Association of British Clinical Diabetologists

Managing Frailty and Associated CoMorbidities in Older Adults with Diabetes: *A Position Statement on behalf of the Association of British Clinical Diabetologists (ABCD)*

Alan Sinclair and Alison Gallagher

Mobility limitation in diabetes: use of risk scores in the *All Wales Research in the Elderly Study (AWARE) 2008*

Older diabetics at risk of physical disabilities

Fri Feb 22, 2008 11:38pm GMT

NEW YORK (Reuters Health) - Elderly people with diabetes may be at heightened risk of physical limitations that could hinder their independence, a new study suggests.
British researchers found that among more than 800 adults age 65 or older, those with diabetes were more likely to have problems with walking and performing daily tasks like bathing, climbing stairs and dressing.

REUTERS

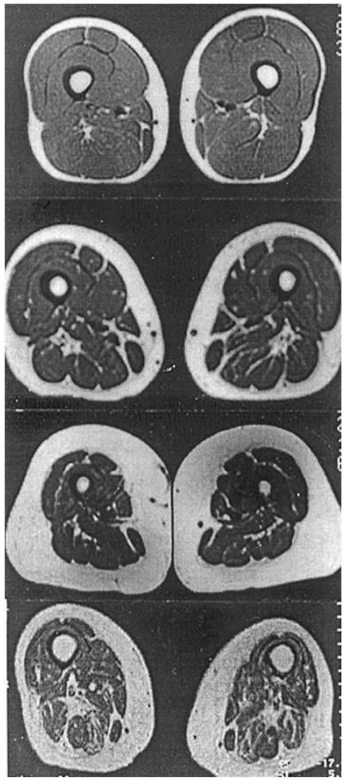
Results

- **Use of a mobility aid as marker of perceived mobility limitation**
- Controlling for age, hypertension, CVA, COPD, cancer, OA and dementia, ***diabetes*** remains significantly associated with mobility limitation: OR 2.1 (1.5-2.83), P<0.001
- A predictive model for mobility limitation was used to interpret risk scores for each patient, based on assigning 1 point each for the above controlling factors (with weighting for age)
- A cut-off score ≥ 3 correctly identified 65% of those with mobility limitation (sensitivity,53.3%; specificity, 75.4%)

Diabetes Care

Sinclair AJ, Conroy SP, Bayer AJ: Impact of diabetes on physical function in older people. Diabetes Care. 2008 Feb;31(2):233-5

Age-related loss of muscle mass - sarcopaenia



31 yrs (M)

66 yrs (M)

73 yrs (F

85 yrs (M

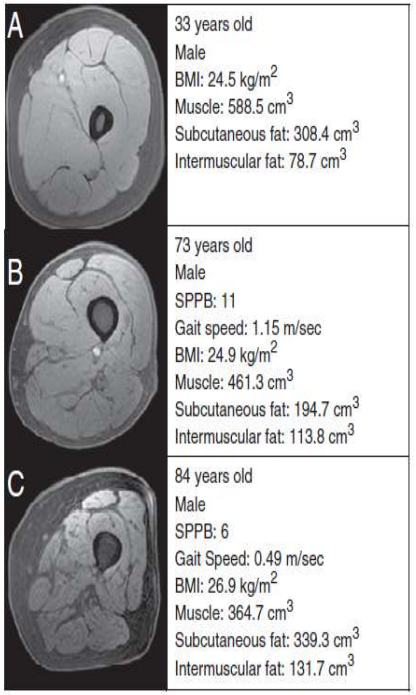
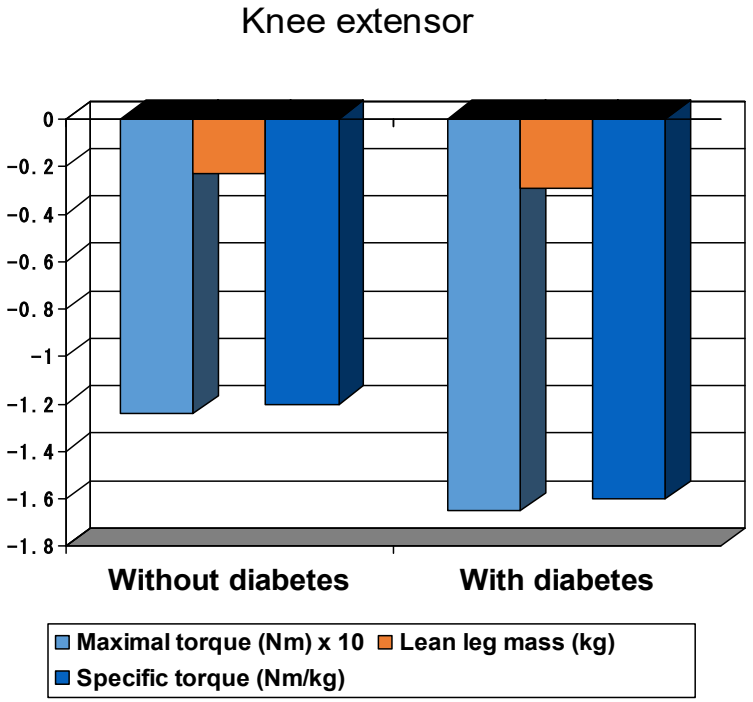


Fig. 1. Representative magnetic resonance images of the femoral region collected at 3T from A) young B) high-functioning older, and C) low-functioning older study groups.

Vandervoort
Muscle and Nerve 25, 2002)

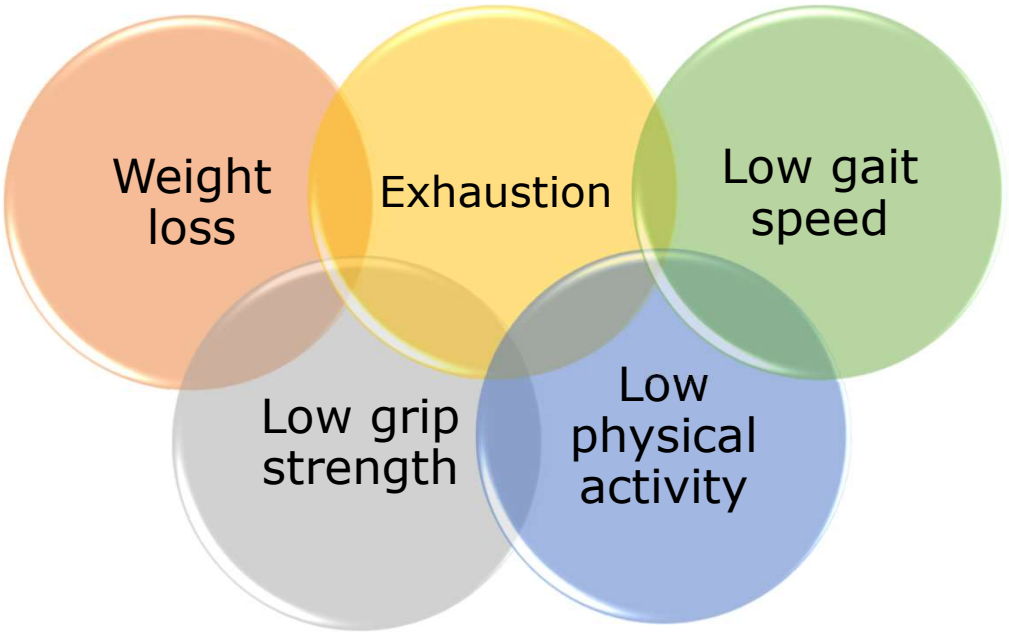
Buford et al,
Exp. Gerontol, 2012

Diabetes-related accelerated loss of muscle and strength – Park SW et al, Ageing, & Body Composition (ABC) Study 2007



1,840 older adults aged 70-79 years measured at baseline and 3 years

Emerging Concepts of Frailty – A multisystem impairment associated with increased vulnerability to stressors



FRIED Phenotypic Model (Fried L et al, 2001)

Score

0–1 = Not frail
2 = Pre-frailty
3–5 = Frailty

Cumulative Deficit Model of Frailty: derivation of the Electronic Frailty Index

Rockwood K et al, 2007

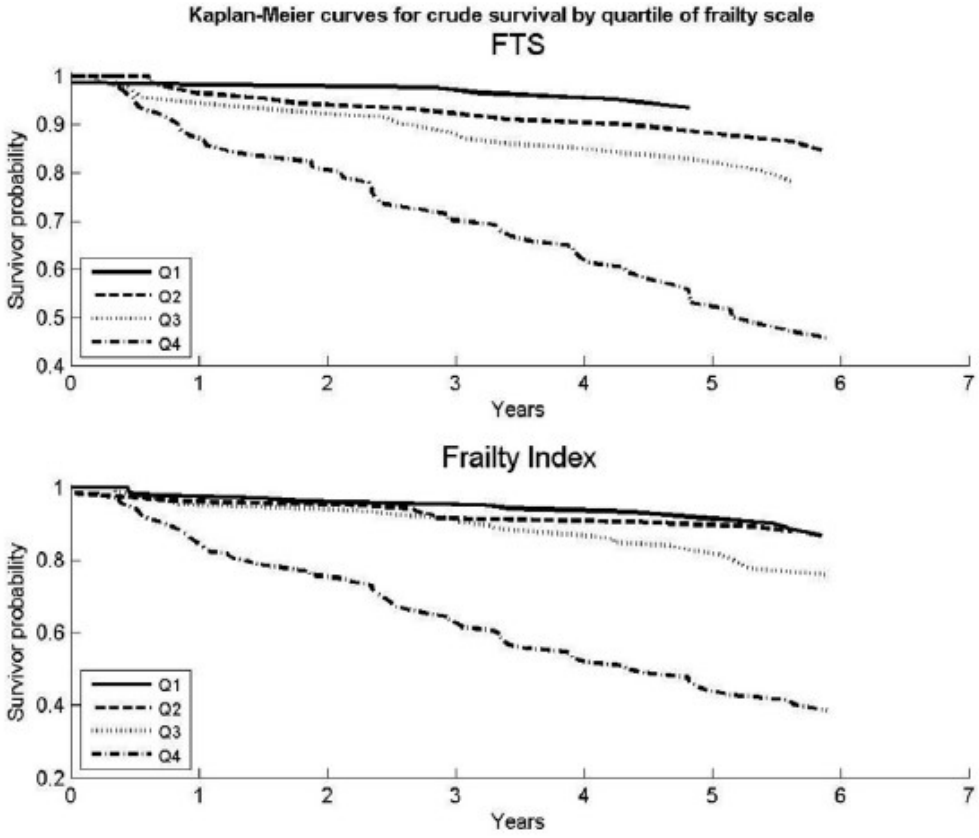
- The eFI consists of 36 deficits which have been constructed using around 2,000 primary care Read codes
- The eFI calculates a frailty score by dividing the number of deficits present by the total possible: uses 36 validated deficits
- The score is a robust predictor of those who are at greater risk of adverse outcomes: *an eFI > 0.36 have a six-fold increased risk of admission to a care home in the next 12 months and a five-fold increased mortality risk, compared to fit older people*

Clegg A et al, 2016

Frailty Status predictive of Adverse Outcomes and Increased Mortality

	Hazard ratios* Estimated over 3 years
	Frail
Incident fall	1.29
Worsening mobility	1.50
Worsening ADL disability	1.98
First hospitalisations	1.29
Death	2.24

Cardiovascular Health Study
Fried L et al, 2001; *p≤0.05



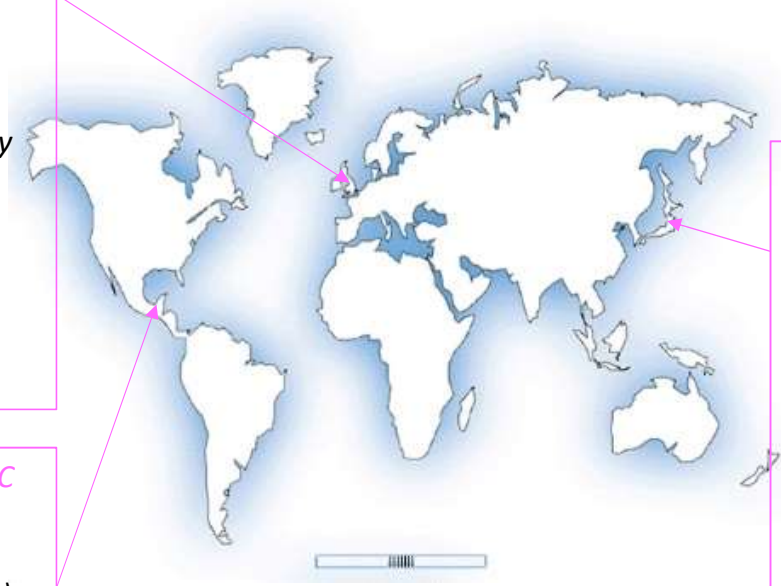
Survival Probability in the Toledo Cohort Study, Spain; n = 1825 non-instit people >65y (20% with diabetes) (Castro-Rodriguez M et al, 2016

Diabetes and related risk factors for Frailty:

The Mexican Health and Nutrition Survey, Japanese Cross-Sectional Survey, and Whitehall II Studies

***Whitehall* II Prospective Study 2013** *Bouillon K et al*
2707 civil servants, 45-69y and free of diabetes at baseline followed for 10.5y
2.8% frail and 37.5% prefrail;
Elevated diabetes risk scores (Cambridge & Finnish) more likely to be associated with the development of both diabetes and frailty
Developing diabetes, increased age, being female, stopping smoking, low physical activity, and not having a daily consumption of fruits and vegetables all associated with an increased risk of frailty

Mexican Health and Nutrition Survey 2016 *Castrejon-Perez RC et al*
7164 people mean age (SD) 71 (8y)
An independent association between diabetes (22% of sample), hypertension (37% of sample) or both conditions (coefficients 0.28, 0.4 and 0.63, respectively, P < 0.001) with frailty
Any ***diabetic complication was significantly associated with frailty with a coefficient of 0.55 (95% CI 0.45–0.65, P < 0.001)***



Japanese Community Survey 2016 *Lee S et al*
9606 people >65 y
An eGFR of <30.0 mL/min/1.73 m^2 - increased risk of frailty (OR,1.90, 95% CI , 1.01-3.59).
Individually/in combination: diabetes and hypertension increased the risk of frailty (combination: OR, 3.67, 95% CI 1.13-14.1

Frailty and Diabetes – a timely initiative in Primary Care: *work from a National Stakeholder Group 2018*

DIABETICMedicine

DOI: 10.1111/dme.13644

Review Article

Type 2 diabetes mellitus in older people: a brief statement of key principles of modern day management including the assessment of frailty. A national collaborative stakeholder initiative

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[1]Diabetes and Vascular Research Centre, University of Exeter Medical School, Medical Academic Staff Committee, Lead Physician, Academic Department of Healthcare for the Older Person, Royal Devon and Exeter Hospital Trust, and British Medical Association Medical Academic Staff Committee, [2]Secretary, British Geriatrics Society Special Interest Group in Diabetes, and University of Exeter Medical School, [3]General Practitioner, Hedon Group Practice, East Yorkshire, and Clinical and Prescribing Policy Lead, British Medical Association GP Committee, [4]National Clinical Deputy Director for Diabetes, NHS England, [5] National Clinical Director for Obesity & Diabetes, NHS England and Imperial College London and [6]Association of British Clinical Diabetologists and Director, Foundation for Diabetes Research in Older People, Diabetes Frail Ltd

Accepted 4 April 2018

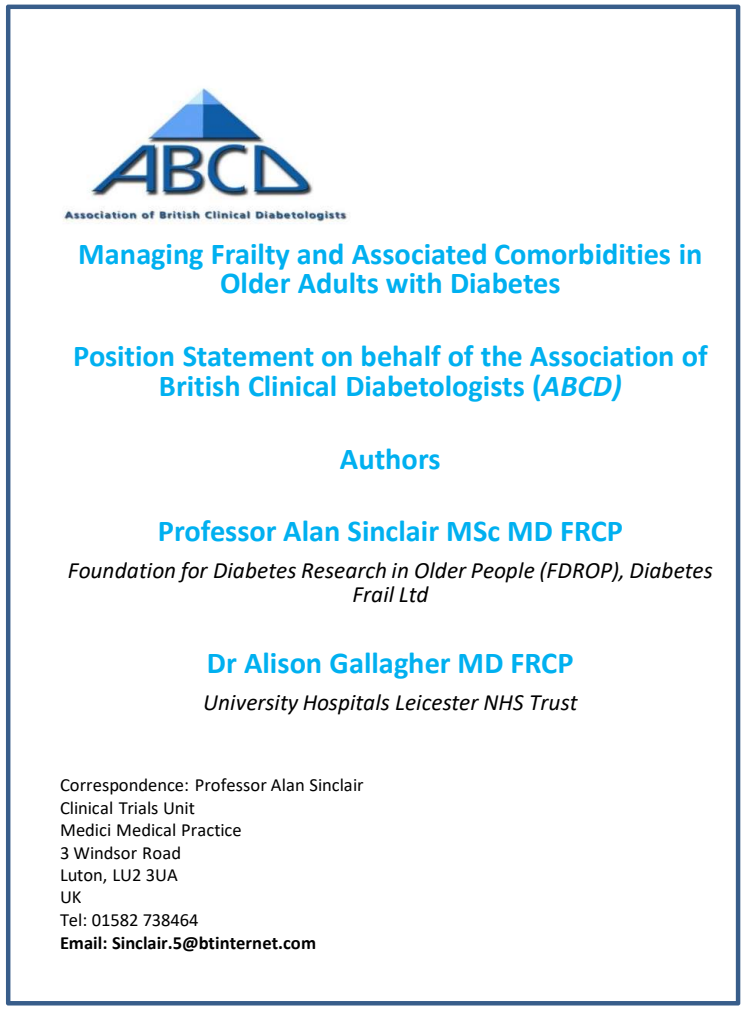
Abstract

Rates of population ageing are unprecedented and this, combined with the progressive urbanization of lifestyles, has led to a dramatic shift in the epidemiology of diabetes towards old age, particularly to those aged 60–79 years. Both ageing and diabetes are recognized as important risk factors for the development of functional decline and disability. In addition, diabetes is associated with a high economic, social and health burden. Traditional macrovascular and microvascular complications of diabetes appear to account for less than half of the diabetes-related disability observed in older people. Despite this, older adults are under-represented in clinical trials. Guidelines from organizations such as the National Institute for Health and Care Excellence (NICE), the European Association for the Study of Diabetes, and the American Diabetes Association acknowledge the need for individualized care, but the glycaemic targets that are suggested to constitute good control [HbA_{1c} 53–59 mmol/mol (7–7.5%)] are too tight for frail older individuals. We present a framework for the assessment of older adults and guidelines for the management of this population according to their frailty status, with the intention of reducing complications and improving quality of life for these people.

Diabet. Med. 35, 838–845 (2018)

Key Actions

- A clinical framework for diabetes in older people has been developed as part of a national stakeholder initiative
- The key priorities for promoting high quality individualised and safer care are stated
- The importance of promoting diabetes care pathways in primary and secondary care have been emphasised



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- ❑ **Definition, diagnosis and assessment of frailty**
- ❑ **Glucose regulation and glucose-lowering therapies**
- ❑ **Avoiding and managing hypoglycaemia**
- ❑ **Use of lipid-lowering agents**
- ❑ **Blood pressure management**
- ❑ **Strategies to avoid hospital admission due to hypoglycaemia**
- ❑ **Exercise interventions**
- ❑ **Clinical audit in frailty**

Methodology

- Frailty is common in older adults with diabetes: 32-48% adults aged over 65 with diabetes[1]
- Lack of evidence to guide clinical practice recommendations
  - 1.4% of clinical trials recruit older adults[2]
  - Very few clinical trials involving older patients with both diabetes and frailty
  - Extrapolation of evidence from clinical studies in younger adults with diabetes is not possible
- Much guidance represents best practice consensus viewpoints

1. Morley JE et al. J Am Med Dir Assoc. 2014;15(12):853-9
2. Cruz-Jentoft AJ et al. Eur Geriatr Med. 2013;4:102–105.

Key Principles of Position Statement

- Early detection of frailty

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- Individualised goals of care with appropriate and clinically meaningful aims of treatment

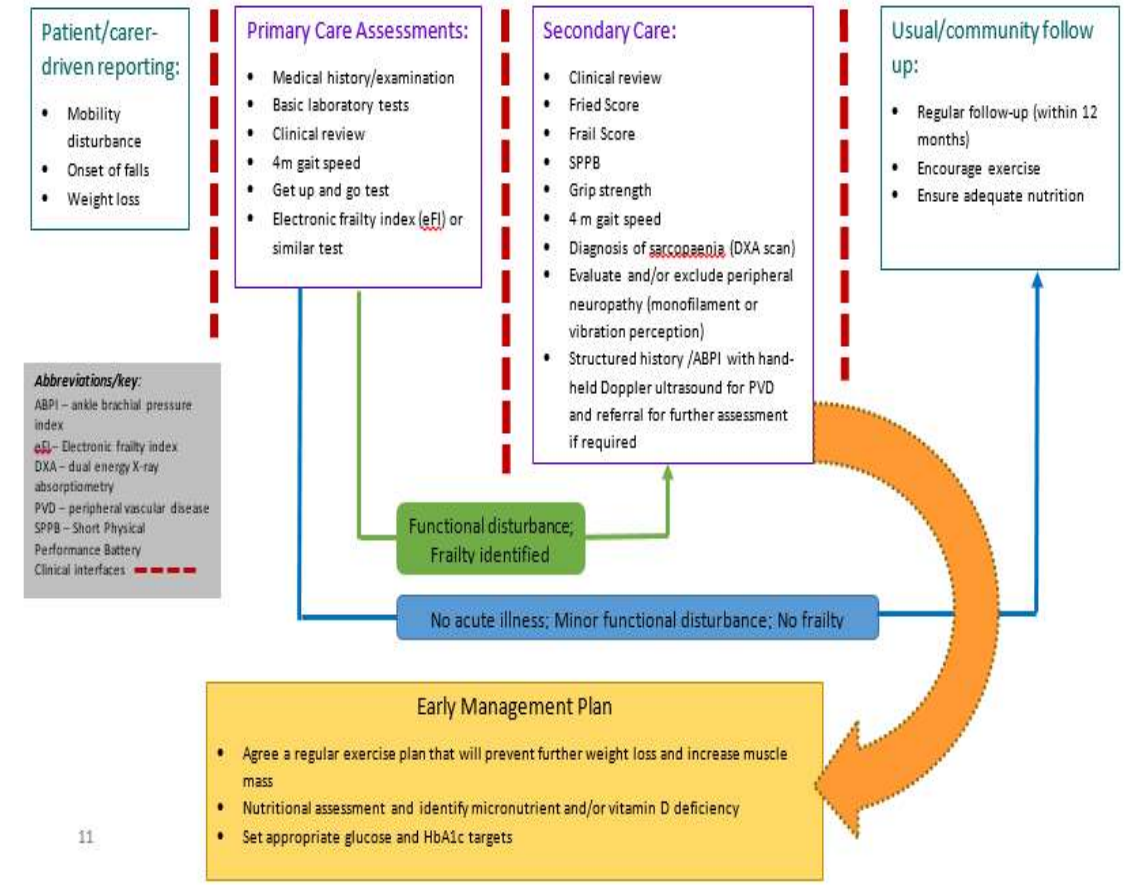
Key Principles of Position Statement

Individualised goals of care incorporating functional status, comorbidity and life expectancy

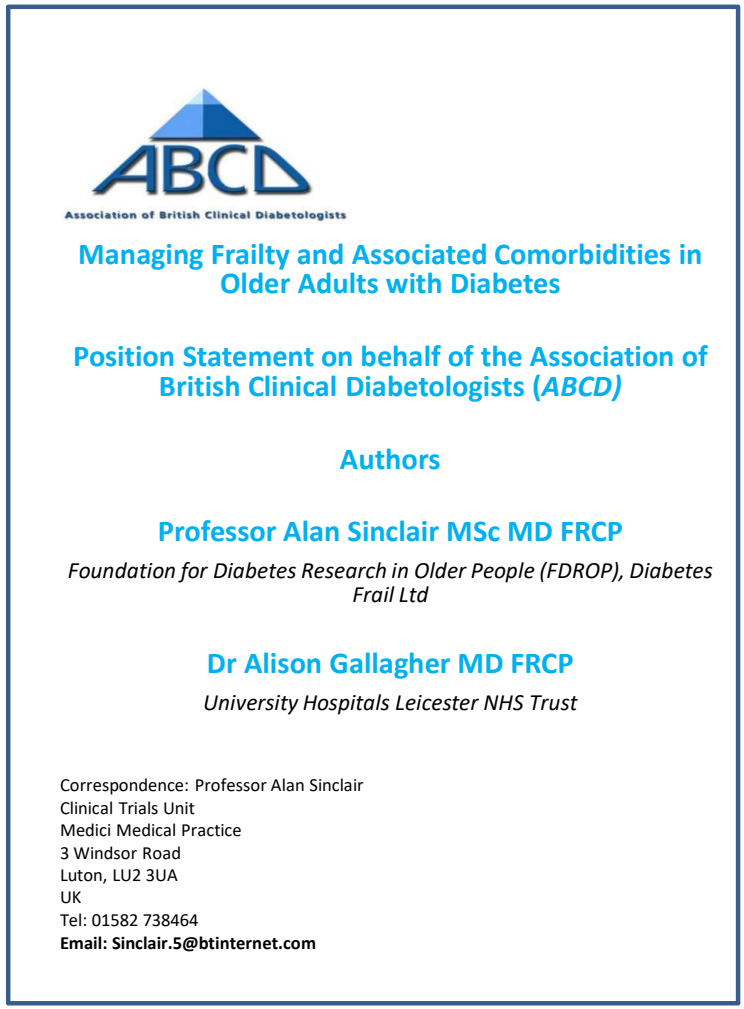
Key Principles of Position Statement

- Early detection of frailty
- Individualised goals of care with appropriate and clinically meaningful aims of treatment
- An emphasis on medicine management to prevent overtreatment
- A clear focus on patient safety incorporating avoidance of hypoglycaemia and avoidance of hospital/emergency dept admissions
- The promotion of local interdisciplinary diabetes care teams to develop specific care pathways for frail older people with diabetes

ABCD Frailty Assessment Pathway in Diabetes



Based on: Strain WD, Hope SV, Green A, Kar P, Valabhji J, Sinclair AJ. Diabetic Med 2018; Sinclair AJ, Abdelhafiz A, Forbes A, Munshi M, Diabetic Med 2018 (In press)



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Individualised Glycaemic Goals

Mild to moderate frailty:

7-8.0% (53-64mmol/mol)

Moderate to severe frailty:

7.5-8.5%(59-69 mmol/mol)[1]

Sinclair AJ et al. J Frailty Aging 2018; 7: 10–20

Glucose Regulation in Frail, Older People with Diabetes

- Glucose-lowering medication should have a low risk of hypoglycaemia
- “Start low and go slow” when undertaking dose titration
- Avoidance of sulphonylureas
- Less complex insulin regimens

Association of British Clinical Diabetologists

	HbA1c reduction	Advantages	Disadvantages	Vignette in Frail Population
Metformin	1% (11 mmol/mol)	Low hypoglycaemia risk Low cost Well tolerated generally	Many contraindications in population with high comorbidity burden May cause weight loss, GI upset in frail patients	Can be used until eGFR <30 ml/min Use with caution if previous episode of acute kidney injury Extended release formulation has lower complexity and fewer GI side effects Assess and replace vitamin B12
Sulphonyureas	1% (11 mmol/mol)	Low cost Established glucose-lowering medication Can be used in moderate to severe renal impairment	High risk of hypoglycaemia Avoid glibenclamide (glyburide)	Avoid in patients with inconsistent eating pattern such as in advanced dementia and *malignancy* *High risk of hypoglycaemia during acute* illness or weight loss Consider discontinuing if already receiving substantial amount of insulin (approximately >40 units/day) Have a high threshold for use with insulin in frail older adults
Meglitinides	0.4-0.9% (4.4-9.9 mmol/mol)	Shorter duration of action compared with sulfonylurea	Higher cost than sulfonylurea Increased regimen complexity due to multiple daily doses with meals	Can be withheld if patient refuses to eat any particular meal
TZDs, Pioglitazone	1% (11 mmol/mol)	Low hypoglycaemia risk Low cost Once a day dosing Can be used in moderate to severe renal impairment	Many contraindications in population with high comorbidity burden such as CHF, leg edema, anemia, fractures Use with caution in combination with insulin	Good efficacy in older patients with high insulin resistance
DPP-4 inhibitors	0.5-0.8% (6-9 mmol/mol)	Low hypoglycaemia risk Once a day oral medication Well tolerated Can be used in renal impairment but dose adjustment required (except linagliptin)	Medium / high cost HbA_{1c} reduction modest compared to other agents Potential risk of heart failure in at risk individuals	Can be combined with basal insulin for a low complexity regimen
SGLT-2 inhibitors	0.8-1.0% (9-11 mmol/mol)	Low hypoglycaemia risk Reasonable efficacy Risk of other adverse effects moderate Diuretic, blood pressure lowering effect	High cost Limited experience in older population but evidence increasing Low risk of diabetic ketoacidosis which may be euglycaemic and unrecognised	In frail adults, watch for increased urinary frequency, incontinence, lower BP, genital infections, dehydration; do not initiate if eGFR is <60 ml/min; dose reduction required in the presence of renal impairment Withhold SGLT-2 inhibitors at times of acute illness or major surgery
GLP-1 receptor agonists	0.8-1.0% (9-11 mmol/mol)	Low hypoglycaemia risk Once a day and once a week formulation New formulations available in combination with basal insulin	High cost Injectable Gastrointestinal side effects	Monitor for anorexia, weight loss; do not use in severe renal impairment (eGFR <30 ml/min); dose reduction needed in moderate impairment (except for Liraglutide and Dulaglutide) Once weekly formulations may be helpful if carer support is necessary to deliver injectable therapy
Insulin	> 1% (> 11 mmol/mol)	No ceiling effect Many different types including high concentrated forms have variable serum half-life and can be used to target hyperglycaemia at different times of the day; can be used in renal impairment	High risk of hypoglycaemia Need for matching carbohydrate content in patients with variable appetite when using prandial insulin Carer education and training needed if involved in administration Blood glucose testing necessary adding to cost	Use of basal insulin with other agents to lower post-prandial glucose can lower complexity of management and reduce the risk of hypoglycaemia

Avoiding and Managing Hypoglycaemia

- In older adults hypoglycaemia is defined as a blood glucose level of 4mmol/L or less
- Hypoglycaemia is common but under-reported in older people due in part to impaired counterregulatory responses
- Hypoglycaemia has added potential to cause harm in older people particularly if severe
  - Falls, fractures, hospital admission
  - Associated with increased CV events and mortality
  - Accelerated cognitive decline[1]
- Recurrent hypoglycaemia is a risk factor for frailty especially if associated with hospital admission[2]

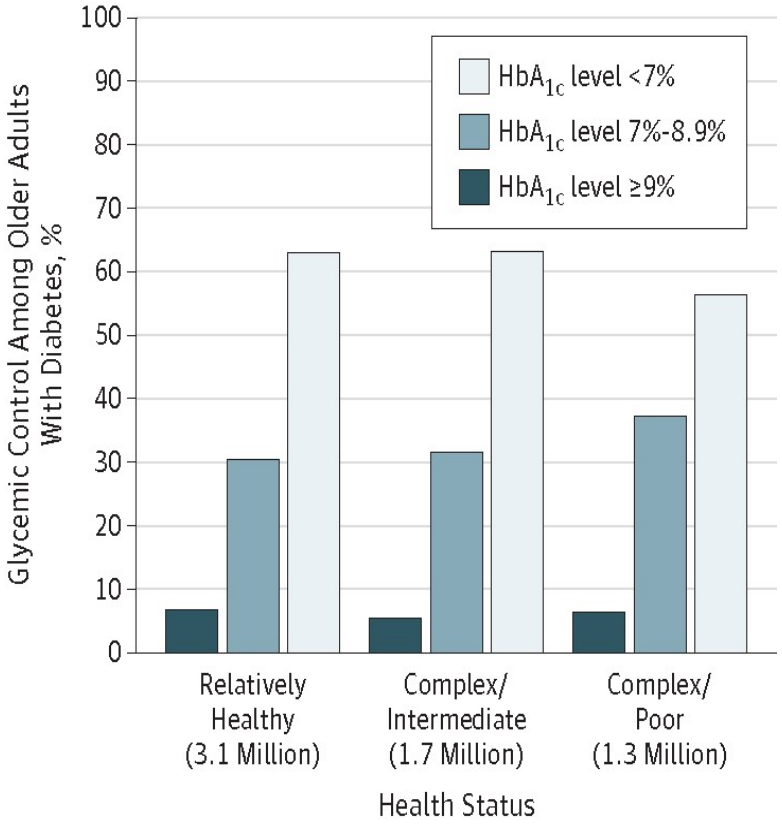
1. Feinkohl I et al. Diabetes Care 2014; 37:507–15
2. Abdelhafiz AH et al. Aging Dis. 2015; 6:156–167

Avoiding and Managing Hypoglycaemia

- Risk factors for hypoglycaemia in older people include
  - Cognitive impairment
  - Renal impairment
  - Presence of multiple co-morbidities
  - Duration of diabetes
  - Treatment with insulin or sulphonylureas

- **An HbA_{1c} of 7% (53mmol/mol) or less is likely to indicate overtreatment of hyperglycaemia in frail older adults with diabetes**

Potential Overtreatment of Diabetes Mellitus in Older Adults With Tight Glycaemic Control



Lipska KJ et al. JAMA Intern Med. 2015;175(3):356-362

Avoiding and Managing Hypoglycaemia

- **Deintensification** describes the simplification of blood glucose lowering regimens to achieve an individualised HbA_{1c} goal with a reduced risk of hypoglycaemia

- This process might incorporate the use of blood glucose therapies with lower hypoglycaemic potential than sulphonylurea and insulin treatment or a switch from an intensive insulin regimen to basal insulin

Management of Dyslipidaemia in Frail Older Adults with Diabetes

- Lipid profile should be included in the assessment of older people with diabetes
- Other secondary causes of dyslipidaemia should be excluded including primary hypothyroidism and liver disease
- Diet and lifestyle interventions may not be possible
- All older people with diabetes are considered at high cardiovascular risk and statin therapy should be considered to improve cardiovascular outcome provided this is clinically appropriate
- Fibrate therapy is not recommended unless there is marked hypertriglyceridaemia[1]

1. Ginsberg HN et al. N Engl. J. Med. 2010;362:1563-1574.

Statins for primary prevention of cardiovascular events and mortality in old and very old adults with and without type 2 diabetes: retrospective cohort study

Rafel Ramos,[1,4] Marc Comas-Cufí,[1,2] Ruth Martí-Lluch,[1,3] Elisabeth Balló,[1,4] Anna Ponjoan,[1,3] Lia Alves-Cabratosa,[1,2] Jordi Blanch,[1,2] Jaume Marrugat,[5,6] Roberto Elosua,[5,6] María Grau,[5,6] Marc Elosua-Bayes,[1,2] Luis García-Ortiz,[7] Maria Garcia-Gil[2,4]

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Additional material is published online only. To view please visit the journal online.

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ABSTRACT

OBJECTIVE

To assess whether statin treatment is associated with a reduction in atherosclerotic cardiovascular disease (CVD) and mortality in old and very old adults with and without diabetes.

DESIGN

Retrospective cohort study.

SETTING

Database of the Catalan primary care system (SIDIAP), Spain, 2006-15.

PARTICIPANTS

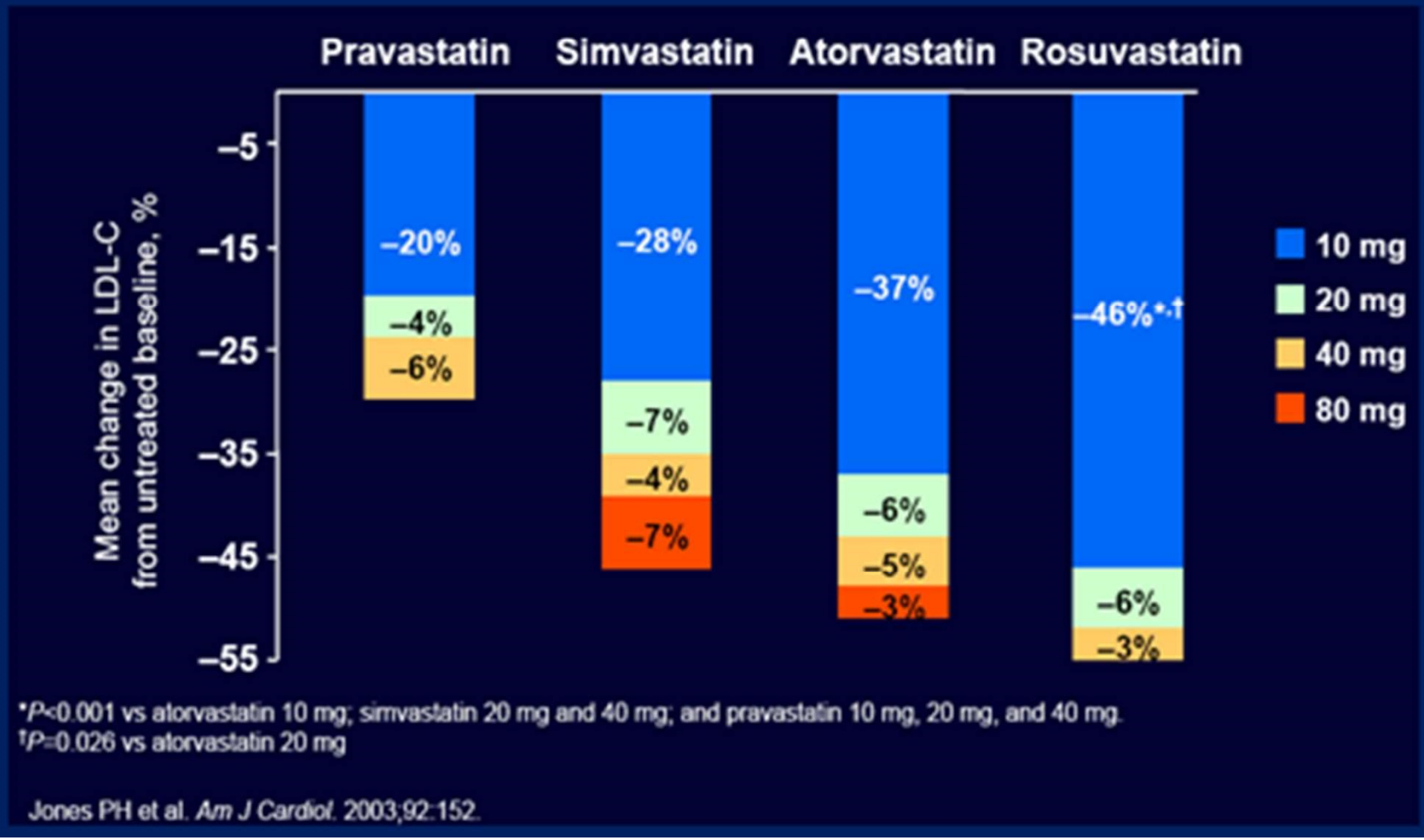
46 864 people aged 75 years or more without clinically recognised atherosclerotic CVD. Participants were stratified by presence of type 2 diabetes mellitus and

for statin use in 75-84 year olds were 0.94 (95% confidence interval 0.86 to 1.04) for atherosclerotic CVD and 0.98 (0.91 to 1.05) for all cause mortality, and in those aged 85 and older were 0.93 (0.82 to 1.06) and 0.97 (0.90 to 1.05), respectively. In participants with diabetes, the hazard ratio of statin use in 75-84 year olds was 0.76 (0.65 to 0.89) for atherosclerotic CVD and 0.84 (0.75 to 0.94) for all cause mortality, and in those aged 85 and older were 0.82 (0.53 to 1.26) and 1.05 (0.86 to 1.28), respectively. Similarly, effect analysis of age in a continuous scale, using splines, corroborated the lack of beneficial statins effect for atherosclerotic CVD and all cause mortality in participants without diabetes older than 74 years. In participants with

Statin Myopathy in Older Adults

- Statin myopathy is more common in older people due to sarcopenia
- Dose dependent
- Myalgia may improve with Vitamin D correction
- Low or moderate doses of statins are recommended in frail older people

Initial treatment gives the biggest LDL reduction



*P<0.001 vs atorvastatin 10 mg; simvastatin 20 mg and 40 mg; and pravastatin 10 mg, 20 mg, and 40 mg.
†P=0.026 vs atorvastatin 20 mg

Jones PH et al. *Am J Cardiol.* 2003;92:152.

Summary

- Frailty is common in older people with diabetes
- Early detection of frailty is important to prevent disability and optimally manage hyperglycaemia and associated comorbidities
- Individualised treatment goals are essential in the medical management of frail older people
- Overtreatment is common and requires deintensification to prevent harm
- Statin therapy is beneficial in older patients with diabetes up to the age of 85