European Diabetes Working Party for Older People 2011
Clinical Guidelines for Type 2 Diabetes Mellitus. Executive Summary

A Report of the European Diabetes Working Party for Older People (EDWPOP) Revision Group on Clinical Practice Guidelines for Type 2 Diabetes Mellitus

Expert Revision Group

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Abstract

Aim – The Clinical Guidelines provide an opportunity to summarise the interpretation of relevant clinical trial evidence for older people with diabetes. They are intended to support clinical decisions in older people with diabetes and the primary focus is enhancing high quality diabetes care by the use of best available evidence.

Methods – The principles used for developing the recommendations are drawn from the Scottish Intercollegiate Guidelines Network (SIGN) based in Edinburgh, Scotland. Using SIGN 50, the Guidelines developer's handbook, each reviewer evaluated relevant and appropriate studies which have attempted to answer key clinical questions identified by the Working Party. Searches were generally limited to English language citations over the previous 15 years but the wide experience and multinational nature of the Working party ensured that citations in Italian, French, Spanish, and German were considered if relevant. All relevant published articles were identified from the following databases: Embase, Medline/PubMed, Cochrane Trials Register, Cinahl, and Science Citation. Hand searching of 13 key major peer-reviewed journals was undertaken by two reviewers and included the Lancet, Diabetes, Diabetologia, Diabetes Care, Diabetes and Metabolism, British Medical Journal, New England Journal of Medicine, and the Journal of the American Medical Association.

Results – Key evidenced-based recommendations were made in 18 clinical domains of interest and Good Clinical Practice points identified. A glucose-lowering algorithm has been provided for frail older patients with diabetes.

Conclusion – We have provided an up-to-date evidenced-based approach to practical clinical decision-making for older adults with type 2 diabetes of 70 years and over. We have included a user-friendly set of recommendations to aid clinical decision-making in primary, community-based and secondary care settings.

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Keywords: Diabetes; Elderly; Older; Guidelines; Recommendations; Frailty; Review
pertinentes ayant tenté de répondre aux questions cliniques clés identifiées par le groupe de travail. Les recherches ont été limitées en général aux publications écrites en anglais mais la nature multinationale du groupe de travail garantit que les publications en italien, français, espagnol et allemand ont pu être prises en compte si elles étaient pertinentes. Tous les articles publiés au cours des 15 dernières années ont été identifiés dans les bases de données suivantes : Embase, Medline/PubMed, Cochrane Trials Register, Cinahl, et Science Citation. Une recherche manuelle a été réalisée par deux lecteurs critiques dans les 13 principaux journaux pour le thème: *Lancet*, *Diabetes*, *Diabetologia*, *Diabetes Care*, *Diabetes and Metabolism*, *British Medical Journal*, *New England Journal of Medicine*, et *the Journal of the American Medical Association*.

**Résultats** – Les recommandations clés fondées sur les preuves ont été établies dans 18 domaines cliniques et des points de bonne pratique clinique ont été identifiés. Un algorithme de correction de la glycémie pour le sujet âgé fragile est fourni.

**Conclusions** – Nous avons mis à disposition une approche actualisée fondée sur les preuves de la prise de décision clinique pour les personnes âgées de plus de 70 ans atteinte d’un diabète de type 2. Nous avons produit un jeu convivial de recommandations pour l’aide à la décision pour les soins primaires au domicile ou pour les structures de soins secondaires.

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*Mots clés*: Diabète de type 2 ; Sujet âgé ; Gériatrie ; Recommandations de pratique Clinique ; Fragilité ; Revue générale

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### 1. Introduction

This *Executive Summary* of the Clinical Guidelines provides an opportunity to summarise the interpretation of relevant clinical trial evidence for older people with diabetes. They are intended to support clinical decisions in older people with diabetes and the primary focus is enhancing high quality diabetes care by the use of best available evidence. Where possible, recommendations which have a cost-effective component will be employed.

The original *European Diabetes Working Party for Older People* (EDWPOP) was established in December 2000 to ensure that older people in societies across the European Union have consistent and high quality diabetes care throughout their lives. It developed from the Elderly Diabetes Working Group (Chair: Professor A J Sinclair, UK) of the St Vincent Declaration Primary Care Diabetes Group chaired by Dr Paul Cromme (Netherlands).

Modern diabetes care systems for older people require integrated care between general practitioners, hospital specialists, and other members of the healthcare team. These should have a multi-dimensional approach with an emphasis on prevention of diabetes and its complications, early intervention for vascular disease, and assessment of disability due to limb problems, eye disease, stroke, and other causes.

Although management of diabetes in older people can be relatively straightforward especially when patients have no other co-morbidities and when vascular complications are absent. In many cases, however, special issues arise which increase the complexity of management and lead to difficult clinical decision-making.

Variations in clinical practice are common in most healthcare systems resulting in inequalities of care. For older people with diabetes, this may be manifest as lack of access to services, inadequate specialist provision, poorer clinical outcomes and patient and family dissatisfaction. Our response to these concerns has been to develop *Clinical Guidelines* for older patients with type 2 diabetes mellitus based on the best available scientific and clinical trial evidence.

We anticipated a series of possible advantages for developing the guidelines and these have been summarised in Table 1. Other benefits of this approach include: (a) provide an up-to-date evidenced-based approach to practical clinical decision-making for older adults with type 2 diabetes of 70 years and over; and (b) provide a user-friendly set of recommendations to aid clinical decision-making in primary, community-based and secondary care settings.

Little, if any, published work exists which examines the ethical and moral dimensions of providing diabetes care for older people. Issues which might pose specific problems include aims and strategies of care, patients’ compliance, and risks of hypoglycaemia, choice of priorities, cost-effectiveness, and the presence of dementia or depression. Decision-making needs to reflect consideration of quality of life, life expectancy, cognitive and physical skills and the presence or otherwise of frailty. In the full set of *Guidelines* launched in 2004, those sections where ethical and/or moral issues are apparent, these have been highlighted and discussed, and practical advice provided.

In preparing the original full version EDWPOP identified various primary areas of concern and produced a series of

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Advantages of Clinical Guidelines for older people with type 2 diabetes mellitus in the European Union.</th>
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<tbody>
<tr>
<td>Improve clinical diabetes care and health outcomes</td>
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<tr>
<td>Increase consistency of diabetes care across Europe</td>
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<tr>
<td>Influence European public policy where appropriate</td>
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<td>Improve professional and public knowledge about clinical care and services</td>
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<td>Identify major gaps in knowledge where research is warranted</td>
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<tr>
<td>Complement existing clinical diabetes guidelines, e.g. IDF guidelines</td>
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<td>Support quality improvement activities</td>
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<td>Improve cost effectiveness in diabetes care</td>
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</table>
target areas for concerted action (Table 2) [1-7]. These were based on common but important clinical issues relevant to most people with diabetes, but, in addition, other areas were identified which were deemed to satisfy a series of additional criteria: each has a significant impact on the lives of older people with diabetes and their families; in each case, some supporting evidence was available but careful scrutiny by an experienced review group would be necessary to derive an appropriate grade of recommendation; for each targeted area either existing Guidelines for adult diabetes had failed to discuss or specific guidance was thought necessary.

The lack of a sufficient clinical evidence base for establishing recommendations on best practice was recognised and highlighted by the absence of any large-scale intervention studies in older people with type 2 diabetes, no substantial evidence of benefit for glucose or lipid lowering, no evidence of large studies in diabetic residents of care homes, and no evidence to recommend a particular care model.

This extensive literature review has revealed numerous gaps in our knowledge of diabetes in older adults. In several Sections of the full Guideline (but not in this document) the Working party has tried to identify important research areas which might be addressed by the diabetes research community in the form of a randomised controlled trial or some form of epidemiological research.

2. Further developments of clinical guidelines

The original comprehensive version of Clinical Guidelines represents an important step in highlighting the special needs of older people with diabetes mellitus. A first draft of the Guidelines were presented at the 18th International Diabetes Federation (IDF) Congress in Paris, France, 24-29th August 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December 2003, and later in Florence, Italy at the 2nd Congress of the European Union Geriatric Medicine Society (EUGMS), 27-29th August 2003. A complete version then underwent critical review by an International External Advisory Board and, between 2004 and 2007, has been subsequently presented in 10 countries including the United States. They were again presented at the IDF Congress in Cape Town in December

### Table 2

<table>
<thead>
<tr>
<th>Areas of clinical importance and targets for concerted action: type 2 diabetes mellitus in older people.</th>
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<tbody>
<tr>
<td>Importance of functional and vascular risk assessment</td>
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<tr>
<td>Relationship between functional outcome and metabolic control</td>
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<tr>
<td>Management of diabetes in primary care</td>
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<tr>
<td>Detection of cognitive impairment and depression</td>
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<tr>
<td>Management of specific major complications: e.g. foot disease, visual loss, hypoglycaemia, pain</td>
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<tr>
<td>Care Home diabetes</td>
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<tr>
<td>Ethical and moral aspects of treatment</td>
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</tbody>
</table>

The Guidelines Revision Group was set up in May 2008 to review new clinical trial evidence and provide a document more readily available as a publication source. The members of the Group consist of acknowledged experts in medicine of older people and diabetes and endocrinology. The revision process also provided the opportunity to examine better implementation strategies for the Guideline across the European Union and more globally.

2.1. Methodology underpinning the full clinical Guidelines

Every attempt has been made to ensure that the recommendations are evidenced-based (where evidence is available) and the principles used for developing them are drawn from the Scottish Intercollegiate Guidelines Network (SIGN) based in Edinburgh, Scotland. Using SIGN 50, the Guidelines developer’s handbook, each reviewer evaluated relevant and appropriate studies which have attempted to answer key clinical questions identified by the Working Party. Reviewers assigned a level of evidence and grade of recommendation based on Section 6 of the SIGN handbook for each major recommendation. In addition, reviewers completed a Considered Judgement form for each key area/question, and produced Good Clinical Practice Points where a practical management issue needs to be highlighted and is unlikely to be addressed via research.

Searches were generally limited to English language citations over the previous 15 years but the wide experience and multinational nature of the Working party ensured that citations in Italian, French Spanish, and German were considered if relevant. The primary strategy attempted to locate any relevant systematic reviews or meta-analyses, but randomised controlled trials were a main focus. Every effort was made to avoid bias in selection of evidence and all members of the Revision Group were asked to provide disclosure statements or indicate any ongoing relationship with the Industry.

The following databases were examined: Embase, Medline/PubMed, Cochrane Trials Register, Cinahl, and Science Citation. Hand searching of 13 key major peer-reviewed journals was undertaken by two reviewers and included the *Lancet, Diabetes, Diabetologia, Diabetes Care, Diabetes and Metabolism, British Medical Journal, New England Journal of Medicine, and the Journal of the American Medical Association.*

2.2. Classification of recommendations

All recommendations in this Executive Summary have been assigned both a Level of Evidence and a Grade of Recommendation in keeping with the revised SIGN grading system.

For areas without evidence or where evidence was minimal, reviewers came to a consensus view following a structured process where practicable. In general, recommendations made in this way are graded as D. In some cases, when the level of evidence is weak, e.g. 2, or 3 or 4, the reviewers have assigned a higher grade of recommendation, e.g. C, or
Guidelines Development Plan has been rigorously tied to a
that the identification of individuals most likely to benefi t from
people. An important message throughout the
particularly where the medical literature is not specifi c to older
but readers should allow for some variation in the analysis
evidence and grade of recommendation in each clinical area,
pre-testing phase was introduced before the fi nal guidelines
ducted by the reviewers and fi nal revisions developed. A
peer review process.
preliminary revisions were instituted as part of an overall
guidelines were examined by several relevant bodies where
and also involved patients and carers. In addition, the draft
Group whose membership was multidisciplinary, professional
higher, but their justification has given. The overall process
has been rigorously tied to a Guidelines Development Plan
where each of the key steps has been specifi ed.
Following methodological review, the draft of the guide-
lines was scrutinised by the External International Advisory
Grades of recommendation

<table>
<thead>
<tr>
<th>Grades of recommendation</th>
<th>Evidence level 2++, Grade of recommendation (A)</th>
<th>Evidence level 2+, Grade of recommendation B</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>- At least one meta-analysis, systematic review, or RCT rated as 1++, and directly applicable to the target population; or - A systematic review of RCTs or a body of evidence consisting principally of studies rated as 1+, directly applicable to the target population, and demonstrating overall consistency of results</td>
<td>- A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or - Extrapolated evidence from studies rated as 1++ or 1+</td>
</tr>
<tr>
<td>B</td>
<td>- A body of evidence including studies rated as 2++, directly applicable to the target population, and demonstrating overall consistency of results; or - Extrapolated evidence from studies rated as 1++ or 1+</td>
<td>- A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or - Extrapolated evidence from studies rated as 2++</td>
</tr>
<tr>
<td>C</td>
<td>- A body of evidence including studies rated as 2+, directly applicable to the target population and demonstrating overall consistency of results; or - Extrapolated evidence from studies rated as 2++</td>
<td>- Evidence level 3 or 4; or - Extrapolated evidence from studies rated as 2++</td>
</tr>
<tr>
<td>D</td>
<td>- Evidence level 3 or 4; or - Extrapolated evidence from studies rated as 2++</td>
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metabolic interventional strategies is a paramount concern, equalled only by the need for structured and integrated diabetes care.
It is hoped that this Executive Summary and the accompanying full Guidelines (available at www.instituteofdiabetes.org) will be frequently accessed by all health professionals and those affected by diabetes as an important learning and educational resource.

3. Recommendations for enhancing the practice and quality of diabetes care

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Rationale for High Quality Diabetes Care for Older People.</th>
</tr>
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<tr>
<td>Evidence level 1+, Grade of recommendation (A)</td>
<td>Screening and early diagnosis may prevent progression of undetected vascular complications:</td>
</tr>
<tr>
<td>Evidence level 1+, Grade of recommendation (A)</td>
<td>Overall improved metabolic control will reduce cardiovascular risk:</td>
</tr>
<tr>
<td>Evidence level 1+, Grade of recommendation (A)</td>
<td>Improved screening for maculopathy and cataracts will reduce visual impairment and blind registrations:</td>
</tr>
<tr>
<td>Evidence level 2++, Grade of recommendation (C)</td>
<td>An integrated approach to management of peripheral vascular disease and foot disorders will reduce amputation rate:</td>
</tr>
</tbody>
</table>

3.1. Aims of care [8-9]

1. The physician should aim to establish a contract between himself/herself and the patient or principal carer in relation to treatment aims and goals of care, designed to optimise patient empowerment at all times. Evidence Level 2++, Grade of recommendation B

2. The decision to offer treatment should be based on the likely benefit/risk ratio of the intervention for the individual concerned, but factors such as vulnerability to hypoglycaemia, ability to self-manage, the presence or absence of other pathologies, the cognitive status, and life expectancy must be considered. Evidence level 2++, Grade of recommendation B

3.2. Education and nutrition [10-14]

1. Structured patient education should be made available to all older people with diabetes. Evidence level 1+, Grade of recommendation B

2. Each educational package should have following elements: based on best principles of adult learning; provided by adequately trained multidisciplinary staff; and provided both individually and as groups; techniques adapted to the special needs of older people. Evidence level 2+, Grade of recommendation C

3. Educational sessions should be accessible to all older people and take into account culture, language, nutritional preferences, ethnicity, disability and geographical factors. Evidence level 2+, Grade of recommendation B.
4. Nutritional assessment is recommended for all older patients with diabetes at the time of diagnosis and regularly thereafter. This will also allow the identification of patients with undernutrition. Evidence level 2++, Grade of recommendation B.

3.3. Screening and diagnosis [15-18]

1. Clinical presentation of diabetes in old age is often asymptomatic and non-specific and clinical diagnosis may be delayed. Evidence level 2++, Grade of recommendation B.

2. In general, screening for and diagnosis of diabetes in older subjects should be in accordance with published international/national criteria and guidelines and no age-modified criteria are currently recognised. Evidence level 1+, Grade of recommendation A.

3. The prevalence and incidence rates of diabetes mellitus in elderly subjects (> 65 years) may be underestimated when using only fasting plasma glucose. Evidence level 1+, Grade of recommendation A.

4. The presence of isolated post-challenge hyperglycaemia (IPH) is common in older subjects and should alert the clinician to screen for cardiovascular disease and institute risk intervention strategies to minimise premature death. Evidence level 1+, Grade of recommendation A.

5. In high-risk older subjects with a normal fasting glucose, and where an OGTT is not feasible, determination of HbA1c may be helpful in the diagnosis of diabetes. A value of HbA1c > 6.5% may indicate the likely presence of diabetes. Evidence level 2++, Grade of recommendation B.

3.4. Prevention and lifestyle change [19-22]

1. In older adults with impaired glucose tolerance (IGT) regular exercise as part of a lifestyle change can reduce the risks of developing type 2 diabetes independently of BMI. Evidence level 2++, Grade of recommendation B.

2. Lifestyle intervention is preferable to treatment with metformin in reducing the risks of type 2 diabetes in non-obese older adults with elevated fasting and post-load plasma glucose levels. Evidence level 1++, Grade of recommendation B.

3.5. Functional evaluation [23-26]

1. Each older patient with type 2 diabetes should have an assessment of their functional status by a multidisciplinary team skilled in evaluation using well-validated assessment tools. Evidence level 1+, Grade of recommendation A. This should be at the time of diagnosis and annually thereafter.

2. Each functional assessment must include a measure of the three major domains of function: global/physical, cognitive and affective. Evidence level 1+, Grade of recommendation A.

3.6. Renal disease [27-30]

1. At the time of diagnosis and annually thereafter, all older people with type 2 diabetes have a measured serum creatinine, an estimated glomerular filtration rate, and an albumin-creatinine ratio undertaken. Evidence level 1+, Grade of recommendation B.

2. In older people with type 2 diabetes who have a raised albumin/creatinine ratio (>2.5 mg/mmol, women; > 3.5 mg/mmol, men), treatment with an ACE inhibitor is recommended – extrapolated data. Evidence level 1+, Grade of recommendation B.

3. In older patients with diabetes and microalbuminuria, maintaining a blood pressure target of 140/80 or less, and a HbA1c range of 6.5-7.5%, may help to reduce the development of chronic kidney disease (CKD). Evidence level 2++, Grade of recommendation B.

4. Specialist review by a nephrologist at an earlier stage of CKD may prevent late referrals of older patients with diabetes for renal replacement therapy and improve outcomes. Evidence level 2++, Grade of recommendation B.

4. Recommendations for treatment

4.1. Managing cardiovascular risk [31-36]

1. At initial assessment, all older patients aged less than 85 years with diabetes should have a cardiovascular risk assessment undertaken. Evidence level 1+, Grade of recommendation A.

2. All older patients with type 2 diabetes aged less than 85 years should have a review and discussion of modifiable cardiovascular risk factors and be offered advice on smoking cessation. Evidence level 2++, Grade of recommendation B.

3. The ten-year risk of developing symptomatic cardiovascular disease should be calculated for all patients who have 2 or more risk factors to assess the need for primary prevention. Evidence level 1+, Grade of recommendation B.

4. There is insufficient evidence at present to routinely recommend low-dose aspirin for older patients with type 2 diabetes for the primary prevention of stroke or cardiovascular mortality. Evidence level 1+, Grade of recommendation A.

5. All older patients with type 2 diabetes, irrespective of baseline cardiovascular risk, should be offered aspirin treatment at a dose of 75-325 mg/d for secondary prevention. Evidence level 2++, Grade of recommendation B.

4.2. Glucose regulation [37-44]

4.2.1. Targets

1. For older patients with type 2 diabetes, with single system involvement (free of other major co-morbidities), a target HbA1c range of 7-7.5% should be aimed for (DCC T
aligned). Evidence level I+, Grade of recommendation A. The precise target agreed will depend on existing cardiovascular risk, presence of microvascular complications, and ability of individual to self-manage.

2. For frail (dependent; multisystem disease; care home residency including those with dementia) patients where the hypoglycaemia risk is high and symptom control and avoidance of metabolic decompensation is paramount, the target HbA1c range should be 7.6-8.5%. Evidence level I+, Grade of recommendation A.

3. For older patients with type 2 diabetes, with single system involvement (free of other major co-morbidities), a fasting glucose range of 6.5-7.5 mmol/l can be regarded as indicating good control. Evidence level 2++, Grade of recommendation B.

4. For frail patients including those residing in care homes, a fasting glucose range 7.6-9.0 mmol/l should minimise the risk of hypoglycaemia and metabolic decompensation. Evidence level 2+, Grade of recommendation C.

4.2.2. Use of oral agents

1. In non-obese older people with diabetes in whom target levels of glucose or HbA1c have failed to be maintained on dietary/lifestyle changes, first line therapy with an insulin secretagogue (normally a sulphonylurea) or metformin should be offered. Evidence level I++, Grade of recommendation A.

2. Metformin should normally be first line therapy for overweight older adults with type 2 diabetes (BMI > 25.0 kg/m²). Evidence level I++, Grade of recommendation A.

3. An insulin secretagogue may be used in combination with metformin in normal or overweight patients where glycaemic targets have not been achieved or maintained. Evidence level I+, Grade of recommendation B

4. In those cases where metformin is contraindicated or not tolerated, an insulin secretagogue may be prescribed. Evidence level I+, Grade of recommendation B.

5. Age per se is not a contraindication to the use of metformin but its use is contraindicated in those with renal impairment (serum creatinine > 130 μlitré), severe coronary, cerebrovascular or peripheral vascular disease. Evidence level 2++, Grade of recommendation B.

6. Glibenclamide should be avoided for newly diagnosed cases of type 2 diabetes in older adults (> 70 years) because of the marked risk of hypoglycaemia. Evidence level I+, Grade of recommendation A.

7. Consider a DPP-4 inhibitor as an add-on to metformin when use of a sulphonylurea may pose an unacceptable hypoglycaemia risk in an older patient with diabetes. Evidence level I+, Grade of recommendation A.

8. In the very obese older patient (age less than 75 years) with type 2 diabetes (BMI > 35) a GLP-1 mimetic (e.g., exenatide, liraglutide) may be considered as 3rd line therapy to metformin and a sulphonylurea. Evidence level 2++, Grade of recommendation B.

4.2.3. Use of insulin

9. When oral agents fail to lower glucose levels adequately, insulin may be given either as monotherapy or in combination with a sulphonylurea or metformin. Evidence level I+, Grade of recommendation A.

10. In older adults with diabetes, the use of pre-mixed insulin and pre-filled insulin pens may lead to a reduction in dosage errors and an improvement in glycaemic control. Evidence level 2++, Grade of recommendation B.

11. Use of a long-acting insulin analogue (e.g. glargine, detemir) rather than NPH-insulin should be considered in older patients who require the assistance of a carer, those residing within a care home, or where there is a defined higher risk of hypoglycaemia. Evidence level I+, Grade of recommendation A.

4.3. Hypoglycaemia

1. All physicians involved in the care of older patients with type 2 diabetes should assess the risk of hypoglycaemia and adjust therapy to minimise this risk. Evidence level I+, Grade of recommendation A.

2. Where the risk of hypoglycaemia is considered moderate (renal impairment, recent hospital admission) to high (previous history, frail patient with multiple co-morbidities, resident of a care home) use an agent with a lower hypoglycaemic potential, e.g. DPP4 inhibitor, lower risk sulphonylurea. Evidence level I+, Grade of recommendation A.

In figure 1, we have presented an algorithm for glucose-lowering for frail older people with diabetes which has attempted to incorporate some of the above evidence-based recommendations but has also simplified the treatment path to avoid unnecessary over-treatment and polypharmacy, and to align more closely with likely treatment targets in a patient with frailty.

4.4. Blood pressure regulation [45-48]

The following decisions are based on the likelihood of reducing cardiovascular risk in older subjects balanced with issues relating to tolerability, clinical factors and disease severity, and targets likely to be achievable with monotherapy and/or combination therapy, and with agreement with primary care colleagues. A lower value of blood pressure should be aimed for in those who are aged less than 80 years and are able to tolerate the therapy and self-manage, and/or those with concomitant renal disease:

1. The threshold for treatment of high blood pressure in older subjects with type 2 diabetes should be 140/80 mmHg or higher present for more than 3 months and measured on at least three separate occasions during a period of lifestyle management advice (behavioural: exercise, weight reduction, smoking advice, nutrition/dietary advice). Evidence level 2++, Grade of recommendation B.
2. In non-frail subjects with diabetes older than 80 years, an acceptable blood pressure on treatment is a systolic of 140-145 mmHg, and a diastolic less than 90 mmHg. Evidence level 1+, Grade of recommendation B.

3. For frail (dependent; multisystem disease; care home residency including those with dementia) patients, where avoidance of heart failure and stroke may be of greater relative importance than microvascular disease, an acceptable blood pressure is <150/90 mmHg. Evidence level 2+, Grade of recommendation C (extrapolated data).

4. In older patients with a sustained blood pressure (≥140/80 mmHg) and in whom diabetic renal disease is absent, first-line therapies can include: use of ACE inhibitors, angiotensin II receptor antagonists, long-acting calcium channel blockers, beta blockers or thiazide diuretics. Evidence level 1+, Grade of recommendation A.

5. In older patients with a sustained blood pressure (≥140/80 mmHg) with microalbuminuria or proteinuria, treatment with an ACE inhibitor or angiotensin II receptor antagonist is recommended. Evidence level 1+, Grade of recommendation B.

6. Use of a perindopril-based regimen in older patients with type 2 diabetes (with or without hypertension) improves both microvascular and macrovascular outcomes. Evidence level 1+, Grade of recommendation A.

4.5. Plasma lipid regulation [49-52]

1. In subjects with no history of cardiovascular disease, a statin should be offered to patients with an abnormal lipid profile if their 10-year cardiovascular risk is >15%. Evidence level 1-, Grade of recommendation A.
2. A statin should be offered to patients with an abnormal lipid profile who have proven cardiovascular disease. Evidence level 1++, Grade of recommendation A.

3. Consider statin therapy in older subjects with diabetes to reduce the risk of stroke as part of secondary prevention of cardiovascular disease. Evidence level 2++, Grade of recommendation B.

4. A fibrate should be considered in patients with an abnormal lipid profile who have been treated with a statin for at least 6 months but in whom the triglyceride level remains elevated (≥2.3 mmol/l). Evidence level 2+, Grade of recommendation C.

5. Recommendations for care home diabetes [53-56]

   1. In view of the high rate of undiagnosed diabetes in care home residents, at the time of admission to a care home, each resident requires to be screened for the presence of diabetes. Evidence level 2++, Grade of recommendation B.

   2. At the time of admission to care home, each resident with diabetes should be comprehensively assessed for the presence of functional loss as they are at higher risk of progression of disability. Evidence level 2+, Grade of recommendation B.

   3. Residents on insulin secretagogues and/or insulin must be regularly reviewed for the presence of hypoglycaemia and be given instruction on how to provide prompt treatment

   4. As part of the assessment of older newly-diagnosed patients with hypertension, investigations to exclude secondary causes must also be considered, e.g. renovascular causes, hypothyroidism

   5. In patients with type 2 diabetes and a recent acute stroke (within 4 weeks), consideration should be given to an active treatment approach of raised blood pressure and lipids, vascular prophylaxis with anti-platelet therapy (aspirin), and optimising blood glucose control to reduce the rate of recurrent stroke

6. Recommendations in special categories

6.1. Diabetic foot disease [57-59]

   1. All older patients with type 2 diabetes should receive foot care education and instruction to self-inspect by suitable health care professionals. Evidence level 1++, Grade of recommendation A.

   2. All older patients with type 2 diabetes should receive an annual (minimum frequency) inspection (including vascular and neurological examination) of their feet by a health care professional to detect risk factors for ulceration. Evidence level 2+, Grade of recommendation C.

   3. Use of a 10-g monofilament or test of pin-prick sensation can be used to identify loss of protective sensation in older patients with diabetes. Evidence level 2++, Grade of recommendation B.

   4. All older people with diabetes at high risk of foot ulceration should be referred to a foot protection team. Evidence level 2++, Grade of recommendation B.

6.2. Cognitive impairment and low mood states [60-66]

   1. At the time of diagnosis and at regular intervals thereafter, patients aged 70 years and over should be screened for the presence of cognitive impairment using an age- and language-validated screening tool such as the MiniMental State Examination score. Evidence level 2++, Grade of recommendation B.

   2. Regular screening for cognitive impairment and mood disorder is recommended for residents with diabetes who are at high risk of undetected disease. Evidence level 2+, Grade of recommendation B.

   3. Optimal glucose regulation may help to maintain cognitive function in older people with type diabetes. Evidence level 1+, Grade of recommendation A.

   4. Optimal blood pressure regulation should be aimed for to help to maintain cognitive performance and improve learning and memory. Evidence Base 2++, Grade of recommendation B.

   5. Prevention of repeated hypoglycaemia in older patients with diabetes may decrease the risk of developing cognitive impairment or dementia. Evidence level 2++, Grade of recommendation B.

Good clinical practice

- Where insulin secretagogues and/or insulin is prescribed, patients (and carers) must be aware of how to recognise the symptoms of hypoglycaemia and be given instruction on how to provide prompt treatment

- As part of the assessment of older newly-diagnosed patients with hypertension, investigations to exclude secondary causes must also be considered, e.g. renovascular causes, hypothyroidism

- In patients with type 2 diabetes and a recent acute stroke (within 4 weeks), consideration should be given to an active treatment approach of raised blood pressure and lipids, vascular prophylaxis with anti-platelet therapy (aspirin), and optimising blood glucose control to reduce the rate of recurrent stroke

Good clinical practice in care homes

- Each resident should have an annual screen for diabetes

- Each resident with diabetes should have an individualised diabetes care plan with the following minimum details: dietary plan, medication list, glycaemic targets, weight, and nursing plan.

- Each care home with diabetes residents should have an agreed Diabetes Care Policy or Protocol which is regularly audited.

- In larger care homes (>30 beds), access by suitable care home staff to a diabetes education and training course should be available.

- All residents with diabetes require a risk-benefit analysis in terms of medication used, metabolic targets agreed, and extent of investigation of diabetes-related complications.

- Clinical decision making for residents with diabetes by the community diabetes team must be based on the principles of enhancing quality of life, maintaining functional status, and avoiding hospital admission for diabetes-related complications.

- Optimal glucose regulation may help to minimise symptoms of mood disorder in patients with depression and assist in adherence to treatment.

- At the time of diagnosis and at regular intervals thereafter, older patients with diabetes should be screened for the presence of low mood disorder using an age- and language-validated screening tool such as the Geriatric Depression score.
6.3. Visual loss and erectile dysfunction [67-72]

1. At the time of diagnosis and at regular intervals thereafter all older people with type 2 diabetes should be asked about symptoms of persistent pain and offered prompt and appropriate treatment when it is present. Evidence level 2++, Grade of recommendation B.

6.4. Peripheral arterial disease [81-84]

1. In view of the high prevalence of asymptomatic disease in older patients with diabetes, evaluation by ABI (ankle-brachial index) is recommended. Evidence level 2++, Grade of recommendation B.

2. ABI can be used to predict functional status and when combined with the Framingham score can predict risk of cardiovascular events. Evidence level 2++, Grade of recommendation B.

3. The use of ABI in detecting peripheral disease in older patients is recommended as a cost-effective tool. Evidence level 2++, Grade of recommendation B.

7. Other good clinical practice points

• Healthcare providers should address the following issues in older patients with diabetes and their carers:
  – The need for well structured shared care protocols with agreements on management of new cases, hospital admission criteria, access to specialist services, and follow-up criteria.
  – To avoid excessive carer burden, support is available in the areas of education, access to medical and nursing care, financial assistance, transport facilities and networking with other carers and support groups.
• A clinical (multidisciplinary) audit cycle can be adopted as a protocol for quality development and evaluating performance of a validated Diabetes Management System (DMS).

• DMS-related outcomes for older people must include clinical (e.g. rates of hospitalisation, amputation, cardiovascular mortality, and hypoglycaemia), metabolic, preventative, functional, health-related quality of life, and process-based (e.g. annual review, % referral rate to vascular surgeons) indicators.

• An agreed diabetes minimum data (MDS) set provides a consistency of approach to evaluating patients and facilitates the interpretation of randomised clinical trials of interventions.

Acknowledgment

Supported by RETICEF (Red Temática de Investigacion Cooperativa envejecimiento y Fragilidad) (RD06/0013), Instituto de Salud Carlos III, Ministerio de Ciencia e Innovación, Spain and Institute for Diabetes in Old People (IDOP), UK.

Conflicts statement of interest

No potential conflicts of interest relevant to this article have been reported by any of the authors.

Key References by section

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Aims of care


Education and nutrition


Screening and diagnosis


Prevention and lifestyle change


Functional evaluation


Renal disease

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Visual loss and erectile dysfunction


Peripheral neuropathy and pain