Multimorbidity and Frailty in Older Adults with Diabetes

Dr Lisa Devine (GP with Special Interest in Diabetes) and Hannah Beba (Consultant Pharmacist Leeds Health and Care Partnership)

@LisaDevineGP @hannahbeba

Conflicts of Interest Lisa Devine

Pharmaceutical and other medical companies for which you have attended an Advisory Board in the past 3 years	**Advisory board x 1 : Roche**
Pharmaceutical and other medical companies for which you have delivered or received sponsored education in the past 3 years	**Nil**
Roles that you hold a professional contract with (i.e. for which you earn a salary/fee)	**Carlton Clinic – GP** **ICGP – Course Director ; ‘ Better Safer Prescribing Course’** **GP Notebook – Editor** **IHeed – Course Tutor**
Professional non-financial roles	**Steering committee member – East Coast Area Diabetes Society** **ICGP Chronic Disease Management advisory board member** **Primary Care Diabetes Society Committee Member** **Diabetes in Primary Care Editorial Board Member**
Other relevant potential conflicts of interest	

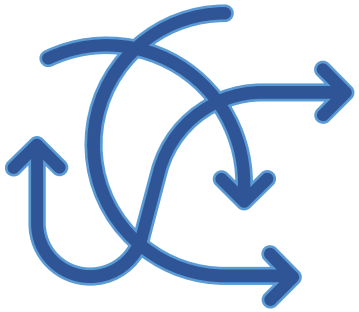
Conflicts of Interest – Hannah Beba

Pharmaceutical and other medical companies for which you have attended an Advisory Board in the past 3 years	ADA virtual attendance 2023 – sponsorship from Lilly EASD attendance 2023 – sponsorship from Daiichi Sankyo ADA virtual attendance 2022 – sponsorship from Lilly EASD in person attendance 2022- sponsorship from Novonordisk EASD virtual attendance 2021 – sponsorship from Novonordisk Since joining Leeds CCG and now Leeds Health and Care Partnership no personal payments have been made to myself from pharmaceutical companies for advisory boards. In the last three years I have taken part in advisory boards for Sanofi, Roche, Abbott, Astra Zeneca, Lilly, Novonordisk, Boehringer, Royal college of Physicians, QiC awards, Diabetes UK, Primary Care Pharmacy Association, Amarin, Manchester University, Leeds University.
Pharmaceutical and other medical companies for which you have delivered or received sponsored education in the past 3 years	Since joining Leeds CCG and now Leeds Health and Care Partnership no personal payments have been made to myself from pharmaceutical companies for education. I have done education linked to: Kings fund, i2i, CPPE, DPC, SPS, Newcastle University, PM Management, PCDS, Amgen, Lilly, Sunderland University, Astra Zeneca, Leeds University, DSN Forum, RPS, PCDE, DUK, Cardiology Professional Care, PCPA, Sanofi, PITSTOP, BHS, BCS
Roles that you hold a professional contract with (i.e. for which you earn a salary/fee)	Consultant Pharmacist for West Yorkshire and Leeds Health and Care Partnership Tutor for Warwick university MSC in Diabetes
Professional non-financial roles	Co-chair of Diabetes UK Council of Healthcare Professionals Member of the UKCPA Diabetes and Endocrinology Committee Member of the Primary Care Diabetes Society Member of Royal Pharmaceutical Society Chair of the Expert Reference Group for Cardio-Renal and Metabolic Medicine at Leeds Health and Care Partnership Chair for the Diabetes Steering Group at Leeds Health and Care partnership Member of the Primary Care Diabetes Transformation and Innovation Group Member of the Expert Working Group for Diabetes Policy
Other relevant potential conflicts of interest	**N/A**

Aims

- Recognize the challenges posed by diabetes in the older adult population
- Introduce resources that can help us structure and maximize our consultations with this group
- Maire's Case : Target setting according to the ADA Guidelines in a non frail older adult , initial recognition of overtreatment and hypoglycemia , review of older Medication groups . Introduction to deprescribing and deprescribing algorithms
- Mahati's case : Target setting in the mid frail patient , frailty phenotypes and their impact on diabetes care , assessment of cognitive impairment in patients with diabetes , using newer medication classes in this group
- Matilda's case : Target setting in the severely frail patient ,

What is Type 2 Diabetes in an Older Person?



A significant disabling health state

Sinclair et al, AWARE study, Diabetes Care 2008, Wong et al, Lancet 2013.

A pronounced multimorbid health state

Guthrie et al, 2012

A significant risk factor for frailty

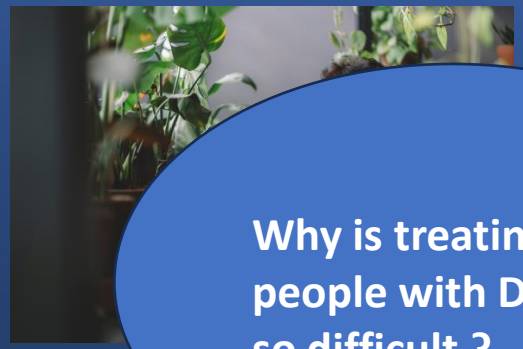
Wenbo He et al, BMC Geriatr, 2022

A chronic disease of underdeveloped technological interventions

Sinclair A, Morley J, Lancet 2013

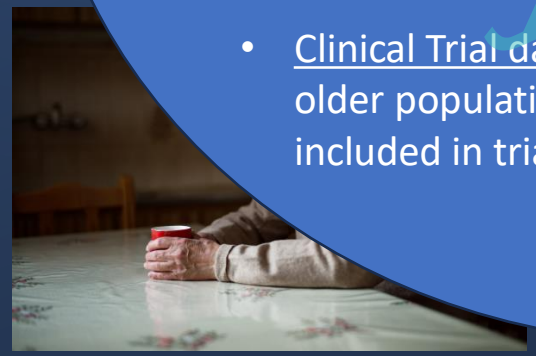
A condition associated with geriatric syndromes

Polypharmacy
Cognitive impairment
Depression
Urinary incontinence
Injurious falls
Persistent pain
Frailty



Why is treating older people with Diabetes so difficult ?

- Heterogeneity – renal function, co-morbidities, socio-economic status, risks of hypoglycaemia, food
- Multimorbidity
- Frailty, Disability, Cognitive status
- Self management can be challenging
- Clinical Trial data is often extrapolated to an older population rather than older people being included in trials



Why is co-morbidity and multi-morbidity important?

Co-morbidity – this is when a disease exists together with a primary disease, a disease in its own right (can be mental or physical)

Multimorbidity- when two or more co-morbidities exist (it may not be clear what the index condition is), it can be multiple chronic or acute conditions

<u>In the Context of Diabetes</u>

The presence of diabetes as a co-morbidity often influences more than other co-morbidities

40% of people with diabetes have 3 or more co-morbidities

Co-morbidities can influence the ability to self care

Individualised care must look at the co-morbidity profile and address it

Maddigan et al, Qual Life Res 2005
Piette and Kerr E Diabetes Care 2006
Sinclair et al, Lancet 2015.

Geriatic syndromes more common in this group

- Polypharmacy
- Cognitive impairment
- ***Depression***
- Urinary incontinence
- Injurious falls
- Persistent pain
- Frailty

Frailty…leading to vulnerability

How do you feel today Mrs Smith ?

WELLL……

Weight loss

Exhaustion

Low gait speed

Low grip strength

Low physical activity

Assessment Tools

Co-morbidity	Frailty
Cumulative Illness Rating Score – a measure of multimorbidity and burden of cumulative chronic disease	CFS (clinical frailty score)
Charlson Co-morbidity Index – 1 year mortality for those with a range of co-morbidities	eFI (electronic frailty index) – looks at 36 deficits using read codes
Elixhauser Co-morbidity Index – mortality calculator based on 30 co-morbidities	
Index of Co-existing Disease (ICED) – predictor of death on dialysis	
Chronic Disease Score (CDS) – uses medications to identify co-morbidites	
Rx-Risk – uses pharmacy systems to look at medications prescribed and predict disease and impact	

Multi-morbidity and Frailty a Pathway to Disablement

- Diabetes is an independent risk factor for multimorbidity
- There was a direct relationship found between multi-morbidity and
  - Higher levels of HbA1c and LDL-C
  - Increased risks of CVD
  - Increased disability
  - Increased risk of hypoglycaemia (linked to accident and emergency visits and admissions)
  - Increased depression
  - Decreased quality of life
  - Increase mortality

- Diabetes is an independent risk factor for frailty
- Direct relationship between frailty and:
  - CV events
  - Falls and fractures
  - Increase mortality
  - Hypoglycaemia
  - Decreased cognitive function
  - Hospitalisation
  - Progression to ESRD

Sinclair AJ, Abdelhafiz AH. Multimorbidity, Frailty and Diabetes in Older People-Identifying Interrelationships and Outcomes. J Pers Med. 2022 Nov 16;12(11):1911. doi: 10.3390/jpm12111911. PMID: 36422087; PMCID: PMC9695437.

Guidelines – are not helpful at times !

- Vague
- Clinical inertia
- Element of successful de-escalation – what does this look like?
- Should so gluco-centric still ? Complex illness model?
- How do we distinguish between different groups that benefit more from different approaches?
- Precision medicine – is this the future?

What can we do ?

Integrated diabetes care

Multidomain management plans

Resources to the Rescue !!!!!


13. Older Adults: Standards of Medical Care in Diabetes—2022
American Diabetes Association Professional Practice Committee*
Diabetes Care 2022;45(Suppl. 1):S195–S207 | https://doi.org/10.2337/dc22-S013
Diabetes Ther (2021) 12:1227–1247
https://doi.org/10.1007/s13300-021-01035-9
REVIEW
Diabetes and Frailty: An Expert Consensus Statement on the Management of Older Adults with Type 2 Diabetes
W. David Strain · Su Down · Pam Brown · Amar Puttanna · Alan Sinclair
Complex/Intermediate (multiple (at least 3) co-existing chronic illnesses* or 2 or more instrumental ADL impairments or mild/moderate cognitive impairment
HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT
Mini-Cog
Instructions for Administration & Scoring
Scoring
Co-morbidity
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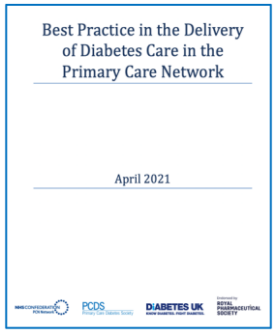
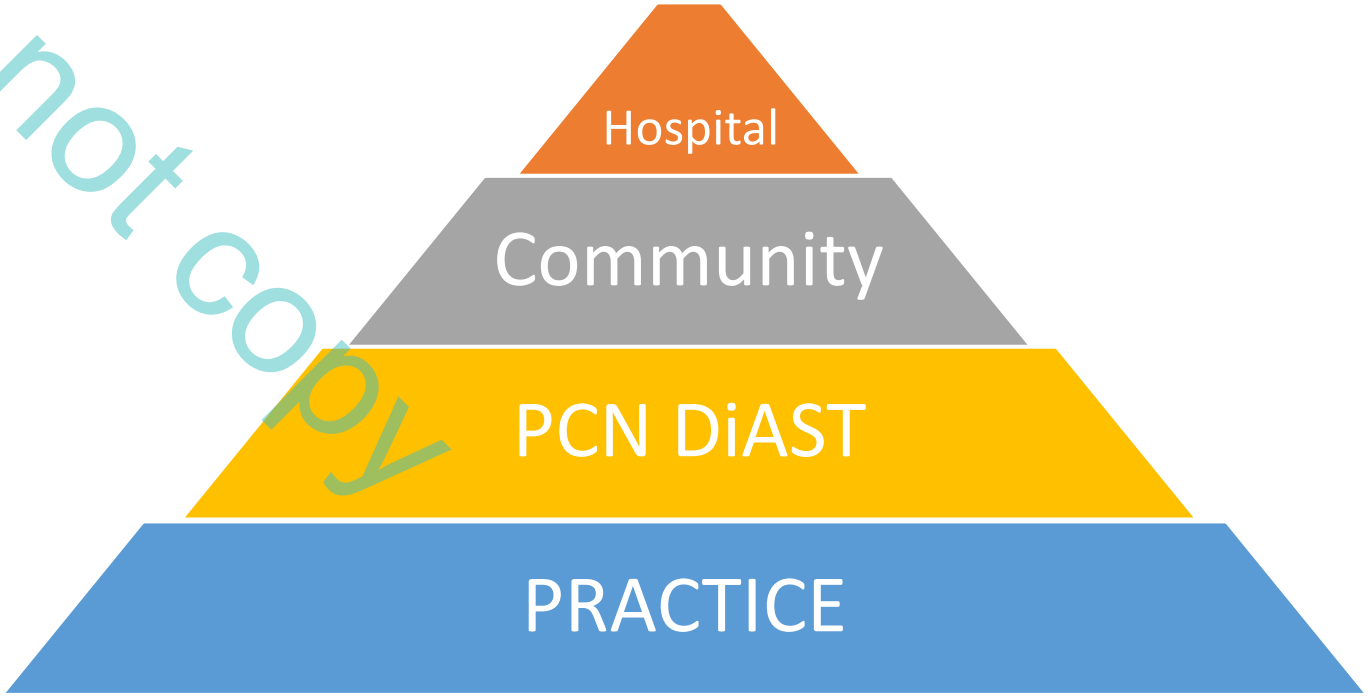
Integrating Diabetes Care



One of the key ways we are addressing this is by championing the chronic care model.An example of this might be to support the development of Diabetes Support Team (DiaST) model. It brings an additional layer of expertise into primary care.

Each layer has integrated support e.g. specialist clinical support, population health management tools, training offers, advice and guidance and drop-in sessions.



https://www.diabetesonthenet.com/journals/issue/637/article-details/glance-guide-best-practice-delivery-diabetes-care-primary-care-network

Multidomain Management Plans

- Glucose and HbA1c
- Blood pressure and lipids
- De-prescribing and hypoglycaemia management
- Frailty management
- Physical exercise
- Co-morbidity profile
- Technology
- Precision medicine

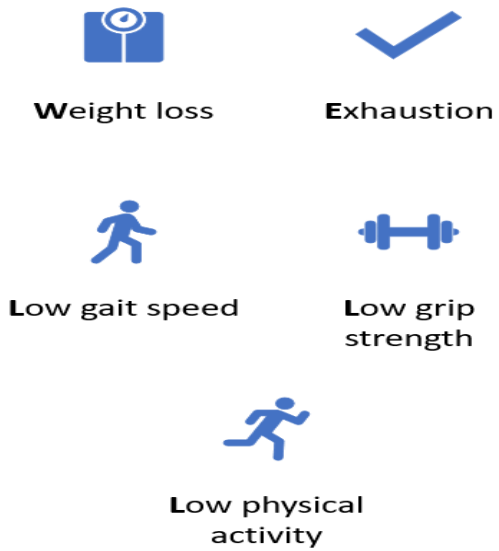
Three older adults with Diabetes : Mairead , Mahati and Matilda

- All three are patient that have passed through both your surgery doors and are friends and have been members of the local active retirement group.
- You know that Maire has recently been admitted to the local nursing home and this has had a significant impact on Mairead and Mahati who both spoke about this to your practice nurse .
- Mairead – Retired shopkeeper , living independently at home
- Mahati – Retired nurse , living with family
- Matilda – Retired nurse also and previous colleague of Mahati

Mairead

- 78 Yo lady Retired shopkeeper four children and two dogs
- Independent in ADL's , handles the family bills , likes to cook Sunday lunch for her family and enjoys walking her dogs in the woods near her house.
- Hx Type 2 Diabetes + Osteoarthritis
- Diabetes dx 7 years ago no renal impairment / complications of diabetes , retinal screen and foot check up to date.
- On metformin 1gram BD , Gliclazide M/R 30mg daily and Pioglitazone 15mg daily for her diabetes .
- Topical NSAIDS for osteoarthritis
- Hba1c 46
- EGFR 80 Urine ACR normal , BP 138/80

Frailty ? WELLL???



What are Maireads targets?

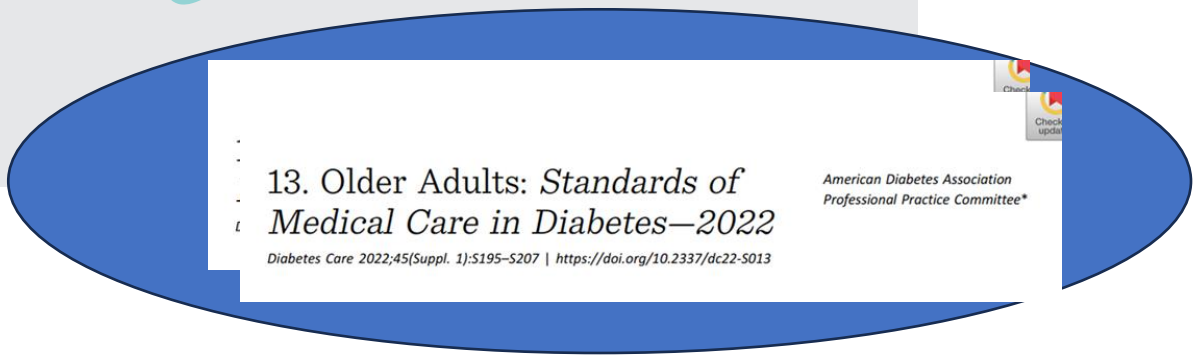
Hba1c

Blood pressure

Statin ?

Table 13.1—Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes

Patient characteristics/ health status	Rationale	Reasonable A1C goal‡	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.0–7.5% (53–58 mmol/mol)	80–130 mg/dL (4.4–7.2 mmol/L)	80–180 mg/dL (4.4–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or two or more instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<130/80 mmHg	Statin, unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or two or more ADL impairments)	Limited remaining life expectancy makes benefit uncertain	Avoid reliance on A1C; glucose control decisions should be based on avoiding hypoglycemia and symptomatic hyperglycemia	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<140/90 mmHg	Consider likelihood of benefit with statin



What are Maireads targets?

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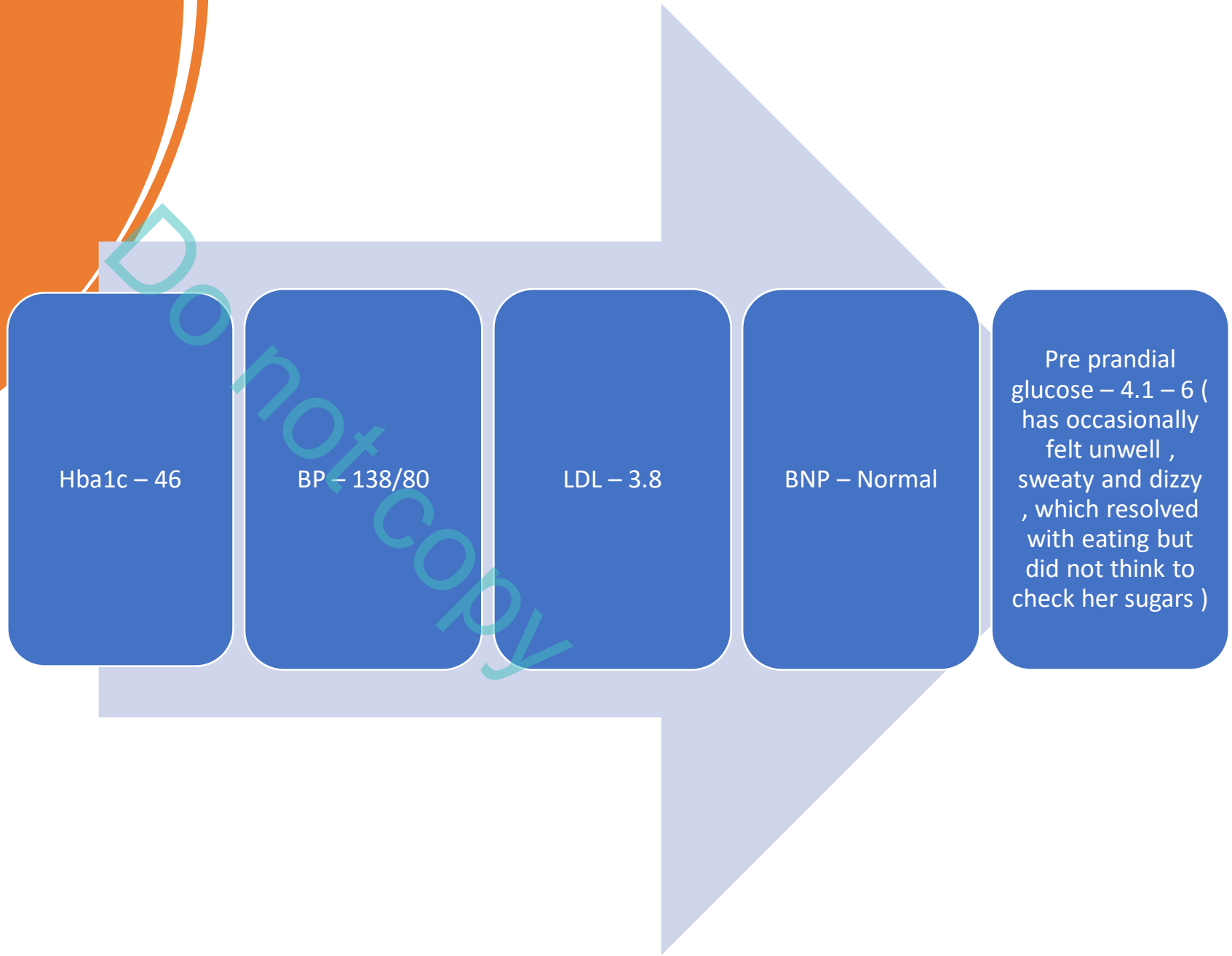
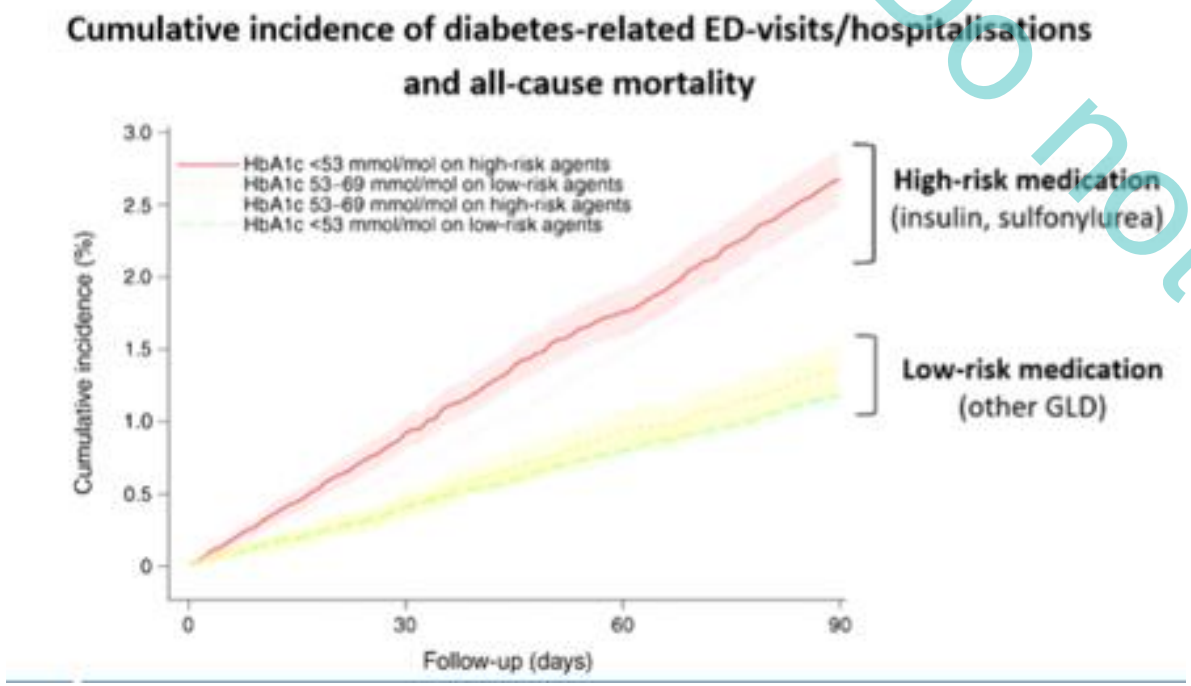
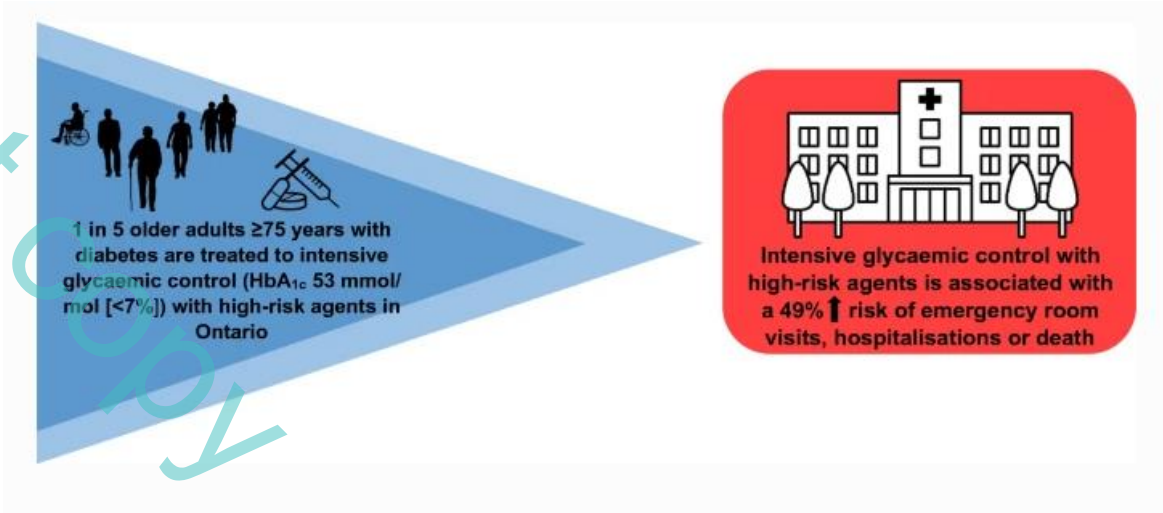
Results for Mairead



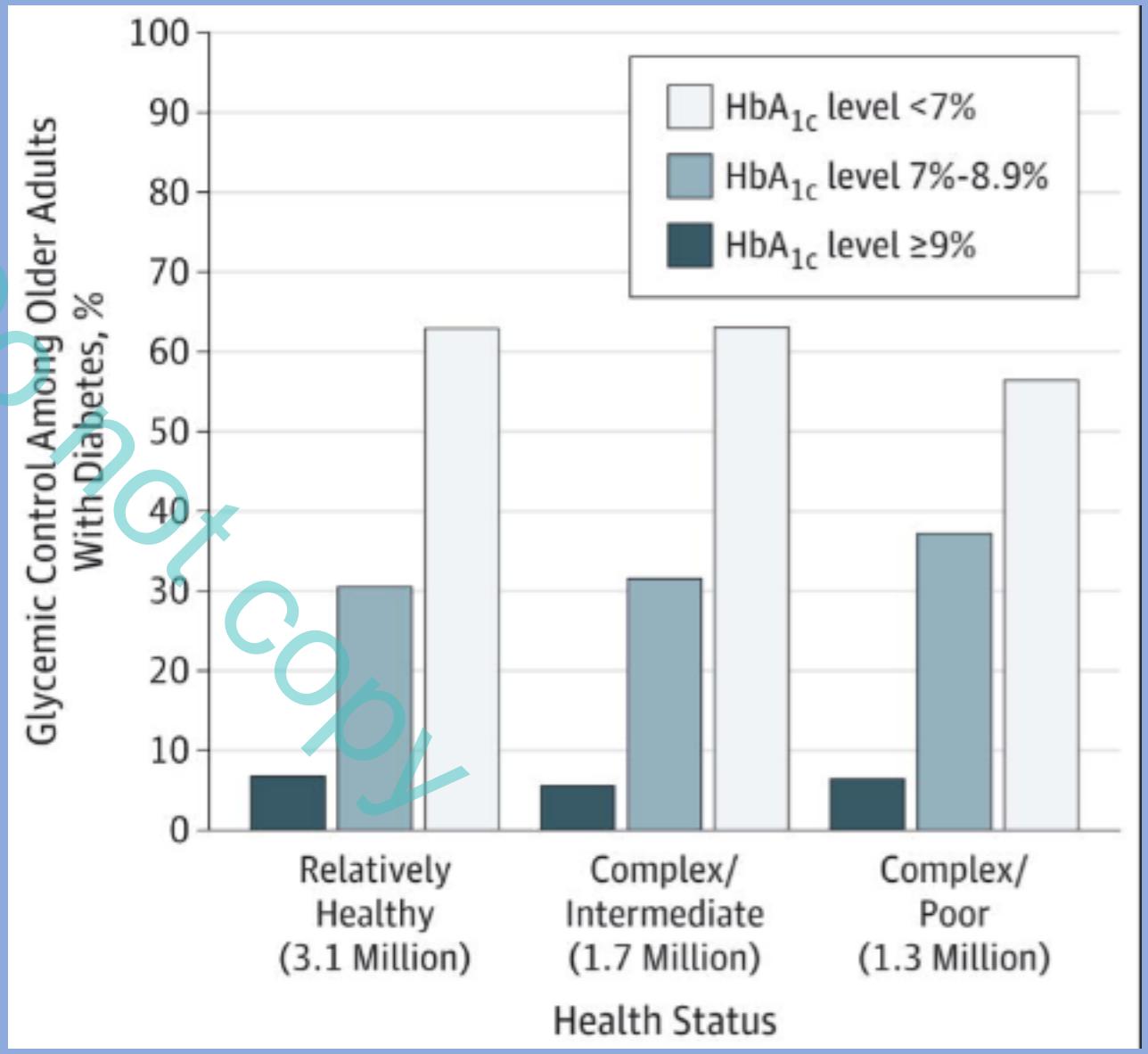
Overtreatment





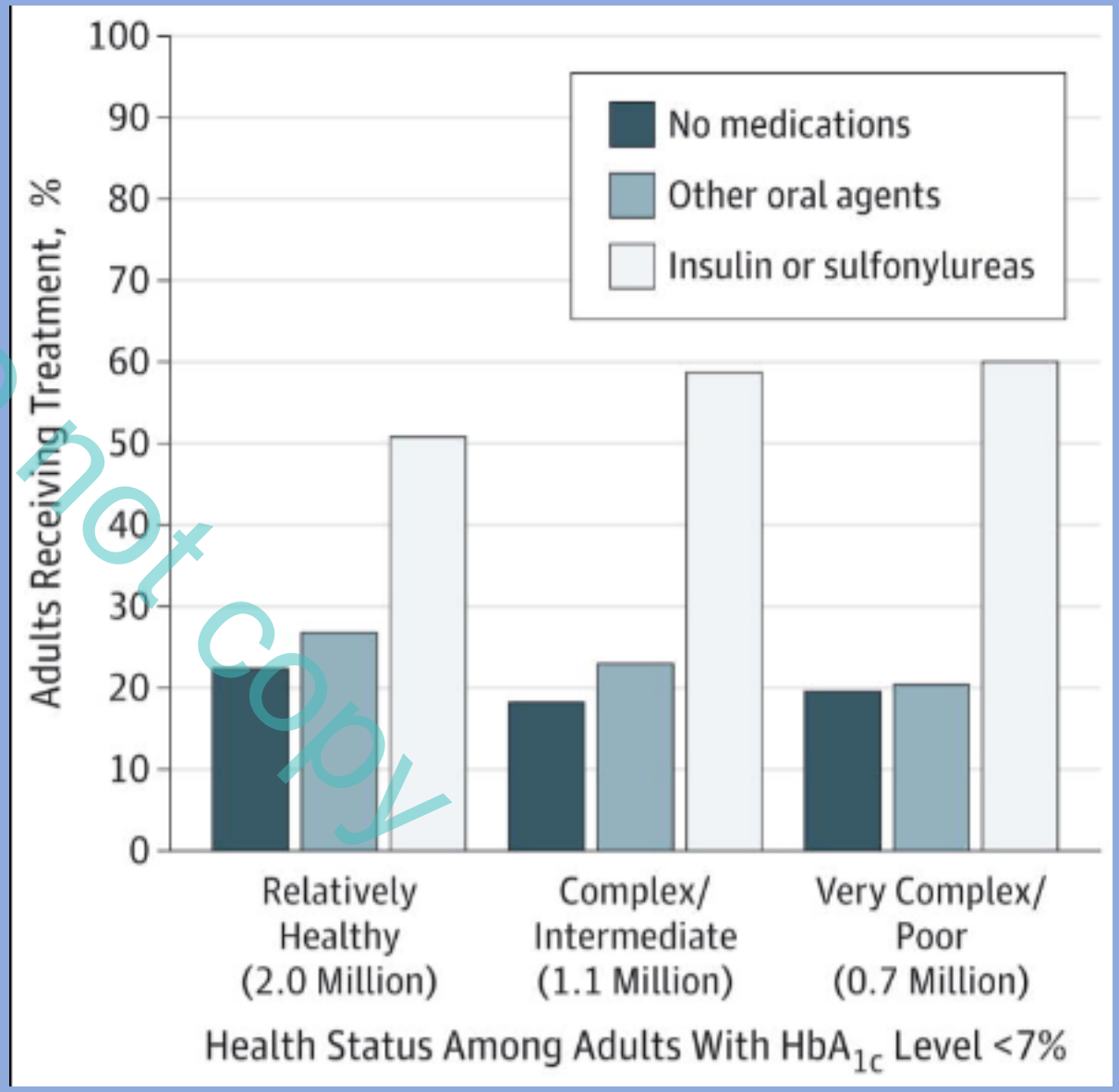
Lega, I.C., Campitelli, M.A., Austin, P.C. *et al.* Potential diabetes overtreatment and risk of adverse events among older adults in Ontario: a population-based study. *Diabetologia* **64**, 1093–1102 (2021). https://doi.org/10.1007/s00125-020-05370-7

Overtreatment



Lipska KJ, Ross JS, Miao Y, Shah ND, Lee SJ, Steinman MA. Potential overtreatment of diabetes mellitus in older adults with tight glycemic control. JAMA Intern Med. 2015 Mar;175(3):356-62. doi: 10.1001/jamainternmed.2014.7345. PMID: 25581565; PMCID: PMC4426991.

Overtreatment



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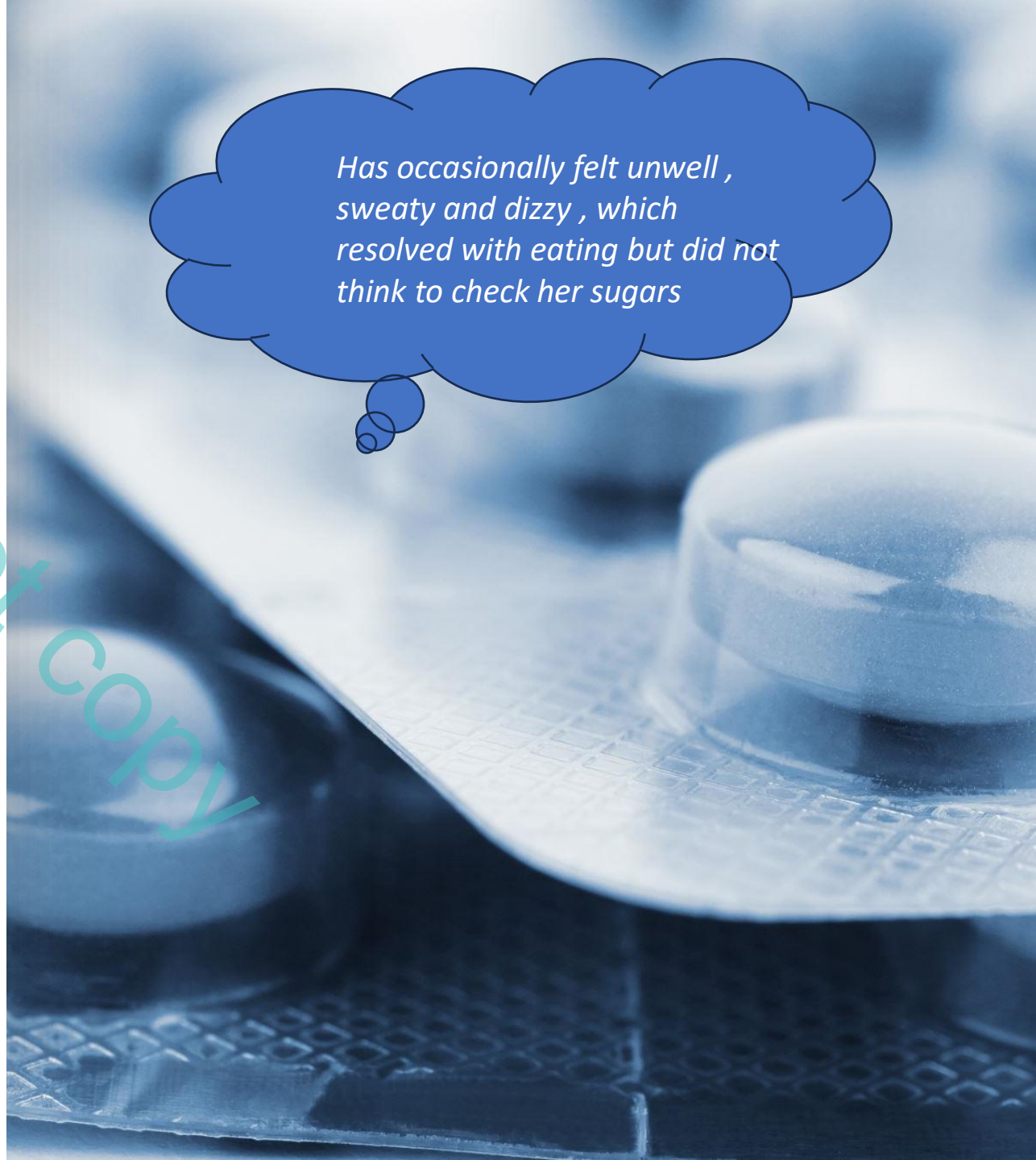
Hypoglycaemia

- Avoidance of hypoglycaemia is of paramount importance in the elderly/frail
- Increased risk of experiencing hypoglycaemia
- Consequences may be more profound
- Loss of the autonomic warning symptoms of hypoglycaemia (tremor, sweating, palpitations and nausea)
- Danger is of progression to very low blood glucose levels and the more serious problem of neuroglycopenia (confusion, behavioural change, speech difficulty, blurred vision, drowsiness and, ultimately, convulsions and coma



Deprescribing/De-intensification of Therapy

- Dose reduction
- Cessation of therapy
- Switch to an alternative product
- Why?
- To get better outcomes
- To reduce polypharmacy
- Are people bought into this ?
- Yep ! 80% talk the talk and 65% walk the walk

Genere et al Medicine 2021, Maser et al Int J Pract 2021

Deprescribing

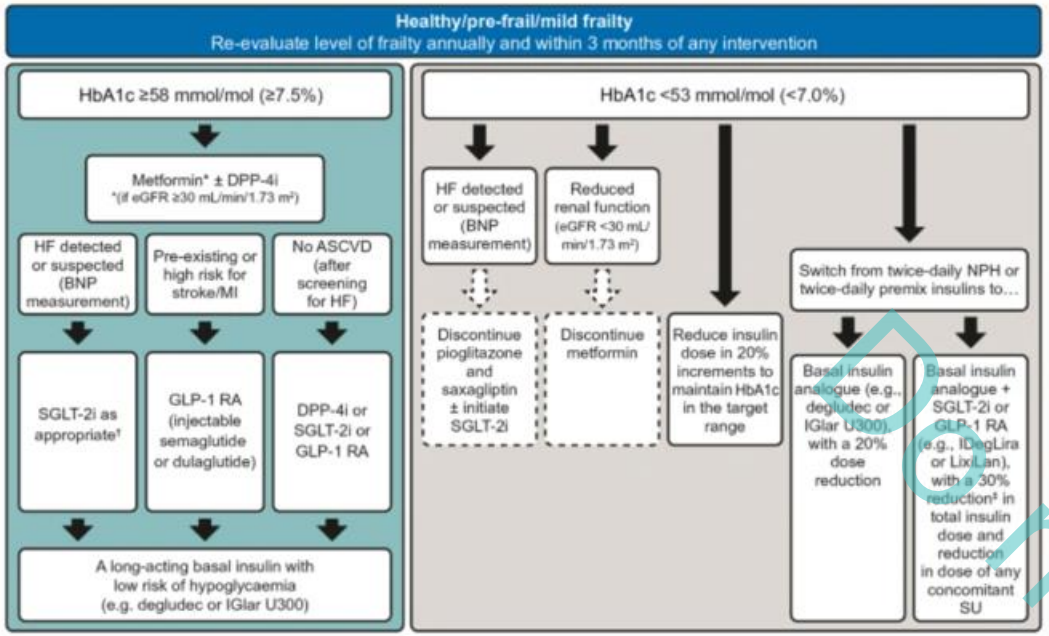
Deprescribing rates (6 studies)

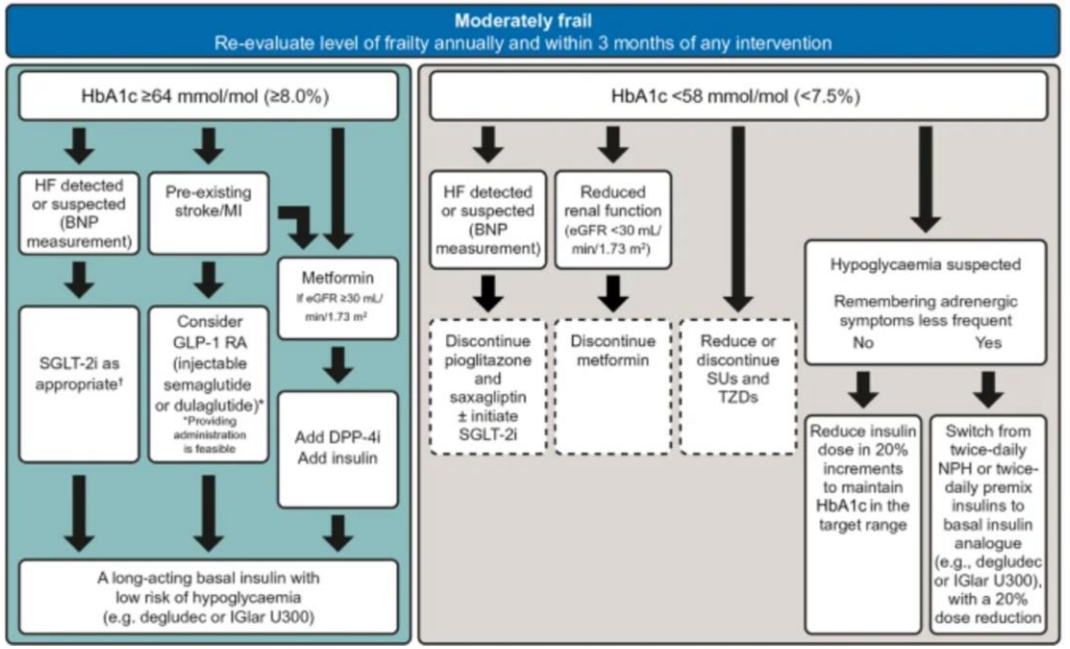
- Deprescribing rates varied from 14-21% for older people with HbA_{1c} <6.5%
- Minimal differences by clinical complexity, age, gender, race, frailty, or life expectancy

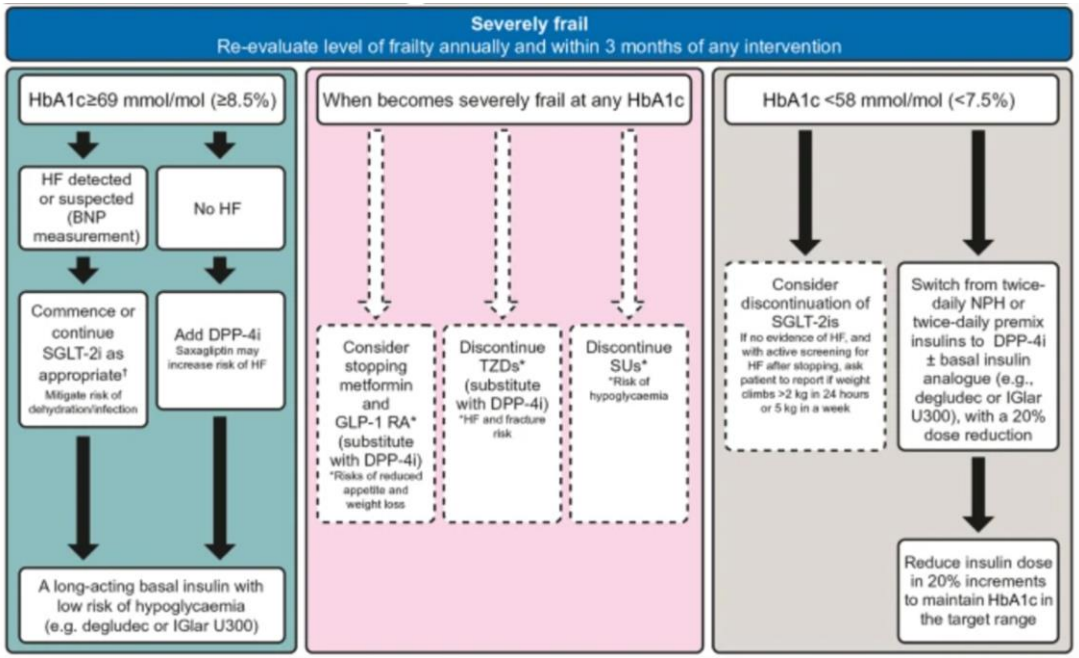
Success of deprescribing (4 studies)

- In those with stable HbA_{1c} levels, deprescribing was successful in 57-100%
- HbA_{1c} levels increased only minimally after deprescribing
- Hypoglycemia incidence was reduced after deprescribing vs no treatment change

Oktora MP, Kerr KP, Hak E, Denig P. Rates, determinants and success of implementing deprescribing in people with type 2 diabetes: A scoping review. Diabet Med. 2021 Feb;38(2):e14408. doi: 10.1111/dme.14408. Epub 2020 Oct 2. PMID: 32969063; PMCID: PMC7891362.







Diabetes Ther (2021) 12:1227–1247
https://doi.org/10.1007/s13300-021-01035-9

REVIEW

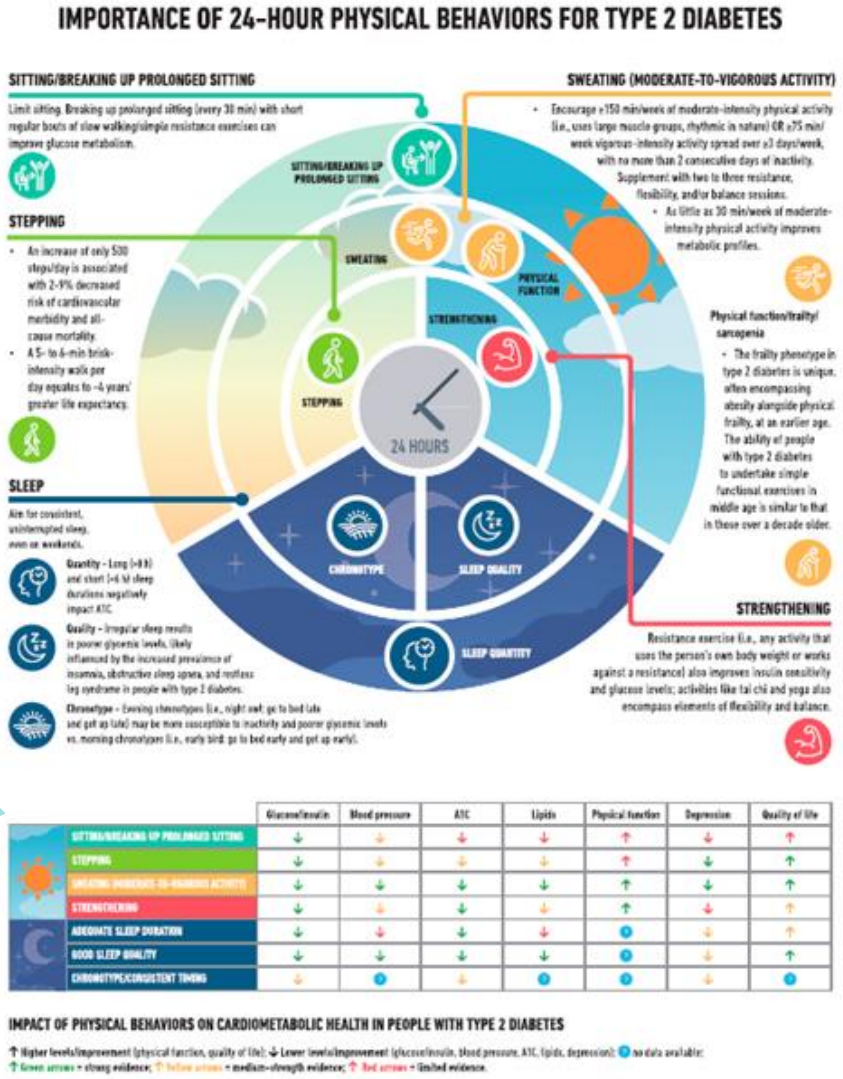
Diabetes and Frailty: An Expert Consensus Statement on the Management of Older Adults with Type 2 Diabetes

W. David Strain · Su Down · Pam Brown · Amar Puttanna · Alan Sinclair

Metformin	Sulphonylurea (Diamicron)	Pioglitazone
• Reduction in appetite • EGFR • Sick Day Rules • B12 monitoring	• Hypoglycaemia risk • Requires monitoring of blood sugars • Can cause weight gain	• Not prone to causing hypoglycaemia • Risk of inducing heart failure in the elderly • Concerns about the possible association with fracture risk and bladder cancer • Pioglitazone may lead to weight gain

Multidomain Management Plans

- Glucose and HbA1c
- Blood pressure and lipids
- De-prescribing and hypoglycaemia management
- Frailty management
- Physical exercise
- Co-morbidity profile
- Technology
- Precision medicine



Screening for Geriatric syndromes

Multidomain Management Plans

- Glucose and HbA1c
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- Technology
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- Polypharmacy
- Cognitive impairment
- ***Depression***
- Urinary incontinence
- Injurious falls
- Persistent pain
- Frailty

- Chart review
- Mairead had attended with low mood following the death of her sister and the deterioration in health of her friend Maire who has been admitted to a nursing home.
- She worries about becoming and burden on her family in the future and misses the social interactions she used to have since the pandemic

Plan for Mairead

- Stop gliclazide and pioglitazone
- Recheck hba1c 3/12 and consider whether to reduce metformin
- Happy with metformin , appetite normal and fbc normal.
- Check B12
- Add ramipril 2.5mg daily
- Add statin
- Referral to social prescribing/ local living well program , signposted to local Exercise in older adults page
- Encouraged to consider local active retirement group
- Given local resources for online and face to face psychological interventions

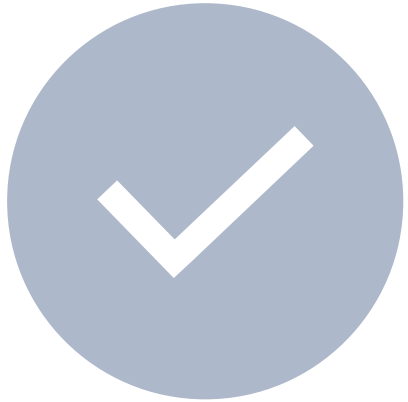
Mahati

- 76 yo lady retired nurse. Knows Mairead through their friend Maire , who she worked as a nurse alongside.
- From Kerala in India
- She has 3 sons who are very supportive and lives in a bungalow.
- What do we need to know about Mahati ??

What do we need to know about Mahati?

CO MORBIDITIES

COGNITIVE STATUS



FUNCTIONAL STATUS

Co morbities	Cognitive status	Functional status
Type 2 Diabetes diagnosed 10 years ago Atrial Fibrillation Previous MI Osteoarthritis Overactive bladder Prior right knee replacement Egfr 62 , BMI 28 Undergoing workup for SOB . BNP 356 . Echo awaited	Attended last year worried about her memory Occasionally forgets names and needs lists to ensure she does all of her daily tasks . MMSE 28/30. Enduring Power of Attorney in place	ADLS – Independent washing , dressing , on flat even ground does not use any walking aids but uses a stick on uneven ground Had 1 fall this year Her son and daughter in law help with shopping and bills

Medication List

- Metformin 1gram BD
- Linagliptin 5mg od po
- Frusemide 40mg od po
- Ramipril 5mg od po
- Atorvastatin 20mg od po
- Apixiban 5mg bd po
- Bisoprolol 2.5mg od po
- Po NSAID
- Paracetamol 1gram QDS po / prn
- Mirabegron 25mg od po

Frailty ? WELLL???

- *Polypharmacy*
- *Cognitive impairment*
- Depression
- Urinary incontinence
- *Injurious falls*
- *Persistent pain*
- *Frailty*

What are Mahati's targets?

Hba1c

Blood pressure

Statin ?

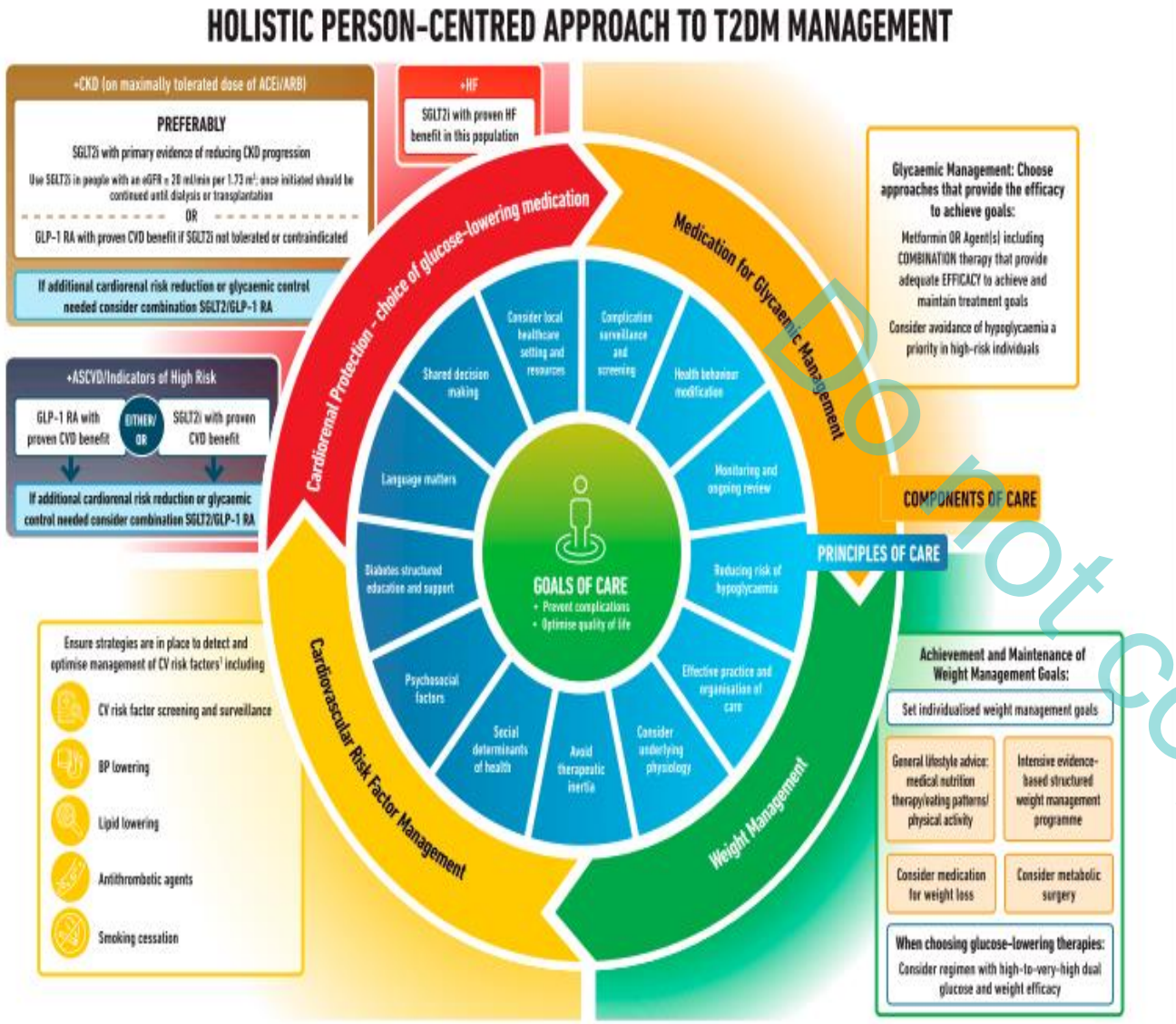
Complex/Intermediate (multiple (at least 3) co-existing chronic illnesses* or 2 or more instrumental ADL impairments or mild/moderate cognitive impairment

Clinical Frailty Score	Rationale	HbA1c mmol/mol	Blood Glucose (testing if on insulin or other agents that may cause hypoglycaemia)	Blood pressure (mmHg) clinic	Blood pressure (mmHg) ABPM or HBPM	Lipids
5-6	intermediate remaining life expectancy 5-10 years, high treatment burden, falls risk	53-64	Pre-prandial 6 -8mmol/L Bedtime 6- 9mmol/	<140/90 (check no postural drop, target on standing) <130/80 If CKD (albuminuria>70mg/mmol) If diastolic BP<70mmHg consider deescalating therapy as decreases cerebral perfusion and increases risk of cognitive decline	<135/85 (check no postural drop, target on standing) < 125/75 If CKD (albuminuria>70mg/mmol) If diastolic BP<70mmHg consider deescalating therapy as decreases cerebral perfusion and increases risk of cognitive decline	Secondary prevention: As per NICE guidance Primary Prevention: Offered if <85 years old and QRISK 3 score >10% or FH / Inherited Lipid Disorder / eGFR <60 ± Proteinuria As per NICE guidance being extra mindful of: – Drug interactions – Altered pharmacokinetics/pharmacodynamics Consideration to be given to start at a low dose and titrate if there is renal impairment or potential drug interactions

Mahatis's results

- FBC – normal
- U/E – Egfr 62
- LFT – NAD
- Hba1c 70
- Lipids – LDL 1.4
- BNP – 356
- Urine ACR NAD
- BP 123/81

What should we do for Mahatis Diabetes ?



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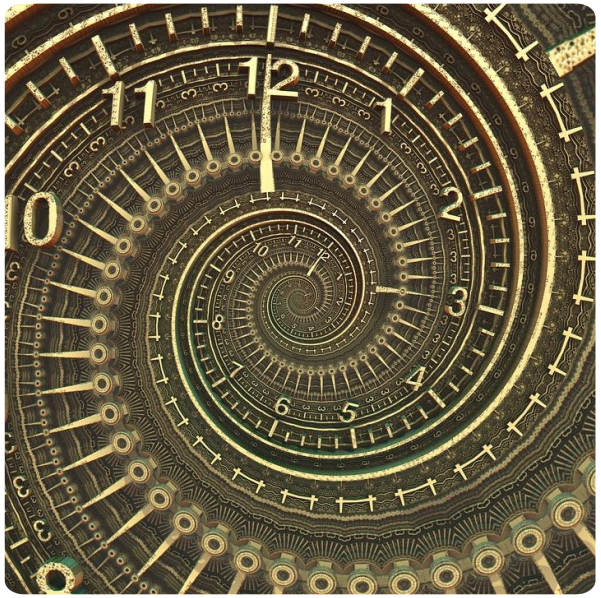
- Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB *Diabetes Care* 2022; https://doi.org/10.2337/dci22-0034. *Diabetologia* 2022; https://doi.org/10.1007/s00125-022-05787-2.

MID Frail



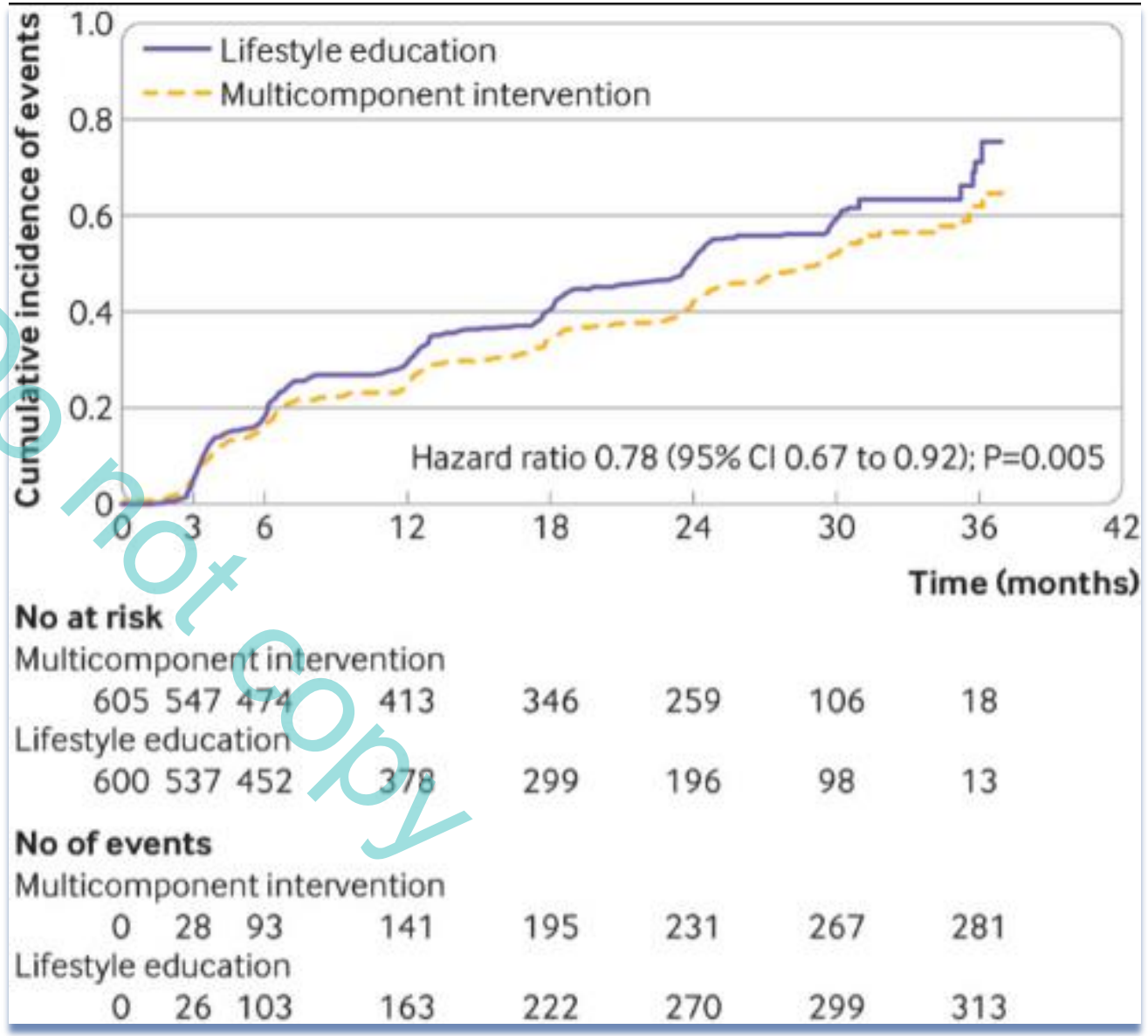
To look at the effectiveness of a multi-modal intervention (education, diet and exercise) in frail and pre-frail subjects aged equal or older than 70 years with T2D with respect to change in function and quality of life 24 months after they are randomized.

After 12 months, participants had mean SPPB scores 0.85 points higher than those in the standard care arm (95% CI, 0.44 to 1.26, $P < 0.0001$).

Estimates suggest a mean saving following intervention of 428.02 EUR (2016) per patient per year, with ICER analysis indicating a consistent benefit of the described health care intervention over usual care.

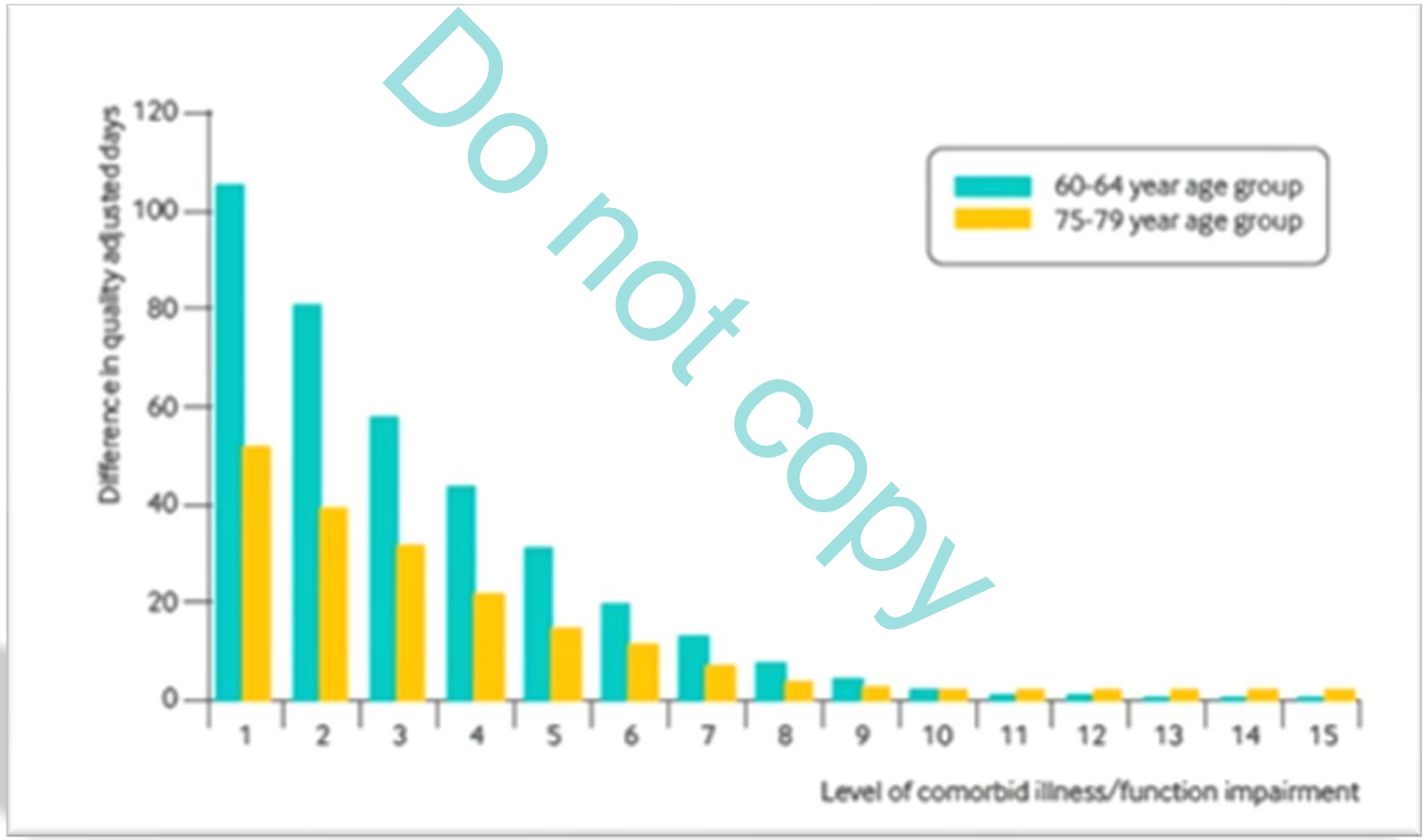
Rodriguez-Mañas L, Laosa O, Vellas B, Paolisso G, Topinkova E, Oliva-Moreno J, Bourdel-Marchasson I, Izquierdo M, Hood K, Zeyfang A, Gambassi G, Petrovic M, Hardman TC, Kelson MJ, Bautmans I, Abellan G, Barbieri M, Peña-Longobardo LM, Regueme SC, Calvani R, De Buyser S, Sinclair AJ; European MID-Frail Consortium. Effectiveness of a multimodal intervention in functionally impaired older people with type 2 diabetes mellitus. J Cachexia Sarcopenia Muscle. 2019 Aug;10(4):721-733. doi: 10.1002/jcsm.12432. Epub 2019 Apr 23. PMID: 31016897; PMCID: PMC6711410.

Multicomponent Interventions



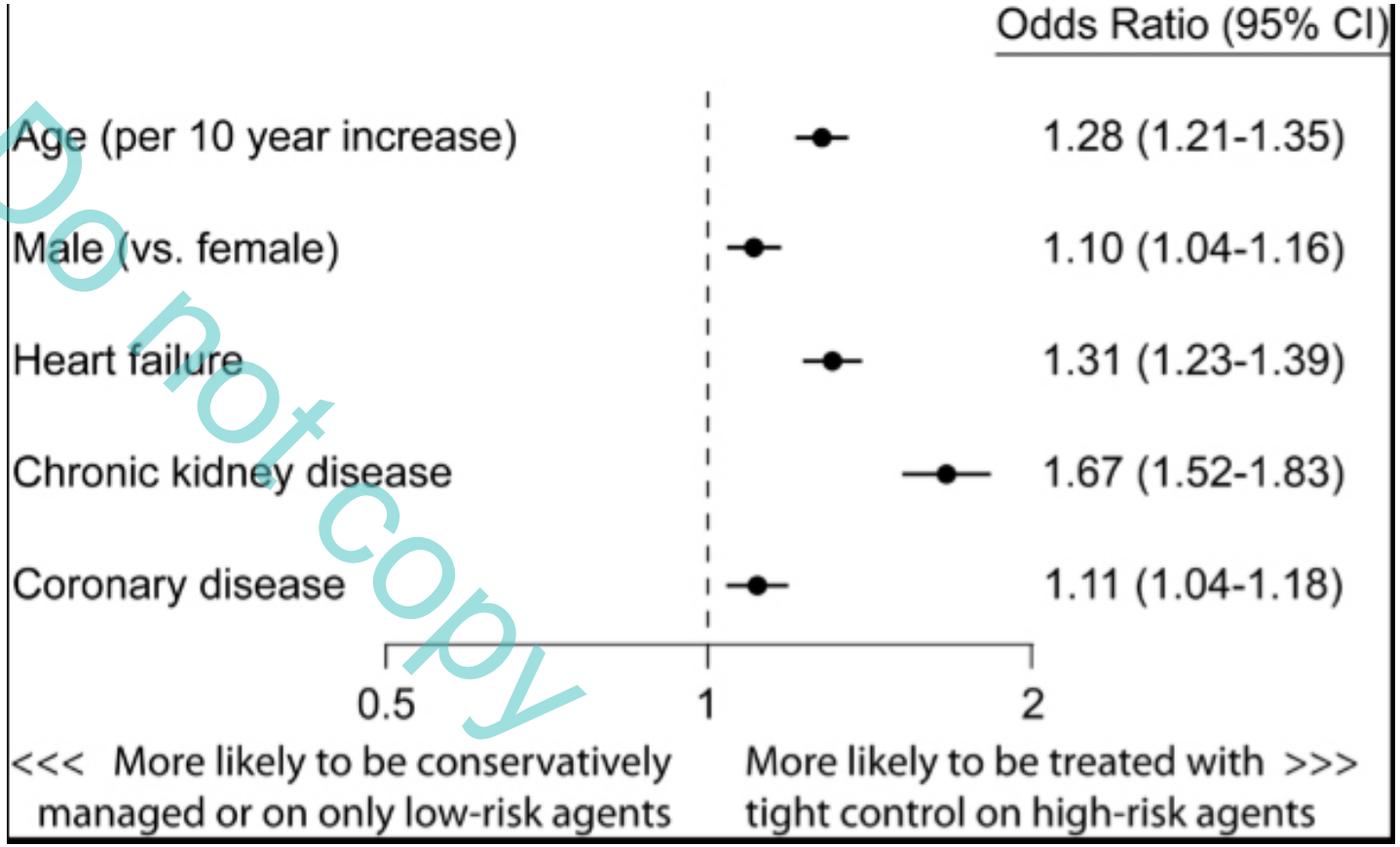
Bernabei R, Landi F, Calvani R, Cesari M, Del Signore S, Anker SD, Bejuit R, Bordes P, Cherubini A, Cruz-Jentoft AJ, Di Bari M, Friede T, Gorostiaga Ayestarán C, Goyeau H, Jónsson PV, Kashiwa M, Lattanzio F, Maggio M, Mariotti L, Miller RR, Rodriguez-Mañas L, Roller-Wirnsberger R, Rýznarová I, Scholpp J, Schols AMWJ, Sieber CC, Sinclair AJ, Skalska A, Strandberg T, Tchalla A, Topinková E, Tosato M, Vellas B, von Haehling S, Pahor M, Roubenoff R, Marzetti E; SPRINTT consortium. Multicomponent intervention to prevent mobility disability in frail older adults: randomised controlled trial (SPRINTT project). BMJ. 2022 May 11;377:e068788. doi: 10.1136/bmj-2021-068788. PMID: 35545258; PMCID: PMC9092831.

Co-morbid illness attenuates the benefits of tight glycaemia control



Huang ES, Zhang Q, Gandra N, Chin MH, Meltzer DO. The effect of comorbid illness and functional status on the expected benefits of intensive glucose control in older patients with type 2 diabetes: a decision analysis. Ann Intern Med. 2008 Jul 1;149(1):11-9. doi: 10.7326/0003-4819-149-1-200807010-00005. PMID: 18591633; PMCID: PMC2562733.

Overtreatment



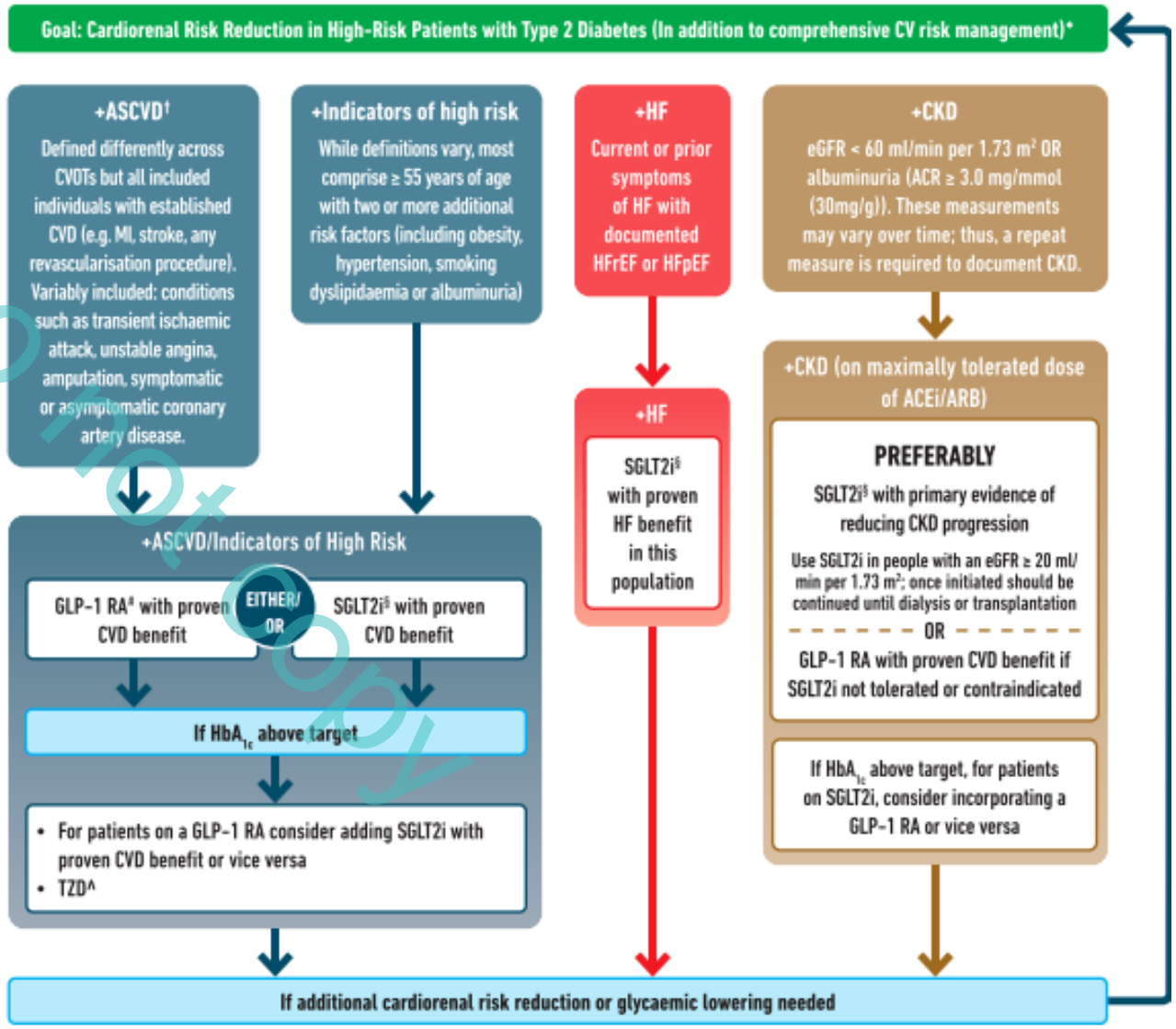
- Arnold SV, Lipska KJ, Wang J, Seman L, Mehta SN, Kosiborod M. Use of Intensive Glycemic Management in Older Adults with Diabetes Mellitus. J Am Geriatr Soc. 2018 Jul;66(6):1190-1194. doi: 10.1111/jgs.15335. Epub 2018 Apr 10. PMID: 29633237; PMCID: PMC7032960.

Frailty Phenotypes for Diabetes

Anorexic Malnourished (AM)	Sarcopenic Obese (SO)
Low body weight	Higher body weight
Anorexia of aging	No anorexia of aging
Lower cholesterol	Higher cholesterol
Lower albumin	Normal albumin
Decreased insulin resistance	Increase insulin resistance
Hypoglycaemia risk	Hyperglycaemia risk
Regressive in nature	Progressive in nature

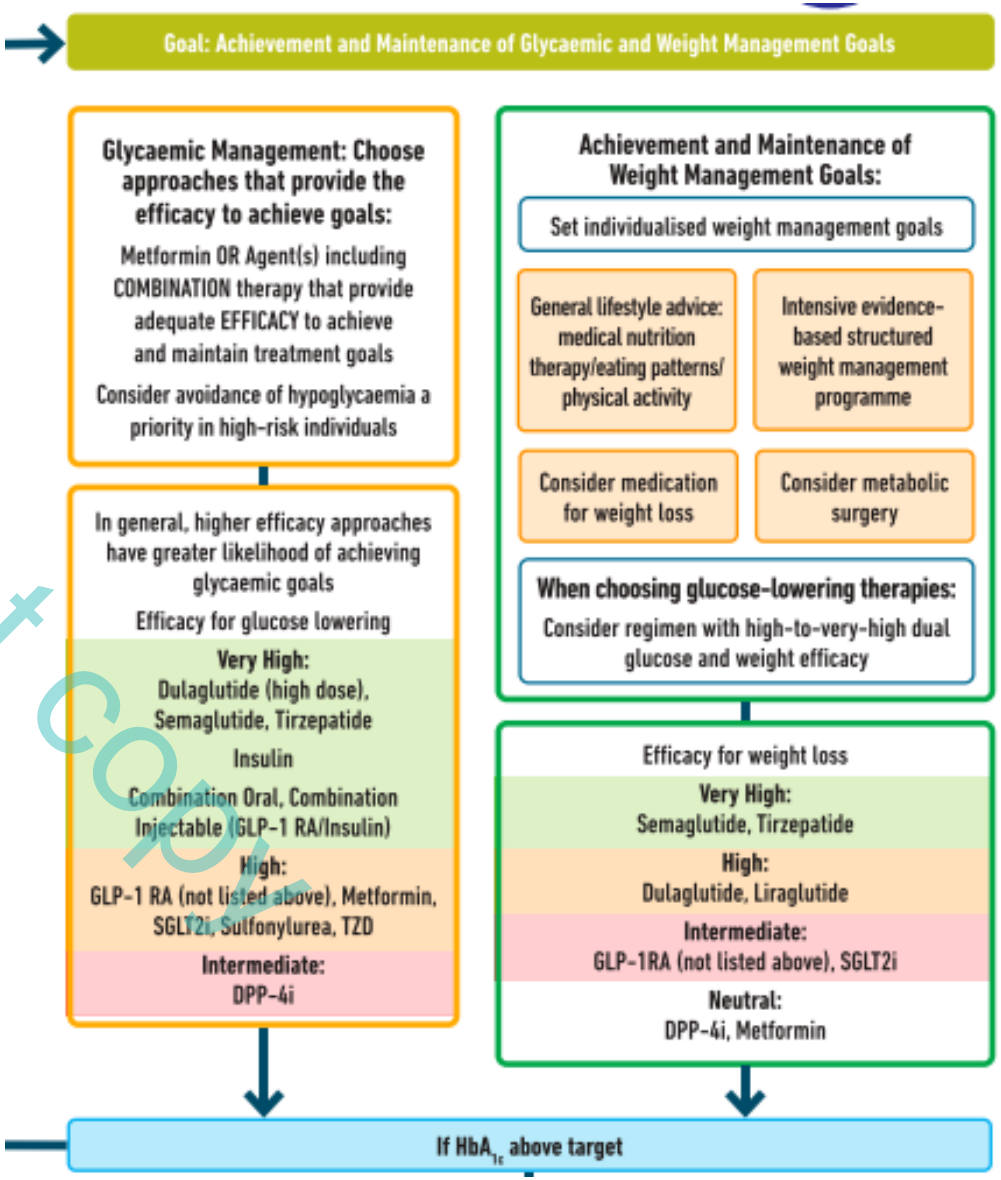
De-intensify therapy **Relax targets** **Do not sue GLP-1 or SGLT2i therapy**	**Escalate therapy** **Try to attain target hyperglycaemia** **Use GLP-1 and SGLT2i therapy**

Pharmacological Goal 1: decrease cardiorenal risk



- Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB
Diabetes Care 2022; https://doi.org/10.2337/dci22-0034.
Diabetologia 2022; https://doi.org/10.1007/s00125-022-05787-2.

Pharmacological Goal 2: achieve weight and glycaemic targets



- Davies MJ, Aroda VR, Collins BS, Gabbay RA, Green J, Maruthur NM, Rosas SE, Del Prato S, Mathieu C, Mingrone G, Rossing P, Tankova T, Tsapas A, Buse JB
Diabetes Care 2022; https://doi.org/10.2337/dci22-0034.
Diabetologia 2022; https://doi.org/10.1007/s00125-022-05787-2.

Benefits vs Risks – SGLT2s and GLP-1s

Drug Class	Benefits	Risks
SGLT2	CVOTs have shown reduction in MACE Benefits demonstrated for people with diabetes and heart failure Potential benefit in reducing progression of renal impairment Low hypoglycaemia risk	Weight loss could result in sarcopenia Risk of candidiasis Potential increased urinary incontinence Lack of glucose-lowering efficacy in established renal impairment Risk of euglycaemic diabetic ketoacidosis Fluid volume depletion

https://diabetesonthenet.com/wp-content/uploads/pdf/dotn024ae8fb1b78500b7bc752b98e9b6d92.pdf

Sick day rules

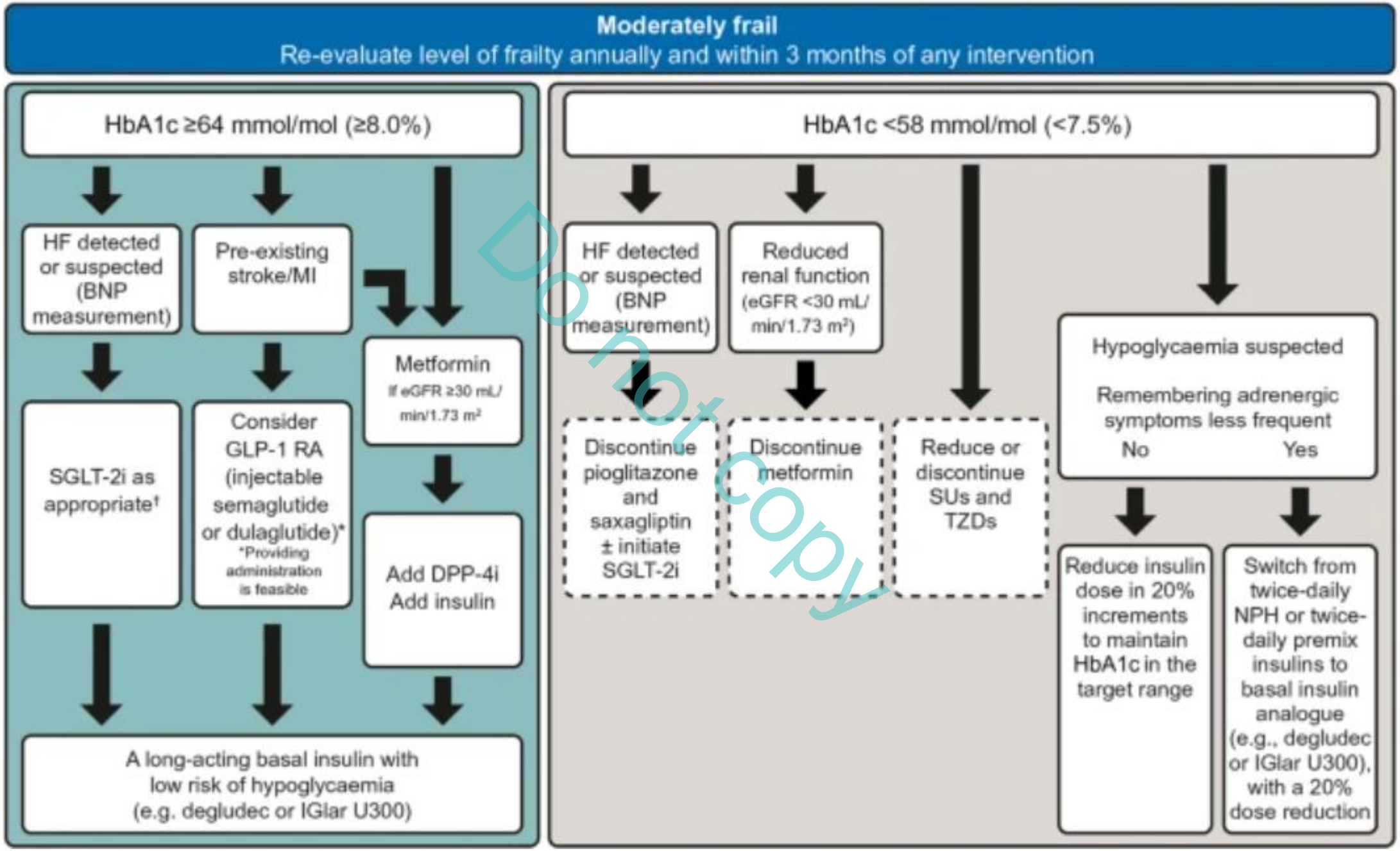
General advice for managing diabetes during intercurrent illness

S (Sugar)	• Blood glucose levels can rise during illness even if the person is not eating • Advise to increase blood glucose monitoring if the person has access to it • Diabetes medications (sulfonylureas and insulin doses) may need to be increased temporarily during illness to manage these raised glucose levels
I (Insulin)	• **NEVER** stop insulin or oral diabetes medications* • Insulin doses may need to be increased during illness, especially if ketones are present • Specific advice for people on insulin therapy is presented overleaf
C (Carbohydrate)	• Ensure the person maintains hydration and carbohydrate intake • If the person is not able to eat or is vomiting, advise to replace meals with sugary fluids • If blood glucose levels are high, maintain fluid intake with sugar-free fluids • If blood glucose levels are low, encourage regular intake of sugary fluids
K (Ketones)	• In type 1 diabetes, advise to check for ketones every 4–6 hours. If present, check every 2 hours • Give **extra rapid-acting insulin doses** (in addition to regular doses) based on total daily insulin dose if ketones are present – see insulin algorithm overleaf • Advise to drink plenty of water to maintain hydration and flush through ketones

*Metformin and SGLT2 inhibitors may need to be temporarily stopped if at risk of dehydration (see SADMAN rules below.

Benefits vs. Risks GLP-1s

Drug Class	Benefits	Risks
GLP-1s	CVOTs have shown CV benefits with some, particularly in patients with ASCVD, and those at high risk of CV events Renoprotective effects Low hypoglycaemia risk despite good glucose-lowering efficacy Once-weekly administration possible with some A once-daily oral formulation of semaglutide is now available	Weight loss could result in sarcopenia Nausea is common, and reduced appetite could be problematic Most are given by sc injection Relatively expensive


Moderately frail
Re-evaluate level of frailty annually and within 3 months of any intervention
HbA1c ≥64 mmol/mol (≥8.0%)
HF detected or suspected (BNP measurement)
Pre-existing stroke/MI
Metformin
If eGFR ≥30 mL/min/1.73 m²
SGLT-2i as appropriate†
Consider GLP-1 RA (injectable semaglutide or dulaglutide)*
*Providing administration is feasible
Add DPP-4i
Add insulin
A long-acting basal insulin with low risk of hypoglycaemia (e.g. degludec or IGlar U300)
HbA1c <58 mmol/mol (<7.5%)
HF detected or suspected (BNP measurement)
Reduced renal function (eGFR <30 mL/min/1.73 m²)
Discontinue pioglitazone and saxagliptin ± initiate SGLT-2i
Discontinue metformin
Reduce or discontinue SUs and TZDs
Hypoglycaemia suspected
Remembering adrenergic symptoms less frequent
No
Yes
Reduce insulin dose in 20% increments to maintain HbA1c in the target range
Switch from twice-daily NPH or twice-daily premix insulins to basal insulin analogue (e.g., degludec or IGlar U300), with a 20% dose reduction

What about DPP4 Inhibitors ?

- Commonly prescribed and generally well tolerated
- Less potent than other groups

Mahati's management plan

- Add SGLT2 Inhibitor with proven cardiovascular benefit
- Trial off frusemide
- Refer to community hub cardiology to request echocardiography
- Review 1/12 to check for side effects of above changes including BP , any symptoms HF.
- Referral to public health nurse and physiotherapy to assess gait and for walking aids after fall.
- Online diabetes education program for Mahati to revise with her family. Consider attendance at refresher structured education program .
- Signposted to Exercise in Older adults resources

Neurocognitive dysfunction in Diabetes

13. Older Adults: *Standards of Medical Care in Diabetes—2022*

*American Diabetes Association Professional Practice Committee**

Diabetes Care 2022;45(Suppl. 1):S195–S207 | https://doi.org/10.2337/dc22-S013

Poor glycaemic control is associated with a decline in cognitive function , and longer duration of diabetes is associated with worsening cognitive function.

People with diabetes have higher incidences of all cause dementia, Alzheimer disease, and vascular dementia than people with normal glucose tolerance

Pilot studies in patients with mild cognitive impairment evaluating the potential benefits of intranasal insulin therapy and metformin therapy provide insights for future clinical trials and mechanistic studies

Annual screening for cognitive impairment – is this possible ???

Mini-Cog©

Instructions for Administration & Scoring

ID:_____ Date: _____

Step 1: Three Word Registration

Look directly at person and say, "Please listen carefully. I am going to say three words that I want you to repeat back to me now and try to remember. The words are [select a list of words from the versions below]. Please say them for me now." If the person is unable to repeat the words after three attempts, move on to Step 2 (clock drawing).

The following and other word lists have been used in one or more clinical studies.[1-3] For repeated administrations, use of an alternative word list is recommended.

Version 1	Version 2	Version 3	Version 4	Version 5	Version 6
Banana	Leader	Village	River	Captain	Daughter
Sunrise	Season	Kitchen	Nation	Garden	Heaven
Chair	Table	Baby	Finger	Picture	Mountain

Step 2: Clock Drawing

Say: "Next, I want you to draw a clock for me. First, put in all of the numbers where they go." When that is completed, say: "Now, set the hands to 10 past 11."

Use preprinted circle (see next page) for this exercise. Repeat instructions as needed as this is not a memory test. Move to Step 3 if the clock is not complete within three minutes.

Step 3: Three Word Recall

Ask the person to recall the three words you stated in Step 1. Say: "What were the three words I asked you to remember?" Record the word list version number and the person's answers below.

Word List Version: _____ Person's Answers: _____ _____ _____

Scoring

Word Recall: ____ (0-3 points)	1 point for each word spontaneously recalled without cueing.
Clock Draw: ____ (0 or 2 points)	Normal clock = 2 points. A normal clock has all numbers placed in the correct sequence and approximately correct position (e.g., 12, 3, 6 and 9 are in anchor positions) with no missing or duplicate numbers. Hands are pointing to the 11 and 2 (11:10). Hand length is not scored. Inability or refusal to draw a clock (abnormal) = 0 points.
Total Score: ____ (0-5 points)	Total score = Word Recall score + Clock Draw score. A cut point of <3 on the Mini-Cog™ has been validated for dementia screening, but many individuals with clinically meaningful cognitive impairment will score higher. When greater sensitivity is desired, a cut point of <4 is recommended as it may indicate a need for further evaluation of cognitive status.

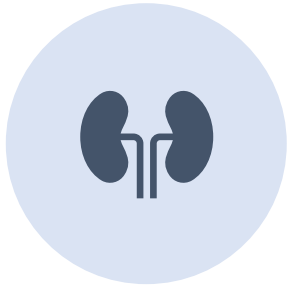
Matilda

82 yo lady hx Type 2 Diabetes

Recently admitted to a nursing home from hospital after a fall with a hip fracture .

Had a CVA in hospital with some residual unilateral weakness .

Widowed since last year, no children . Had a carer at home 3 times a week prior to admission and was supported by neighbours and friends as much as possible.



CO-MORBIDITIES

COGNITIVE STATUS

FUNCTIONAL STATUS

What do we need to know about Matilda?

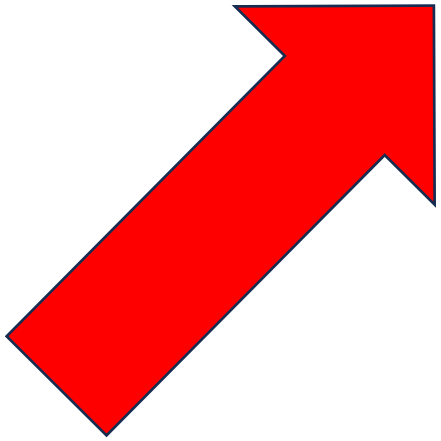
Co morbidities	Cognitive status	Functional status
Diabetes x 10 years Recent hip fracture Recent CVA with some residual right sided weakness Two x prior TIAs Hypertension , Hyperlipidaemia Renal Impairment EGFR 45 Osteoporosis Osteoarthritis	Diagnosis of Alzheimer's Disease MMSE 21	Mobility - very unsteady on feet , walks with mobility aid but high falls risk and needs some supervision. Assistance with washing and toileting 

Medication list

- Metformin 1gram BD
- Gliclazide 80mg bd
- Pioglitazone 30mg daily
- **Linagliptin 5mg mane**
- **Semaglutide 1gram once a week**
- Aspirin 75mg daily
- Amlodipine 10mg daily
- Atorvastatin 10mg nocte
- Calcium / Vitamin D
- Denosumb every 6 months
- Topical NSAID gel
- Paracetamol 1 gram TDS / PRN

Frailty Phenotypes for Diabetes

Anorexic Malnourished (AM)	Sarcopenic Obese (SO)
Low body weight	Higher body weight
Anorexia of aging	No anorexia of aging
Lower cholesterol	Higher cholesterol
Lower albumin	Normal albumin
Decreased insulin resistance	Increase insulin resistance
Hypoglycaemia risk	Hyperglycaemia risk
Regressive in nature	Progressive in nature



De-intensify therapy **Relax targets** **Do not sue GLP-1 or SGLT2i therapy**	**Escalate therapy** **Try to attain target hyperglycaemia** **Use GLP-1 and SGLT2i therapy**

What are Matilda's targets?

Hba1c

Blood pressure

Statin ?

Very Complex/Poor health (end stage chronic illness** or palliative approach or moderate/severe cognitive impairment or dependent on others for 2 or more ADL

Clinical Frailty Score	Rationale	HbA1c mmol/mol	Blood Glucose (testing if on insulin or other agents that may cause hypoglycaemia)	Blood pressure (mmHg) clinic	Blood pressure (mmHg) ABPM or HBPM
7-8	limited life expectancy < 5 years	58-69	Pre-prandial 7 -10mmol/L Bedtime 7 -11mmol/	<150/90 (check no postural drop, target on standing) <140/80 if CKD (albuminuria>70mg/mmol) If diastolic BP<70mmHg consider deescalating therapy as decreases cerebral perfusion and increases risk of cognitive decline	<145/85 (check no postural drop, target on standing) <135/75 if CKD (albuminuria>70mg/mmol) If diastolic BP<70mmHg consider deescalating therapy as decreases cerebral perfusion and increases risk of cognitive decline

Results

- FBC – WCC normal , HB 9.1 , PLTs 530
- U/E – EGFr 44
- HBA1C – 56
- Pre-Prandial glucose 5.2 – 7.3 mmol/litre
- BNP 70
- BP 105/70
- BMI 24

De-intensification in nursing homes

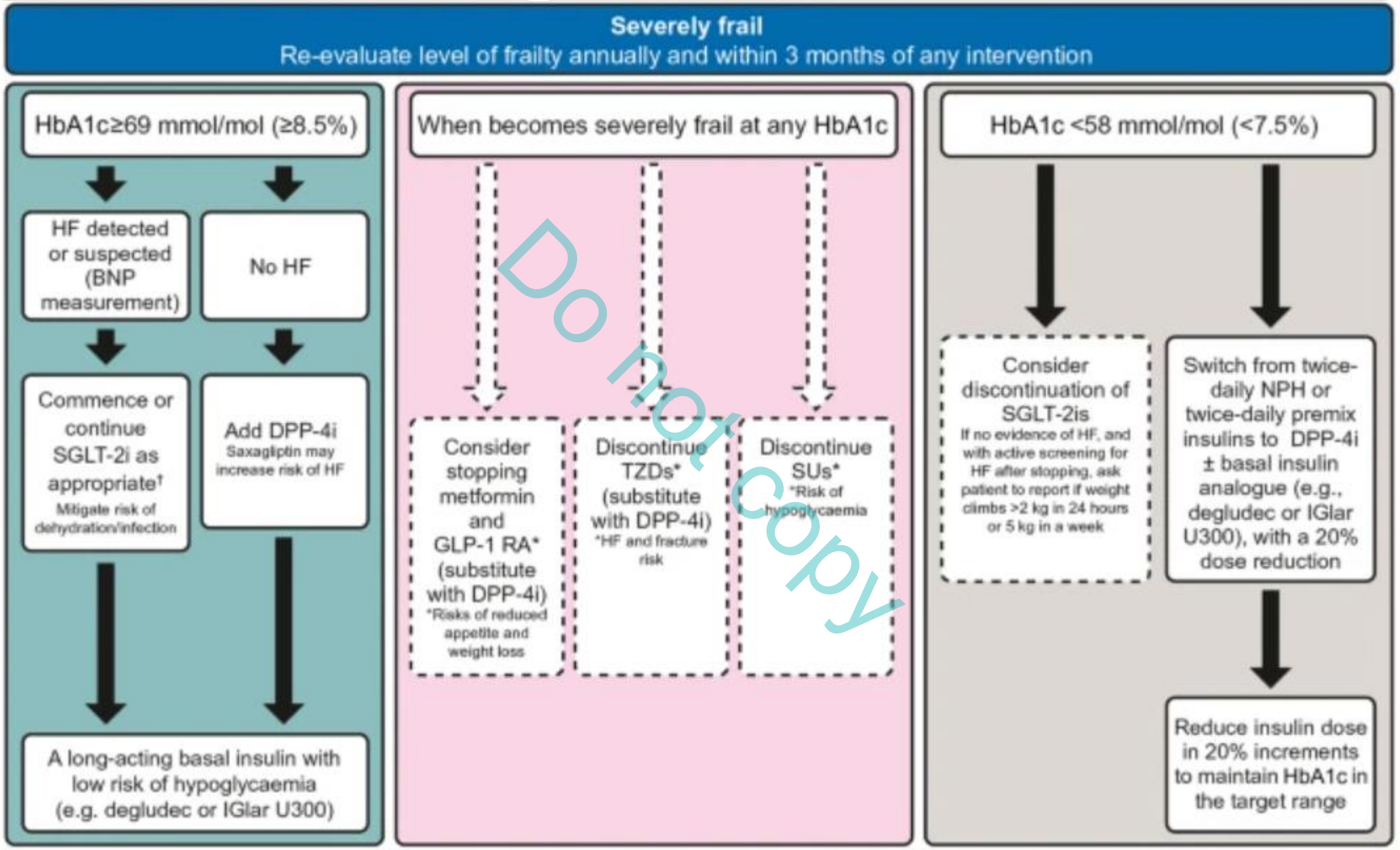
	HbA1c <6.5%	HbA1c 6.5–7.4%	HbA1c 7.5–8.4%	HbA1c ≥8.5%
No GLM (*N* = 1491)	38%	16%	6%	**4%** [b]
Metformin alone (*N* = 448)	7%	7%	5%	2%
Use of other GLMs (*N* = 531)	**7%** [c]	8%	7%	7%
Short acting insulin use (*N* = 1185)	**19%** [d]	**17%** [c]	14%	10%
Long-acting insulin use (*N* = 3767)	**29%** [d]	**51%** [c]	68%	77%
Total (*N* = 7422)	2602	2260	1442	1118

Abbreviation: GLM, glucose-lowering medication.

[a] Percent by column. [b] Potentially undertreated. [c] Potentially overtreated. [d] Overtreated.

- Ledrele et al. 2022. Glycemic treatment deintensification practices in nursing home residents with type 2 diabetes. J Am Geriat Soc . 70:7:2019-2028

What should we do for Matilda's Diabetes ?


Severely frail
Re-evaluate level of frailty annually and within 3 months of any intervention
HbA1c≥69 mmol/mol (≥8.5%)
HF detected or suspected (BNP measurement)
No HF
Commence or continue SGLT-2i as appropriate†
Mitigate risk of dehydration/infection
Add DPP-4i
Saxagliptin may increase risk of HF
A long-acting basal insulin with low risk of hypoglycaemia (e.g. degludec or IGlar U300)
When becomes severely frail at any HbA1c
Consider stopping metformin and GLP-1 RA* (substitute with DPP-4i)
*Risks of reduced appetite and weight loss
Discontinue TZDs* (substitute with DPP-4i)
*HF and fracture risk
Discontinue SUs*
*Risk of hypoglycaemia
HbA1c <58 mmol/mol (<7.5%)
Consider discontinuation of SGLT-2is
If no evidence of HF, and with active screening for HF after stopping, ask patient to report if weight climbs >2 kg in 24 hours or 5 kg in a week
Switch from twice-daily NPH or twice-daily premix insulins to DPP-4i ± basal insulin analogue (e.g., degludec or IGlar U300), with a 20% dose reduction
Reduce insulin dose in 20% increments to maintain HbA1c in the target range

Plan for Maire

- **Stop**
  - Stop Gliclazide and Pioglitazone and Semaglutide
- **Reduce**
  - Reduce metformin to 500mg bd po
- **Continue**
  - Continue linagliptin
- **Reduce**
  - Reduce amlodipine to 5mg daily
- **Monitor**
  - Monitor capillary glucose twice a week with the aim to keep her pre-prandial glucose between 5.6 and 10

Multidomain Management Plans

- Glucose and HbA1c
- Blood pressure and lipids
- De-prescribing and hypoglycaemia management
- Frailty management
- Physical exercise
- Co-morbidity profile
- Technology
- Precision medicine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American Diabetes Association Professional Practice Committee*
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Diabetes Ther (2021) 12:1227–1247
https://doi.org/10.1007/s13300-021-01035-9
REVIEW
Diabetes and Frailty: An Expert Consensus Statement on the Management of Older Adults with Type 2 Diabetes
W. David Strain · Su Down · Pam Brown · Amar Puttanna · Alan Sinclair
Complex/Intermediate (multiple (at least 3) co-existing chronic illnesses* or 2 or more instrumental ADL impairments or mild/moderate cognitive impairment
HOLISTIC PERSON-CENTRED APPROACH TO T2DM MANAGEMENT
Mini-Cog
Instructions for Administration & Scoring
Scoring
Co-morbidity
Frailty
Cumulative Illness Rating Score – a measure of multimorbidity and burden of cumulative chronic disease
CFS (clinical frailty score)
Charlson Co-morbidity Index – 1 year mortality for those with a range of co-morbidities
eFI (electronic frailty index) – looks at 36 deficits using read codes
Elixhauser Co-morbidity Index – mortality calculator based on 30 co-morbidities
Index of Co-existing Disease (ICED) – predictor of death on dialysis
Chronic Disease Score (CDS) – uses medications to identify co-morbidites
Rx-Risk – uses pharmacy systems to look at medications prescribed and predict disease and impact

Leadership across the system is required to address the challenges of diabetes and frailty:

The prevalence of diabetes increases with age and is likely to reach epidemic proportions in the upcoming years as the population ages (Cowie, Rust, Ford, 2009)

The greatest proportional increase is likely to occur in those aged 60–79 years (Whiting, Guairquata, Shaw 2013)

Alongside micro/macrovascular complications of diabetes, frailty appears to be another complicating factor (Kirkman, Briscoe, Clark 2003)

Aims

- Recognize the challenges posed by diabetes in the older adult population
- Introduce resources that can help us structure and maximise our consultations with this group
- Maire's Case : Target setting according to the ADA Guidelines in a non frail older adult , initial recognition of overtreatment and hypoglycaemia , review of older Medication groups . Introduction to deprescribing and deprescribing algorythms
- Mahati's case : Target setting in the mid frail patient , frailty phenotypes and their impact on diabetes care , assessment of cognitive impairment in patients with diabetes , using newer medication classes in this group
- Matilda's case : Target setting in the severely frail patient , Frailty phenotypes revised , Deintensification and nurseing home residents

Thank you !