Comorbidities, Frailty and Cognitive Dysfunction in Older People with Diabetes – *A Challenge to Effective Care*

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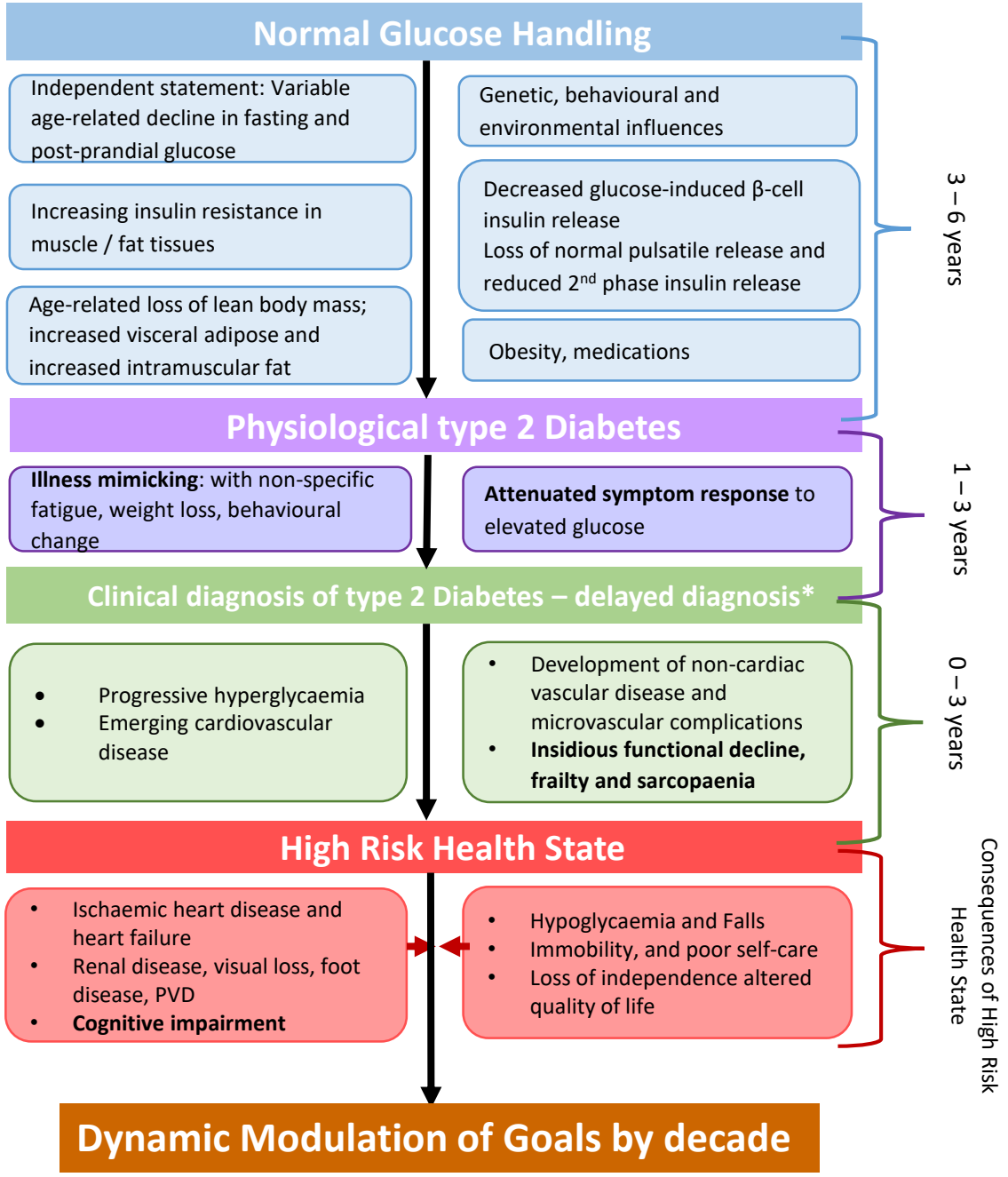
There are no conflicts of interest in preparing or presenting this lecture. *October 3rd 2019*

Professor Alan Sinclair

Diabetes in Older Adults – a High Risk Health State



Sinclair AJ, Abdelhafiz A, Forbes A, Munshi M, Diabetic Med 2018

Diabetes Mellitus – has a comparable co-morbidity profile to other high impact conditions

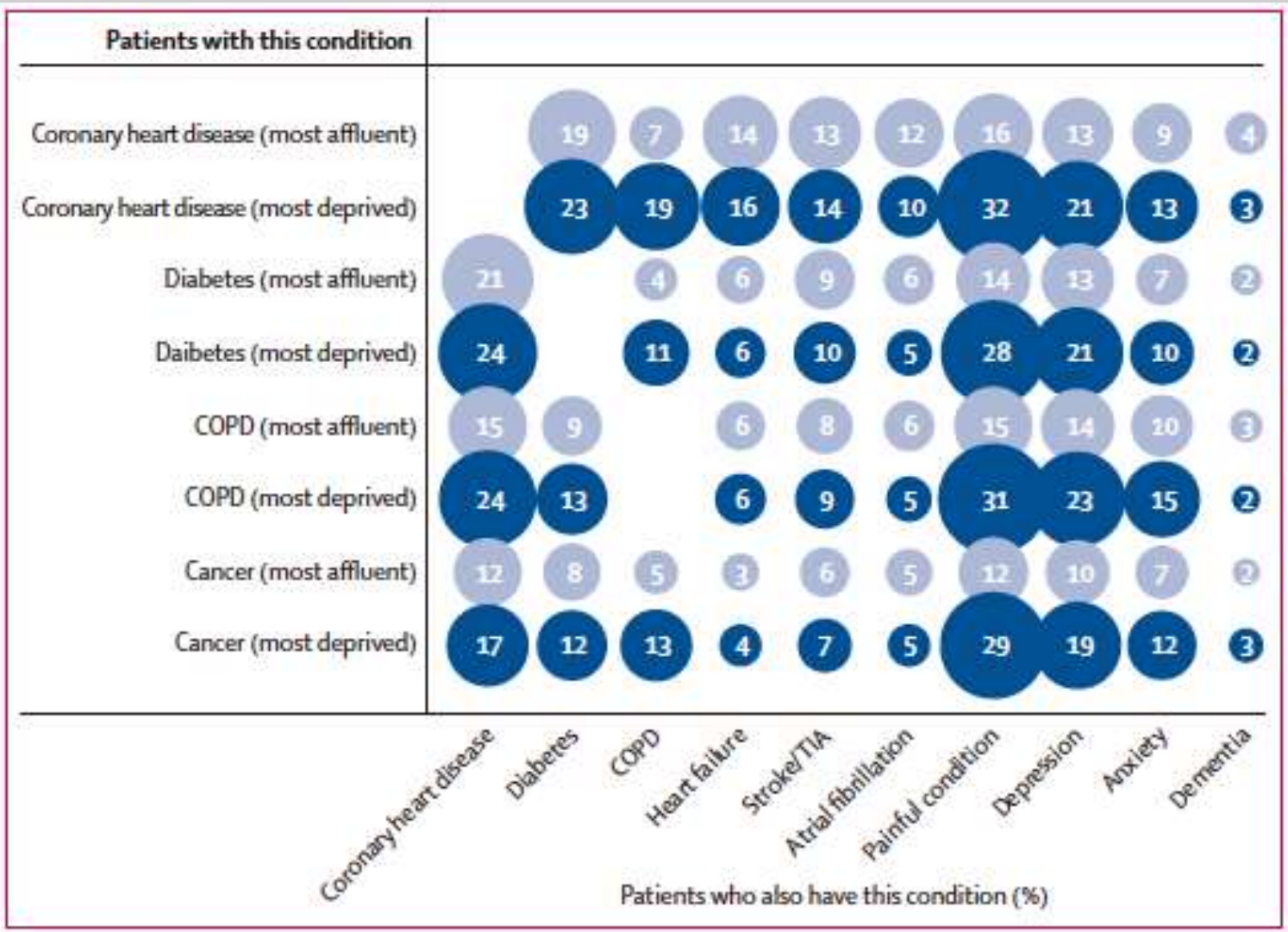


Figure 4: **Selected comorbidities in people with four common, important disorders in the most affluent and most deprived deciles**

Why both a Comorbid and MultiMorbid State are important influences in achieving optimal Diabetes Care

Definitions

- A **comorbidity** is a disease or condition that coexists with a primary disease but also stands on its own as a specific disease. The conditions may be physical or mental in nature
- With two or more comorbidities, the term **multimorbidity** is used, especially if it isn't clear as to which is the primary condition or index condition.
- Multimorbidity means that multiple chronic or acute diseases and medical conditions are present within one person, without designating one as the primary condition.
- In the United States, about 80% of Medicare Funding is for older adults that have 4 or more chronic conditions

Why Important?

- 40% of adults with diabetes have 3 or more comorbidities
- Failure to address the treatment of comorbidities may lead to ineffective control of diabetes-specific risk factors or lead to suboptimal glucose-lowering
- Some comorbidities may have greater urgency of care, influence outcomes more dramatically than diabetes, and have a greater impact on the individual
- Comorbidities may influence negatively the ability of individuals with diabetes to self-care
- Clinicians need to tailor goals to take into account the comorbidity profile – individualised care
- Effective comorbidity management is expensive and time consuming – how/where is it best managed?

Maddigan SL et al, Qual Life Res, 2005; Piette JD & Kerr EA, Diabetes Care, 2006; Sinclair AJ et al, Lancet D&E, 2015

Comorbidity Assessment Tools

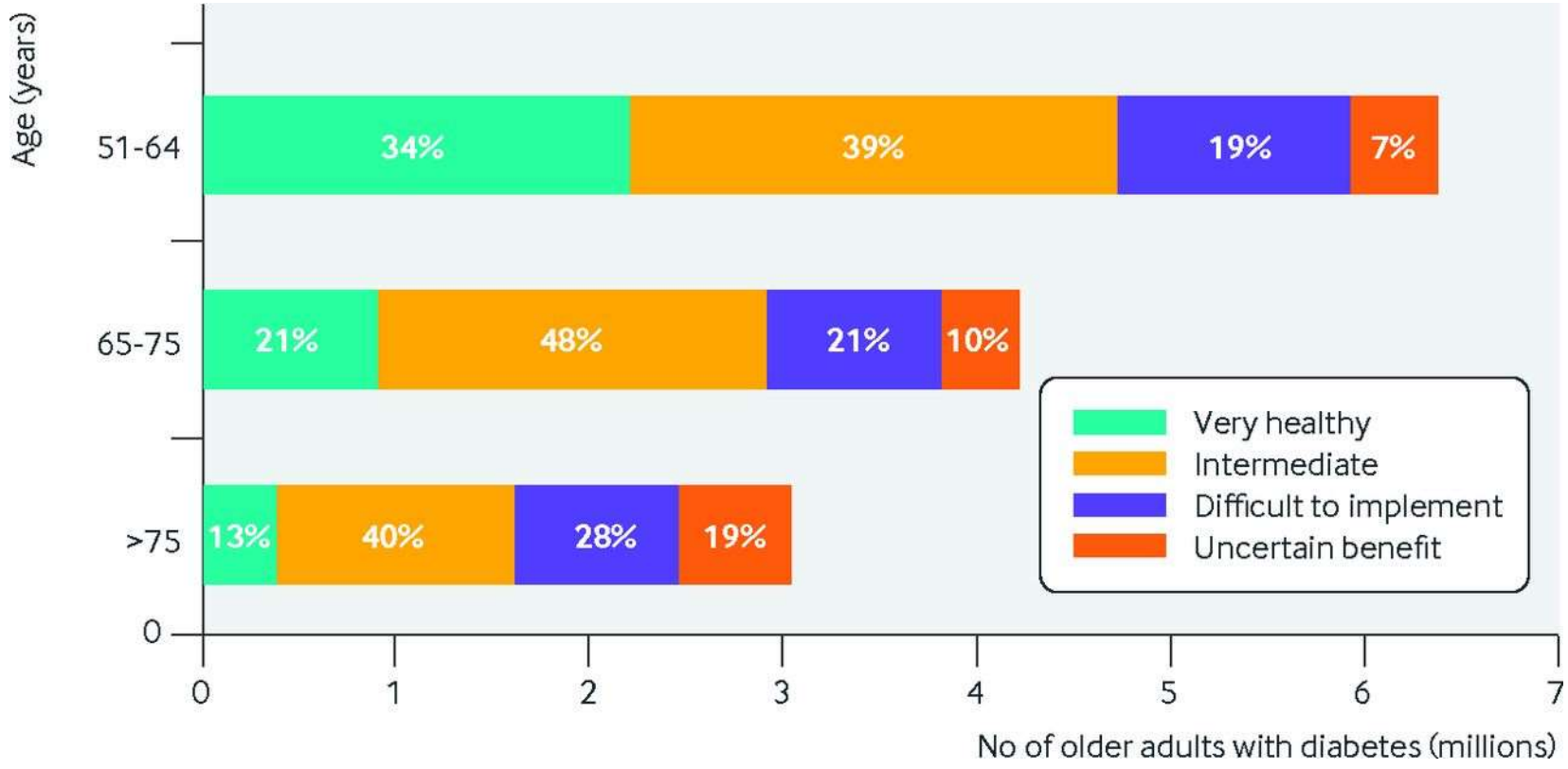
Cumulative Illness Rating Scale (CIRS)[70]	A measure of multimorbidity and particularly of the burden of chronic medical illness. Has 14 individual system scores giving a score of 0-56
Charlson Comorbidity Index (CCI) and its adaptations (Deyo CCI, Romano CCI, D'Hoore CCI, Ghali CCI, Quan CCI)[71,72]	Predicts the 1-year mortality for an individual with a range of comorbidities (22 conditions are listed) and assigned a score of 1,2,3 or 6. A total score predicts mortality.
Elixhauser comorbidity index (EI)[73]	Uses a comprehensive set of 30 comorbidities to predict mortality; these are based on the International Classification of Diseases (ICD)
Index of Coexisting Disease (ICED)[74]	A comorbidity scale that was initially shown as a strong predictor of death in dialysis patients.
Chronic Disease Score (CDS)[75] <vonKorff_1992>	Uses the medications to identify comorbidities
RxRisk and RxRisk-V[76]	All-age risk assessment using outpatient pharmacy database to identify chronic diseases and predict future healthcare costs

Frequencies of adults with diabetes in clinical groups by age in United States Health and Retirement Study

Class 1: relatively healthy

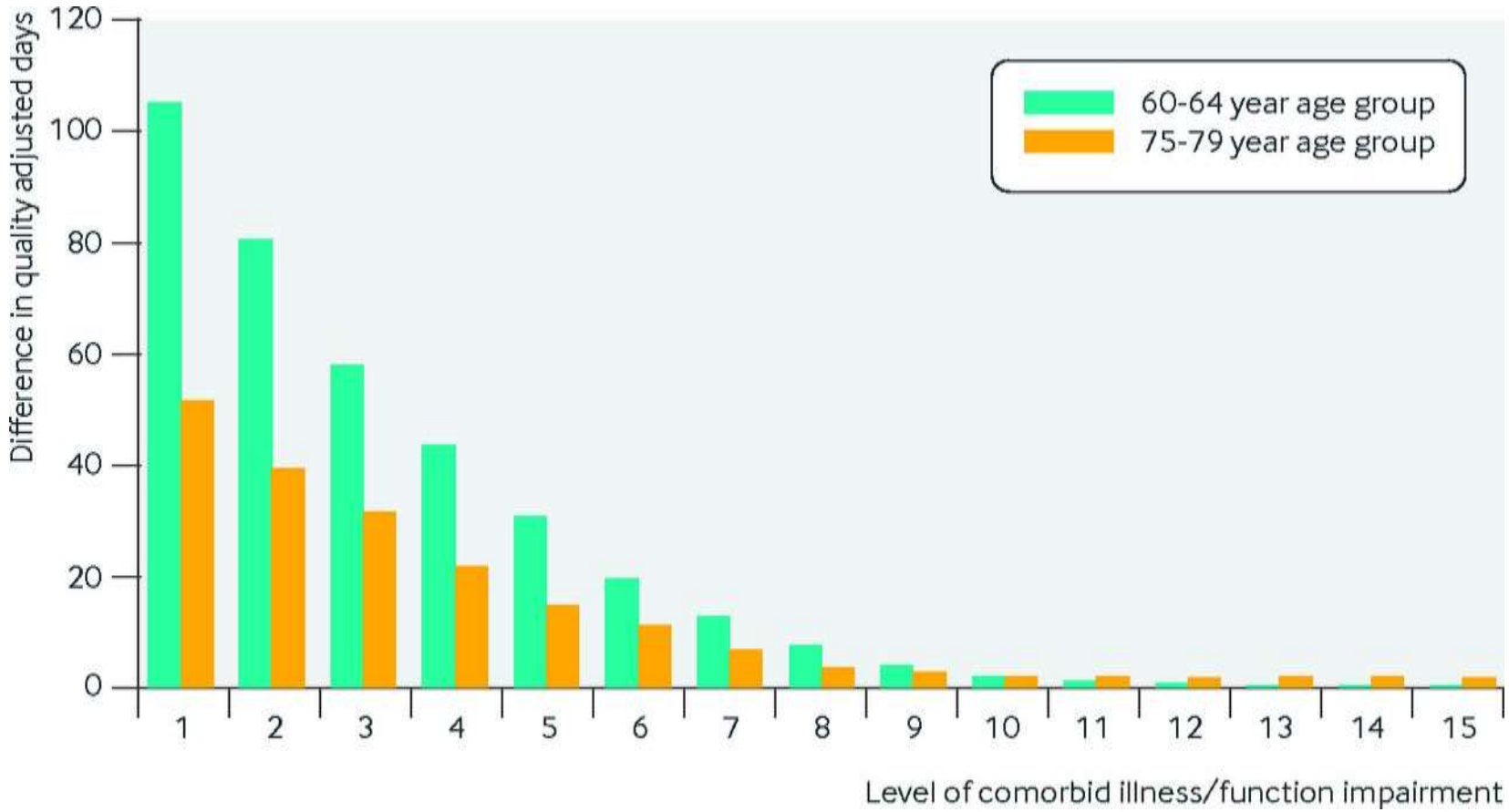
Class 2: complex illness profile where self-care may be difficult

Class 3: significant multimorbidity profile/functional impairment



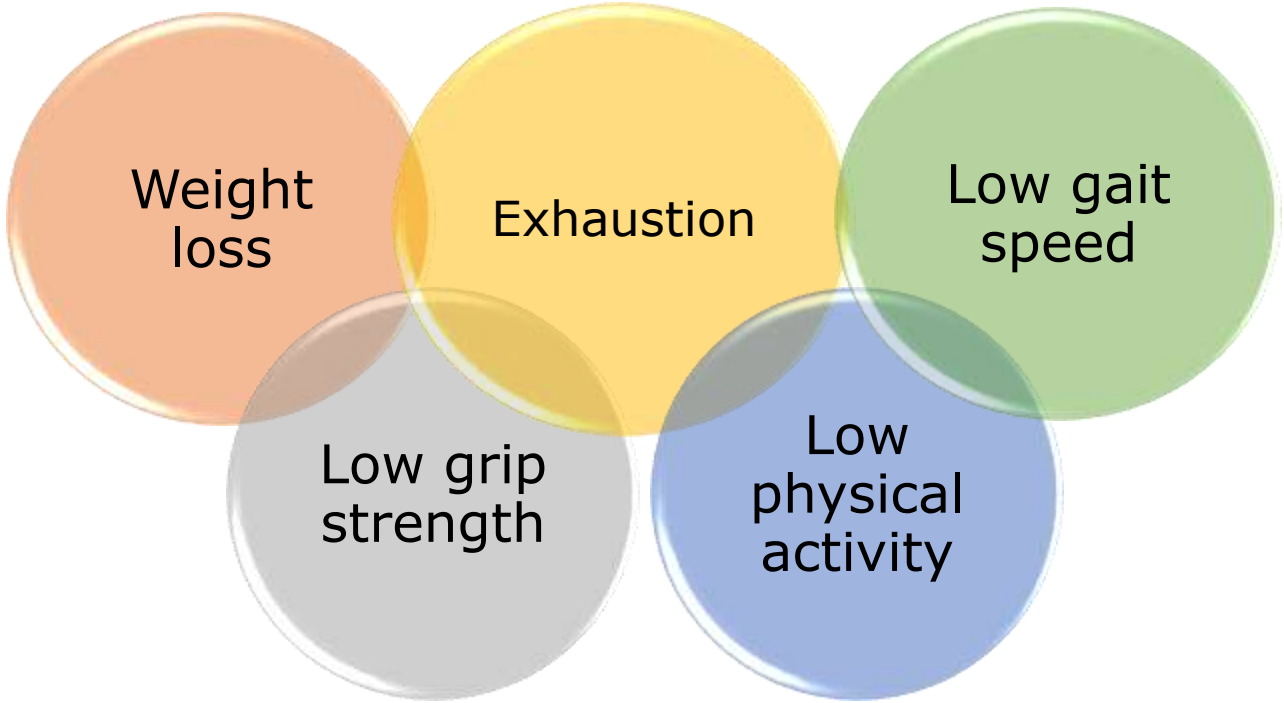
Elbert S Huang BMJ 2016;353:bmj.i2200

Expected quality of life benefits of intensive glucose control for 60-64 year old and 75-79 year old patients with newly diagnosed diabetes, with increasing levels of comorbid illness and functional impairment



Elbert S Huang BMJ 2016;353:bmj.i2200

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*

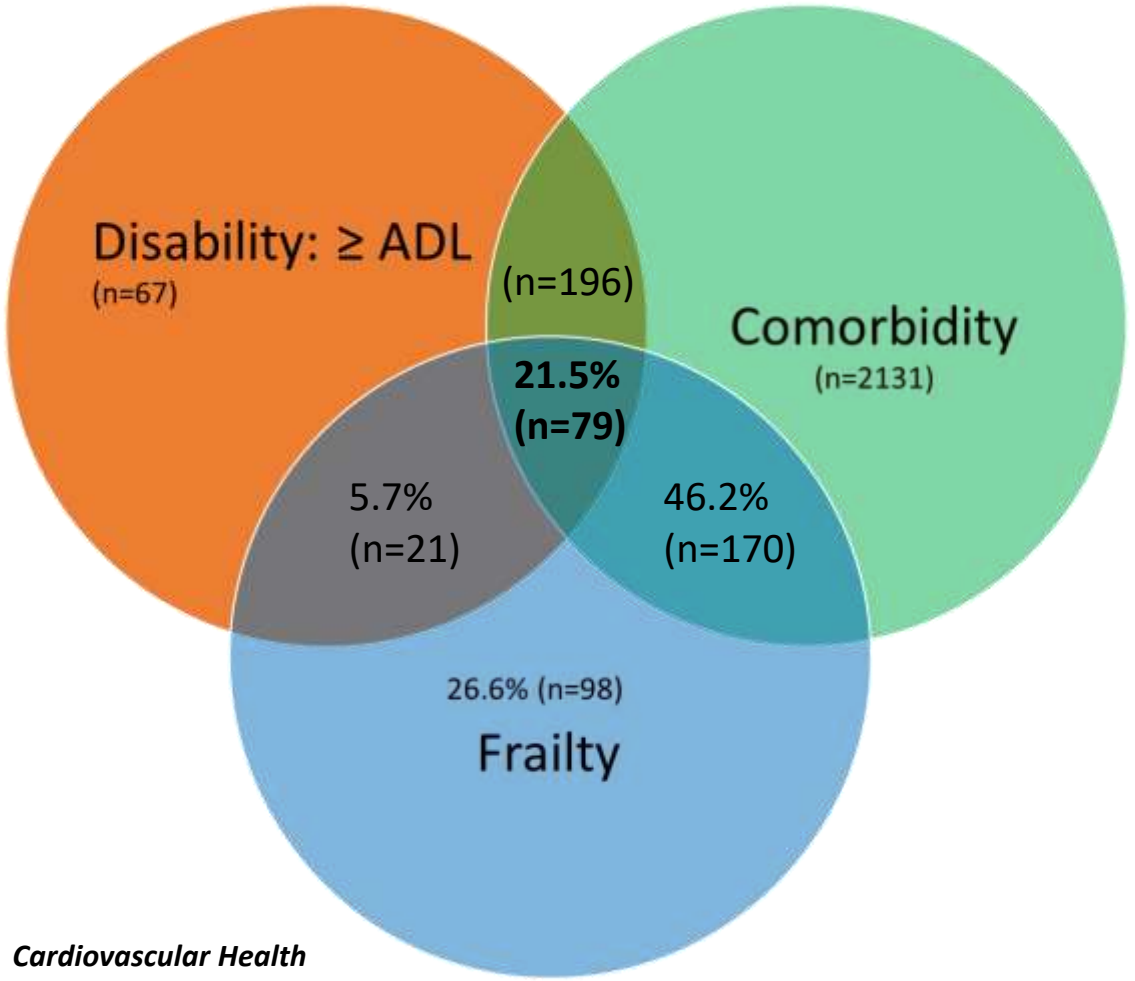
- The eFI consists of 36 deficits which have been constructed using around 2,000 primary care Read codes
- The eFI calculates a frailty score by dividing the number of deficits present by the total possible: uses 36 validated deficits
- The score is a robust predictor of those who are at greater risk 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 is not synonymous with Comorbidity – *it is a distinct biological syndrome !*

Statements

- Frailty can be shown to be different than other comorbidities in terms of definitions, pathophysiology, assessment, relationship to disability, prognosis, and management approach
- Frailty represents the **combined outcome** of the ageing process + comorbidity + other chronic conditions
- Frailty is the best predictor for adverse outcomes (including death and incident disability), while comorbidity is a weak prognostic factor in older people and this is more pronounced with advanacing age
- Frailty often co-exists with comorbidity but sometimes this association is not present
- Although comorbidities often precede frailty, frailty may be a risk factor for comorbidities
- Assessment and Management strategies are different for frailty or comorbidity



Cardiovascular Health Study, 2001

Frailty predicts adverse outcomes and 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 data, 2001

JAMDA 17 (2016) 949–955

JAMDA

journal homepage: www.jamda.com

Original Study

Frailty as a Major Factor in the Increased Risk of Death and Disability in Older People With Diabetes

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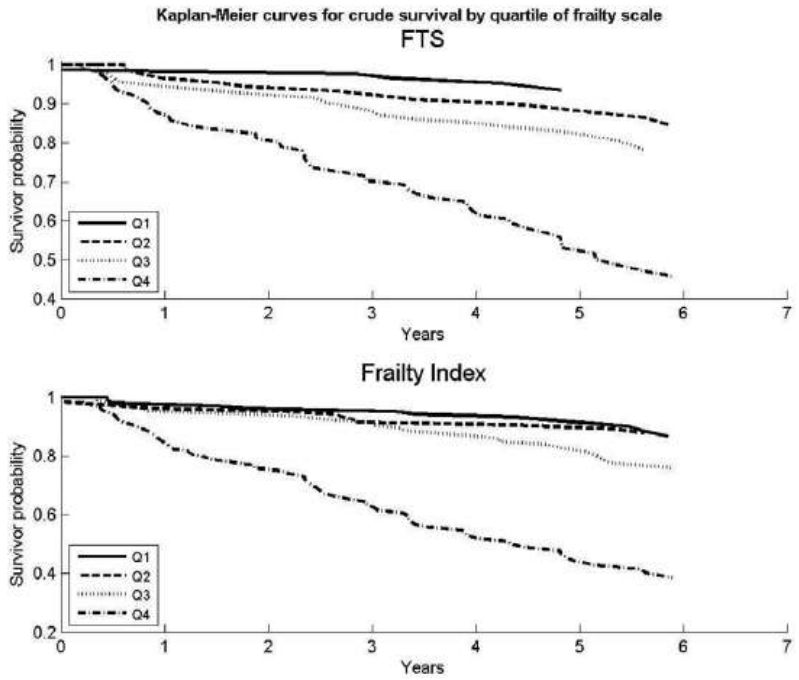
Keywords:
Older adults
frailty
mortality
disability
type 2 diabetes
risk factors

ABSTRACT

Objectives: To assess the role of frailty in predicting death and incident disability in older adults with type 2 diabetes mellitus.
Design: Prospective cohort study.
Setting: Community dwelling.
Participants: A total of 1825 individuals >65 years old recruited between June 2006 and September 2009 were followed for a median of 5.5 years for mortality and 4.98 years for incident functional disability in activities of daily living. Self-reported diabetes, comorbidities (Charlson index), cardio- and cerebrovascular diseases, drug treatments, Frailty Trait Score (FTS) and Frailty Index (FI), activities of daily living, heart rate, and blood pressure among others were collected at baseline.
Main outcome measures: Survival analysis (Kaplan-Meier), adjusted Cox proportional-hazards models, and binary logistic regression were used to assess the relationship between frailty, comorbidity, and vascular diseases and time to death and incident disability.
Results: A total of 363 people had diabetes. Among them, 83 deaths and 84 cases of incident disability occurred during follow-up. People with diabetes died more frequently than those without diabetes [hazard ratio = 1.36, 95% confidence interval (CI) 1.06–1.75; P = .002], showing a poorer functional status at baseline. Survival analysis showed a relationship between frailty quartiles and the risk of death. In the adjusted Cox-models, only age and frailty indices, but not comorbidity or cardio/cerebrovascular diseases, were associated with the risk of death and incident disability after adjusting for measures of frailty. The hazard ratio for death was 1.51 (95% CI 1.28–1.77) and 1.83 (95% CI 1.49–2.26) for each 10 points increase in the FTS and FI; odds ratio for incident disability was 1.64 (95% CI 1.22–2.20) and 1.35 (95% CI 1.09–1.67) when using FI and FTS, respectively.
Conclusions: Frailty is an important risk factor for death and disability in older adults with diabetes, supporting the recent recommendations that frailty status should be routinely assessed in these patients.

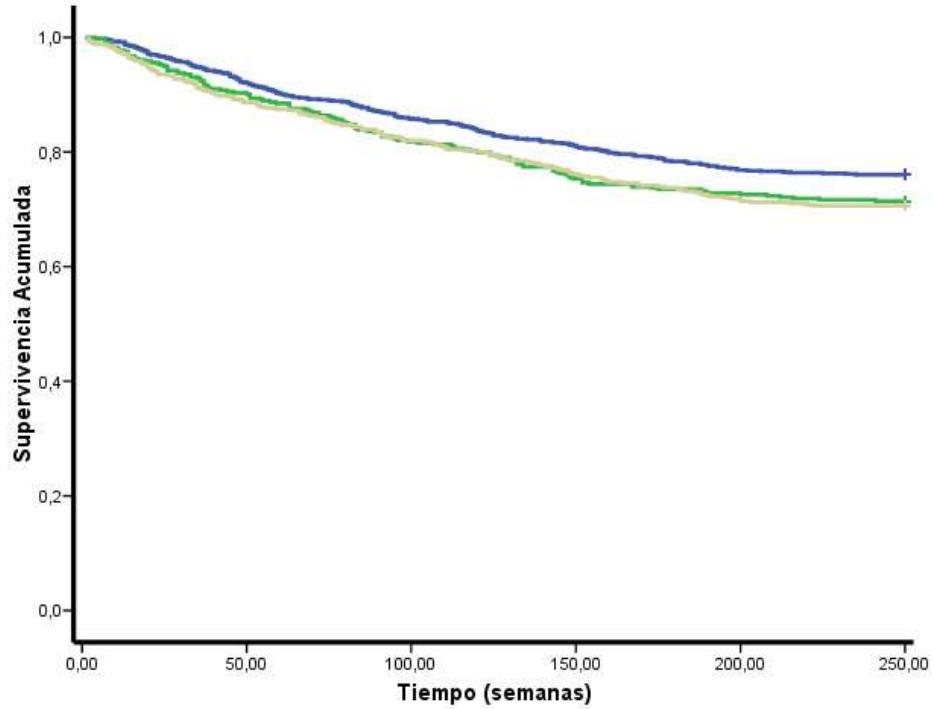


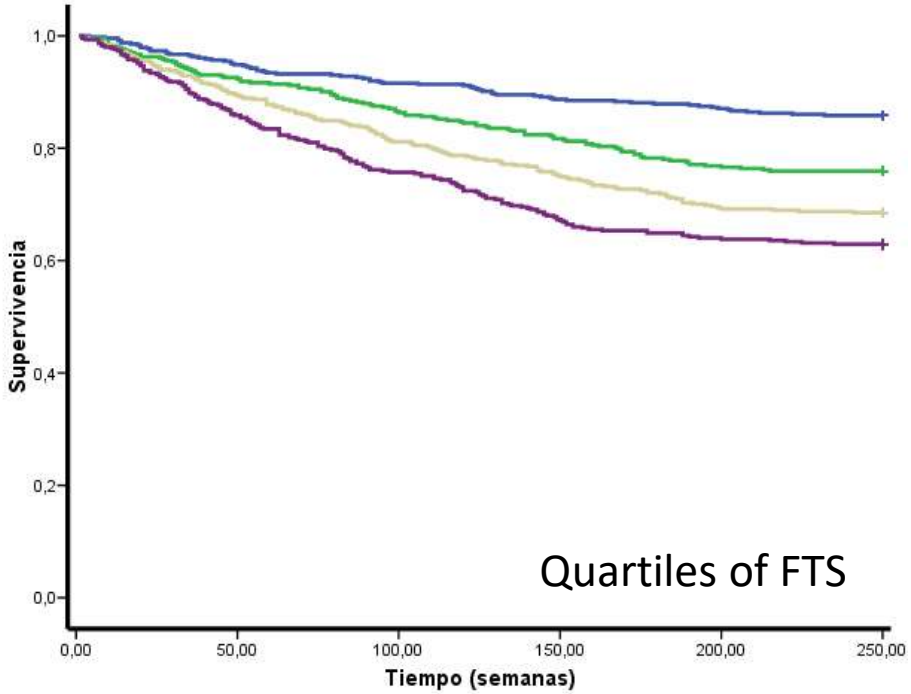
Time until first hospitalization

Charlson Index

Frailty Trait Scale

Accumulated Survival





Time in Weeks

ESTUDIO TOLEDO ENVEJECIMIENTO SALUDABLE

TOLEDO STUDY FOR HEALTHY AGING

Recent Unpublished Observations, Toledo Study, Manas R. L et al.

SPECIAL ARTICLE

AN INTERNATIONAL POSITION STATEMENT ON THE MANAGEMENT OF FRAILTY IN DIABETES MELLITUS: SUMMARY OF RECOMMENDATIONS 2017

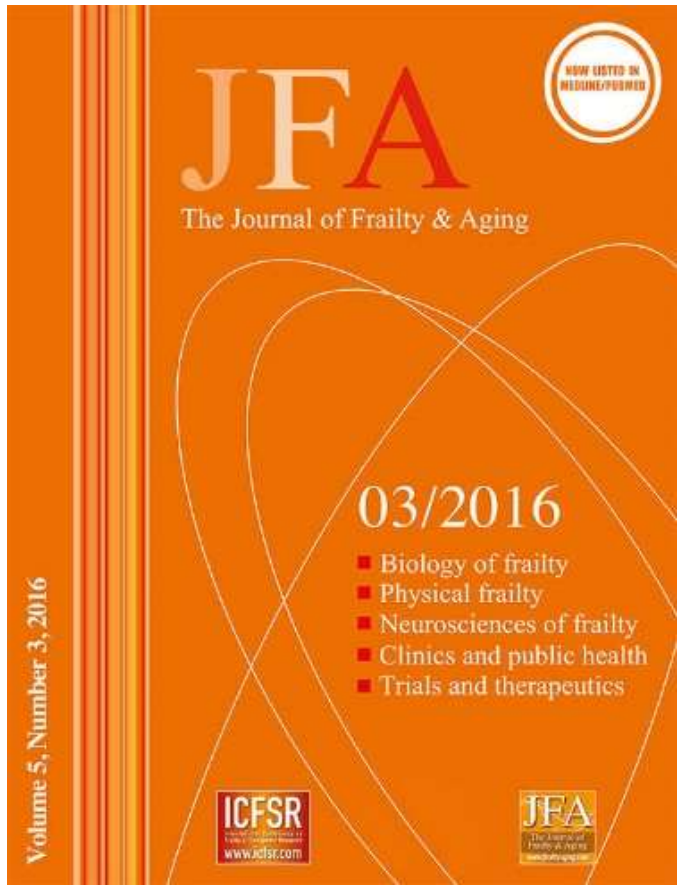
A.J. SINCLAIR[1,*], A. ABDELHAFIZ[2], T. DUNNING[3], M. IZQUIERDO[4], L. RODRIGUEZ MANAS[5], I. BOURDEL-MARCHASSON[6], J.E. MORLEY[7], M. MUNSHI[8], J. WOO[9], B. VELLAS[10,*]

1. Foundation for Diabetes Research in Older People, Diabetes Frail Ltd and University of Aston, United Kingdom; 2. Rotherham General Hospital, United Kingdom; 3. Deakin University, Geelong, Australia; 4. Public University of Navarre, Spain; 5. Universitario Hospital de Getafe, Madrid, Spain; 6. CHU Bordeaux, Bordeaux, France; UMR 5536 Univ Bordeaux/CNRS, France; 7. St Louis University, USA; 8. Harvard University, USA; 9. Hong Kong Geriatrics Society. 10; Gerontopole and Hopitaux de Toulouse, France. *Co-Chairs.
Endorsed by the European Diabetes Working Party for Older People (EDWPOP), the 2017 International Conference of Frailty & Sarcopenia Research (ICFSR), the Hong Kong Geriatrics Society, and an International Group of Experts.
Corresponding author: Professor Alan Sinclair, Foundation for Diabetes Research in Older People, Diabetes Frail Ltd, Medici Medical Practice, 3 Windsor Street, Luton, Bedfordshire, UK. Email: Sinclair.5@btinternet.com, Phone: 00 44 (0)1628 738464

Abstract: *Aim:* the the International Position Statement provides the opportunity to summarise all existing clinical trial and best practice evidence for older people with frailty and diabetes. It is the first document of its kind and is intended to support clinical decisions that will enhance safety in management and promote high quality care. *Methods:* the Review Group sought evidence from a wide range of studies that provide sufficient confidence (in the absence of grading) for the basis of each recommendation. This was supported by a given rationale and key references for our recommendations in each section, all of which have been reviewed by leading international experts. Searches for any relevant clinical evidence were generally limited to English language citations over the previous 15 years. The following databases were examined: Embase, Medline/ PubMed, Cochrane Trials Register, Cinahl, and Science Citation. Hand searching of 16 key major peer-reviewed journals was undertaken by two reviewers (AJS and AA) and these included Lancet, Diabetes, Diabetologia, Diabetes Care, British Medical Journal, New England Journal of Medicine, Journal of the American Medical Association, Journal of Frailty & Aging, Journal of the American Medical Directors Association, and Journals of Gerontology - Series A Biological Sciences and Medical Sciences. *Results:* two scientific supporting statements have been provided that relate to the area of frailty and diabetes; this is accompanied by evidence-based decisions in 9 clinical domains. The Summary has been supported by diagrammatic figures and a table relating to the inter-relations between frailty and diabetes, a frailty assessment pathway, an exercise-based programme of intervention, a glucose-lowering algorithm with a description of available therapies. *Conclusions:* we have provided an up to date evidence-based approach to practical decision-making for older adults with frailty and diabetes. This Summary document includes a user-friendly set of recommendations that should be considered for implementation in primary, community-based and secondary care settings.

Key words: Diabetes mellitus, frailty, older people, sarcopenia, position statement, management.

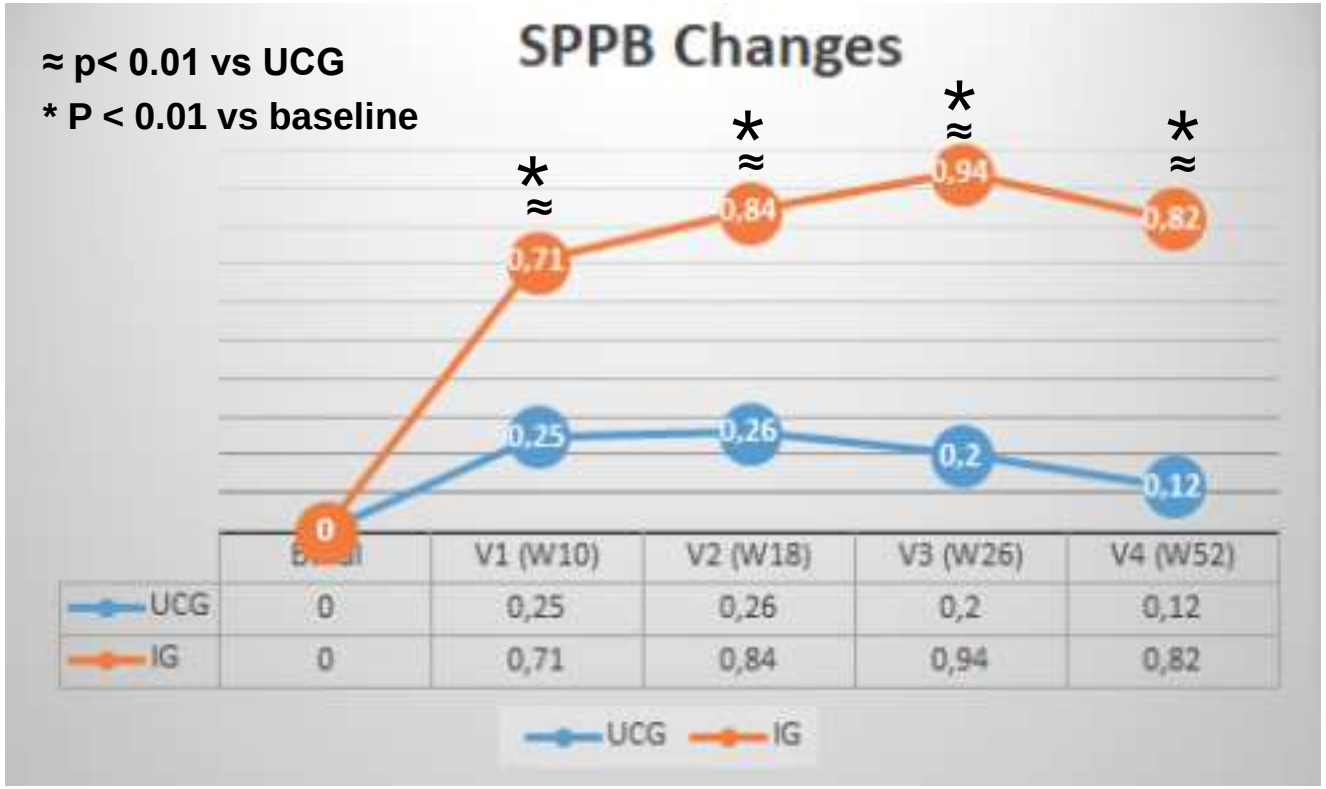
J Frailty Aging 2017;in press
Published online October 4, 2017, http://dx.doi.org/10.14283/jfa.2017.39



EUROPEAN COMMISSION / European Research Area / Health & life sciences

MID Frail

MAIN RESULTS at 1 YEAR



J Cachexia Sarcopenia Muscle. 2019 Apr 23.[Epub ahead of print]

Effectiveness of a multimodal intervention in functionally impaired older people with type 2 diabetes mellitus.

Rodriguez-Mañas L[1], Laosa O[2], Vellas B[3], Paolisso G[4], Topinkova E[5], Oliva-Moreno J[6], Bourdel-Marchasson I[7], Izquierdo M[8], Hood K[9], Zeyfang A[10], Gambassi G[11], Petrovic M[12], Hardman TC[13], Kelson MJ[14], Bautmans I[15], Abellan G[3], Barbieri M[4], Peña-Longobardo LM[6], Regueme SC[7], Calvani R[11], De Buyser S[12], Sinclair AJ[16]; European MID-Frail Consortium.

Diabetes is a Risk Factor for Dementia and Mild Cognitive Impairment: A Meta-analysis of Longitudinal Studies

G. Cheng et al 2012

- Quantitative meta-analysis of 19 studies from 1996–Dec 2010
- Data from 6184 subjects with diabetes and 38 530 subjects without diabetes
- Main finding – *diabetes was a risk factor for incident dementia (incl AD, VD and any dementia) and MCI*

Table 3 Summary relative risks of AD, VD and any dementia among subjects with diabetes compared with that without

	Heterogeneity test			Random effects		Fixed effects	
	Chi	d.f.	*P*	RR	95%CI	RR	95%CI
Risk for AD	47.3	15	<0.0001	1.46	1.20–1.77	1.54	1.40–1.70
Risk for VD	6.3	9	0.71	2.49	2.09–2.97	2.48	2.08–2.96
Risk for any dementia	28.9	10	0.001	1.51	1.31–1.74	1.54	1.41–1.67
Risk for mild cognitive impairment	0.1	1	0.76	1.22	1.0–1.45	1.21	1.02–1.45

95%CI, 95% confidence interval; AD, Alzheimer's disease; RR, relative risk; VD, vascular dementia.

The Mini–Cog Assessment Tool: development of a reliable and quick measure of mental performance in diabetes

Part A: **a three item recall**

Part B:

- Quick and easy to administer
- Participants given a circle (4-10cm in diameter), told that it represents a clock face and instructed to "put in the numbers so that it looks like a clock and the set the time to 10 minutes past 10"

- **Tests executive function and**
  - Auditory comprehension
  - Planning
  - Visual memory and reconstruction
  - Visuo-spatial abilities
  - Motor programming and execution
  - Numerical knowledge
  - Abstract thinking (semantic instruction)
  - Concentration

Part C – asked to repeat the original three items

Mini-Cog scores	No. of patients		No. aged			
			55-64	65-74	75-84	85+
0	2 (1%)	**35 (17.4%) screen-positive**			2(3%)	
1	4 (2%)		1(2%)	1(1%)	2(3%)	
2	9 (4%)			4(6%)	5(7%)	
3	20 (10%)		2(4%)	8(12%)	9(12%)	1(11%)
4	30 (15%)		7(14%)	6(9%)	15(20%)	2(22%)
5	136 (68%)		39 (80%)	48 (72%)	43(57%)	6(66%)

•PILOT study of 207 patients aged 55 – 90 years
•Use of Mini-Cog to screen for cognitive impairment in diabetes in primary care settings

•Use of score of <24 on MMSE, the Mini-Cog had sensitivity of 86%, specificity of 91%, positive predictive value of 54% and negative predictive value of 98%.

Not influenced by education, culture or language; Performance comparable to MMSE *Borson S. et al, 2000; Shulman, 2000*

Sinclair AJ, Gadsby R, Hillson R, Forbes A, Bayer AJ, 2013,

Cognitive dysfunction may present differently in older people with diabetes – *typical clinical presentation and influence on self management*

Varying symptoms to prompt enquiry into cognitive performance:

- An unexplained 'fall'
- A change in memory - e.g. a change in 'self-care' ability
- Repeated errors in insulin management
- Increased evidence of 'stress'
- New onset of repeated 'hypos'

- The risk of adverse changes in mental performance is increased in older patients with diabetes[1,2]
- Cognitive impairment may worsen diabetes self-management and lead to poor glycaemic control[3]
- May result in the following complications[4]:
  - Reduced adherence to treatment
  - Skipped meals
  - Risk of hypoglycaemia if treatment doses are repeated (and failure to treat 'hypos')
  - Unreliable self monitoring and updates during clinical assessments

[1]Gregg EW et al. Arch Int Med. 2000;160:174-80; [2]Sinclair AJ et al. Diab Res Clin Pract. 2000;50(3):203-12; 3 Gradman TJ et al, 1993 JAGS 41::1305-12 [4]Munshi M et al. Diab Care. 2006;29:1794-99

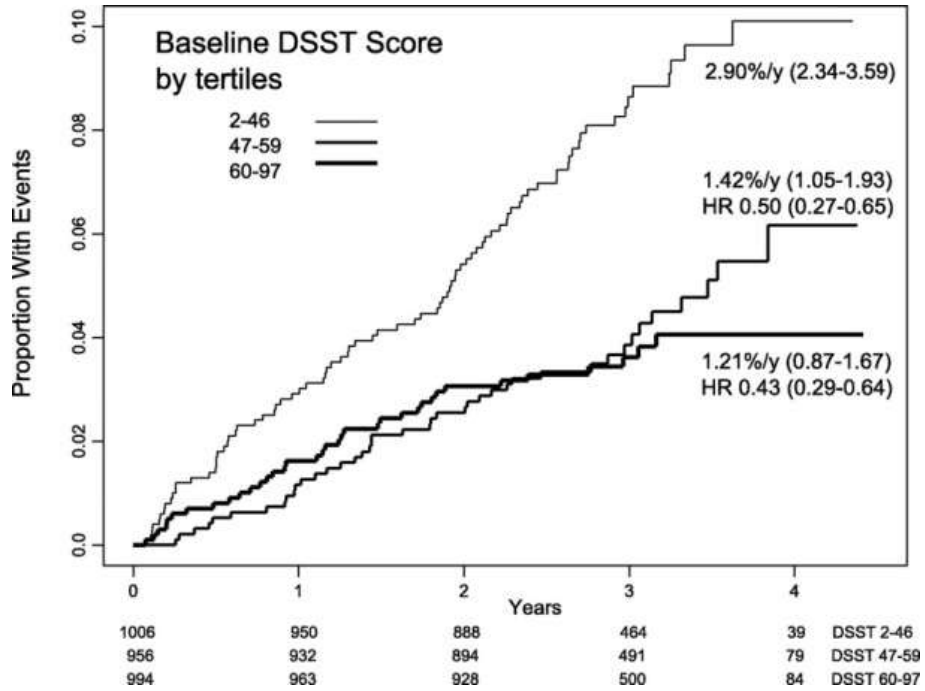
Intensive Glucose Lowering NOT associated with Changes in Cognition – Substudy Analysis in the *Action to Control Cardiovascular Risk in Diabetes Trial (ACCORD –MIND)*

2977 patients aged 55-80 (mean 63y) with type 2 diabetes, treated with standard care or intensive glycaemic control; use of DSST (digit symbol substitute test) as one of several cognitive measures

- 20% of patients found to have undetected cognitive impairment at baseline
- No difference in DSST score (or any other cognitive tests) at 40 mths between groups
- Greater mean total brain volume on MRI on intensive than standard treatment (p=0.0007)
- Launer et al. Lancet Neurol 2011;10:969-77

- Baseline cognitive function (DSST score) significantly associated with risk of severe hypoglycemia (p<0.0001)

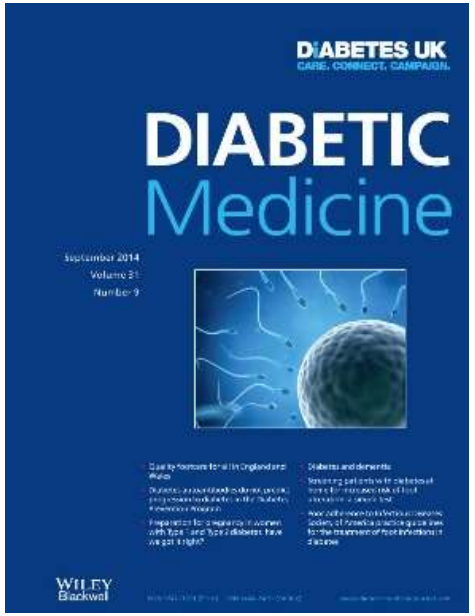
Punthakee et al. Diab Care 2012; 35:787-793

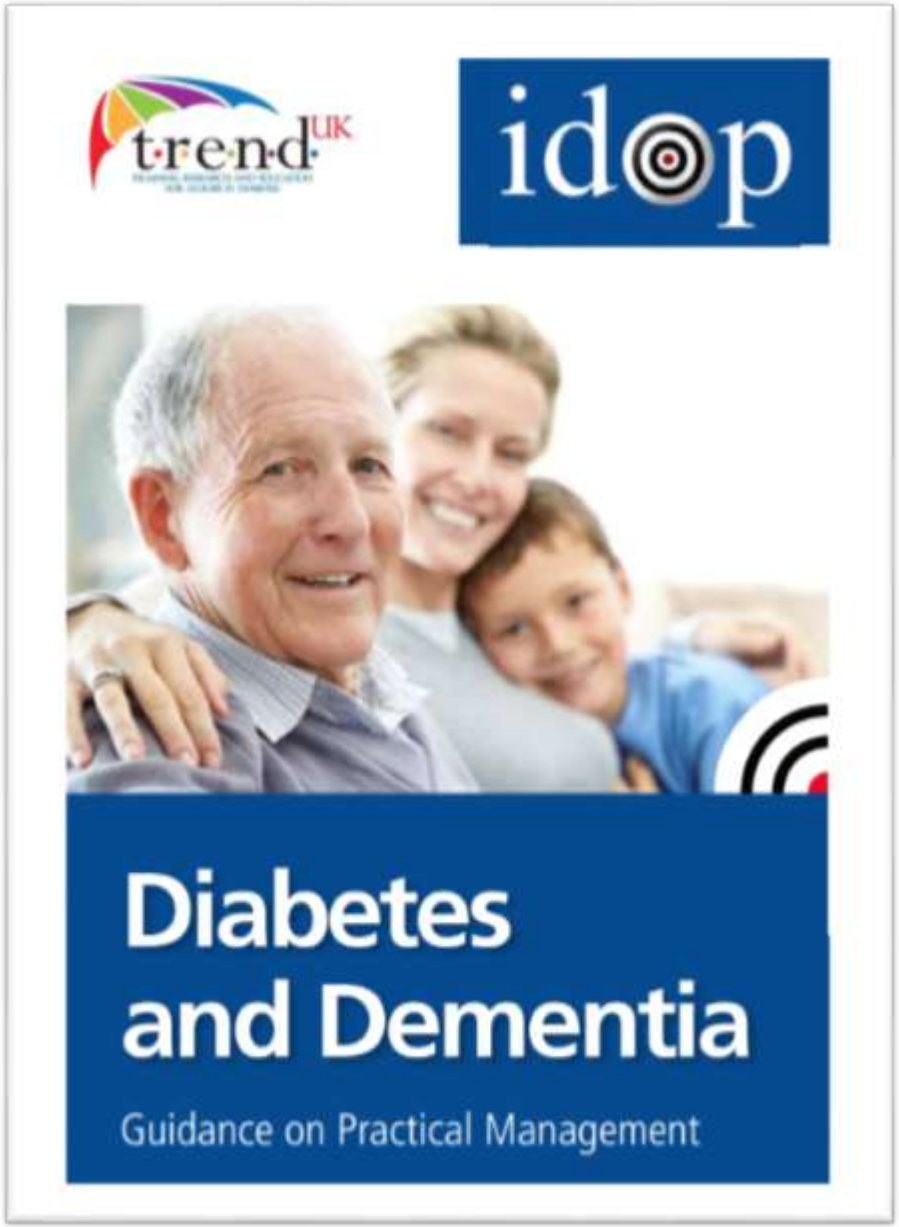


National Guidance – Managing People with Diabetes & Dementia

Diabetes and dementia in older people: a Best Clinical Practice Statement by a multidisciplinary National Expert Working Group – ***Sinclair AJ et al, 2014***

- Key steps in an integrated care pathway
- Guidance on identifying each condition
- Hypoglycaemia management
- Outlined competencies required of healthcare workers in both fields





https://diabetes-resources-production.s3-eu-west-1.amazonaws.com/diabetes-storage/2017-08/Diabetes_And_Dementia_Guidance_2013.pdf

Summary

- Older adults with diabetes often have a complex illness requiring a **complex multidomain management strategy**
- Complexity is increased with the combined effects of varying degrees of functional loss, comorbidity, frailty and when cognitive impairment develops
- Individualised medicine is paramount to manage varying goals of care – **minimising the risk of frailty and early detection of cognitive disorders are key goals**
- Maintaining individuals to be **well functioning** gives an enhanced likelihood of worthwhile quality of life

fDROP
foundation for Diabetes Research in Older People

Royal College of Psychiatry- Joint British Diabetes Societies National Consensus: Key Conclusions, 2015

Immediate

1. A **Diabetes Screen and Diabetes Review** is indicated in all mental health and residential settings.

2. **Assess Predisposing Risk factors** - exclude hypoglycaemia. Attempt to identify risk factors e.g. poor renal function, undernutrition and intercurrent medical illness. Review polypharmacy and consider agents with a lower hypoglycaemic risk.

Long-term

1. **Acute trusts and older adult mental health services should share the same clinical pathways for diabetes and dementia.**

In the dementia care setting:

- proactive screening for diabetes
- symptom alleviation and assessment for complications
- risk minimisation
- palliative care approaches in advanced dementia.

In the diabetes care setting:

- increasing awareness of and screening for dementia
- managing the cognitive deficit and minimising therapy risk
- palliative care approaches in advanced dementia.

2. Implement a competency **framework** in acute NHS trusts, primary care and care home settings that outlines the training and educational needs of direct care staff in the management of patients with diabetes and dementia. For diabetes in mental health settings, consider using the **TREND UK** framework

3. Develop an understanding of the balance between managed risk and patient autonomy for **individualised diabetes treatment**.

4. Implement audits of care pathways and processes in NHS and care home settings

ABCD
Association of British Clinical Diabetologists

DIABETES UK
CARE. CONNECT. CAMPAIGN.

RC PSYCH
ROYAL COLLEGE OF PSYCHIATRISTS

Multiple Predictors of Cognitive Decline in Older Adults with Diabetes - Veteran Affairs Diabetes Trial 2016

Final model of risk factors associated with 5-year decline in (A) digit span, (B) Trails-making Part B, and (C) digit symbol test performance.

- Neuropsychological testing:

  digit span, digit symbol substitution (DSym), and Trails-making Test-Part B (TMT-B)]

- Administered at baseline in ~1700 participants and repeated at year 5.
- Thirty-seven risk factors were evaluated as predictors of cognitive decline in multivariable regression analyses.

Zimering MB and VADT Investigators, 2016

Parameter	Estimate	SE	*P*-value
(A) Digit span			
Treatment (INT vs. STD)	–0.026	0.153	0.863
African-American (yes/no)	–0.807	0.209	<0.001
Thiazide diuretic (yes/no)	–0.425	0.202	0.036
(B) Trails B			
Treatment (INT vs. STD)	0.0024	0.147	0.987
Diabetes duration (years)	–0.028	0.010	0.006
Diastolic BP (mmHg)	0.028	0.0091	0.002
CCB (yes/no)	–0.639	0.184	<0.001
(C) Digit symbol			
Treatment (INT vs. STD)	0.067	0.172	0.697
Diabetes duration (years)	–0.025	0.012	0.034
CCB (yes/no)	–0.557	0.217	0.011
Thiazide diuretic (yes/no)	–0.549	0.225	0.015

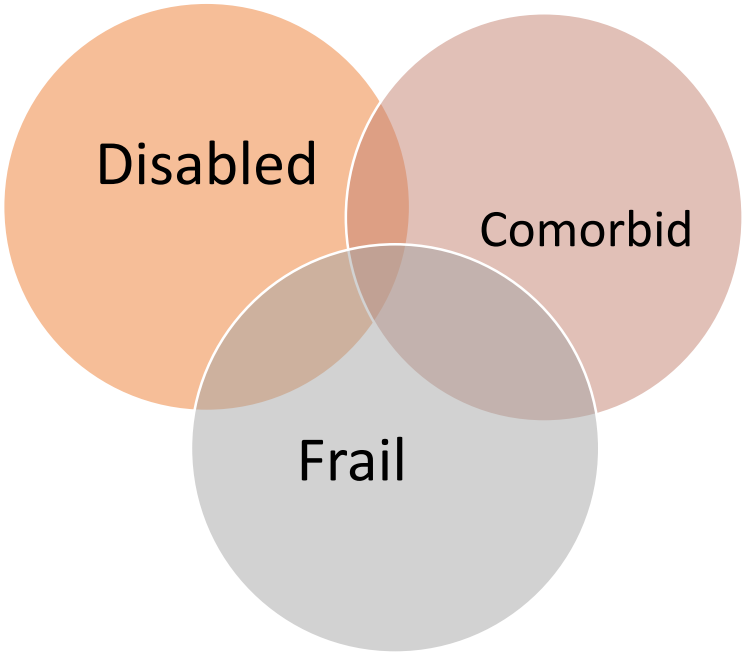
(A) N = 1159.

(B) N = 1099; BP, blood pressure; CCB-calcium channel blocker.

(C) N = 1139.

What is Frailty?

- A biological syndrome
- A state of increased vulnerability to stressors
- Decreased physiological reserve in multiple systems
- Limited capacity to maintain homeostasis
- Prevalence around 10% in different population's studies



So, why do we use tools to assess frailty that include disability and diseases?

Frailty Index
Frailty Clinical Scale
PRISMA
Groningen
Tilberg

What it is defined there should not be a part of the definition

Development and validation of a Hospital Frailty Risk Score focusing on older people in acute care settings using electronic hospital records: an observational study

Thomas Gilbert, Jenny Neuburger*, Joshua Kraindler*, Eilis Keeble, Paul Smith, Cono Ariti, Sandeepa Arora, Andrew Street, Stuart Parker, Helen C Roberts, Martin Bardsley, Simon Conroy*

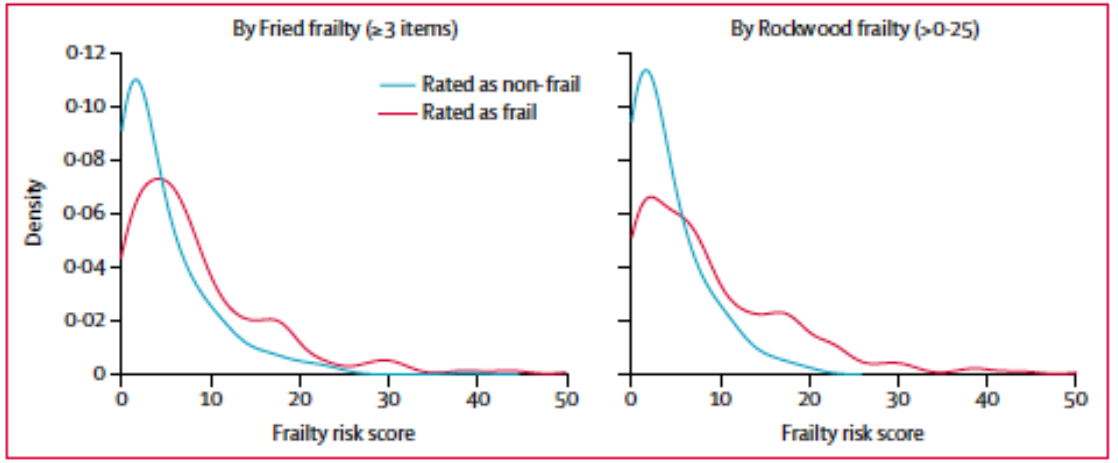
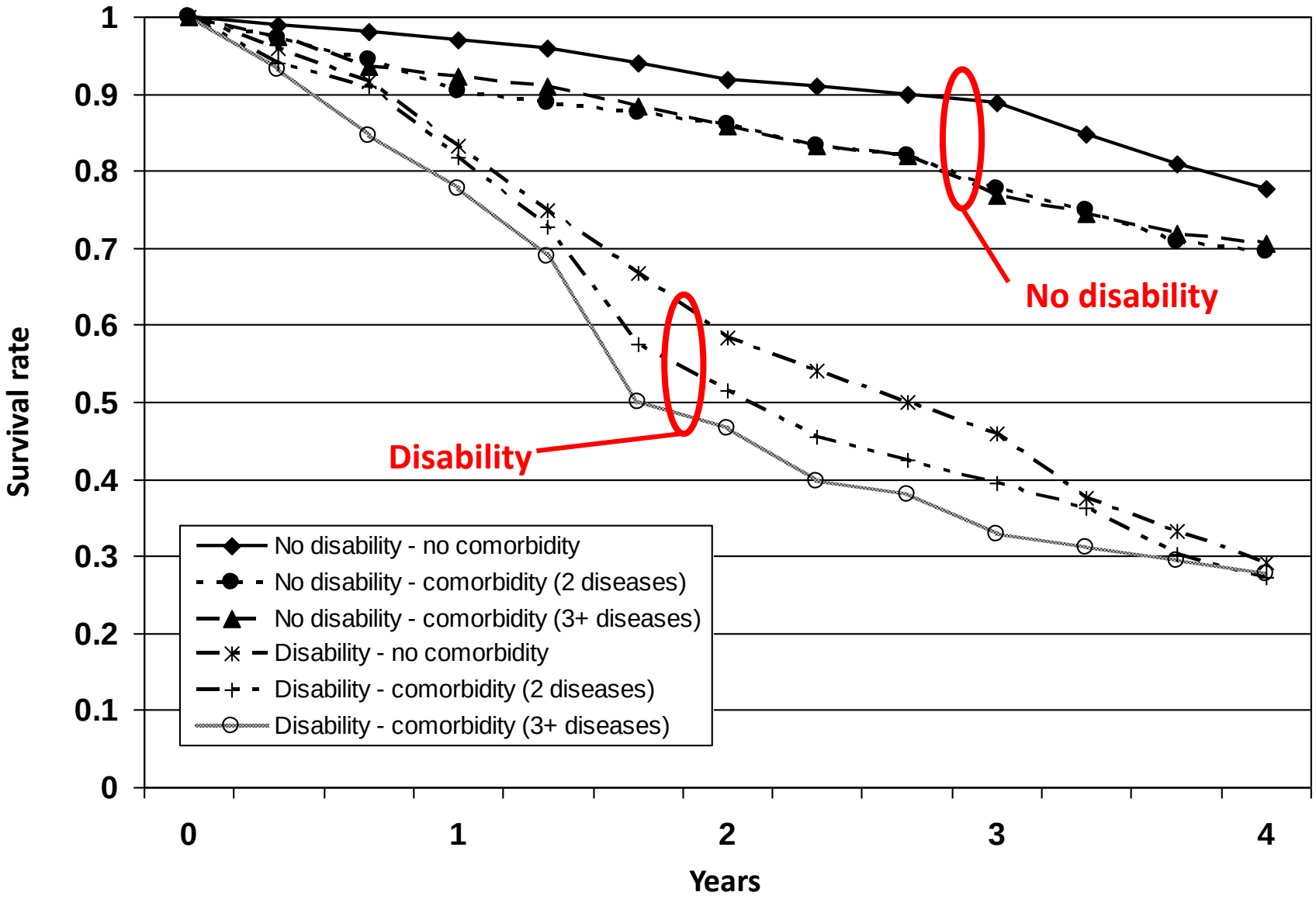


Figure 2: **Distribution of Hospital Frailty Risk Scores among patients identified as frail and non-frail by the Fried and Rockwood scales**

Disability, more than multimorbidity, predicts mortality in advanced age



Landi et al., J Clin Epidemiol 2010

JAMDA

journal homepage: www.jamda.com

Original Study

Diabetes and Risk of Frailty and Its Potential Mechanisms: A Prospective Cohort Study of Older Adults

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Diabetes is associated with higher risk of frailty after 3.5 yrs of follow-up. This risk is explained by,

- ✓ **Unhealthy behaviour**
- ✓ **Poor glycemic control**
- ✓ **Altered serum lipid profile (HDL)**

Only levels of HbA1c > 8% provides an increase risk of frailty/functional decline in older adults

Kalyani et al., Diabetes Care 2010
Kalyani et al., JAGS 2012

Table 3
ORs (95% CIs) of Frailty in Diabetic Versus Nondiabetic Individuals With Progressive Adjustment for Possible Mechanism of the Association

	OR (95% CI)
Adjusted for age, sex, and educational level (basic model)	**2.18 (1.42–3.37)**
Additionally adjusted for health behaviors and morbidity	
Basic model and lifestyle factors (smoking, alcohol consumption, time spent watching TV, recreational activity, MEDAS, energy intake)	**2.01 (1.28–3.16)**
Basic model and abdominal obesity	**1.96 (1.26–3.03)**
Basic model and lifestyle factors and abdominal obesity (model 1)	**1.83 (1.16–2.90)**
Additionally adjusted for morbidity	
Model 1 and cardiovascular disease (heart disease, stroke, heart failure), cancer, chronic respiratory disease, arthritis, osteoarthritis, fracture (model 2)	**1.76 (1.10–2.82)**
Additionally adjusted for cardiometabolic biomarkers	
Model 2 and hs-CRP	**1.71 (1.06–2.76)**
Model 2 and fibrinogen	**1.75 (1.09–2.80)**
Model 2 and leptin	**1.80 (1.12–2.88)**
Model 2 and systolic blood pressure	**1.79 (1.11–2.87)**
Model 2 and HDL-cholesterol	**1.64 (1.00–2.69)**
Model 2 and HDL-cholesterol, triglycerides and LDL-cholesterol	1.47 (0.89–2.43)
Model 2 and HbA1c	1.51 (0.83–2.74)
Model 2 and all the above mediators (model 3)	1.32 (0.70–2.49)
Additionally adjusted for treatment of diabetes and of cardiovascular risk factors	
Model 3 and diabetes nutritional therapy	1.64 (0.77–3.49)
Model 3 and with oral antidiabetic drugs	1.01 (0.46–2.20)
Model 3 and insulin	1.29 (0.68–2.45)
Model 3 and treatment with nutritional therapy, oral antidiabetics, and/or insulin	1.28 (0.57–2.91)
Model 3 and antihypertensive drug treatment	1.35 (0.72–2.55)
Model 3 and lipid-lowering drug treatment	1.35 (0.72–2.55)
Model 3 and all the above treatments (model 4)	1.32 (0.58–2.98)

Analyses were based on 76 frailty cases among 1404 nondiabetic individuals and 39 frailty cases among 346 diabetic individuals.
Note: Bold values are statistically significant $P < .05$.