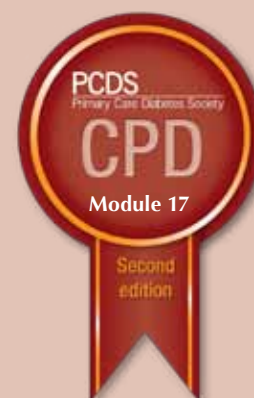


Diabetes care for older people: A practical view on management



Roger Gadsby

Diabetes can impose a substantial health burden on older people and their informal and formal carers. If there is evidence of sub-optimal care planning, a lack of empowerment, or under-skilling of those delivering direct diabetes care to this group, independence of the individual will be under threat. This substantially increases the risk of a serious adverse outcome, such as hospital or care home admission. This article identifies the specific needs, treatments and assessments for functional loss and depression in older people with diabetes living in the community, those living in care homes and those in hospital. It also looks at end-of-life care and managing hypoglycaemia.

Across a range of European countries, type 2 diabetes affects 10–30% of people above pensionable age (DECODE [Diabetes Epidemiology: Collaborative Analysis of Diagnostic Criteria in Europe] Study Group, 2003). The prevalence of diabetes in care homes in the UK may be as high as one in four residents (Sinclair et al, 2001).

Evidence suggests that older people with diabetes use primary care services two to three times more than their counterparts without diabetes (Damsgaard et al, 1987). The demands on hospital care are also increased two to three times in those with diabetes compared with an aged-matched population without diabetes, with more frequent clinic visits and a five-fold higher admission rate (Damsgaard et al, 1987). Acute hospital admissions account for 60% of total expenditure in this group (Krop et al, 1998). Some 5–8% of general hospital beds in the UK are occupied by people with diabetes aged ≥60 years, accounting for 60% of all inpatients with diabetes (Hudson et al, 1995). Hospital admissions last twice as long for older people with diabetes than those without the condition, with the totals in the former averaging 7 and 8 days per

year for men and women, respectively (Health and Social Care Information Centre, 2013).

It has also been shown that residents of care homes are associated with higher workload for GPs than individuals living in the community (Groom et al, 2000).

Diabetes care themes that apply to older people across all clinical settings include:

- A clinician mindset that aims to find a diagnosis for illness-related symptoms and provide good-quality care based on the individual's needs.
- A major emphasis on dignity, safety, quality of life and wellbeing for each individual.
- The early and effective use of interventions that can be applied in community settings.
- A commitment to improving or maintaining independence and functional status.
- The avoidance of ageism and a reductionist approach to care.

Influencing diabetes management in older people

Defining key aims and identifying needs

The key aims and needs for the management of older people with type 2 diabetes are presented

New online learning opportunity

Visit diabetesonthenet.com/cpd to gain a certificate of continuing professional development for participating in this module.

See page 267

Citation: Gadsby R (2014) Diabetes care for older people: A practical view on management. *Diabetes & Primary Care* 16: 259–67

Learning objectives

After reading this article, the participant should be able to:

1. Treat older people with diabetes with an emphasis on dignity, safety, quality of life and wellbeing.
2. Describe the cognitive and geriatric assessment process.
3. Discuss the diagnosis and treatment of depression in older people with diabetes.
4. Describe the optimisation of diabetes therapy in older people with diabetes, taking into account the risk of falls and hypoglycaemia.

Key words

- Carers
- Depression
- End-of-life care
- Functional impairment
- Hypoglycaemia

Author

Roger Gadsby MBE is Principal Teaching Fellow, Warwick Medical School, and Professor, University of Bedfordshire.

Supported by a grant from Boehringer Ingelheim and Eli Lilly and Company. These modules were conceived and are delivered by the Primary Care Diabetes Society in association with Diabetes & Primary Care. Boehringer Ingelheim and Eli Lilly and Company had no input into the modules and are not responsible for their content.

Box 1. Major aims in managing older people with diabetes.

Medical

- Balance safety and risk by aligning therapy to metabolic disturbance and individual needs
- Minimise polypharmacy
- Prevent undesirable weight loss
- Avoid hypoglycaemia and other adverse drug reactions and interactions
- Detect cognitive impairment, depression and functional disability at an early stage
- Avoid unnecessary hospital admission

Patient-oriented

- Maintain general wellbeing, good quality-of-life and independent living
- Preserve dignity and safety
- Acquire skills and knowledge to adapt to lifestyle changes
- Encourage diabetes self-care
- Risk management (e.g. to reduce the risk of falls)
- Maintain optimal physical and mental performance
- Achieve a normal life-expectancy where possible

in *Box 1* and these can act as a template for developing a care plan. The care plan should be individualised and assessed regularly, as the status of older people can change quickly. Apart from social isolation, socioeconomic factors and varying family dynamics, other issues may operate and influence management (see *Box 2*).

The management of type 2 diabetes is often complicated in older people because of the added effects of ageing on metabolism and renal function, the use of potentially diabetogenic drugs, and low levels of physical activity. Cardiovascular risk is particularly high because many risk factors of the “metabolic syndrome” can be present for up to a decade before type 2 diabetes is diagnosed (Alberti

et al, 2005). Older people with diabetes have a set of characteristics that reveal a pattern of specific needs (*Box 3*).

Guidelines for the management of older people with type 2 diabetes

The first international guidelines on the management of type 2 diabetes in older people were published by the International Diabetes Federation (IDF) in 2013. They are freely downloadable from the IDF website (IDF, 2013). They give recommendations for all aspects of diabetes care, including assessment, screening, nutrition and physical activity, education and self management, cardiovascular risk, glucose control, blood pressure, inpatient care, foot disease, eye disease and sexual health. The guidelines structure these recommendations as follows:

- **Category 1** – those who are functionally independent.
- **Category 2** – those who are functionally dependent, owing to either (a) frailty or (b) dementia.
- **Category 3** – in end-of-life care, defined as a life expectancy of less than 1 year.

An example of recommendations using this category system is that for glycaemic targets. Here, for the functionally independent a target HbA_{1c} of 53–59 mmol/mol (7–7.5%) is recommended. For the functionally dependent who are frail or who have dementia, an HbA_{1c} of up to 70 mmol/mol (8.5%) may be appropriate. For those in the last year of life, avoidance of symptomatic hyperglycaemia is the recommended aim.

Functional impairment and the role of comprehensive geriatric assessment

Diabetes is associated with both functional impairment and disability that cannot be solely accounted for by vascular disease. Metabolic disturbance, medication effects and nutritional deficits may superimpose on this to exacerbate functional loss.

A number of studies have identified diabetes as a predictor of functional decline (Gregg et al, 2000a; Volpato et al, 2002; Sinclair et al, 2008), which can manifest itself as changes in activities of daily living

Box 2. Factors that may influence diabetes management in older people.

- High medical comorbidity levels
- Frailty and limited life-expectancy
- Physiological ageing and lowered counter-regulation to hypoglycaemia
- Higher frequency of depressive illness or cognitive impairment
- Care home residency
- Reliance on informal or formal carers
- Increased risk of adverse events from multiple medications

(ADL), domestic and leisure abilities or cognitive tests. Falls and fall-related fractures are a significant source of morbidity and resultant disability. In people with diabetes, the increased risk of falling is nearly three-fold, and they have a two-fold increase in having a fall that is injurious, with fall-related fractures being more common in women (Schwartz et al, 2002). Factors contributing to falls include problems with gait and balance, as well as neurological and musculoskeletal disabilities. Environmental factors, such as tripping on rugs or ill-fitting slippers, can also play a role.

In addition, in people with diabetes, the high rate of cardiovascular disability, visual deficit, cognitive impairment and treatment-related issues are likely to contribute. Insulin treatment significantly increases the risk of falling in older women with diabetes (Bonds et al, 2006). Factors that may be involved in the risk of falls are the duration and severity of the diabetes, or possibly a higher rate of hypoglycaemia, which might be unrecognised. Clinicians involved in managing older people with diabetes must directly question them about the occurrence of falls and provide an estimate of risk. They may require an education review or additional education. It is important that the teaching method is appropriate to the person's learning style and accounts for cognitive and memory deficits.

Encouraging people to take an active part in lifestyle modification, including rehabilitation, can foster their autonomy, improve their self-esteem and coping skills, and reduce the anxiety and depression associated with disability and functional decline.

It is also important to identify individuals who would appropriately be labelled as frail because the aims of care are modified for such people. Frailty, in this context, represents a vulnerability to a wide range of adverse outcomes secondary to the effects of ageing, long-term vascular complications of diabetes, physical and cognitive decline, and the presence of other medical comorbidities. Healthcare professionals are often able to define a series of factors, such as recurrent hypoglycaemia, cardiac disease and reduced recovery from metabolic decompensation that underlie a frailty state (Sinclair, 2000).

The annual review process should include an assessment of basic measures of ADL function, including: a Barthel test; tests of cognitive function,

Box 3. Characteristics indicative of specific needs in older people with diabetes.

- Varying evidence of impaired physical function and walking ability
- Increased vulnerability to hypoglycaemia and increased risk of hospital admission
- Increased risk of cognitive dysfunction and mood disorder, making decision-making more difficult for healthcare professionals
- Increased risk of hospital and care home admission
- Increased risk of inpatient mortality

such as the Mini-Mental State Examination or Clock Test; a screen for depression, such as the Geriatric Depression Score; and an assessment of gait and balance, which can be simply estimated by the timed "Get Up and Go" test. This involves asking the individual to stand from a chair that has armrests, walk 3 metres, turn, walk back to the chair, and sit down. If this takes longer than 30 seconds, there is evidence of impaired mobility. People with major mobility or falls disorder require referral to a local therapy centre where physical therapy and occupational therapy are available, or to a geriatrician, preferably one who has an interest in diabetes and falls disorder.

Nutritional assessment using "MUST" (the malnutrition universal screening tool) is an important and relatively quick method of assessing nutritional status and should form part of the assessment procedures. This integrated process of assessment – comprehensive geriatric assessment – is suitably applied to people with diabetes meeting the criteria presented in *Box 4*.

The role of carers

There is increasing recognition that informal (unpaid) carers provide considerable, if not the majority of, community-based care in domestic

Box 4. Criteria for referring people with type 2 diabetes for comprehensive geriatric assessment.

- Presence of a geriatric syndrome, elements of which can include confusional state, depression, falls, incontinence, immobility and pressure sores
- Presence of several coexisting morbidities and complex drug regimens
- Presence of disabilities resulting from lower-limb vascular disease or neuropathy requiring a rehabilitation programme in the absence of a terminal illness or dementing syndrome
- Increasing frailty

settings and this need is likely to increase dramatically over the next 25 years (Sinclair et al, 2010). At the same time, they appear to be greatly affected by the burden of this responsibility, including lost earnings (as many carers are in the working-age category) and an increased risk of depressive illness.

Apart from direct diabetes care roles, informal carers have a wide range of other care responsibilities including skin and wound care, medication management, dietary provision, financial care and even in-home dialysis where needed. Factors such as other chronic diseases or the presence of physical disability, falls and fractures, or dementia are likely to impose a particularly heavy burden. Carers are also likely to be partners or spouses of the person with diabetes and may have their own health requirements or may need diabetes education.

Reports also suggest that a particularly heavy burden is borne by informal carers among black and minority ethnic groups (Sinclair et al, 2010). Their burden may involve issues such as a more significant lack of access to services, problems relating to living within poor inner-city environments (including poverty and overcrowding), and a greater prominence of difficulties in obtaining care home placements.

Based on the available evidence in relation to care-giving roles in both white and ethnic populations, *Box 5* contains a summary of the optimal content of informal carer “support packages”. This information needs to be individualised and presented in an appropriate way.

Language difficulties and health literacy (Nutbeam, 2000) remain important issues since they can hinder trust among people with diabetes and healthcare professionals, increase the likelihood of staff failing to recognise complexity in an individual, and decrease adherence to therapy (Rivadeneira et al, 2000).

It is important to ensure that the information and instruction provided in the “support package” is translatable into relevant languages, is simple and easy to read and is appropriately illustrated. It should also be sensitive to the cultural, educational, religious and ethnic issues for each group of people and be designed to empower individuals to successfully manage their diabetes and other healthcare issues.

Diabetes and cognitive performance

Diabetes and cognitive dysfunction are related (Gregg et al, 2000b; Sinclair et al, 2000). Impaired cognitive function has been demonstrated in older people with diabetes, but these studies were mostly not population based, excluded people with dementia, and generally used a large battery of tests to show the deficit.

Impaired glucose tolerance has been shown to be associated with cognitive dysfunction. It has been suggested that certain components of the metabolic syndrome may each contribute to memory disturbance in type 2 diabetes abnormalities, and that hyperinsulinaemia is associated with decreased cognitive function and dementia in women (Sinclair and Asimakopoulou, 2009). The overall risk of dementia is significantly increased for both men and women with type 2 diabetes; a statistically significant excess risk for Alzheimer’s disease has been found only in men (Sinclair and Asimakopoulou, 2009). Poor glycaemic control may be associated with cognitive impairment, which recovers following improvement in glycaemic control.

Impaired cognitive function may result in poorer adherence to treatment, worsened glycaemic

Box 5. A summary of the optimal content of informal carer “support packages” (Sinclair et al, 2010).

- Information about the essentials of diabetes as a medical disorder
- Practical guidance on the following:
 - Monitoring of blood glucose and urinary glucose
 - Insulin administration where appropriate
 - Dietary advice
 - Exercise and lifestyle “desirable” practices
 - Carer management of hypoglycaemia, worsening glycaemic control of the person with diabetes, and management of “sick days”
- Information about local diabetes teams and other healthcare professionals involved in diabetes care, including contact persons and telephone numbers
- Information about community and neighbourhood services and social services that are available locally to support older adults with diabetes from varying ethnic backgrounds and their informal carers
- Information about local ethnic diabetes support groups, which can provide further information and advice regarding living with diabetes and the caring role, and provide a forum and link for networking in any one area

control (due to an erratic diet and medication schedule), and an increased risk of hypoglycaemia if individuals forget that they have taken their blood glucose-lowering medication and repeat the dose. Depending on its severity, cognitive dysfunction in older people with diabetes may remain undiagnosed and have considerable implications that include increased hospitalisation, less ability for self-care, less likelihood of specialist follow-up, and increased risk of institutionalisation. Clinicians must be prepared to refer people for specialist assessment if memory loss or behaviour change becomes an issue.

A UK working group on diabetes and dementia has met to develop best practice guidelines and their report should be published by the end of 2014.

Depression and diabetes

Depression and diabetes are common in an ageing community and there is evidence of an association (Eaton et al, 1996; Egede et al, 2002). A major depressive disorder appears to significantly increase the risk of diabetes (Maraldi et al, 2007), and the presence of depression is an important predictor of subsequent death in people with diabetes admitted into hospital (Nouwen and Oyeboode, 2009). Depression occurs in up to a quarter of people with cardiovascular disease and diabetes, and in both cases, clinical outcomes are worse (Nouwen and Oyeboode, 2009).

Failure to recognise depression can be serious and may be associated with worsening diabetes control and decreased treatment adherence. Diabetes and depression may have a similar symptomatology, with elements such as fatigue, irritability and sexual dysfunction. This may delay or confuse the diagnosis, although the commonly used diagnostic assessment scales are still likely to be valid. Enquiries about wellbeing, sleep, appetite and weight loss should be part of the routine history, with a more comprehensive psychiatric evaluation if appropriate.

A Geriatric Depression Scale score of >5 can indicate probable depression. Other scales to be considered include the two-question test by NICE (2009) or the World Health Organization-5 Well-Being Index (Henkel et al, 2003).

A Quality and Outcomes Framework clinical indicator for depression screening in people with diabetes or cardiovascular disease was introduced

in April 2006. It offered a financial incentive based on the indicator of the “percentage of patients on the diabetes register and/or the CHD register for whom case finding for depression has been undertaken on one occasion during the previous 15 months using two standard screening questions.” This indicator was withdrawn in April 2013. Concern had been expressed that screening for depression in this way could be counterproductive (Maxwell et al, 2013).

Depression in diabetes can be treated successfully with pharmacotherapy or psychological therapy, but blood glucose levels should be monitored closely, especially with the former. Goals for treating people with depression and diabetes are two-fold: first, remission or improvement of depressive symptoms; and, second, improvement of glycaemic control if poor. The preferred first-line treatment is a selective serotonin reuptake inhibitor (SSRI) or a serotonin noradrenaline reuptake inhibitor, as well as psychotherapy. Treatment with an appropriate SSRI may improve symptoms and consequently metabolic control, although close observation for side effects and changes to glycaemic control are needed (Nouwen and Oyeboode, 2009).

Diabetes in care homes

Between 7% and 27% of care home residents in the UK and USA have diabetes (Sinclair et al, 2001). The wide range is partly because of differences in the diagnostic criteria used and the prevalence of impaired glucose tolerance may be as high as 30%. People with diabetes in care homes should receive care commensurate with their health and social needs. The best possible quality of life and wellbeing should be maintained, without unnecessary or inappropriate interventions, while helping residents to manage their own diabetes wherever feasible, reasonable and appropriate.

Metabolic control should reduce both hyperglycaemic lethargy and hypoglycaemia, with a well-balanced dietetic plan that prevents weight loss and maintains nutritional wellbeing. Foot care and vision require screening and preventative measures to maintain mobility and prevent falls and unnecessary hospital admissions.

At present, residents with diabetes in care homes appear to be generally vulnerable and neglected, with high prevalences of macrovascular complications

Page points

1. The presence of depression is an important predictor of subsequent death in people with diabetes admitted into hospital.
2. Depression in diabetes can be treated successfully with pharmacotherapy or psychological therapy, but blood glucose levels should be monitored closely, especially with the former.
3. In care homes, foot care and vision require screening and preventative measures to maintain mobility and prevent falls and unnecessary hospital admissions.

Box 6. Recommendations for improving diabetes management in care homes.

- Screen for diabetes on admission and regularly thereafter
- Policies must include strategies to minimise hospital admission, metabolic decompensation, pressure sore development, pain, diabetes-related complications, infections and weight loss
- All residents should have an individual diabetes care plan that is reviewed regularly and after any intermittent illness
- All residents with diabetes should have an annual review which includes a medication review and access to specialist services
- All care homes should have a diabetes care policy that can be regularly updated and be a basis for diabetes audit
- Staff should have the relevant knowledge and skills, and participate in regular diabetes CPD programmes

and infections (especially skin and urinary tract), frequent hospitalisation, and much physical and cognitive disability. Known deficiencies of diabetes care include lack of individual management care plans and dietary supervision, infrequent review by specialist nurses, doctors and ophthalmologists, and poor knowledge and training for care staff.

Various strategies may improve diabetes care in this setting (see *Box 6*). National clinical guidelines are available (Diabetes UK, 2010). There is emerging evidence that many people with diabetes in care homes are severely disabled yet are still being prescribed multiple medications, especially for cardiovascular disease risk reduction, which may be inappropriate (Gadsby et al, 2012). Regular medication review will help to identify medications that may no longer be necessary or appropriate.

Issues in end-of-life care

Any clinician regularly involved in delivering diabetes care in older people will face one or more end-of-life care (EOLC) scenarios in their patient population each year. Each of these episodes requires the clinician to demonstrate knowledge of key palliative care principles, skill in revising goals of diabetes care, and a compassionate understanding of what the individual with diabetes is experiencing.

The Association of British Clinical Diabetologists (ABCD) position statement (Kilvert et al, 2010) demonstrates a commitment by diabetes specialists to integrate important

EOLC approaches into diabetes teamwork. This requires close working with community-based teams and primary care. As stated in the ABCD guidance (Kilvert et al, 2010):

“The multidisciplinary diabetes team will need to be proactive in recognising the onset of a patient’s terminal decline in health and liaising with the appropriate EOLC services. Services will be based around high quality EOLC, symptom management, and the provision of psychosocial support. There will be an agreed set of criteria to identify those who require urgent palliative care, support worker responses in different situations, e.g. unresolved pain, rapid discharge from hospital, or care breakdown at home.”

Issues that need to be addressed include adjusting glycaemic targets that lead to greater safety from hypoglycaemia, a reduction in unnecessary blood glucose monitoring, treating infections promptly to minimise pain and discomfort, providing pain relief, and at times considering withdrawal of treatment in type 2 diabetes when the individual is in the near stages of death and is not being troubled by hyperglycaemia.

Diabetes treatment considerations

Along with glucose regulation, active management of other cardiovascular risk factors – especially hypertension and dyslipidaemia – is necessary from the outset. Advice on diet and lifestyle are given as for middle-aged people, including an exercise programme if possible. Incorporating a resistance training component may be important in minimising the disability (by increasing muscle strength) associated with lower-limb dysfunction.

Treatment strategies aimed at blood glucose lowering in older people are similar to those in younger people, but treatment decisions are influenced by hypoglycaemia risk, presence of frailty, renal impairment, carer involvement and the glycaemic targets that have been agreed.

A multi-party position statement on diabetes in older people was produced by Sinclair et al in 2012.

Non-insulin agents

The first version of this module (Sinclair, 2011) reviewed various classes of non-insulin agents used in diabetes. Since then, a new oral class had been launched, the sodium–glucose cotransporter 2 (SGLT2) inhibitors. These agents work on the kidney, partially blocking glucose reabsorption and therefore causing an increased urinary excretion of glucose, which in turn reduces HbA_{1c} and leads to weight loss. Renal function and the risk of volume depletion should be taken into account when prescribing these agents in older people. For guidance on age cut-offs, readers are referred to the summaries of product characteristics for these agents (<http://medicines.org.uk>).

Insulin

General considerations relating to the use of insulin in older people are provided in the first version of this module (Sinclair, 2011).

Hypoglycaemia

The presenting symptoms of hypoglycaemia in older adults can primarily be neuroglycopenic (confusion, delirium and dizziness) rather than adrenergic (palpitation, sweating and tremors). Hypoglycaemia in this context would be the presence of symptoms in addition to a plasma glucose level of ≤ 3.9 mmol/L. Healthcare professionals may misdiagnose hypoglycaemia as a stroke, transient ischaemic attack, unexplained confusion or seizure.

People with cognitive impairment or loss of the warning symptoms of hypoglycaemia are at increased risk, as they may not recognise impending hypoglycaemia or fail to communicate their feelings to their carers. Multiple factors underlie the increased susceptibility to hypoglycaemia in older people, including recent discharge from hospital with altered sulphonylurea dosages, renal or hepatic impairment, excess alcohol and insulin therapy. In addition, older people show a diminished counter-regulatory response to hypoglycaemia (Meneilly et al, 1994), and this may delay recovery.

The risk of hypoglycaemia may be elevated, to differing degrees, in older people taking insulin therapies, but prolonged hypoglycaemia is also an

important clinical issue for those taking certain sulphonylurea drugs. Impaired renal function further prolongs hypoglycaemia secondary to sulphonylureas that are cleared through the kidneys.

In older people, serious hypoglycaemia appears to carry a worse prognosis and higher mortality risk, as is discussed in the first version of this module (Sinclair, 2011).

Recurrent hypoglycaemia may be a particular problem in care home residents with diabetes taking insulin or sulphonylurea therapy (Abdelhafiz and Sinclair, 2009). Residents appear to have many hypoglycaemia risk factors that increase their vulnerability to hypoglycaemia, which further impairs their wellbeing and may increase hospital admission rates. An approach to reducing this risk is given in the Diabetes UK (2010) guidance.

Many older people cannot treat hypoglycaemia themselves. An educational programme should focus on detecting and treating hypoglycaemia, with advice to others about how to manage cases of unresponsive hypoglycaemia. In view of the additional vulnerability of older people to hypoglycaemia, extra caution is required when there is a history of recurrent symptoms, when drowsiness is present, when the person is on relatively large doses of insulin or when the individual's diabetes care is delegated to an informal carer. This increased risk must be balanced by a lower threshold for admission to hospital when hypoglycaemia is suspected. In this setting, a glucose level < 4 mmol/L may warrant admission.

Conclusion

Diabetes is a high-impact disorder that poses challenges of a highly complex nature for many health and social care professionals. This article describes key areas where change leading to enhanced care is feasible without major changes in healthcare policy being necessary.

All members of the diabetes care team must honour their commitment to strive for excellence in medical care, and diabetes in ageing people poses one of the more distinct of these challenges. Thoroughness, vigilance, compassion and professionalism are prime qualities in caring for older people with diabetes. When this care can

Page points

1. The presenting symptoms of hypoglycaemia in older adults can primarily be neuroglycopenic rather than adrenergic.
2. In older people, serious hypoglycaemia appears to carry a worse prognosis and higher mortality risk.
3. Recurrent hypoglycaemia may be a particular problem in care home residents with diabetes taking insulin or sulphonylurea therapy.

“All members of the diabetes care team must honour their commitment to strive for excellence in medical care, and diabetes in ageing people poses one of the more distinct of these challenges.”

be integrated and meet the aims of agreed clinical pathways, we help to lower inequality, reduce inequity of care and enhance the likelihood of a better outcome. ■

Acknowledgement

This module has been updated from the first version, which was written by Professor Alan Sinclair.

Abdelhafiz AH, Sinclair AJ (2009) Hypoglycaemia in residential care homes. *Br J Gen Pract* **59**: 49–50

Alberti KG, Zimmet P, Shaw J, IDF Epidemiology Task Force Consensus Group (2005) The metabolic syndrome – a new worldwide definition. *Lancet* **366**: 1059–62

Bonds DE, Larson JC, Schwartz AV et al (2006) Risk of fracture in women with type 2 diabetes: the Women’s Health Initiative Observational Study. *J Clin Endocrinol Metab* **91**: 3404–10

Damsgaard EM, Frøland A, Holm N (1987) Ambulatory medical care for elderly diabetics: the Fredericia survey of diabetic and fasting hyperglycaemic subjects aged 60–74 years. *Diabet Med* **4**: 534–8

DECODE Study Group (2003) Age- and sex-specific prevalences of diabetes and impaired glucose regulation in 13 European cohorts. *Diabetes Care* **26**: 61–9

Diabetes UK (2010) *Good Clinical Practice Guidelines for Care Home Residents with Diabetes*. Diabetes UK, London. Available at: <http://bit.ly/1oqH13C> (accessed 28.08.14)

Eaton WW, Armenian H, Gallo J et al (1996) Depression and risk for onset of type II diabetes. A prospective population-based study. *Diabetes Care* **19**: 1097–102

Egede LE, Zheng D, Simpson K (2002) Comorbid depression is associated with increased health care use and expenditures in individuals with diabetes. *Diabetes Care* **25**: 464–70

Gadsby R, Galloway M, Barker P, Sinclair A (2012) Prescribed medicines for elderly frail people with diabetes resident in nursing homes: Issues of polypharmacy and medication cost. *Diabet Med* **26**: 136–9

Gregg EW, Beckles GL, Williamson DF et al (2000a) Diabetes and physical disability among older U.S. adults. *Diabetes Care* **23**: 1272–7

Gregg EW, Yaffe K, Cauley JA et al (2000b) Is diabetes associated with cognitive impairment and cognitive decline among older women? Study of Osteoporotic Fractures Research Group. *Arch Intern Med* **160**: 174–80

Groom L, Avery AJ, Boot D et al (2000) The impact of nursing home patients on general practitioners’ workload. *Br J Gen Pract* **50**: 473–6

Health and Social Care Information Centre (2013) *National Diabetes Inpatient Audit 2012: Key findings about the quality of care of inpatients with diabetes in England and Wales*. HSCIC, Leeds. Available at: <http://bit.ly/1lyO03h> (accessed 28.08.14)

Henkel V, Mergl R, Kohlen R et al (2003) Identifying depression in primary care: a comparison of different methods in a prospective cohort study. *BMJ* **326**: 200–1

Hudson CN, Lazarus J, Peters J et al (1995) An audit of diabetic care in three district general hospitals in Cardiff. *Practical Diabetes International* **13**: 29–32

International Diabetes Federation (2013) *Managing Older People with Type 2 Diabetes*. IDF, Brussels, Belgium. Available at: <http://bit.ly/1izxDlj> (accessed 28.08.14)

Kilvert A, Sinclair A, Rowles S (2010) *ABCD Position Statement: Diabetes and End of Life Care*. Association of British Clinical Diabetologists, High Wycombe

Krop JS, Powe NR, Weller WE et al (1998) Patterns of expenditures and use of services among older adults with diabetes. Implications for the transition to capitated managed care. *Diabetes Care* **21**: 747–52

Maraldi C, Volpato S, Penninx BW et al (2007) Diabetes mellitus, glycemic control, and incident depressive symptoms among 70- to 79-year-old persons: the health, aging, and body composition study. *Arch Intern Med* **167**: 1137–44

Maxwell M, Harris F, Hibberd C et al (2013) A qualitative study of primary care professionals’ views of case finding for depression in patients with diabetes or coronary heart disease in the UK. *BMC Fam Pract* **14**: 46

Meneilly GS, Cheung E, Tuokko H (1994) Counterregulatory hormone responses to hypoglycemia in the elderly patient with diabetes. *Diabetes* **43**: 403–10

NICE (2009) *Depression in adults: The treatment and management of depression in adults* (CG90). NICE, London. Available at: <http://www.nice.org.uk/guidance/CG90> (accessed 28.08.14)

Nouwen A, Oyeboode JR (2009) Depression and diabetes in older adults. In: Sinclair AJ, ed. *Diabetes in Old Age* (3rd edition). John Wiley and Sons, Chichester

Nutbeam D (2000) Health literacy as a public health goal: a challenge for contemporary health education and communication strategies into the 21st century. *Health Promot Int* **15**: 259–67

Rivadeneira R, Elderkin-Thompson V, Silver RC, Waitzkin H (2000) Patient centeredness in medical encounters requiring an interpreter. *Am J Med* **108**: 470–4

Schwartz AV, Hillier TA, Sellmeyer DE et al (2002) Older women with diabetes have a higher risk of falls: a prospective study. *Diabetes Care* **25**: 1749–54

Sinclair AJ (2000) Diabetes in old age – changing concepts in the secondary care arena. *J R Coll Physicians Lond* **34**: 240–4

Sinclair AJ, Girling AJ, Bayer AJ (2000) Cognitive dysfunction in older subjects with diabetes mellitus: impact on diabetes self-management and use of care services. All Wales Research into Elderly (AWARE) Study. *Diabetes Res Clin Pract* **50**: 203–12

Sinclair AJ, Gadsby R, Penfold S (2001) Prevalence of diabetes in care home residents. *Diabetes Care* **24**: 1066–8

Sinclair AJ, Conroy SP, Bayer AJ (2008) Impact of diabetes on physical function in older people. *Diabetes Care* **31**: 233–5

Sinclair AJ, Asimakopoulou KG (2009) Diabetes and cognitive dysfunction. In: Sinclair AJ, ed. *Diabetes in Old Age* (3rd edition). John Wiley and Sons, Chichester

Sinclair AJ, Armes DG, Randhawa G, Bayer AJ (2010) Caring for older adults with diabetes mellitus: characteristics of carers and their prime roles and responsibilities. *Diabet Med* **27**: 1055–9

Sinclair A (2011) Diabetes care for older people: A practical view on management. *Diabetes & Primary Care* **13**: 29–38

Sinclair A, Morley JE, Rodriguez-Mañas L et al (2012) Diabetes mellitus in older people: position statement on behalf of the International Association of Gerontology and Geriatrics (IAGG), the European Diabetes Working Party for Older People (EDWPOP), and the International Task Force of Experts in Diabetes. *J Am Med Dir Assoc* **13**: 497–502

Volpato S, Blaum C, Resnick H et al (2002) Comorbidities and impairments explaining the association between diabetes and lower extremity disability: The Women’s Health and Aging Study. *Diabetes Care* **25**: 678–83

Online CPD activity

Visit www.diabetesonthenet.com/cpd to record your answers and gain a certificate of participation

Participants should read the preceding article before answering the multiple choice questions below. There is ONE correct answer to each question. After submitting your answers online, you will be immediately notified of your score. A pass mark of 70% is required to obtain a certificate of successful participation; however, it is possible to take the test a maximum of three times. A short explanation of the correct answer is provided. Before accessing your certificate, you will be given the opportunity to evaluate the activity and reflect on the module, stating how you will use what you have learnt in practice. The new CPD centre keeps a record of your CPD activities and provides the option to add items to an action plan, which will help you to collate evidence for your annual appraisal.

- What proportion of residents in a UK care home is estimated to have diabetes? Select ONE option only.
 - As much as 5%
 - As much as 10%
 - As much as 15%
 - As much as 25%
 - As much as 50%
- What is the estimated proportion of people of a pensionable age in Europe with type 2 diabetes? Select ONE option only.
 - 5–10%
 - 10–20%
 - 10–30%
 - 20–30%
 - 25–30%
- An 89-year-old nursing home resident has type 2 diabetes, COPD and dementia. She is frail and bedbound.

Which one of the following, if any, is the MOST appropriate TARGET HbA_{1c} (in mmol/mol) for her? Select ONE option only.

 - 48
 - 53
 - 70
 - 86
 - None of the above
- A 62-year-old man has type 2 diabetes, significant heart failure and metastatic colon cancer. His life expectancy is almost certainly less than 6 months.
 - Hyperparathyroidism
 - Major depressive disorder
 - Myeloproliferative disease
 - Obsessive compulsive disorder
 - Osteoarthritis
- Which one of the following, if any, is the MOST appropriate TARGET HbA_{1c} (in mmol/mol) for him? Select ONE option only.
 - 48
 - 53
 - 70
 - 85
 - None of the above
- Which is the MOST appropriate statement concerning the risk of falls in people with diabetes? Choose ONE option only.
 - Decreased risk
 - Increased risk
 - No effect on risk
 - No statistically significant evidence
 - The evidence is inconclusive
- Which one of the following is the MOST appropriate screening tool to assess nutritional status? Select ONE option only.
 - CURB-65
 - GDS
 - FAST
 - MUST
 - PEWS
- Which one of the following is reported to significantly INCREASE the risk of developing diabetes? Select ONE option only.
 - Four-times-daily short-acting insulin and twice-daily long acting insulin
 - Three-times-daily short-acting insulin plus once-daily long acting insulin
 - Twice-daily biphasic insulin
 - Twice-daily biphasic insulin plus once-daily long-acting insulin
 - Once-daily intermediate-acting insulin plus metformin
- Compared to care home residents without diabetes, residents with diabetes are MOST at risk of developing which one of the following infections? Choose ONE option only.
 - Biliary
 - Bone
 - Dental
 - Ear
 - Skin
- Which of the following issues should be taken into account when prescribing SGLT2 inhibitors in older people?
 - Renal function
 - Risk of volume depletion
 - Both of the above
 - None of these options
- A 79-year-old man with mild-moderate cognitive impairment and obesity is cared for by his 81-year-old wife. His glycaemic control is very poor despite a combination of oral antidiabetes agents and is probably contributing to his cognitive impairment.

Which of the following would be the MOST appropriate regimen to recommend? Select ONE option only.

 - Four-times-daily short-acting insulin and twice-daily long acting insulin
 - Three-times-daily short-acting insulin plus once-daily long acting insulin
 - Twice-daily biphasic insulin
 - Twice-daily biphasic insulin plus once-daily long-acting insulin
 - Once-daily intermediate-acting insulin plus metformin