The aim of patient education is for people with diabetes to improve their knowledge, skills and confidence, enabling them to take increasing control of their own condition and integrate effective self-management into their daily lives. High-quality structured education can have a profound effect on health outcomes and can significantly improve quality of life. A Cochrane review found that culturally appropriate health education has short- to medium-term effects on glycaemic control and on knowledge of diabetes and healthy lifestyles.[1]

For self-management strategies to be effective, people with diabetes require a sense of ownership of the management of their disease. This can be fostered through the timely provision of information and advice that acknowledges and accounts for their individual circumstances (eg, disease duration and prior experience of diabetes management).[2]

The National Institute for Health and Care Excellence (NICE) recommends that well-designed and well-implemented programmes are likely to be cost-effective for people with diabetes and should be offered to every person and/or their carer at and around the time of diagnosis, with annual reinforcement and review. NICE clinical guidance for adults with type 2 diabetes states:[3]

- Ensure that any structured education programme for adults with type 2 diabetes includes the following components:
  - It is evidence-based and it suits the needs of the person.
  - It has specific aims and learning objectives, and supports the person and their family members and carers in developing attitudes, beliefs, knowledge and skills to self-manage diabetes.
  - It has a structured curriculum that is theory-driven, evidence-based and resource-effective, has supporting materials and is written down.
  - It is delivered by trained educators who have an understanding of educational theory appropriate to the age and needs of the person, and who are trained and competent to deliver the principles and content of the programme.
  - It is quality assured and is reviewed by trained, competent, independent assessors who measure it against criteria that ensure consistency.
  - The outcomes are audited regularly.

A programme of structured diabetes education covering all major aspects of diabetes self-care and the reasons for it should be made available to all adults with type 1 diabetes in the months after diagnosis and should be repeated according to agreed need.[4]

The potential benefits of an effective patient education programme for people with type 2 diabetes include:

- Improving knowledge, health beliefs and lifestyle changes.
- Improving patient outcomes - eg, weight, haemoglobin A1c (HbA1c), lipid levels, smoking and psychosocial changes, such as quality of life and levels of depression.
- Improving levels of physical activity.
- Reducing the need for - and potentially better targeting of - medication and other items such as blood testing strips.

Diabetes education must be flexible enough to suit the needs of the individual - eg, cultural, linguistic, cognitive and literacy needs. There are several different programmes available across the UK:
For people with type 1 diabetes

- The Dose Adjustment for Normal Eating (DAFNE) Programme\(^5\).
- The X-PERT Insulin Programme is suitable for people with type 1 diabetes who feel they cannot commit to the DAFNE Programme\(^5\).
- The Bournemouth Type 1 Intensive Education (BERTIE) programme is run locally to Bournemouth but also has an online course.
- There are also many locally run diabetes education programmes and insulin pump courses.

For people with type 2 diabetes

- Diabetes Education and Self-management for Ongoing and Newly Diagnosed (DESMOND).\(^6\)
- The X-PERT Diabetes Programme\(^6\).
- The X-PERT Insulin Programme is suitable for people with type 2 diabetes who require insulin treatment\(^6\).
- EMPOWER Diabetes Education Programmes\(^8\).
- Diabetes UK together with BUPA have designed an online education programme for people with type 2 diabetes\(^10\).

A Cochrane review of the evidence found that computer-based diabetes self-management interventions to manage type 2 diabetes appear to have a small beneficial effect on blood glucose control\(^11\).

The X-PERT Diabetes Programme\(^12\)

- The X-PERT Diabetes Programme is suitable for people with type 2 diabetes.
- The X-PERT Insulin Programme is suitable for:
  - People with type 1 diabetes who feel they cannot commit to the DAFNE Programme.
  - People with type 2 diabetes who require insulin treatment.

The X-PERT Programme aims to increase knowledge, skills and confidence leading to informed decisions regarding diabetes self-management. Participation in the X-PERT Programme by adults with type 2 diabetes has been shown at 14 months to have led to improved glycaemic control, reduced total cholesterol level, improved body mass index and waist circumference, reduced requirement for diabetes medication, increased consumption of fruit and vegetables, increased enjoyment of food, and improved knowledge of diabetes, self-empowerment, self-management skills and treatment satisfaction\(^13\).

- The X-PERT Diabetes Programme is a six-week professionally led programme based on the theories of patient empowerment and patient activation.
- The X-PERT course is aimed at anyone diagnosed with diabetes and it has been shown to improve long-term control of diabetes.

### Contents of the X-PERT Diabetes Programme

The course contents include:

- What is diabetes?
- The eatwell plate and energy balance.
- Carbohydrate awareness and glycaemic index.
- The benefits of physical activity.
- Supermarket tour and understanding food labels.
- Possible complications of diabetes and their prevention.
- Lifestyle experiment.
- Are you an X-PERT? game.
- Care Planning: the lifestyle experiment.

The Diabetes Education and Self-management for Ongoing and Newly Diagnosed Programme

The DESMOND Programme is designed for people with type 2 diabetes and for those at increased risk of developing type 2 diabetes.

DESMOND is a structured education programme designed for patients with type 2 diabetes, and is the first one to meet the criteria set down by NICE for suitable education programmes; it has been developed as a collaborative project between service users, workers, Diabetes UK and the Department of Health. A recent cost-effectiveness analysis showed the DESMOND intervention likely to be cost-effective compared with usual care for people with type 2 diabetes\(^14\).

- DESMOND is available as a Newly Diagnosed Module (for those within the first 12 months of diagnosis) or as Foundation Modules (for those with established diabetes).
- It was piloted in 15 English PCTs between January and May 2004 and revised following feedback from all involved parties.
- The course provides six hours of structured group education based on a formal curriculum. It is offered either as a one-day or two half-day sessions of teaching, for six to ten patients at a time.
Attendees may be accompanied by a person of their choice. Written material is provided to accompany the programme and allow later reference by graduates of the course. The course is delivered by two healthcare professionals trained as DESMOND educators.

There is an ongoing quality assurance assessment for those who teach the course. The course aims to provide patients with a good foundation and practical skills to begin self-management of their diabetes. It empowers them to self-manage by providing a working understanding of their illness and through addressing issues around the initiation and sustaining of motivation.

The curriculum provides the structured education under the broad topics outlined below:

### Contents of the DESMOND Programme
- Thoughts and feelings of the participants around diabetes.
- Understanding diabetes and glucose: what happens in the body.
- Understanding the risk factors and complications associated with diabetes.
- Understanding more about monitoring and medication.
- How to take control: Food Choices, Physical Activity.
- Planning for the future.

### What evidence is there of its effectiveness?
Initial abstracts of preliminary research findings were presented at the Diabetes UK annual conference in 2005. The main points were as follows:

- Illness beliefs do not match the medical model for many newly diagnosed type 2 patients, and beliefs about the impact, and the future prognosis of diabetes, are correlated with depressive symptomatology at diagnosis.
- Pilot data indicated the DESMOND course for newly diagnosed individuals changed important illness beliefs. At three-month follow-up there was a reported improvement in quality of life and metabolic control.[15]

A larger randomised controlled trial was conducted involving 824 adult patients in 207 general practices in 13 primary care sites in the UK. The results showed that, compared with patients who did not undergo the DESMOND Programme, there were greater improvements in weight loss and smoking cessation and positive improvements in beliefs about illness but there were no differences in HbA1c levels up to 12 months after diagnosis.[16]

### How does it work?
- It hopes to promote understanding of type 2 diabetes, allowing patients to be more knowledgeable about what will positively benefit their long-term health as they live with the condition.
- The course aims to dispel any myths about the condition, together with any illness beliefs that are false or potentially damaging.
- It should help patients to see their illness in a biomedical model, as well as the personal functional and social model that most use as their initial conceptual framework for understanding the impact of the illness.
- It should enable patients to monitor their type 2 diabetes effectively, to realise when their control is inadequate and to self-manage their lifestyle, nutrition and medication in order to bring about improvement in diabetic control, or to know when to seek professional help.
- It should enable them to be an active partner in the management of their type 2 diabetes, along with healthcare professionals.

### Dose Adjustment for Normal Eating and Exercise[5]

The DAFNE Programme is designed for people with type 1 diabetes.

- DAFNE is a validated, structured, reproducible diabetes education programme that aims to teach those with type 1 diabetes how to manage their insulin dosing in a flexible manner.
- The aim of the course is to empower those with type 1 diabetes through understanding of their condition, hopefully enabling them to lead as normal a life as possible in terms of heterogeneity of diet, being able to exercise and ability to cope with variability in insulin requirements caused by, for example, illness.
- One of the catchphrases of the course illustrates this theme: 'It is not about dose adjustment for normal eating; it is dose adjustment for normal living!'
- Another desired outcome is that those with type 1 diabetes will achieve better glycaemic control and avoid marked variability in their blood glucose levels by being able to tailor their long-acting and fast-acting insulin doses to their current dietary and physiological requirements.
- The course gives a working understanding of the key areas, listed below:

### Main areas covered during a DAFNE course
- Pathophysiology of diabetes.
- Types of diabetes.
- Metabolic control of diabetes and its monitoring.
- The types, actions and duration of action of insulin preparations.
The course was originally conceived and developed in Düsseldorf at the World Health Organization’s co-ordinating centre, under the auspices of the late Michael Berger and his team. The imbalance between UK and continental results for diabetic control and outcomes led three UK diabetes centres (Sheffield Teaching Hospitals, Northumbria Healthcare Trust and King’s College Hospital, London) to investigate the course’s usefulness and suitability for delivery in the UK. They became convinced that the principles and practice of the unit and the published evidence were sound and that the Programme would be suitable for UK patients and should be tested.

The course lasts for five days and is highly structured. It requires attendance each day for about eight hours, with breaks. It is delivered via discussion and teaching of the concepts being learned, in as relaxed a manner as possible, although there is a lot to get through so it is relatively busy. The course includes a lunchtime meal which is used as an opportunity to try out the concepts being learned in terms of insulin dose adjustment.
What is the evidence that it works?

- In the late 1990s, Diabetes UK funded a trial to assess the effect of attendance at a DAFNE course on diabetic control and quality of life measures:
  - After six months, those who had attended the course had a fall in HbA1c of 1% compared with a control group, sustained at around 0.5% at one year after the course.
  - Despite an increase in the number of injections and blood tests, those attending a DAFNE course reported an improvement in their quality of life and increased satisfaction with their treatment.
  - Another important finding was that of the many areas in their lives in which they reported improvements, the largest increase was observed in the area of freedom to eat as they liked.

- Research has shown that this improvement in glycaemic control is not at the expense of more frequent episodes of hypoglycaemia; in fact, the opposite was true with those attending the course having fewer episodes [17].

- A study of patients undergoing insulin initiation as part of a structured educational programme showed that they had a better quality of life compared with patients who were on insulin but had not undergone an educational programme [18].

- One study using a single educational intervention within the normal clinical setting showed long-lasting benefits [19].

How does it work?

- Those who attend the course are taught how to assess the carbohydrate portions (CPs) and glycaemic index of the meals that they eat.
- A handy pocket book is provided to help with this, covering a wide range of commonly eaten foods, including trademarked brands.
- The patient’s individual response to taking the recommended dose of insulin for the CPs eaten is assessed and the patient self-adjusts the amount of fast-acting insulin they take for a given quantity of CPs, and according to their preprandial capillary blood glucose. This helps to improve glycaemic control and encourages the patient to analyse, rather than just record, their capillary blood glucose measurements.
- The patient is given a step-wise approach on how to adjust both fast-acting and long-acting insulin where glycaemic control can be improved.

Who should go on the course and where can they do it?

- Essentially, all patients with type 1 diabetes. However, the trial data for its effectiveness were based upon patients with HbA1c values in the range 58-108 mmol/mol (7.5-12%), ie moderate or poor control of diabetes.
- Initially, as the programme is rolled out across the UK, it would be sensible to send patients with HbA1c values in this range, as places are still relatively limited in many locations.
- Personal factors such as motivation, educational level, comorbidity and associated disability may influence patient selection for the course.

How do you become involved as a healthcare professional?

The DAFNE website (see below) has details of how to become a DAFNE centre and train as a DAFNE educator or a DAFNE doctor.

Further reading & references

- Diabetes UK
- Diabetes (type 1 and type 2) in children and young people: diagnosis and management; NICE Guidelines (Aug 2015, updated Nov 2016)
- Type 1 diabetes in adults: diagnosis and management; NICE Guidelines (August 2015, updated July 2017)
- Management of diabetes; Scottish Intercollegiate Guidelines Network - SIGN (March 2010 - updated Sept 2013)
- Type 2 diabetes in adults: management; NICE Guidelines (December 2015, updated May 2017)
- Diabetes (type 1 and type 2) in children and young people: diagnosis and management; NICE Guidelines (Aug 2015, updated Nov 2016)
- Dose Adjustment For Normal Eating (DAFNE)
- X-PERT Health Courses
- EMPower Diabetes Education Programmes
- Type 2 diabetes and me training course; Diabetes UK and BUPA
- X-PERT Health