

FRAILTY & DIABETES

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LEARNING OUTCOMES

BY THE END OF THIS SESSION, ATTENDEES WILL:

- HAVE AN UNDERSTANDING OF THE TERM FRAILTY
- HAVE AN UNDERSTANDING OF THE IMPACT OF FRAILTY ON THOSE PEOPLE WITH DIABETES
- BE AWARE OF THE PRACTICAL IMPLICATIONS OF MANAGING FRAILTY
 - TARGETS
 - MEDICATION CHOICE
 - DE-INTENSIFICATION
- MANAGING CASES

WHO IS 'OLD' ?

- CHRONOLOGICAL VS PHYSIOLOGICAL VS FUNCTIONAL AGE

OFFICE FOR NATIONAL STATISTICS (ONS)

- 65YRS

WORLD HEALTH ORGANISATION (WHO)

‘SOMEONE WHOSE AGE HAS PASSED THE MEDIAN LIFE EXPECTANCY AT BIRTH’

UK – 81.2YRS AFRICA – 50-55YRS

WHAT IS FRAILITY?

- THERE ARE LOTS OF DIFFERENT DEFINITIONS

BERGMAN ET AL (2007) DESCRIBE IT AS

“AN ADVERSE HEALTH STATE REPRESENTED BY AN INCREASED VULNERABILITY TO PHYSICAL OR PSYCHOLOGICAL STRESSORS AS A RESULT OF DECREASED PHYSIOLOGICAL RESERVE”

- A SERIOUS BUT MANAGEABLE COMPLICATION OF DIABETES
- TYPE 2 DIABETES IS A RISK FOR DEVELOPMENT OF FRAILITY (SINCLAIR, 2019)

ALL OLD PEOPLE ARE FRAIL

ALL FRAIL PEOPLE ARE OLD

SO WHICH OF THESE PEOPLE ARE FRAIL?



NOT ALWAYS SO CLEAR CUT

<https://youtu.be/CZeMZ3WPuLY>

Functional capacity

Functionally Independent	Functionally Dependent	End of Life
ADLs independent	Impaired ADLs	Limited life expectancy
Self-caring	Supported for self-care	Focus on symptoms
No carers	Dementia and frail subgroups	

ASSESSING FRAILTY

Timed Up and Go (TUG) Test

Name: _____ MR: _____ Date: _____

1. Equipment: arm chair, tape measure, tape, stop watch.
2. Begin the test with the subject sitting correctly (hips all of the way to the back of the seat) in a chair with arm rests. The chair should be stable and positioned such that it will not move when the subject moves from sit to stand. The subject is allowed to use the arm rests during the sit – stand and stand – sit movements.
3. Place a piece of tape or other marker on the floor 3 meters away from the chair so that it is easily seen by the subject.
4. Instructions: “On the word GO you will stand up, walk to the line on the floor, turn around and walk back to the chair and sit down. Walk at your regular pace.
5. Start timing on the word “GO” and stop timing when the subject is seated again correctly in the chair with their back resting on the back of the chair.

6. Normative Reference Values by Age

Age Group	Time in Seconds (95% Confidence Interval)	
60 – 69 years	8.1	(7.1 – 9.0)
70 – 79 years	9.2	(8.2 – 10.2)
80 – 99 years	11.3	(10.0 – 12.7)

8. Cut-off Values Predictive of Falls by

Group	Time in Seconds
Community Dwelling Frail Older Adults	> 14 associated with high fall risk
Post-op hip fracture patients at time of discharge ³	> 24 predictive of falls within 6 months after hip fracture
Frail older adults	≥ 30 predictive of requiring assistive device for ambulation and being dependent in ADLs

Clinical Frailty Scale



1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



7 Severely Frail – Completely dependent for personal care, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



2 Well – People who have no active disease symptoms but are less fit than category 1. Often, they exercise or are very active occasionally, e.g. seasonally.



8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



3 Managing Well – People whose medical problems are well controlled, but are not regularly active beyond routine walking.



9 Terminally Ill – Approaching the end of life. This category applies to people with a life expectancy <6 months, who are not otherwise evidently frail.



4 Vulnerable – While not dependent on others for daily help, often symptoms limit activities. A common complaint is being “slowed up”, and/or being tired during the day.



5 Mildly Frail – These people often have more evident slowing, and need help in high order IADLs (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



6 Moderately Frail – People need help with all outside activities and with keeping house. Inside, they often have problems with stairs and need help with bathing and might need minimal assistance (cuing, standby) with dressing.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

eFI score	Category	Description
0–0.12	Fit	People who have no or few long-term conditions that are usually well controlled. This group would mainly be independent in day-to-day living activities
0.13–0.24	Mild frailty	People who are slowing up in older age and may need help with personal activities of daily living such as finances, shopping, transportation
0.25–0.36	Moderate frailty	People who have difficulties with outdoor activities and may have mobility problems or require help with activities such as washing and dressing
>0.36	Severe frailty	People who are often dependent for personal care and have a range of long-term conditions/multimorbidity. Some of this group may be medically stable but others can be unstable and at risk of dying within 6–12 months
eFI=electronic Frailty Index		

Sinclair (2019) Guidelines in Practice

<https://www.guidelinesinpractice.co.uk/diabetes/key-learning-points-diabetes-in-older-people-with-frailty/454910.article>

HOW ARE FRAILTY AND DIABETES RELATED?

- OLDER POPULATION
- MULTIMORBIDITY
- COMPLICATIONS
- MEDICATIONS
- ORAL INTAKE
- DEPENDENCY
- CARE SETTING

HOW ARE FRAILTY AND DIABETES RELATED?

- IN A TYPICAL 'TIERS OF CARE' MODEL – WHERE DO THIS COHORT OF PEOPLE FIT?
 - **TIER ONE**
 - TYPICALLY PRIMARY CARE LED, 'UNCOMPLICATED' TYPE 2 PATIENTS, SOME INITIATION OF INSULIN, ANNUAL REVIEW
 - **TIER TWO**
 - SOME GP PRACTICES, COMMUNITY DIABETES NURSING TEAMS, SOME TYPE 1 SERVICES
 - **TIER THREE**
 - SPECIALIST SERVICES (GENERALLY SECONDARY CARE). TYPE 1 SERVICES, AND 'SUPER SIX' COHORT

NICE NG28 – TYPE 2 DIABETES IN ADULTS

INDIVIDUALISED CARE

- **ADOPT AN INDIVIDUALISED APPROACH TO DIABETES CARE**

- TAILORED TO THE NEEDS AND CIRCUMSTANCES, TAKING INTO ACCOUNT THEIR PERSONAL PREFERENCES, COMORBIDITIES, RISKS FROM POLYPHARMACY, AND THEIR ABILITY TO BENEFIT FROM LONG-TERM INTERVENTIONS BECAUSE OF REDUCED LIFE EXPECTANCY.

- **SUCH AN APPROACH IS ESPECIALLY IMPORTANT IN THE CONTEXT OF MULTIMORBIDITY.**

- REASSESS THE PERSON'S NEEDS AND CIRCUMSTANCES AT EACH REVIEW AND THINK ABOUT WHETHER TO STOP ANY MEDICINES THAT ARE NOT EFFECTIVE.

- **TAKE INTO ACCOUNT ANY DISABILITIES**

- INCLUDING VISUAL IMPAIRMENT, WHEN PLANNING AND DELIVERING CARE FOR ADULTS WITH TYPE 2 DIABETES.

U-SHAPED CURVE OF MORTALITY

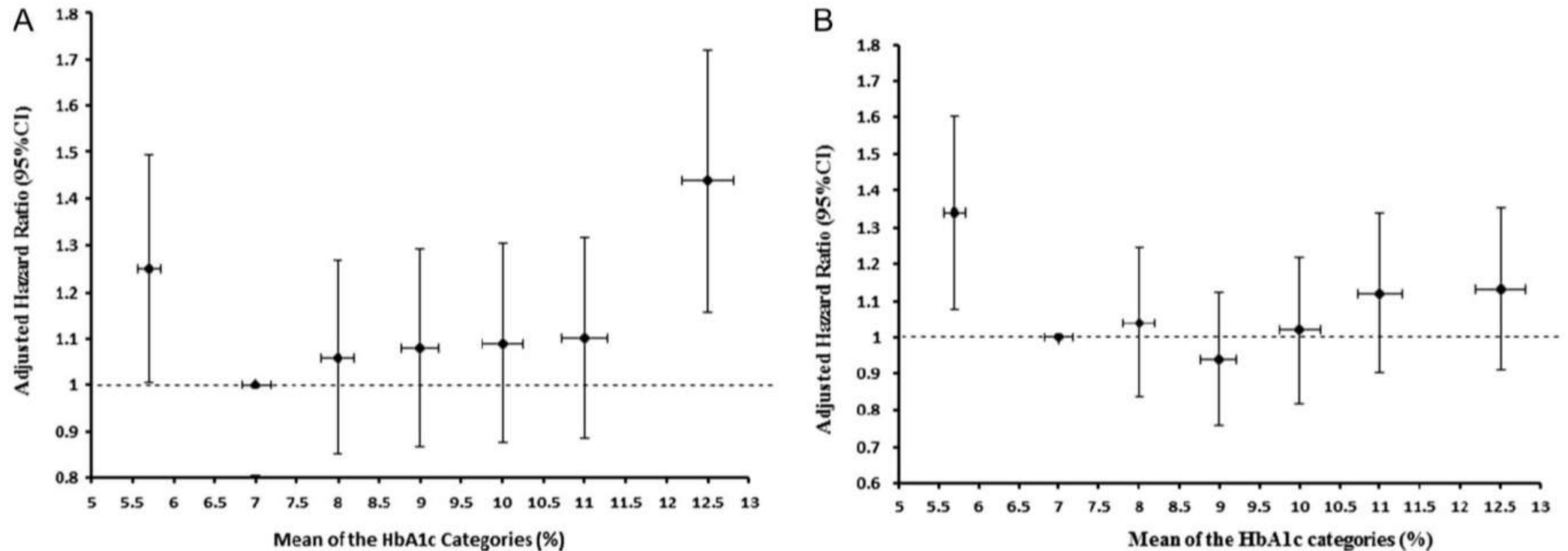


Figure 3 Graph of adjusted hazard ratios for all-cause mortality (A) and two-point composite cardiovascular (non-fatal MI and stroke) events (B) (The vertical bars show 95% CI while the horizontal bars show the mean HbA_{1c} range).

Relationship between HbA_{1c} and all-cause mortality in older patients with insulin-treated type 2 diabetes: results of a large UK Cohort Study, Age and Ageing 2019; 0: 1–6

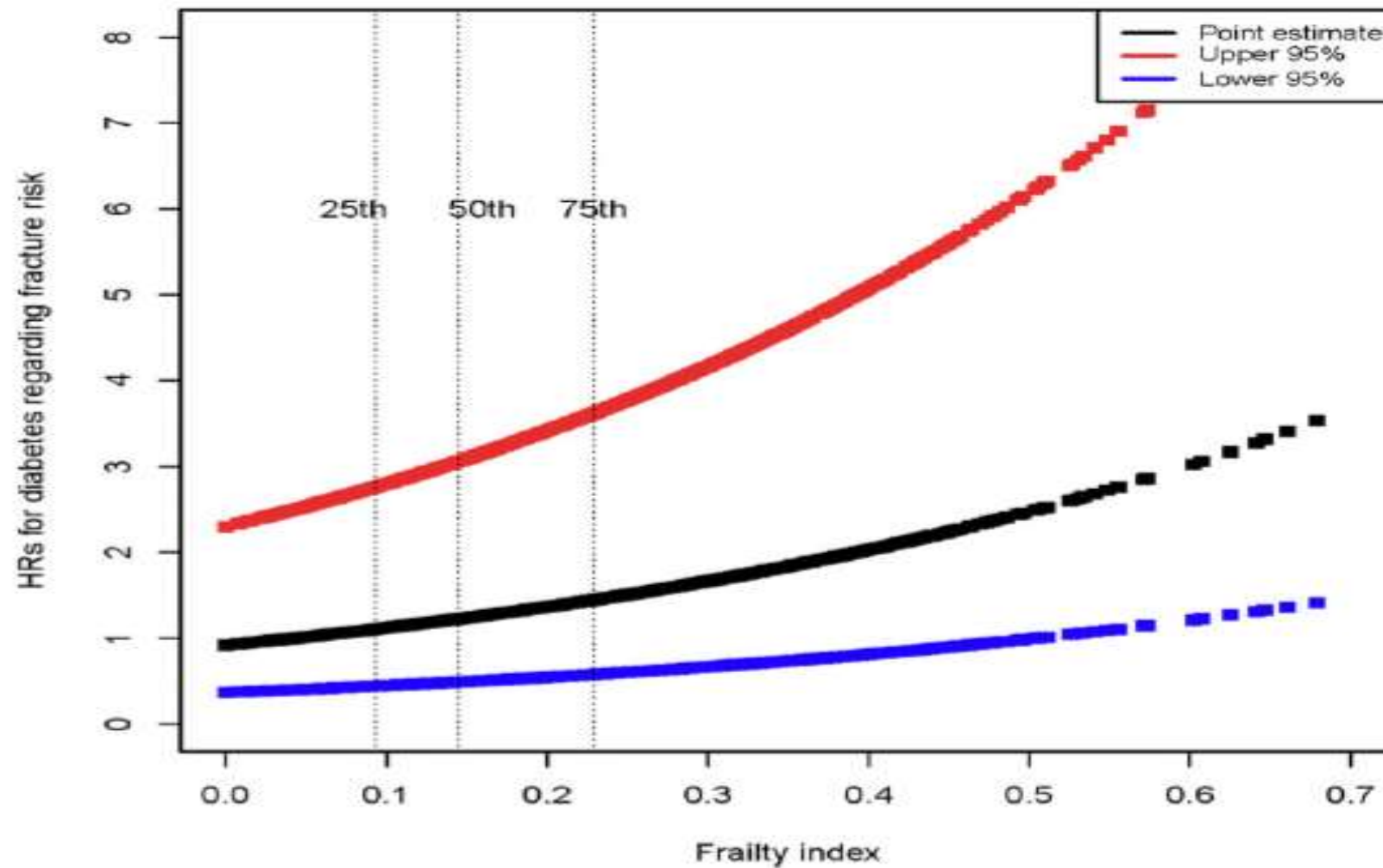
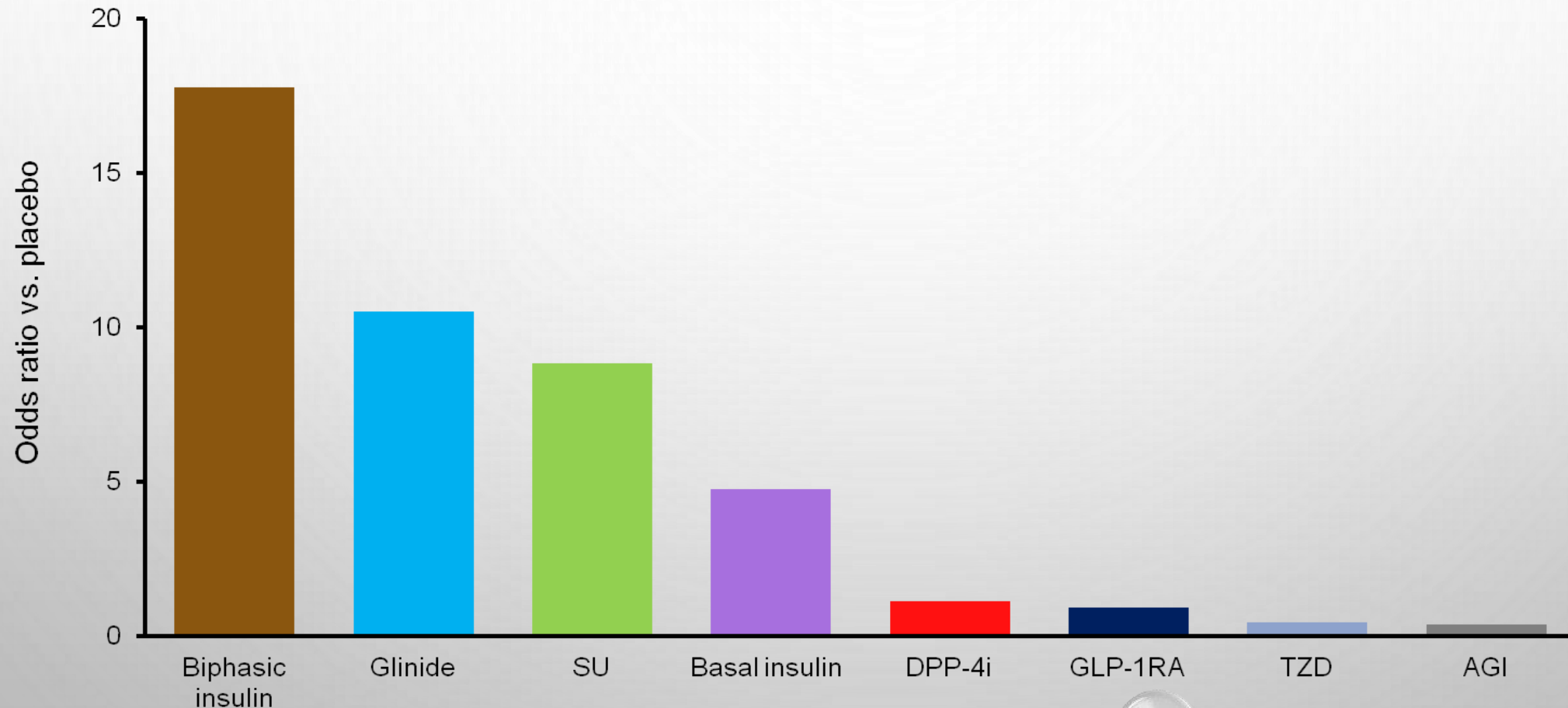


Figure 1—Different HRs for diabetes regarding the fracture risk at different levels of the FI (25th, 50th, 75th denoting quartiles of the FI). (A high-quality color representation of this figure is available in the online issue.)

CURRENT AGENTS

- METFORMIN
- SULFONYLUREAS
- MEGLITINIDES
- THIAZOLIDINEDIONES
- DPP-4 INHIBITORS
- GLP-1 AGONISTS
- SGLT-2 INHIBITORS
- BASAL INSULIN
- PRE-MIXED INSULIN
- BASAL BOLUS
- NEWER INSULINS

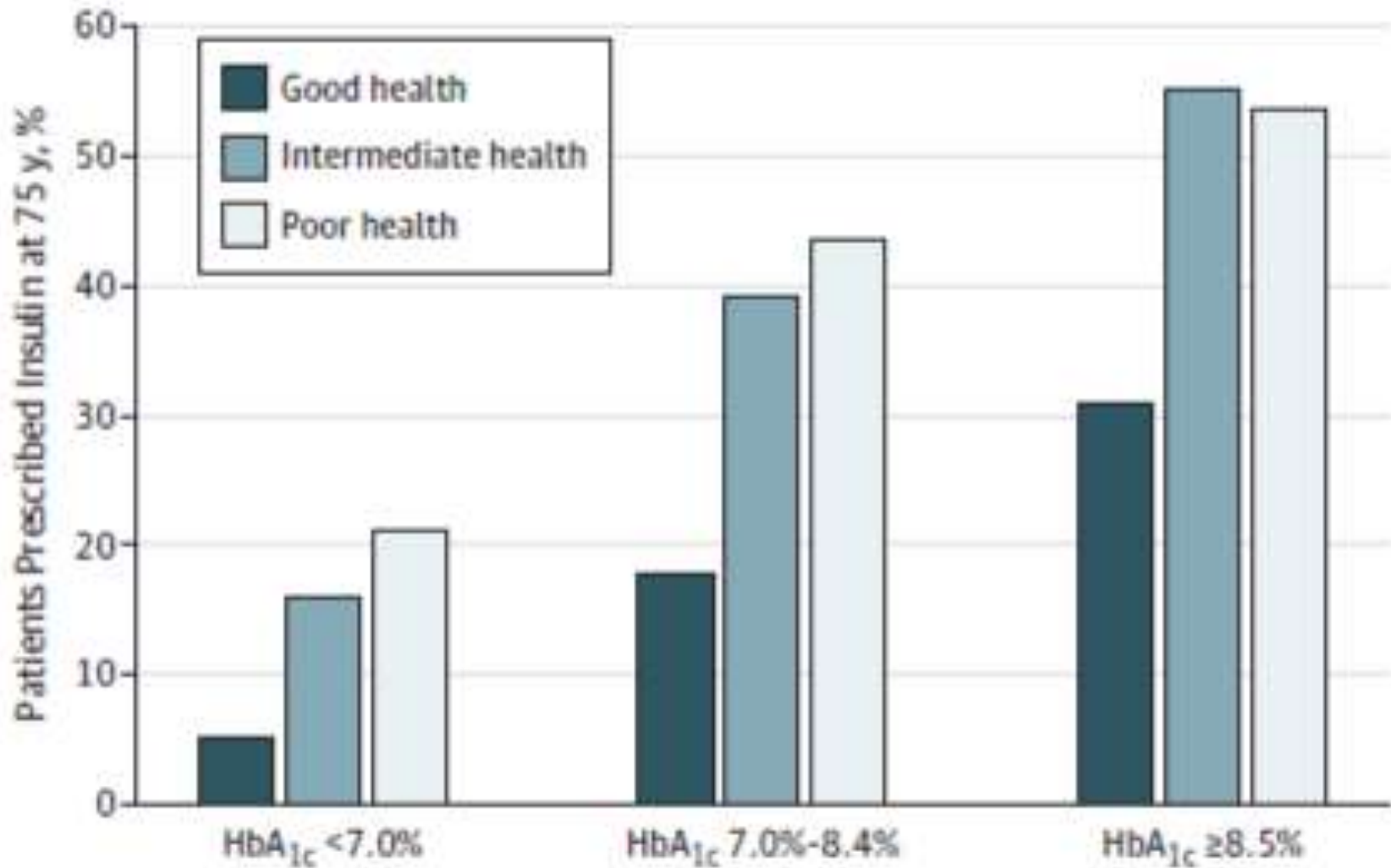
HYPOGLYCAEMIC RISK OF ANTIHYPERGLYCAEMIC AGENTS ADDED TO METFORMIN



SU=sulphonylurea; DPP-4i=dipeptidyl peptidase-4 inhibitor; GLP-1RA=glucagon-like peptide-1 receptor agonist; TZD=thiazolidinedione; AGI=alpha glucosidase inhibitor.

Liu SC et al. *Diabetes Obes Metab* 2012;14:810-20

A Insulin use at age 75 years by health status and HbA_{1c} category

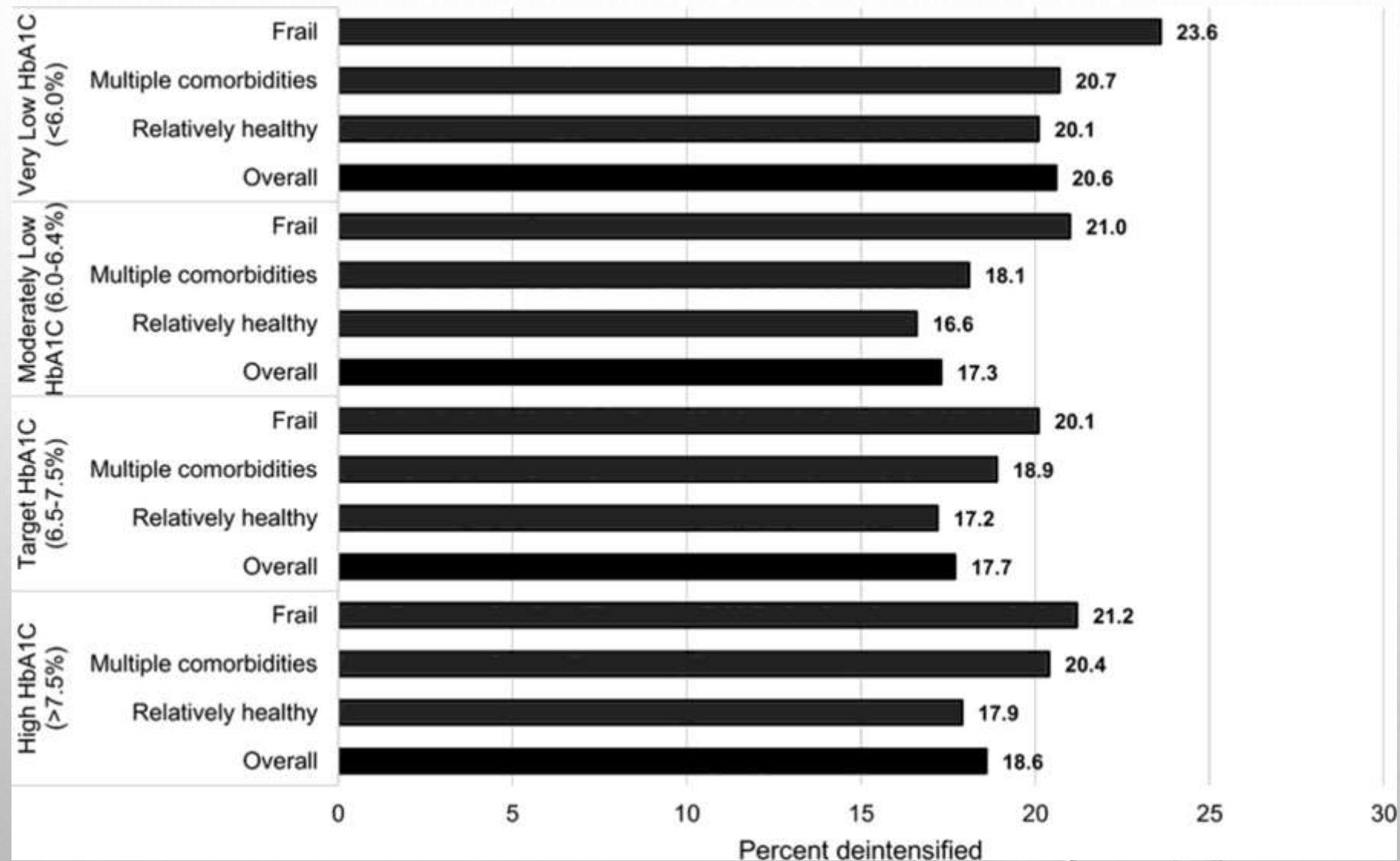


Weiner JZ et al. Use and Discontinuation of Insulin Treatment Among Adults Aged 75 to 79 Years With Type 2 Diabetes. *JAMA Intern Med*. Published online September 23, 2019. doi:10.1001/jamainternmed.2019.3759

DE-INTENSIFICATION

- WHAT IS IT?
- RATIONALE
- HYPOGLYCAEMIA VS HYPERGLYCAEMIA
- PRACTICAL APPLICATION
 - ANY SUBGROUPS TO TARGET?
 - HOW WOULD YOU GO ABOUT THIS?

Proportion of patients with deintensification of glycemic treatment, by health status and within HbA1C strata.



DO WE EXCLUDE FROM QOF?

NOT ANY MORE!

Frailty in diabetes – QOF 2019

*NM157 - The percentage of patients with diabetes **without** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months*

*NM158 - The percentage of patients with diabetes **with** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 month*

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0–0.12	Fit	People who have no or few long-term conditions that are usually well controlled. This group would mainly be independent in day-to-day living activities
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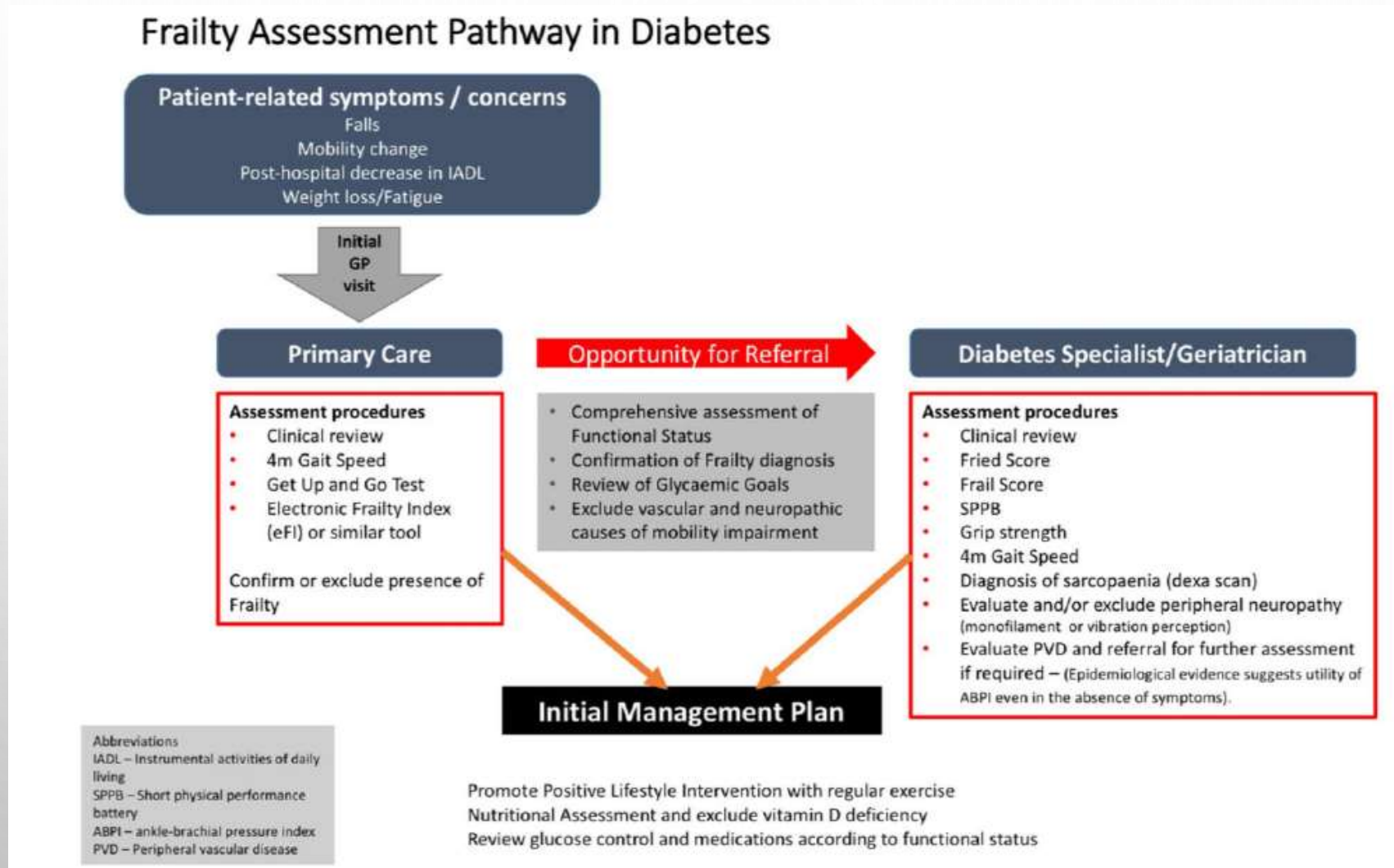
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POSSIBLE INTERVENTIONS

- PATIENT STRATIFICATION
- DE-INTENSIFICATION
- AT RISK GROUPS
- LOCAL GUIDELINES
- ELECTRONIC FRAILTY INDEX (EFI) SCORES
- COMPLEX REGIMES
- CARE HOMES

FUTURE MODEL?



STRAIN ET AL. TYPE 2 DIABETES MELLITUS IN OLDER PEOPLE: A BRIEF STATEMENT OF KEY PRINCIPLES OF MODERN DAY MANAGEMENT INCLUDING THE ASSESSMENT OF FRAILITY. A NATIONAL COLLABORATIVE STAKEHOLDER INITIATIVE. [DIABET MED.](#) 2018 JUL;35(7):838-845. DOI: 10.1111/DME.13644.

CASE STUDY - *BERYL

BERYL IS 79YRS OLD, LIVES ALONE

MILD DEMENTIA – HAS A BD CARE PACKAGE AND HELP WITH SHOPPING

CURRENTLY ON ONCE DAILY INSULIN (GLARGINE) ADMINISTERED BY DN'S

3 OF KEY CARE PROCESSES WITHIN LAST YEAR (NOT A FOOT CHECK)

DN'S CARRY OUT BLOOD GLUCOSE MONITORING AT TIME OF INSULIN

- WHAT ELSE WOULD YOU WANT TO KNOW?
- WOULD BERYL BE REGARDED AS 'FRAIL'



*BERYL

- CURRENT MEDICATION:
 - METFORMIN 500MG BD
 - GLARGINE (LANTUS) 18UNITS ONCE DAILY
(COMMENCED DURING HOSPITAL ADMISSION 10 MONTHS AGO)
- HBA1C
 - CARRIED OUT AS PART OF A HOUSEBOUND PROJECT – 25MMOL
- ACR
 - CARRIED OUT 10 MONTHS AGO - 6
- FOOT ASSESSMENT
 - ASSESSED AS MODERATE RISK DUE TO SOME NEUROPATHY



*BERYL

- WHAT ARE YOUR CONCERNS?
- WHAT ARE YOUR PRIORITIES?



'FALLING THROUGH THE NET'

- INITIAL FINDINGS FROM A HOUSEBOUND PROJECT
 - WITHIN ONE CCG (3 HUBS) – 54 PATIENTS IDENTIFIED ON THE DN CASELOAD
 - AT WEEKENDS STAFF OFTEN HAVE 8 VISITS FOR INSULIN ADMINISTRATION IN THE MORNING
 - LIMITED AMOUNT OF STAFF ADEQUATELY TRAINED IN THE SAFE ADMINISTRATION OF INSULIN – SEEN AS A TASK
 - ANNUAL REVIEW WAS AD-HOC AT BEST, NOT CARRIED OUT AT WORST (ONLY 2 PATIENTS HAD ALL 9 KEY CARE PROCESSES MET SO FAR)

CASE STUDY - JAMES

- 76YR OLD MAN – WIDOWED SIX MONTHS AGO
- HAS TYPE 2 DIABETES AND CORONARY HEART DISEASE
- LIVES ALONE AND ADMINISTERS OWN INSULIN
 - BD NOVOMIX 30 BREAKFAST AND EVENING MEAL
- DOCUMENTED AS 'FRAIL' BY OUT OF HOURS GP
 - HAD VISITED AS PATIENT FELT GENERALLY UNWELL



JAMES*

- DO YOU THINK JAMES IS FRAIL?
- WHAT COULD LEAD THE OOH GP TO CONSIDER HIM FRAIL?
- WHAT ARE YOUR MAIN CONCERNS?



JAMES*

- ANNUAL REVIEW IN GP SURGERY
- BLOOD PRESSURE 135/85
- HBA1C 42MMOL
- RARELY DOES BG MONITORING AT HOME
- LOW FOOT RISK ASSESSMENT
- KIDNEY FUNCTION AND ACR NORMAL
- WHAT WOULD YOU DO?



Type 2 diabetes mellitus

Guideline for the choice of oral and non-insulin antihyperglycaemic agents in adults

Diabetes Medicines Management Advisory Group (DMMAG)

Contents

1. Scope
2. Local prevalence of diabetes
3. Treatment goals in type 2 diabetes and patient-centred care
4. Managing blood glucose
5. Antihyperglycaemic treatment options for adults with type 2 diabetes
6. Key considerations to support drug selection
7. Addressing cardiovascular risk in type 2 diabetes
8. Self-monitoring of blood glucose and ketones
9. Drug dosing in renal impairment
10. Sick day rules
11. De-escalation of treatment
12. Special considerations for the frail elderly

12 - Special considerations for the frail elderly

There is increasing evidence that tight control of glucose and blood pressure in frail elderly people with diabetes can be harmful. This group are less likely to benefit from the long-term microvascular outcomes of good glycaemic control and have a marked increase in risk of hospital admissions. There is therefore a need to avoid over-treatment of both blood pressure and glycaemia.

Aims of treatment in the context of frailty should be:

1. To avoid hypoglycaemia
2. To control symptoms of hyperglycaemia
3. To reduce risk of infection
4. To avoid hospital admission
5. To introduce timely end-of-life care
6. To avoid complex regimes

NICE have changed some of the QOF diabetes indicators for primary care in 2019/20. People with moderate or severe frailty can now be excluded from tighter HbA1c and BP control:

NM157 - The percentage of patients with diabetes **without** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 58 mmol/mol or less in the preceding 12 months

NM158 - The percentage of patients with diabetes **with** moderate or severe frailty, on the register, in whom the last IFCC-HbA1c is 75 mmol/mol or less in the preceding 12 month

NM159 - The percentage of patients with diabetes **without** moderate or severe frailty, on the register, in whom the last blood pressure reading (measured in the preceding 12 months) is 140/80 mmHg or less

The International Diabetes Federation global guideline for managing type 2 diabetes in older people (IDF, 2013) recommends very specific HbA1c targets (table 1). Active steps must be taken to review this population, including an assessment of their level of frailty, and make appropriate plans.

Table 1: General glycaemic targets for older people, according to functional category*

Functional category	General HbA1c target
Functionally independent	7.0 – 7.5% / 53-59 mmol/mol
Functionally dependent	7.0 – 8.0% / 53-64 mmol/mol
• Frail	Up to 8.5% / 70 mmol/mol
• Dementia	Up to 8.5% / 70 mmol/mol
End of life	Avoid symptomatic hyperglycaemia

*Glycaemic targets should be individualised taking into account functional status, comorbidities, especially the presence of established CVD, history and risk of hypoglycaemia and presence of microvascular complications.

Proposed changes in medication and treatment should be discussed with the patient and their carer. The reasons for changes need to be understood in terms of increased risk of therapy and/or low likelihood of benefit. It is important to respond to **falling HbA1c or losing weight** by reviewing and reducing diabetic treatments. A low HbA1c is often overlooked as a desirable target but may result in an admission with hypoglycaemia, particularly where HbA1c is <53mmol/mol (7.0%). Consider treatment de-intensification, starting with drugs that carry a risk of hypoglycaemia.

Poor hydration/oral intake and reduced renal function are also important considerations in older people. Food intake and subsequent medication requirement (including insulin dosage) may reduce with changes in personal circumstances, such as transfer of care settings, and comorbidities. Care home residents who have diabetes need specific review and plans put in place; this is an area that may require focus - [Diabetes UK](#) guidance is available.

In the older frail adult, preferentially utilise oral regimes with lower hypoglycaemia risk such as metformin and DPP4 inhibitors. Be wary of sulfonylureas and pre-mixed insulins due to higher hypoglycaemia risk especially in those with renal disease. Insulin should not be withheld if deemed the most appropriate therapy/add-on therapy in those with type 2 diabetes however be aware of the increased risk of hypoglycaemia where tight control is not required. Table 2 represents a consensus view from the guideline authors.

Regular testing of blood glucose is required for any patient where hypoglycaemia is a potential risk. Take into consideration changes in dexterity, vision, and the need for third-party assistance with medicines' administration, particularly injectables, prior to initiation and in ongoing treatment.

Table 2: Antihyperglycaemic agents in older people – advantages and disadvantages

Medication	Advantages	Disadvantages
Metformin	Effective at reducing blood glucose, low hypo risk, preferred first-line agent	Be aware of sick day guidelines in those with poor hydration/oral intake and/or reduced renal function. Risk of lactic acidosis especially in severe CCF, reduce if eGFR<45, stop if <30. Be wary in those with recurrent AKI. GI side effects may reduce tolerability
Sulfonylureas (SU)	Effective. They are an option for older adults who eat consistently and are able to recognize and treat hypoglycaemia. In the elderly, gliclazide M/R may have lower hypo risk than standard release gliclazide (due to gradual increase in plasma levels) where meal patterns are erratic and appetite is poor. Weight gain less of a concern in frailty. Repaglinide works in a similar manner to SUs, but has to be taken with meals so it can be skipped if meals are skipped, thus avoiding hypoglycaemia.	Hypo risk with all SUs, use with caution in older people - can use gliclazide but avoid long-acting SUs with active metabolites (glimepiride and glibenclamide). Higher risk of hypos when SU added to insulin or in people with CKD. Avoid SUs in functionally dependent older people (moderate to severe frailty) due to high hypo risk and inability to treat/recognise hypos. Regular blood glucose monitoring required.
Pioglitazone	Effective, low hypo risk. Weight gain less of a concern in frailty	Use hampered by side effects in older people due to increased prevalence of comorbidities. Risk of peripheral oedema - avoid in heart failure, macular oedema; avoid also in people with fracture risk, and a history or risk of bladder cancer
DPP4i	Moderately effective, safe, well tolerated (e.g. low GI side-effects), low hypo risk. Preferred alternative or add-on to metformin	Dose reduction required in those with deteriorating renal function for some agents in this group. Note risk of pancreatitis

GLP-1 RA	Effective, low hypo risk. Once weekly GLP-1 may be useful in those with administration difficulties.	Injectable therapy may be undesirable e.g. due to poor dexterity, third-party assistance required. Satiety and weight loss effects are not beneficial in frailty. GI side effects may lead to dehydration. Therapeutic experience in those aged >75 years is limited and dose adjustments is required for some agents. Note risk of pancreatitis. Cost/benefit considerations need to be weighed up.
SGLT2i	Effective. Some cardiovascular benefits in people with existing CVD but caution in people with pre-existing low blood pressure	Side effect profile not appropriate in frailty – increased risk of GU infections, diuresis, weight loss. Be aware of sick day guidelines in those with poor hydration/oral intake and/or reduced renal function. Need regular monitoring of kidney function. Avoid in those aged over 85 years due to limited therapeutic experience.
Basal insulin	Effective, simplest regime to use when insulin is clinically indicated, particularly when a third-party is needed to administer the insulin (e.g. carers or district nurses). Best given in morning in those with overnight/early morning hypos, shorter profile of NPH insulins may have benefit in reducing overnight hypos. Useful add-on to oral medication.	Risk of hypos (though less than other insulin regimes). Hypo risk increased when combined with sulfonylureas - use with caution. Higher risk of hypos in CKD. May need dose reduction as appetite/food intake decreases or HbA1c/blood sugars settle to avoid hypos. Requires regular blood glucose monitoring.
Premixed insulin	Fixed dose and time of administration is good for people with regular meal patterns. Fewer injections required than a basal bolus regime, which may be an advantage with third-party administration; simple method of administration in those with post-prandial hyperglycaemia.	Higher risk of hypos compared with other insulin regimes, especially in erratic/poor eaters where mismatch can occur. Higher risk of hypos in CKD. Avoid concomitant use of sulfonylureas. Requires more frequent blood glucose monitoring than basal insulin regimes.

The image features a light gray background with a subtle radial gradient. In the top-left and bottom-right corners, there are clusters of realistic water droplets of various sizes, rendered with soft shadows and highlights to give them a three-dimensional appearance. The text is centered in the middle of the frame.

**[http://www.birminghamandsurrounds
formulary.nhs.uk/docs/acg/](http://www.birminghamandsurrounds
formulary.nhs.uk/docs/acg/)**

SUMMARY

- OFTEN FALL OUTSIDE OF THE TYPICAL TIERS OF CARE
- PART OF MDT BUT NO ONE PERSON RESPONSIBLE
- COST NOT ALWAYS IN RELATION TO QUALITY
- DO NOT ROUTINELY EXEMPT FROM QOF
- CONSIDER FRAILTY ASSESSMENT AT EACH ANNUAL REVIEW
- VULNERABLE PEOPLE DOES NOT MAKE THEM FRAIL – BUT IS ONLY ONE STEP AWAY