes*. IDF. Brussels, 2008. Tuomilehto H, Seppä J, Sahlman J on behalf of Kuopio Sleep Apnea Group. Weight reduction and life style intervention as a treatment of mild OSAS – A prospective and randomized study. *Sleep Med* 2006; 7(Suppl 2): S48.

Module III-7f

Oral health and diabetes

Overview	Oral health is commonly overlooked in the management of diabetes. However, it is important in order to maintain an optimal level of health for people with diabetes. Oral infections may compromise glycaemic control; conversely, hyperglycaemia may lead to increased dental caries and/or infections to the teeth and the gums. Dry mouth as a consequence of diabetes medications may also lead to discomfort and problems, especially in people who wear dentures.
Goals	• To understand the increased risk of oral disease and gum disease in people with diabetes • To understand the importance of counselling people with diabetes on oral hygiene techniques and practices
Objectives	After completing this module the participant will be able to: • Discuss the increased risk of dental caries in people with diabetes • Define xerostomia, why it occurs, and its consequences • Discuss the increased risk of fungal infections of the mouth and some of the predisposing factors • Discuss lichen planus and its consequences • Discuss gum diseases, such as gingivitis and periodontitis, their causes, treatment and consequences
Teaching strategy	Lecture and discussion
Suggested time	30 minutes
Who should teach this module	Diabetes educator

Evaluation of learning	Question and answer Case studies
References	American Dental Association. *Diabetes and your oral health*. (www.ada.org/public/topics/diabetes.asp) American Diabetes Association. *Oral health and oral hygiene*. (www.diabetes.org/type-1-diabetes/mouth-care.jsp) Cherry-Peppers G, Ship JA. Oral health in patients with type 2 diabetes and impaired glucose tolerance. *Diabetes Care* 1993; 16: 638-41. D'Aiuto F, Massi-Benedetti M. Oral health in people with diabetes: why should we care? *Diabetes Voice* 2008; 53: 33-6. Mayo Foundation for Medical education and Research. *Oral health: a window to your overall health*. (www.mayoclinic.com/health/dental/DE00001) Ship JA. Diabetes and oral health: an overview. J *Am Dent Assoc* 2003; 134 Spec No: 4s-10s.

Module III-8

Complementary therapies

Overview	Complementary therapies are increasingly used by the general population and health professionals worldwide. In some countries a complementary therapy practitioner could be the first encounter for healthcare assessment. The frequency of use of complementary therapies by people with diabetes is largely unknown, but probably mirrors the general population. Therefore, there is a need for diabetes educators to have some knowledge about the issues surrounding the use of complementary therapies by people with diabetes. Complementary therapies are known by a variety of names, such as 'alternative', 'natural', and 'traditional'. The varied terminology can be applied differently in different countries, or even between regions of the same country. Importantly, although complementary therapies have a common philosophical basis, they are very heterogeneous in their approach; each therapy is different from the others and carries different risks and benefits.
Goal	To explore the place of complementary therapies in the management of diabetes
Objectives	After completing this module the participant will be able to: • Discuss the philosophical basis for complementary therapies • Identify the different complementary therapies available within his or her region • Describe the frequency and types of therapies used by people with diabetes in the region • Discuss the role of complementary therapies in diabetes management • Describe issues relating to the safety and efficacy of complementary therapies, including the knowledge and competence of therapists, the potential for allergies, interactions and adverse events, fragmented care, and the issues surrounding unregulated practitioners and untested and unregulated substances

	• Provide advice to people with diabetes about the use of complementary therapies that is non-judgmental and relevant to the particular country • Interpret research or articles regarding complementary medicines to determine the actual value of the products
Teaching strategies	Lectures, group discussion, visits to complementary therapists, debate, seminar
Suggested time	1-2 hours
Who should teach this module	Joint teaching between a complementary therapist and knowledgeable conventional practitioners
Evaluation of learning	Short assignment on the implications of the increasing use of complementary therapies for the practice of diabetes education in the relevant country or region
References	Cochrane Collaboration. *The Cochrane Library complementary health field*. Cochrane Collaboration. Oxford, 2001. Dunning T. *Complementary therapies in the management of diabetes and vascular disease*. John Wiley and Sons. Chichester, 2006. Dunning T. Complementary therapies and diabetes – a perspective. *J Aust Diabetes Educ Assoc* 2002; 5: 13-5. Dunning T. *Essential oils in therapeutic care*. Australian Scholarly Publishing. Melbourne, 2007. McCabe P (Ed). *Complementary therapies in nursing and midwifery*. Ausmed Publications. Melbourne, 2000. Woodhart K. Herbal therapies in the treatment of type 2 diabetes. *J Aust Diabetes Educ Assoc* 2002; 5: 6-11.

Detailed content for this module is available as a slide presentation at www.idf.org

Module III-9

Diabetes and sexual health

Overview	Sexual health is a core part of a person's general well-being. Diabetes can affect aspects of human sexuality. Sexual health should be an integral part of the care of people with diabetes, and should address the physical, psychological, social and personal aspects of sexuality in a culturally sensitive and relevant way. Sexual health should include preventive strategies as well as the management of specific sexual problems, recognizing that sexual dysfunction is multifactoral and can occur as a result of poor glycaemic control or can be unrelated to diabetes. A person's sexuality is a highly sensitive issue and sexual health assessments must be approached with due consideration to their privacy and confidentiality. Issues related to sexual health should be incorporated into the overall assessment of a person with diabetes.
Goals	• To discuss the human sexual response and the effects that diabetes can have on the physical, psychological and social well-being and relationships of an individual • To discuss body image concepts and how diabetes can impact on a person's sexual identity
Objectives	After completing this module the participant will be able to: • Describe human sexual responses • Describe the effects of fluctuations in blood glucose levels on sexual responsiveness in men and women • Discuss the individual, interpersonal and disease factors that can impact on a person's sexual health • Describe how the daily demands of living with diabetes may increase stress and fatigue thereby impacting on desire, especially in women • Take a basic sexual history, respecting a person's culture and right to privacy and confidentiality • Discuss appropriate preventive strategies for sexual health – practice safe sex, pap smears

	• Know that age and the stage of a person's life and duration of diabetes can affect sexual health, sexual identity and the sexual activity he or she engages in • Know that there is a wide range of 'normal' sexual activity • Describe the management of common diabetes-related sexual problems, such as erectile dysfunction, monilia, balanitis
Teaching strategies	Case presentations, short lecture
Suggested time	1-2 hours
Who should teach this module	Sexual health counsellor, diabetes educator
Evaluation of learning	Evaluation of a case history that has sexual health as a focus
References	Dunning P. Sexuality and women with diabetes. *Patient Educ Couns* 1993; 21: 5-12. Guay AT. Treatment of erectile dysfunction in men with diabetes. *Diabetes Spectrum* 1998; 11: 101-9. International Diabetes Federation Consultative Section on Diabetes Education. *IDF Position Statements on Diabetes Education*. IDF. Brussels, 2001. International Diabetes Federation Consultative Section on Diabetes Education. *International consensus position statements for diabetes education, diabetes and sexual health.* Class Publishing. London, 2000. Ross M, Channon-Little L. *Discussing Sexuality: A guide for the health practitioner*. MacLennan and Petty. Sydney, 1991.

Module IV-1

Diabetes in children and adolescents

Overview

Annually, at least 60 000 children and adolescents are diagnosed with type 1 diabetes worldwide, and its incidence continues to increase by 3-5% per year. Despite recent progress in our understanding of the genetics and immunology of the disease, its cause is unknown. Although type 2 diabetes has been considered rare in the paediatric population, an increased incidence has been reported throughout the world, associated with the increase of childhood obesity and physical inactivity.

As they grow, children and adolescents with type 1 diabetes have major physical, emotional, psychological, social and intellectual differences and needs compared with adults with type 1 diabetes. These needs must be recognized and addressed by the general public and health professionals. These differences arise from the stages of growth and development through which young people pass. Although their total dependence on insulin and their need for good and appropriate nutrition are the same as in adults with type 1 diabetes, affected infants, toddlers, school children and adolescents, with their developing independence, must each be considered differently.

Optimal management of diabetes in children and adolescents includes a balanced intake of food supplying adequate energy, protein and all nutrients to maintain growth and development; two to four injections of insulin per day and/or other medications; urine testing for glucose and ketones; monitoring of blood glucose levels; and regular physical activity.

Regular monitoring by the paediatric multidisciplinary team is essential.

Individualized assessment and monitoring of the child's maturity level, developmental stage, family and social supports, eating habits, and school and sports schedules are critical. The assessment should be sensitive to cultural, socio-economic and environmental determinants in order to develop a realistic and comprehensive individualized management plan.

Experience in the management of type 2 diabetes in children and adolescents is in its infancy. The management of obesity and cardiovascular risk factors are the main aims of the individualized care plan. A family-based approach, concentrating on positive parental role-modelling and a behavioural approach to lifestyle changes is essential.

All children and adolescents with type 1 diabetes and those with type 2 diabetes have the right to a competent, experienced multidisciplinary team to medically manage and provide diabetes education. The multidisciplinary team needs to be responsive to the changing medical and psychosocial needs of young people and their families. All children and adolescents should have the right to consistent, uninterrupted supplies of food and medication – including insulin.

Children and adolescents cannot advocate on their own behalf. It is therefore the responsibility of society to provide all necessary support to children and adolescents with diabetes and their family and/or carers. This should include social, public, governmental and industrial resources, and medical supplies.

Goals

- To recognize and have a broad understanding of the issues surrounding the care of children and adolescents with type 1 diabetes and those with type 2 diabetes, and their parent(s), family, carers and others
- To understand the clinical management of both types of diabetes and demonstrate the importance of care in relation to long-term diabetes outcomes.

Objectives

After completing this module the participant will be able to:

Clinical management

- Recognize that care should be provided by an experienced, consistent, committed paediatric multidisciplinary team
- Recognize that children and adolescents have special and different needs, and that these will change over time
- Describe the key management components of diabetes care in children; refer to specific care topics, such as insulin treatment and adjustment, nutritional management, blood glucose monitoring, self-care, family dynamics, psychosocial well-being and support
- Recognize young people's constantly changing insulin requirements during growth and development
- Recognize the practical skills, and the importance of shared roles between young people and parent(s), associated with insulin therapy:
    - o demonstrate optimal injection techniques, including the need for short fine needles if available
    - o describe the need for rotating insulin injection sites in children and adolescents
    - o describe the reasons for inspecting injection sites
    - o describe blood glucose monitoring techniques and regimens
    - o discuss the reasons for promoting self-care

- Discuss how to interpret urine and blood glucose readings and adjust insulin accordingly
- Discuss the need for regular monitoring of growth in weight and height, and the importance for children of following correct percentiles on a chart
- Discuss with parents and carers the recognition, treatment and prevention of hypoglycaemia in children and adolescents, with appropriate guidance on carbohydrate management
- Discuss the need for others involved in caring for children and adolescents (teachers, coaches, other family members) to be able to recognize and treat mild, moderate and severe hypoglycaemia
- Provide education on adjusting insulin and carbohydrates to enable safe participation in physical activities generally and specific sporting events
- Discuss the importance of transitional clinics, and strategies to improve attendance of young adults at clinic
- Describe the specific age-related diabetes education that is necessary during the transitional period, including contraception, safe sex, alcohol, drugs

Impact of age, growth, development and maturity on diabetes care

- Describe the needs of children at each stage of growth and development, and the ways in which diabetes impacts daily living at each stage
- Understand how children accomplish diabetes tasks at different ages based on their emotional maturity and parental and carer support – not on chronological age
- Recognize abnormalities of growth and development
- Explore strategies to promote positive growth and development

Nutrition

- Establish meal patterns and develop a staged approach to positive dietary changes
- Understand the need to organize food patterns around the child's food preferences and his or her relationship with insulin treatment
- Discuss the need to individualize food intake and insulin therapy in relation to the child's age and lifestyle
- Consider the existing food pattern and choose an appropriate insulin profile

- Discuss the key role that food plays in the dynamics of the family
- Describe how food can be used as a weapon and cause family disharmony
- Describe the reasons why nutrition goals are based on an individual's diabetes management goals
- Recognize that dietary goals should be self-selected and negotiated between the child, family and health professionals
- Appreciate age-related problems – including, for example, toddler food refusal, peer pressure, omission of insulin by teenagers, religious and cultural influences, insulin abuse and hypoglycaemia, fast foods, such as burgers, food fads (these differ between countries)
- Describe the importance of the amount and types of carbohydrates and their effects on blood glucose levels
- Describe guidelines on the distribution of food to prevent hypoglycaemia and hyperglycaemia
- Recognize changes in weight patterns and assess total energy intake and physical activity
- Describe the importance of healthy eating and an increase or reduction in energy intake to stabilize weight gain or maintain growth percentile lines
- Design a suitable age-appropriate weight-reducing programme for a growing child (including lifestyle changes and provision of adequate nutrients)*

Psychosocial influences

- Recognize the emotional trauma present when the diagnosis of diabetes is made, begin education when the family is ready, and pace education according to the family's wishes (refer to Module I-4, Psychosocial and behavioural approaches)
- Discuss the need to encourage consistent and continuing support from the extended family/carers, peers and paediatric multidisciplinary team
- Discuss behavioural themes, and strategies to promote acceptance and agreement for sharing responsibilities for a management plan – especially when the child exhibits difficulties or distress
- Discuss psychosocial themes, health beliefs and quality of life, and strategies to promote sound family functioning
- Discuss the need to facilitate the total integration in all activities of children and adolescents at nursery, school and college; they should not be excluded from any sports or activities because of diabetes

- Discuss strategies for coping with insulin refusal or omission
- Know the strategies for minimizing trauma in blood testing and coping with refusal
- Recognize the fear that children, adolescents and their parents have of hypoglycaemia, and the impact this has on tightening blood glucose control
- Understand the detrimental behavioural and health effects of both hypo- and hyperglycaemia
- Know that different environmental circumstances (for instance due to school activities, camps, day trips, sleepovers, or sports days) can increase the likelihood of hypoglycaemia
- Promote special diabetes-related holiday activities, such as camps and other group activities for different ages ranges
- Promote the need for all children to be involved in all sports at all levels
- Recognize and help to alleviate the social stigma (and bullying) associated with chronic conditions such as diabetes in many parts of society

Adolescents/young adults

- Recognize the substantial changes in insulin and nutritional management which need to be made during the pubertal phase
- Discuss risk-taking behaviours in adolescents, including (where culturally appropriate):
  - contraception
  - alcohol and its effects on blood glucose
  - smoking, diabetes and vascular disease
  - eating disorders and insulin misuse
  - drugs
- Discuss driving-related safety issues
- Discuss strategies to educate school and college personnel, faith/community leaders, sports leaders, etc.
- Assist parents and adolescents to develop their own peer- and group-support networks
- Appreciate the problems encountered by teenagers (these differ between countries)
- Appreciate the importance of the specific behavioural, psychological and social characteristics in children and adolescents that may influence their level of adherence to a management regimen

- Identify behaviour which might require additional psychological help
- Recognize the increased incidence and prevalence of mental health issues, such as depression and eating disorders, and know when to make an urgent referral to mental health services

Complications

- Recognize that being underweight may have important nutritional and/or emotional causes
- Recognize that overweight and obesity is usually a serious family problem (not only the problem of the child) and increases insensitivity to insulin
- Discuss in a comprehensive but positive way the risks of developing long-term vascular complications, strategies for preventing these or reducing their progression, and the need for annual assessment

Rarer forms of diabetes

- Discuss the occurrence and significance of neonatal diabetes
- Identify the increasing incidence in many countries of children with type 2 diabetes
- Identify ethnic minority groups that have a high prevalence of children with type 2 diabetes
- Understand the various genetic types of MODY and their management

Teaching strategies	Short lectures, workshops, problem-solving through case presentations, role play, presentation by parent/adolescent, attendance at group events, including holidays and camp
Suggested time	4 hours devoted to theory, divided into short modules
Who should teach this module	Educator (nurse/dietitian) and/or paediatrician, behavioural scientist with expertise in diabetes
Evaluation of learning	Multiple-choice questionnaire Present a case history that illustrates a problem and discuss possible solutions from the clinical, therapeutic and psychosocial points of view
References	American Diabetes Association. Nutrition recommendations and interventions for diabetes 2006: A statement of the American Diabetes Association. *Diabetes Care* 2006; 29: 2140-57. Anderson BJ, Auslander WF, Jung KC, et al. Assessing family sharing of diabetes responsibilities. *J Pediatr Psychol* 1990; 15: 477-92.

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Further reading

Series of articles in *Pediatric Diabetes*. December 2006 – August 2008.

Module IV-2

Gestational diabetes

Overview	Gestational diabetes is a common manifestation in the latter stages of pregnancy, usually diagnosed between 24 and 28 weeks' gestation. Gestational diabetes increases risks for both mother and baby, and must be treated promptly, targeting excellent blood glucose levels, to decrease these risks and improve outcomes. For both mother and child, gestational diabetes increases the risk of developing type 2 diabetes in later life. It is more common in certain ethnic populations than in others.
Goal	To understand the importance of early diagnosis, and prompt and adequate treatment for women who develop gestational diabetes
Objectives	After completing this module the participant will be able to: • Discuss the impact of the diagnosis of gestational diabetes and strategies to help the mother • Define gestational diabetes and recognize diagnostic criteria • Discuss the policy for universal screening for gestational diabetes • Describe the pathophysiology of gestational diabetes • Describe the effects on the gestational state, including symptoms of hyperglycaemia and risks to mother and baby • Describe the woman at risk of developing gestational diabetes • Develop a management plan that takes into account obstetric status, diabetes control and culture • Recognize the need for intensive monitoring • Discuss strategies for deciding when insulin is needed (refer to Module III-3, Insulin therapy) • Recognize that nutrition plays a role in the management of blood glucose as well as nourishment for mother and baby (refer to Module III-5, Nutrition therapy) • Discuss the need for frequent contact with the diabetes healthcare team • Discuss the need for the management of labour for women with gestational diabetes

	• Discuss post-partum follow-up with an endocrinologist, obstetrician, diabetes educator and dietitian • Discuss the potential for the mother to develop diabetes and the child to develop obesity and/or diabetes • Advise and provide education on the preventive measures to prevent the development of diabetes – including exercise, diet and weight loss, and the reduction of vascular risk factors such as smoking, hypertension and hyperlipidemia • Discuss the possibility of future pregnancies, arrange pre-pregnancy assessment, encourage good diet before, or early in, pregnancy (including carbohydrate management), repeat screening at 14-18 weeks' gestation • Describe the need for regular screening • Describe the Hyperglycemia and Adverse Pregnancy Outcome study (HAPO)*
Teaching strategies	Short lectures, case presentations, role play
Suggested time	2 hours
Who should teach this module	Diabetes educator and/or endocrinologist, obstetrician with expertise in this area
Evaluation of learning	Multiple choice questionnaire Present a person's medical history that illustrates a problem, and discuss possible alternatives to solve this from the therapeutic and psychosocial points of view
References	Daniels S, Grenyer BFS, Davis WS, et al. Gestational diabetes mellitus. *Diabetes Care* 2003; 26: 385-9. Gillman MW, Rifas-Shiman S, Berkey CS, et al. Maternal gestational diabetes, birth weight, and adolescent obesity. *Pediatrics* 2003; 111: 221-6. Howarka K, Pumprla J, Gabriel M, et al. Normalization of pregnancy outcome in pregestational diabetes through functional insulin treatment and modular out-patient education adapted for pregnancy. *Diabet Med* 2001; 18: 965-72. Metzger BE, Lowe LP, Dyer AR, et al; HAPO Study Cooperative Research Group. Hyperglycemia and adverse pregnancy outcomes. *N Engl J Med* 2008; 358: 1991-2002. Setji TJ, Brown AJ, Feinglos MN. Gestational diabetes mellitus. *Clinical Diabetes* 2005; 23: 17-23.

Module IV-3

Pregnancy in pre-existing diabetes

Overview	Women with pre-existing diabetes can have successful pregnancies. However, very intensive management before conception and throughout the pregnancy is essential. An interdisciplinary approach that includes an obstetrician and the diabetes team is ideal. Where possible, the baby should be born in a facility that offers specialized neonatal care.
Goal	To provide the participant with an understanding of the special needs of women with diabetes who are pregnant
Objectives	After completing this module the participant will be able to: • Discuss the importance of pre-conception counselling in terms of the physical and emotional stress of a high risk pregnancy, financial issues, impact on family life • Discuss the need to advise on pre-pregnancy planning, including contraception, and the importance of achieving blood glucose targets before pregnancy • Discuss the effects of diabetes on pregnancy, the effects of pregnancy on blood glucose control, and diabetes-related complications • Discuss the need for women to undergo a complication assessment, revise hypoglycaemia, glucagon and sick day management before conception • Provide education about the risks of hypoglycaemia and strategies to cope with morning sickness in early pregnancy • Describe the team approach to management including the educator, dietitian, endocrinologist, obstetrician and ophthalmologist, and a renal physician in some cases • Recognize that nutrition plays a role in the management of blood glucose as well as nourishment for mother and child; and recognize the need for altered dietary requirements (refer to Module III-5, Nutrition therapy) • Discuss the need for regular complication assessment at the beginning of the pregnancy and each trimester

	• Describe the need to change to insulin before pregnancy if type 2 diabetes is treated with oral blood glucose-lowering agents • Discuss the need to cease ACE inhibition treatment before pregnancy, and the need to change to other antihypertensive agent(s) • Discuss the need for frequent contact with the diabetes healthcare team and the need to increase insulin dosages as pregnancy progresses • Describe the reason for planning delivery and encouraging delivery in a major hospital with good neonatal care • Outline the importance of postpartum restabilization, the dramatic drop in insulin requirement and greater insulin sensitivity after birth • Recognize the need to provide education to women with regard to increased nutritional needs when breastfeeding, and the increased risk of hypoglycaemia (refer to Module III-5, Nutrition therapy)
Teaching strategy	Problem-solving through a case study. Involve a woman with diabetes who has had a successful pregnancy
Suggested time	2 hours
Who should teach this module	Educator and/or endocrinologist, obstetrician with expertise
Evaluation of learning	Multiple-choice questionnaire Present a case history that illustrates a problem and discusses possible alternatives to solve this from the therapeutic and psychosocial points of view
References	American Diabetes Association. *Medical management of diabetes complicated by pregnancy* 3rd edition. ADA. Alexandria, 2000. American Diabetes Association. Clinical practice recommendations 2008. *Diabetes Care* 2008; 31(Suppl 1). Butte NF, Wong WW, Treuth MS, et al. Energy requirements during pregnancy based on total energy expenditure and energy deposition. *Am J Clin Nutr* 2004; 79: 1078-87. Meltzer SJ. Management of diabetes in pregnancy: challenges and trends. *Can J Diab* 2005; 29: 246-56. Ryan EA, Mereu L. Diabetes management during pregnancy. In Gerstein HC, Haynes RB (Eds). *Evidenced based diabetes care*. Hamilton, 1999: 344-69.

Module IV-4

The older adult

Overview	In many countries the prevalence rate of diabetes increases significantly with age. As people age, their ability to cope with living, to learn new information and remain independent varies greatly. Older people with diabetes may have more disabilities, diabetes complications, and decreased ability to manage diabetes compared with younger people with diabetes. Therefore, they may need special care for their diabetes. Older people are not a homogeneous group and, therefore, it is important to treat them as individuals and address their personal needs.
Goal	To provide participants with the opportunity to consolidate their understanding of the special psychosocial, educational, nutritional, functional and physical requirements of older people with diabetes
Objectives	After completing this module the participant will be able to: • Define why special consideration is required in the management and education of older people with diabetes • Define the issues to be considered when assessing the different treatment options and goals with older people • Describe the factors that need to be considered when deciding on medication treatment with older people with diabetes, and the ways to increase medication safety • Describe the increased risk of unawareness of hypoglycaemia and HHS in older people with diabetes, and relevant preventive strategies • Recognize that older people are at increased risk of falling, and consider the diabetes-specific factors that contribute to falls in the elderly • Recognize the specific precautions that apply to older people with diabetes undergoing surgical procedures or having investigations that involve the use of intravenous dyes – such as radiopaque contrast media • Recognize that older people are an 'at risk' group with regards to nutrition (refer to Module III-5, Nutrition therapy)

	• Define the factors that need to be considered when assessing the exercise requirements and abilities of this group • Describe the strategies required to assess the educational needs of older people • Extrapolate this information to assist in the selection of appropriate educational methods and resources • Outline the resources available in the community for older people • Extrapolate this information to assist in the planning of safe and appropriate diabetes care for older people • Discuss the management of older people in residential care facilities
Teaching strategy	Case study to highlight the special medical, social, nutritional, and psychological requirements of an elderly person with diabetes
Suggested time	1 hour
Who should teach this module	Diabetes educator, dietitian, geriatrician
Evaluation of learning	Development of a management plan for an older person Assignment – description of the diabetes care available to older people in the particular country
References	California Healthcare Foundation/American Geriatrics Society Panel on Improving Care for Elders with Diabetes. Guidelines for improving the care of the older person with diabetes mellitus. *J Am Geriatr Soc* 2003; 51(Suppl 5): S265-S280. Griffiths R, Johnson M, Piper M, Langdon R. A nursing intervention for the quality use of medicines by elderly community clients. *Int J Nurs Pract* 2004; 10: 166-76. Kirkland F. Improvements in diabetes care for elderly people in care homes. *J Diabetes Nurs* 2000; 4: 150-5. Ko LSF, Cheng YH, Leung EMF, Mok JWS. Information-giving and its effect on elderly patients' adherence. *Hong Kong Med J* 2007: 13(Suppl 3); 4-8. Mccloskey B. *Diabetes in the elderly.* In Complete Nurse's Guide to Diabetes Care. Belinda PC (Ed). ADA. Alexandria, 2005: 311-8. Shashikiran U, Vidyasagar S, Prabhu MM. Diabetes in the elderly. *The Internet Journal of Geriatrics and Gerontology* 2004; 1 (2). http://www.ispub.com Sinclair A, Finucane P. *Diabetes in old age* 2nd edition. John Wiley and Sons. Chichester, 2001. Turnheim K. Drug therapy in the elderly. *Exp Gerontol* 2004; 39: 1731-8.

Module IV-5

Perioperative management

Overview	From time to time people with diabetes may have to undergo surgical or medical procedures that can disrupt their usual self-management. Diabetes educators should be able to assist people with diabetes to alter their meals and medication, including blood glucose-lowering agents or insulin, and so they can maintain their target blood glucose levels.
Goal	To be able to understand and anticipate the changing metabolic needs of the person with diabetes undergoing a surgical or medical procedure
Objectives	After completing this module the participant will be able to: • Describe the metabolic changes that occur during surgery • Describe the relationship between glycaemia and wound healing • Explain the stress hormone response and effects on glycaemia • Discuss the different principles of management for people with type 1 diabetes and type 2 diabetes undergoing fasting and surgery • Describe the different regimens for management of people on blood glucose-lowering agents and/or insulin • Discuss the different approaches for the management of minor versus major procedures • Explain the management of fasting hypoglycaemia • Explain the management of an insulin infusion • Describe effective post-procedural strategies, including the management of blood glucose, discharge planning, rehabilitation and follow-up appointments
Teaching strategies	Lecture, case studies
Suggested time	1 hour
Who should teach this module	Diabetes educator, endocrinologist

Evaluation of learning	Development of a perioperative management plans for different types of procedures

References

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Appendix 1

Sample week-long programme

To complete the full curriculum would require a programme of many weeks' duration. However, if time is limited or only a basic course is required, the sample programme below can guide those developing a course.

This is a suggestion only – it should be adapted to the needs of the group. It is recognized that this schedule does not allow for the time suggested in each of the modules. In order to complete the course, some modules could be done, if necessary, as pre-reading or as assignments after attending sessions.

Case studies and small group work are used throughout the week to review and provide opportunities to apply information. Sample case studies are provided in the IDF Diabetes Education Modules (on CD-ROM or at www.idf.org).

Day 1	Day 2	Day 3	Day 4	Day 5
Introduction Getting to know you Outline of the course				
Teaching and learning principles	Hypoglycaemia	Exercise	Neuropathy and foot disease	Small group work: complication case studies
Break	DKA and HHS and sick day management	Blood glucose-lowering agents		Break
Pathophysiology, diagnosis, types of diabetes	Break	Break	Break	Pregnancy
Self-management Blood glucose monitoring	Small group work: hypoglycaemia, HHS, DKA	Small group work: type 2 diabetes case studies	Practical session: foot assessment	Prevention and community awareness
Lunch	Lunch	Lunch	Lunch	Lunch
Practical session with meters, syringes and pens	Nutrition therapy	Insulin	Long-term complications - retinopathy - nephropathy	Evaluation and wrap-up, closing ceremony
Teaching role play	Break	Break	Cardiovascular disease	
	Small group work	Small group work: insulin case studies		

Appendix 2
Physical facilities/layout

Room size and layout

Try to choose a room that is suitable for the number of participants. If the room is too big, it can be difficult to hear and see the presentations; if the room is too small, people will feel crowded and it may get too hot.

For small group work, participants should be seated at round tables where possible, usually six to eight at a table. If there are more than eight people, it is difficult for the group to work well together. When holding a week-long programme, consider asking people to sit at different tables each day. This will increase exposure to different ideas and ways of working through problems.

If possible, try to have a microphone that either clips onto clothing or can be held as the speaker moves around. Speakers are usually more interesting when they walk around and into the audience, but they need to be heard.

Following the small group work, it is useful to have each group report back to the larger group, outlining the discussion and decisions reached at their table. If possible, you should have some flipchart paper or large sheets of paper on which they can highlight points of discussion. These could then be posted on the walls around the room and referred to over the course of the programme.

Appendix 3
Small group work/case study

The following are suggestions for the small group work on Day 2. They are intended to test knowledge of short-term complications and preparation of a teaching plan. If time allows, you could have both groups discuss the proposed programme and role play teaching.
Note: these are suggestions only.

Group 1
You have a group of 30 people newly diagnosed with type 2 diabetes. Most will be taking oral blood glucose-lowering agents. Your task is to teach them about hypoglycaemia, its causes, signs and symptoms, treatment and prevention.

Prepare a class for this group. Some of it may be lecture, but try to include something that will increase participation.

Be sure to include:
- Assessment – how will you know what they already know and what they need to know?
- Plan – goals and objectives, resources to use
- Implementation techniques – what teaching methods will you use?
- Evaluation – how will you know they have achieved the objective?

Be prepared to share your proposed programme with the other groups.

Group 2
Your patient, Yvonne, is 25 years old and has type 1 diabetes. She has been in hospital twice in the past two months with ketoacidosis. She has had some basic diabetes education but really does not understand about sick days or what to do when her blood glucose goes up. Sometimes, when she is tired, she thinks a sugar-sweetened drink will give her more energy. She is not very interested in talking to you and thinks it is all a waste of time.

The doctor asked you to teach Yvonne more about diabetes and to make sure she does not have to go to hospital again.

Prepare for your session with Yvonne. Be sure to include:
- Assessment – how will you find out what she knows and what self-care she undertakes?
- Plan – goals and objectives for the session
- Implementation – what teaching methods will you use?
- Evaluation – how will you know she knows what to do the next time she has hyperglycaemia?

Be prepared to share your plans with the other groups.

Group 3
The local diabetes association has asked you to speak to a group of people who are caring for elderly relatives in their homes. The relatives all have type 2 diabetes and are limited in their ability to care for themselves. Some of the problems the families have include the following:
- Relatives do not always eat the meals prepared by the carers
- It is sometimes hard to know whether a relative has taken his or her medication
- Relatives are sleepy a lot of the time and do not like to go out
- Some relatives are confused at times.

Your task is to teach the group of family members about HHS. You need to teach them about the risk factors for hyperosmolar in the elderly, its possible signs and symptoms, treatment and prevention.

Be sure to include:
- Assessment
  - How do you know what the people know about HHS?
  - What are the conditions at home?
  - Who does most care?
  - How independent are the elderly people?
- Plan – goals and objectives for this session
- Implementation
  - What teaching method will you use?
  - How can you make it interactive and applicable for the home setting?
- Evaluation – how will you know that the families will be better able to care for their relatives?

Be prepared to share your programme plan with the rest of the class.

Appendix 3

Group 4

Faith is 10 years old and is in grade 4. She was diagnosed with type 1 diabetes last week. Her mother has asked you to go to her school to teach the class about diabetes. She wants to be sure the other children and the teacher will know what to do if Faith develops hypoglycaemia.

Be sure to include:

- Assessment
  - What do the staff and classmates know already?
  - Has the teacher had a child with diabetes in her class before?
- Plan – goals and objectives
- Implementation – how to make this fun and meaningful for the children
- Evaluation – how will you know whether the staff and classmates know how to help Faith?

Be prepared to share your plan with the others.

Case study

The following is an example of a case study. The case study follows a person with diabetes through the natural progression of the disease and requires participants to recognize what education is necessary and when treatment should be revised.

Joe's Story

Joe is 55 years old and has had type 2 diabetes for 5 years. For the first few years he managed his diabetes with diet and increased exercise, and lost 5 kg. His current weight is 100 kg and his BMI is 30 kg/m^2. Last year he started metformin and is now taking 2500 mg/day. His most recent HbA_{1c} was 9.2%. He tests his blood glucose before meals and 2 hours after meals, 2-3 days a week. His blood glucose results are 10-11 mmol/l (180-198 mg/dl) fasting, and up to 15 mmol/l (270 mg/dl) before dinner. The doctor refers him back to the diabetes education centre. Joe does not want to go to the diabetes centre; he says he knows what he should do but he just does not do it. His wife wants to go to the centre so he agrees to go with her.

How would you approach Joe and his wife?
What educational and or behavioural strategies would you use in your discussion with them?
What would you recommend for his clinical management?

After 3 weeks, he returns with the following blood glucose records and says he has been following the diet as closely as he can:

FBG	Before lunch	Before dinner	Before bed
9.3 mmol/l (167 mg/dl)	8.4 mmol/l (151 mg/dl)	10.6 mmol/l (190 mg/dl)	14.2 mmol/l (255 mg/dl)
7.9 (142)	8.7 (156)	11.4 (205)	17.0 (306)
8.6 (155)	9.5 (171)	12.3 (221)	15.2 (273)

What is your approach now?
How will you work with Joe to keep him interested and improving his health?
What do you suggest now, and why?

Six months later he returns. The doctor started him on a sulphonylurea twice a day. His metformin dose is unchanged. He brings the following blood glucose results:

FBG	Before lunch	Before dinner	Before bed
10.3 mmol/l (185 mg/dl)	7.4 mmol/l (133 mg/dl)	6.2 mmol/l (111 mg/dl)	8.5 mmol/l (153 mg/dl)
12.3 (221)	8.6 (155)	9.3 (167)	7.2 (129)
11.5 (207)	—	7.8 (140)	10.2 (183)

His HbA_{1c} is now 8.5%. His weight is unchanged; he says he lost a little weight about 5 months ago, but gained it back. He is getting frustrated that he has to take all this medication and his blood glucose is still elevated. He wonders if it is worth making the effort to eat well and do regular activity. He has been walking most days but admits he does not like it.

What is your approach now?
What do you suggest now, and why?

He returns 1 year later. He is now on metformin 2500 mg/day, sulphonylurea twice daily and 25 units NPH insulin at night.

He brings the following results:

FBG	Before lunch	Before dinner	Before bed
8.5 mmol/l (153 mg/dl)	12.6 mmol/l (227 mg/dl)	13.5 mmol/l (243 mg/dl)	17.0 mmol/l (306 mg/dl)
7.9 (142)	10.2 (183)	14.0 (252)	16.0 (288)
9.2 (165)	15.4 (277)	12.9 (232)	13.6 (245)

Joe is still frustrated, even becoming angry – "Why isn't this working?" "Don't they know how to fix this?". He is finding it harder to do his work because he is tired and lacking energy, but he does not want to retire yet. He has gained some weight and doesn't seem to be concerned about this.

How would you approach him this time?
What would you suggest now, and why?

Appendix 4
Suggested web sites

American Association of Clinical Endocrinologists (AACE)	www.aace.com
American Association of Diabetes Educators (AADE)	www.aadenet.org
American Diabetes Association (ADA)	www.diabetes.org
Ask Noah about Diabetes (New York Online Access to Health – detailed information about diabetes in English and Spanish)	www.noah-health.org
Canadian Diabetes Association (CDA)	www.diabetes.ca
Centers for Disease Control and Prevention	www.cdc.gov/diabetes
Children with diabetes	www.childrenwithdiabetes.com
Diabetes Associations in the Americas	www.dota.org/MAP/SouthAmerica.htm
Diabetes Australia Multilingual Resource (Chinese, Hindi, Thai, Vietnamese, Greek, Indonesian, Italian, Turkish, Ukrainian, Arabic and English)	www.multilingualdiabetes.org
Diabetes Deutschland (German – up to date information for people with diabetes and healthcare providers)	www.uni-duesseldorf.de/diabetes/index.htm
Diabetes Education Study Group European Association for Study of Diabetes	www.desg.org
Diabetes India	www.diabetesindia.com
Diabetes UK	www.diabetes.org.uk
International Diabetes Federation	www.idf.org
Diabetes Voice	www.diabetesvoice.org
IDF (Europe) Guidelines	www.staff.ncl.ac.uk/philip.home/guidelines
International Obesity Taskforce	www.iotf.org
International Society for Pediatric and Adolescent Diabetes (ISPAD)	www.ispad.org
Juvenile Diabetes Research Foundation International (JDRF)	www.jdf.org
Med Fetch (automated medline queries – results delivered in English, French, Italian, German, Spanish and Portuguese)	www.medfetch.com
National Institute of Diabetes and Digestive and Kidney Diseases	www.niddk.nih.gov/health/diabetes/diabetes.htm
National Service Framework for Diabetes UK	www.doh.gov.uk/nsf/diabetes.htm
Norwegian Diabetes Association	www.dianet.no
Pub Med (US National Library of Medicine's search service – free)	www.ncbi.nlm.nih.gov/PubMed

Appendix 5
Mentoring

If possible, try to match each participant with a mentor for the duration of the course and provide a contact person in the months following the programme. A mentor could be a senior person at the participant's place of work or a facilitator from the programme who will be able to stay in contact.

Description and responsibilities

According to Webster's Dictionary, a mentor is 'a trusted counsellor or guide'. Mentors can be role models or can assist other people by showing them what to do in keeping with their ambitions and goals. They can listen and provide constructive criticism when warranted. There are several types of mentor – such as a resource mentor, sponsor, coach or instructional mentor, a guidance mentor, group mentor, cultural mentor, support mentor, peer mentor.

The IDF diabetes education mentor should:

- Offer assistance so that the participants can learn from their experience. This can be done by serving on panels or giving presentations, and by establishing an ongoing relationship.
- Provide public support, to the extent possible, by making positive comments to the right people and recommending the mentee for committees or special assignments. This can be done by introducing the mentee to professional circles and encouraging their acceptance.
- Offer day-to-day guidance on how to improve skills and performance. This can be done by assessing performance and providing guidance about how to advance the project at hand.
- Help the mentee set goals and make plans. This can be done by exploring expectations and pointing out difficulties and options.
- Share information, networking tips, and constructive feedback in groups. This can be done by starting an informal mentoring group to exchange information, learn new tasks, and improve performance.

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