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Diabetes UK Position Statements

Joint British Diabetes Societies clinical guideline

Inpatient care of the frail older adult with diabetes: an Executive

Summary

for Inpatient Care (JBDS-IP)

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Abstract

We present an Executive Summary of a guideline produced by a Joint British Diabetes Societies for Inpatient Care Writing Group for managing frail older inpatients with diabetes. This represents a multidisciplinary stakeholder consensus document providing more than 100 recommendations in eight areas: functional assessment and detection of frailty; preventative care: assessing risk factors and avoiding hospital admissions; general inpatient management principles; managing therapy choices for the frail older inpatient with diabetes; managing associated comorbidities and concerns; pre-operative assessment and care; discharge planning and principles of follow-up; and end of life care. The document is intended to guide effective clinical decision-making in an inpatient setting and is supported by four appendices: Appendix 1, STOPPFRAIL criteria; Appendix 2, Acute care toolkit 3—Royal College of Physicians; Appendix 3, a description of physical performance and frailty measures for routine NHS application; and Appendix 4, Inpatient Frailty Care Pathway—template. This document is expected to enhance clinical outcomes and overall health status for this vulnerable inpatient population of older people with diabetes. The full version of the guideline, including the appendices, can be found at https://abcd.care/sites/abcd.care/files/resources/Inpatient_Care_of_the_Frail_Older_Adult.pdf

What's new?

- This inpatient guideline is the first detailed attempt to provide an evidence-based and good clinical practice approach to diabetes care for a frail older inpatient with diabetes which is supported by recommendations for audit indicators.
- The guideline forms part of a suite of clinical guidelines from the UK Joint British Diabetes Societies for Inpatient Care and is the first multidisciplinary consensus for management of frail older inpatients with diabetes.

- The guideline provides the first considered approach to identifying and treating those with both frailty and diabetes admitted into hospital and in whom acute illness is a complicating factor.
- Recommendations are designed to provide a guide to allowing comprehensive assessment model and risk stratification approaches (including functional assessment) to be central features of management.
- The recommendations provide an individualized multidimensional integrated approach to the comprehensive management of diabetes in older inpatients with diabetes and frailty.
- Included is the first template for a detailed inpatient care pathway for frail older people with diabetes.

[H1]Introduction and purpose of the guideline

Frailty is a newly recognized and emerging complication of diabetes, and its aetiology may encompass a close relationship with the presence of sarcopaenia [1]. Type 2 diabetes appears to impose a fivefold increase in frailty risk in people aged 37–73 years [2] and frailty has been found to be a predictor of reduced survival, hospitalization, falls, worsening disability and care home admission in older people [3].

The inpatient guideline on the management of frailty in diabetes mellitus is considered an important and timely development for the Joint British Diabetes Societies for Inpatient Care (JBDS-IP) portfolio of guidelines. With increasing recognition of frailty as an important feature that influences survival and clinical outcomes in diabetes, it represents the first clinical guideline to focus predominantly on the special issues of diabetes inpatient care of the older adult [4]. This detailed guideline complements the 2017 International Guidance on the Management of Frailty in Diabetes [5]. We have planned this guidance so that our recommendations can be applied to those aged > 70 years as people with diabetes in this age group are more likely to exhibit those characteristics of functional loss associated with frailty.

A predominant theme in this work is to highlight the importance of identifying and detecting frailty early in the inpatient course of someone with diabetes to enhance clinical outcomes. The Guideline Working Group was a UK multidisciplinary specialist group that sought to achieve consensus and provide recommendations to support clinicians in the National Health Service (NHS) in the United Kingdom (UK). However, it is felt that these recommendations will have value in guiding management in other national diabetes care systems. We are not aware of any

other similar comprehensive guidelines in this area. A further aim is to convince commissioners of healthcare and policy-makers to use the guideline plan to coordinate inpatient care pathways with the overall objective of delivering high-quality diabetes care to this vulnerable group of inpatients.

[H2]Definition and detection of frailty

We have chosen to characterize frailty as a summary concept based on:

- a vulnerability state that leads to a range of measurable adverse outcomes, such as falls or a decline in physical performance;
- a decline in physiological reserve and the inability to resist to physical or psychological stressors;
- a pre-disability condition.

These characteristics were fundamental to the phenotypic manifestations of frailty defined originally [6], which were focused on five components of exhaustion, physical activity, walk speed, hand grip strength and weight loss, all of which were domains for the Fried Score. A further model describing frailty was subsequently introduced (Frailty Index; FI) based on the number of deficits (or comorbidities) present in an individual, and like the Fried Score, has been shown to determine the risk of an adverse outcome [7]. The FI is now available electronically (eFI) and is advocated as a suitable tool for general practitioners (GPs) in the UK to identify frailty in people aged 65 years and over. The recently introduced Frail test [8] has been validated in multiple populations, is increasingly seen as an effective screening tool for frailty and combines components of both former approaches. In our guideline, we have placed emphasis on the importance of a focused assessment of both physical and cognitive domains during the course of admission, and recognize that clinicians will need to adopt a new set of outcome measures in the management of frailty in diabetes both in hospital settings and in community and primary care.

[H2]Scope and format of guideline

This document aims to improve standards of diabetes care of older frail inpatients by providing recommendations for clinicians working directly with this sector of the diabetes inpatient population. We have identified a number of key outcomes that require assessment, including: glycaemic targets, physical performance measures, an objective assessment of hypoglycaemia risk, falls risk assessment, and quality of life. We acknowledge that introduction of these measures will require a culture change by the diabetes healthcare team and a phase of upskilling in assessment procedures.

The structure of the full guideline is based on the template of the International Diabetes Federation (IDF) Global Guideline on the Management of Type 2 Diabetes (2013) [9]. For each topic area, there is an initial set of recommendations, followed by the rationale and evidence base that supports those recommendations, this is followed in turn by a small section on how to implement these recommendations in routine clinical practice, including one or more audit indicators, and finally a succinct list of key supporting references. A similar approach was used recently in another published Diabetes UK Position Statement on type 1 diabetes that had a special emphasis on older adults [10].

In this Executive Summary, we present an introduction and outline the purpose of this guideline, followed by descriptive information on frailty, other functional measures and principles underlying the guideline. We then list the recommendations for each of the eight areas reviewed. We conclude with a template of an inpatient pathway for managing frailty in older adults with diabetes (Fig. 1).

The main inpatient guideline is available at:

https://abcd.care/sites/abcd.care/files/resources/Inpatient_Care_of_the_Frail_Older_Adult.pdf. It has more than 26 000 words and provides the main discussions on the rationale and evidence base for the recommendations in each section, as well as guidance on how to implement the recommendations into routine NHS practice; in addition, examples of audit indicators are provided.

[H2]Areas covered

The main JBDS-IP guideline provides recommendations, rationale and evidence base, routine NHS clinical implementation notes, and examples for audit indicators in eight areas:

- functional assessment and detection of frailty;
- preventative care: assessing risk factors and avoiding hospital admission;
- general inpatient management principles;
- managing therapy choices for the frail older inpatient with diabetes;
- managing associated comorbidities and concerns;
- pre-operative assessment and care;
- discharge planning and principles of follow-up;
- end of life care.

[H2]Literature search

In arriving at this consensus document, we made every effort to undertake a robust search and article recovery strategy over the last 15 years in English. Large scientific databases were examined including Embase, MEDLINE/PubMed and CINAHL. High impact factor medical and scientific journals were studied such as the *Lancet*, *British Medical Journal* and *New England Journal of Medicine* (general medical journals). Both diabetes and geriatric medicine-specific specialist journals were also scrutinized such as, *Diabetes*, *Diabetologia* and *Diabetes Care*, as well as the *Journal of Frailty & Aging*, *Journal of the American Medical Directors Association* and *Journal of Gerontology - Series A Biological Sciences and Medical Sciences*.

Although the strength of the recommendations varied as determined by the available evidence, we made 113 recommendations to guide effective clinical decision-making over the eight key areas.

[H2]Appendices

A special feature of this guideline is Appendices 1–4 which provide additional information that should support the clinician in managing frailty in older adult inpatients with diabetes.

- Appendix 1. STOPPFRAIL criteria: a list of 27 criteria relating to medications that are potentially inappropriate in frail older adults with limited life expectancy. They are designed to assist clinicians in deprescribing medications in these individuals.
- Appendix 2. Acute care toolkit 3—Royal College of Physicians, London: this provides guidance for NHS medical and nursing staff in acute medical units (AMUs) who are managing older frail adults requiring access to acute care.
- Appendix 3. This is a description of physical performance and frailty measures for routine NHS application.
- Appendix 4. Inpatient Frailty Care Pathway—Template: this is included in this Executive Summary as Fig. 1.

Appendices 1–4 are available online at:

https://abcd.care/sites/abcd.care/files/resources/Inpatient_Care_of_the_Frail_Older_Adult.pdf.

[H2]Key principles underpinning the guideline

The Writing Group has established a number of key principles that form a framework for this inpatient guideline. These principles incorporate the important elements of managing older adults with frailty and diabetes within hospital settings, but may have implications for community-based care as well. They include:

- individualizing goals of care with functional status, complexity of illness including comorbidity profiles, and life expectancy;
- where possible, all therapeutic decisions should be based on comprehensive geriatric assessment and risk stratification, including:
 - identify and subsequently assess of key risks in frail older adults with diabetes,
 - prevent inpatient hypoglycaemia,
 - reduce worsening of activities of daily living (ADL) and instrumental activities of daily living (IADL) function,
 - maintain mobility,
 - reduce in-hospital falls,
 - minimize adverse events from treatment;
- a management strategy that is clearly defined and agreed with all parties and that aims to avoid future post-discharge disability both from diabetes vascular complications and deterioration in functional status;
- a clear focus on patient safety, avoiding further hospital and emergency department admissions and institutionalization by recognizing the deterioration early and maintaining independence and quality of life to a dignified death;
- a management plan that incorporates post-discharge educational support for families and caregivers, and health and social care professionals;
- an emphasis to promote locally relevant interdisciplinary diabetes care teams to develop specific pathways for frail older people with diabetes in and outside the hospital;
- encouragement to promote high-quality clinical research and audit in the area of frailty management in diabetes.

[H2]Other key terms and definitions

[H3]*Comprehensive geriatric assessment*

Assessment of frail older adults should not only require a measure of frailty, but also include a process known as comprehensive geriatric assessment (CGA), which can be defined as a multidimensional interdisciplinary diagnostic process focused on determining a frail older person's medical, psychological and functional capability in order to develop a coordinated and

integrated plan for treatment and long-term follow-up [11]. When carried out formally, CGA enables the measurement and subsequent analysis of a frail older adult (by assigning scores relating to overall function), which in turn leads to creation of a comprehensive management and care plan [12]. When recommendations are actioned, CGA has been shown to improve survival, physical and cognitive performance, and reduce medications, costs, and the use of hospital facilities and institutionalization [13].

[H3]*Intrinsic capacity and functional ability* [14]

The World Health Organization (WHO) defines healthy ageing ‘as the process of developing and maintaining the functional ability that enables wellbeing in older age’ [14]. Functional ability is about having the capabilities that enable all people to be and do what they have reason to value. This includes a person’s ability to: meet their basic needs; learn, grow and make decisions; be mobile; build and maintain relationships; and contribute to society.

Functional ability is made up of the intrinsic capacity of the individual, relevant environmental characteristics and the interaction between them. Intrinsic capacity comprises all the mental and physical capacities that a person can draw on and includes their ability to walk, think, see, hear and remember. The level of intrinsic capacity is influenced by a number of factors such as the presence of disease, injury and age-related changes. Being able to live in environments that support and maintain an individual’s intrinsic capacity and functional ability is the key to healthy ageing.

[H3]*Disability* [15]

Disability often complicates and accompanies the ageing process and is seen as functional state that is preceded by frailty.

You are disabled under the Equality Act 2010 if you have a physical or mental impairment that has a ‘substantial’ and ‘long-term’ negative effect on your ability to do normal daily activities. The word ‘substantial’ in this context is more than minor or trivial, e.g. it takes much longer than it usually would to complete a daily task like getting dressed, and ‘long-term’ means 12 months or more, e.g. a breathing condition that develops as a result of a lung infection, or in the context of having diabetes, a significant mobility disorder due to diabetic foot disease or peripheral vascular disease.

In routine clinical work, clinicians usually assess for the presence of disability by examining the ability of individuals to accomplish a series of activities—ADLs or IADLs, both of which are measured by questionnaire methods.

[H2]Who should read this guideline?

It should be recognized that frailty is a common finding and may be present in 32–48% of adults aged 65 years and over with diabetes living in the community [16], and that diabetes is one of five major comorbidities that is associated with the actual development of frailty [2]. Thus, it follows that every member of the inpatient team who has direct care responsibility for frail older people admitted to hospital, and those health and social care professionals who provide care for them before and after their hospital admission to prevent and minimize hospital stay, should benefit from this document. This includes hospital doctors, nurses, pharmacists, healthcare assistants, GPs, social care workers, carers, secretaries ward clerks, and other support staff.

[H2]Key actions to be prompted by this guideline

The working group recognizes that shortfalls in the care of older adult inpatients with frailty and diabetes are likely to be unrecognized and under-reported in the NHS. These deficits in care are exaggerated where there is a lack of recognition of frailty and its importance by healthcare staff. These recommendations are therefore designed to support clinicians to provide an individualized multidimensional integrated approach to the comprehensive management of frailty in older inpatients with diabetes.

[H1]Recommendations

The full reference list for each section of the recommendations is available online in the Supporting Information (Doc S1).

[H2]Functional assessment and detection of frailty in inpatients

- Requirements for frailty screening tools are as follows: quick, no need for special equipment and time-consuming measurements involving use of cut-off values, no need for administration by professional staff, validated against consensus definitions and/or clinical assessments.
- Examples of screening tools for frailty that fulfil the above criteria include:
 - FRAIL score;
 - FI and its electronic version in primary care, eFI;

- get up and go test;
- PRISMA 7 tool;
- mini-mental state examination score (MMSE) and/or clock test for cognitive impairment.
- Health and social care professionals engaged in direct patient care in hospital and community settings should acquire the basic skills to assess for functional status and frailty.
- Those with abnormal screening results should undergo further examination by a clinician to detect underlying potentially reversible/treatable conditions if any, such as hypothyroidism, vitamin D deficiency, anaemia, cardiovascular or respiratory illnesses.

[H2]Preventative care: assessing risk factors and avoiding hospital admissions

[H3]*Related to the inpatient*

- All individuals above 65 years of age with diabetes should receive a risk factor evaluation for conditions and factors that are associated with a higher risk of hospital admissions.
- It is recommended that the following risk factors are evaluated: poorly controlled diabetes, history of hypoglycaemia, poor nutritional intake, cardiovascular risk factors, comorbidities including recent disabling stroke or fracture, polypharmacy with potential drug interactions, poor support or self-care, ADL, risk of diabetic ketoacidosis and hyperglycaemia, risk of falls, susceptibility for infections, residence in care homes, depression and dementia.
- Individualized care plans detailing comorbidities, presence of frailty or functional loss (including cognition), individualized agreed goals of treatment plan, medications, frequency of monitoring, agreed target capillary blood glucose when appropriate, with HbA_{1c}, blood pressure and serum cholesterol levels being helpful in some cases.
- Older people with diabetes, particularly those with catheters, should be reviewed regularly for urinary infections by a responsive community team. They should have quick access to microbiology and ability to start antibiotics for suspected infection.
- To minimize unwanted hospital admissions, care home residents should be supported by care staff who have received training or instruction in basic diabetes care; this care should be supported where possible by family members and informal carers, accurate recording of

diabetes care processes, and an in-reach service by diabetes specialists for hard to reach residents with diabetes.

[H3]*Related to NHS services provision and other support*

- To lessen the risk of unwanted hospital admissions, informal carers should be identified and provided with instruction and support to manage older people with frailty and diabetes living in the community.
- Where able, community-living older people with type 1 and type 2 diabetes should be considered to have access, training and support for capillary blood glucose monitoring and blood ketone monitoring as required.
- Pneumococcal, influenza and shingles (herpes zoster) vaccination should be considered in all older frail individuals with diabetes living in the community.
- A register of people at risk of hospital admission should be maintained in the community and the hospital with details of risks identified and action plans available.
- For high-quality management of frail older adults with diabetes living in the community, the approach recommended is clinically led managed networks for diabetes that will specify care pathways, contact details of stakeholders and joined-up (linked) care between different care providers.

[H3]*General inpatient management principles*

- Assess the older person's ability, capacity and preference for self-management of diabetes (including blood glucose testing and insulin administration).
- Frail older people may have nutritional deficits, ensure that nutritional status is assessed and that optimal nutritional support is provided.
- Ensure that care routines such as the timing of medications with meals and blood glucose testing are managed to reduce the risk of hyper- or hypoglycaemia.
- Frail older people may have cognitive or communication deficits, hence care needs to be taken to ensure that messages are understood using where appropriate supplemental materials and/or including any carers in that communication.

- Discharge planning preparation needs to ensure that the older person, their carers, and the primary or community diabetes teams fully understand the ongoing care plan and any post-discharge medicines adjustments that may be required.

[H2]Managing therapy choices for the frail older inpatient with diabetes

[H3]Category: *blood glucose monitoring*

- An appropriate blood glucose regimen should be employed throughout the inpatient stay.
- Strict avoidance of both hypoglycaemia (defined as < 4.0 mmol/l) and osmotic symptoms (usually seen when glucose levels are > 15 mmol/l) should be a major goal of care for the frail older inpatient.
- A general inpatient glucose range of 7.8–10 mmol/l or acceptable range of 6–12 mmol/l seems reasonable, and the discussions around ideal and acceptable glycaemic targets, and national and international policy statements in this area have been summarized in JBDS guidance; glycaemic targets should be individualized.
- Blood ketone measurement is recommended for the older frail inpatient who is acutely unwell on admission or who becomes acutely unwell during their inpatient stay.

[H3]Category: *review of diabetes therapy*

General

- The clinician should make an immediate review of the admission therapy regime and ensure that it is appropriate (subject to other factors such as presence of cognitive impairment, comorbidity profile, presence or not of terminal illness) and sufficient to maintain a satisfactory level of glycaemia – overtreatment should be strictly avoided.
- Adjustments to the admission therapy regime should be minimized where possible and recorded in the medical case notes: the frequency of review is recommended to be every 24h.
- The clinician should be aware of special considerations that may influence the therapy regime chosen and these include an existing enteral feeding regimen, hydration status, and pre-existing chronic renal failure which may require a change in the dosing schedule to avoid unnecessary hypoglycaemia.

- The use of concentrated long acting insulin analogues (U300 glargine) and ultralong-acting insulin analogues (degludec) has been used in the outpatient setting to show a decreased rate of hypoglycaemia in the older patient group though even in these studies the maximum age was <75 years.

Specific

- Type 1 diabetes
 - inpatients with type 1 diabetes should not have their insulin treatment withdrawn;
 - inpatients with type 1 diabetes are at particular risk of diabetic ketoacidosis and require blood ketones and venous blood gases to be measured if there is continued unacceptable hyperglycaemia and deterioration in health status;
 - capillary blood glucose monitoring should occur a minimum of four times per day, pre-meal and pre-bed;
 - clinicians responsible for the inpatient management of frail older people should be familiar with the current range of insulins and insulin dose adjustment regimes.
- Type 2 diabetes
 - continuation of pre-admission oral glucose-lowering therapy during inpatient care must take into consideration the presence of renal or hepatic dysfunction, or significant medical comorbidities, and requires an assessment of hypoglycaemia risk;
 - to control prandial hyperglycaemia, frail inpatients may be required to be started on a basal insulin with the addition of bolus insulin on a temporary basis;
 - continuation of pre-admission insulin should be decided on glycaemic goals to be achieved, nutritional status, and the risk of inpatient hypoglycaemia.

[H3] *Category: setting of inpatient glycaemic goals*

- Attempts should be made to access previous HbA_{1c} readings carried out in the previous 6–12 months. This allows the healthcare professional to assess previous control in the context of the current admission and set goals for discharge planning with regards to glycaemia.

- Accepted Article
- This is an opportunity to revisit previous targets and to now individualize goals appropriate to their comorbid medical conditions or functional and cognitive status. Simplification may be necessary if the person's cognitive or functional ability has declined.
 - The relationship of HbA_{1c} with mortality and morbidity is U-shaped [4–6]. It has been shown that the admission HbA_{1c} can predict a person's propensity to have in-hospital hypoglycaemia, with levels < 7% having the highest rate of episodes [7]. Higher HbA_{1c} levels predict a greater risk of hospitalization [8].
 - If no assessment is available, measurement should be carried out on admission – taking into consideration that certain medical conditions may interfere with these measurements.
 - HbA_{1c} is a more global measurement of glycaemia for the few weeks prior to the measurement being taken and is not suitable for use in making management choices during hospital stays of a few days' duration.

[H3] *Category: communication with primary care*

- A hospital stay is an ideal opportunity for a person's diabetes regimen to be reviewed and rationalized.
- Any changes made regarding monitoring, treatment regimes and goals need to be communicated clearly to the person's primary care practitioner and other caregivers, such as district nurses and nursing home staff, or family members to prevent previous regimes, which may now be inappropriate.
- The rationale for any changes should be explained clearly in the discharge summary.
- Conditions in the hospital may cause large differences in glucose handling that may not return to baseline either before or even soon after discharge. Any medication, particularly insulin doses used at discharge, may be very different from those needed at home or in a care setting.
- There is a significant challenge with regards to the need for a rapid review post discharge, whether it be at home or in a care facility, and adequate resources are often not available. Careful planning therefore needs to happen before discharge to allow for as safe a discharge as possible within the resources available, but a call for more adequate resources is also needed.

[H2]Managing associated comorbidities and concerns

[H3]*Cognitive impairment, delirium and dementia*

- Older adults with diabetes and frailty should be screened for dementia, and lower thresholds for suspicion of cognitive impairment considered in such individuals.
- People with cognitive impairment or delirium must have their blood glucose levels monitored carefully to ensure hypoglycaemia or hyperglycaemia does not worsen their condition.
- People with dementia would benefit from focused assessment by specialist teams in order to simplify regimes and ensure medications optimization whilst an inpatient.
- Post-operative people with diabetes and frailty must be monitored closely as they may have a higher risk of delirium.
- Sulfonylureas and insulin regimes (especially pre-mixed) should be reviewed in people with delirium and/or reduced oral intake, with avoidance of hypoglycaemia either by dose reduction or change in regimen.
- It is advisable that sulfonylureas are not placed into Dossett boxes for the frail older adult.
- Dipeptidyl peptidase-4 (DPP-4) inhibitors have a place in the management of glucose levels in view of their low side-effect profile and low hypoglycaemia risk.
- Sodium–glucose co-transporter 2 (SGLT-2) inhibitors are to be avoided given that they increase the risk of genitourinary tract infections, dehydration and postural symptoms, all of which can affect mental performance.
- Carers (both family and informal) should be involved in the inpatient care of the frail older adult with diabetes and cognitive impairment.

[H3]*Hypertension and lipids*

- Hypertension:
 - screening and treating hypertension in frail older people with diabetes is essential;
 - all major anti-hypertensive drug classes can be used to achieve the target;

- Accepted Article
- a target blood pressure of 150/90 mmHg is recommended for frail inpatients with diabetes;
 - renal function and electrolytes should be monitored routinely;
 - caution is recommended with the use of diuretic therapy in terms of exacerbating falls risk after discharge.
 - Lipids:
 - an inpatient assessment of lipids is routinely recommended as part of a wider cardiovascular risk assessment;
 - lipid targets will not be a major priority in the first few days of admission into hospital for a frail older person with diabetes;
 - statin therapy is recommended to reduce cardiovascular risk unless specifically contraindicated. Consider offering Atorvastatin 20 mg for the primary prevention of cardiovascular disease in those with type 2 diabetes if the person is aged ≤ 84 years, is well functioning with mild evidence of frailty only, and their estimated 10-year risk of developing cardiovascular disease using the QRISK®2 [3] assessment tool is 10% or more;
 - consider offering statin treatment with Atorvastatin 20 mg for the primary prevention of cardiovascular disease in people who are aged ≥ 85 years, taking into account the benefits and risks of treatment, degree of frailty, any comorbidities that make treatment inappropriate, and the likelihood that benefits may take several years to be seen [4];
 - lower-dose statins should be considered in those who may have some indications of adverse effects such as muscular or hepatic side-effects and further monitoring is required;
 - the addition of fibrate or niacin to statin therapy has no proven benefit in frail older people with diabetes and should not be considered.

[H3] Falls

- Older people with diabetes and frailty should have access to a multidisciplinary team focused on rehabilitation in the hospital environment and optimizing functional status.

- Routine monitoring for the complications of diabetes should be undertaken in all hospitalized individuals with diabetes to minimize the potential for unassessed microvascular complications to impact upon falls risk.
- All inpatients with diabetes and frailty should have a falls risk assessment and be referred to an in-hospital falls prevention programme if available, or to an outpatient review after discharge.
- A medicines review is essential to minimize the unwanted iatrogenic effects that may increase falls risk.
- Prior to discharge, an evaluation of potential falls hazards should be asked for in the person's home.

[H3]*Inpatient hypoglycaemia: risk reduction principles*

- Frail older adults with diabetes should be set individual glucose targets, with increased risk margins to prevent hypoglycaemia.
- Ensure an adequate blood glucose monitoring regimen to reduce the risks of severe hypoglycaemia and excess hyperglycaemia, aiming to maintain glucose levels between 7.8 and 10 mmol/l. JBDS guidance on glycaemic targets is available for most clinical scenarios [1].
- Review medications on admission and identify therapies that may be a hazard for hypoglycaemia (particularly sulfonylureas and insulin) and either change or cease medications as appropriate.
- Ensure that the ward environment has a hypoglycaemia treatment box, which is checked daily to ensure it is fully resourced and that all people at risk are clearly identified.
- Develop and enact a hospital/ward policy for the assessment and monitoring of all frail older people at risk of hypoglycaemia.
- Identify risk of hypoglycaemia on discharge, and identify a strategy to prevent this in the discharge plan and refer all those discharged on insulin to the community diabetes team or district nurses [2].

[H3]*Chronic kidney disease*

- In frail older adults with chronic kidney disease, glycaemic control should be relaxed with a HbA_{1c} range of 59–69 mmol/mol (7.5–8.5%).
- We recommend regular medication review with de-escalation as renal function deteriorates to avoid hypoglycaemia.
- We recommend a multimodality intervention with adequate nutrition and resistance exercise to improve muscle function which can deteriorate rapidly in those with chronic kidney disease.
- Comprehensive geriatric assessment should be performed in all those admitted.

[H3]*Acute stroke illness*

- All people with acute stroke should have their blood glucose checked on admission, regardless of their diabetes or frailty status.
- Hyperglycaemia should be treated to keep blood glucose levels between 7.8 and 10 mmol/l to avoid hypoglycaemia.
- Thrombolysis should be offered if indicated.
- Antiplatelet therapy for people in sinus rhythm and anticoagulation for those with atrial fibrillation should be offered if no contraindications exist.
- Carotid stenting may be considered in people with asymptomatic (> 70%) or symptomatic (> 50%) carotid stenosis.
- In frail people with diabetes, secondary prevention is indicated but targets for cardiovascular risk factors should be relaxed during the inpatient stay.
- We suggest early integration of frailty management into post-stroke rehabilitation is important to coordinate physical recovery and support discharge processes.

[H2]Perioperative assessment and care

- Planning for an elective admission begins at the time that referral is made for inpatient surgical treatment.
- Documenting a detailed plan for management of diabetes in a frail individual should reduce the risk of treatment errors during the admission process.

- The individual plan needs to reference the level of support that is normally needed before admission.
- The diabetes status, list of diabetes-related complications and hypoglycaemic medications should be clearly documented in the medical records on admission.
- The WHO surgical safety checklist bundle should be implemented.
- Glycaemic targets need to be individualized as the risks associated with hypoglycaemia will be greater in a frail inpatient group.
- The target blood glucose should be 7.8–10 mmol/l (acceptable range 6–12 mmol/l), but JBDS guidance on glycaemic targets in all inpatient situations is available.
- Individuals should have access to diabetes specialist multidisciplinary team assessment when needed.
- The combination of diabetes and frailty should trigger a diabetes specialist review of the care plan before admission. People who can self-administer their insulin should be monitored initially and then encouraged to continue with minimal supervision by staff.
- Individuals should be well hydrated and their renal function checked before having any radiological investigation that includes contrast injection.
- At discharge, individuals should have clear documentation of any change in medications, and future care plans should be smoothly communicated to primary care teams.

[H2]Discharge planning incorporating principles of follow-up

- It is important that planning discharge begins at the time of admission to reduce unnecessary length of stay.
- A comprehensive (holistic) geriatric assessment should be performed as an inpatient.
- Where available, a vulnerable adults team may need to be consulted in relation to safe and effective discharge planning of frail inpatients.
- An implementable discharge plan should be included in an individualized management and risk minimization approach.
- Members of the inpatient care team should have received training in assessment of older adults and in the recognition of frailty and functional impairment.

- Inpatients at special risk of a delayed or failed discharge, or early readmission should be identified as soon as possible after admission—these will include: those with a history of repeated admissions for poor glucose control, hypoglycaemia, those with moderate to severe frailty, those with high comorbidity load, those with cognitive impairment and dementia who have still managed to remain in their own homes prior to admission, and those from residential care homes.
- Older adults discharged to a residential care home should have an individualized care plan agreed with the care home, resident and family before discharge, including a realistic and appropriate follow-up schedule.
- Consideration must be given to training potential carers who may be involved after discharge. This may require coordination with other clinicians such as district nurses or the GP.

[H2]End of life care

- Recommended blood glucose targets in recent guidelines [8] are 6–15 mmol/l although levels of 6 and 7 mmol/l may pose an unacceptable hypoglycaemia risk in those with frailty and such glucose ranges require regular review; it is recommended that for those with moderate to severe frailty, a higher glucose range is warranted and decided by the care team.
- HbA_{1c} measurement is not recommended unless used to estimate long-term hypoglycaemia risk; fasting blood glucose readings are not required.
- Fluids should not be withdrawn unless it is the wish of the individual or if they lack capacity, or it is the wish of the family or carer in consultation with the direct care team.
- Insulin regimens in type 2 diabetes should be simplified; these individuals may only require a single injection of intermediate insulin e.g. Insuman Basal, Humulin I, Insulatard.
- If hypoglycaemia is a significant risk, a long-acting analogue insulin such as Tresiba® or Lantus® can be given. This is useful if the insulin is to be administered by community nurses.
- Insulin and other non-insulin injectable treatments such as glucagon-like peptide-1 (GLP1) inhibitors and oral diabetes therapies may be withdrawn in people with type 2 diabetes if clinically appropriate.

- If the individual is transferred to a ward or back to a care home, a clear diabetes treatment plan must be in place and medication and supplies provided.
- Contact numbers for the GP or diabetes specialist nurse team caring for the individual must be included in the frailty and end of life management plan.

[H1]Conclusion

Diabetes and primary care healthcare teams are becoming increasingly aware of the importance of frailty detection and early management in all clinical settings. This inpatient guideline provides a detailed and practical response to this awareness in relation to inpatient diabetes care. With recent evidence that the functional consequences of frailty in older adults with diabetes can be ameliorated by a multicomponent intervention [17], and with a recent national initiative to involve stakeholders in frailty management in diabetes [18], this JBDS-IP guideline should have a key and complimentary role in how the NHS see frailty as an emerging topic of significant importance that requires quality diabetes care at all levels.

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Competing interests

None declared.

Collaborators

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References

- 1 Sinclair AJ, Abdelhafiz AH, Rodríguez-Mañas L. Frailty and sarcopenia – newly emerging and high impact complications of diabetes. *J Diabetes Complications* 2017; **31**: 1465–1473.
- 2 Hanlon P, Nicholl BI, Jani BD, Lee D, McQueenie R, Mair FS. Frailty and pre-frailty in middle-aged and older adults and its association with multimorbidity and mortality: a prospective analysis of 493 737 UK Biobank participants. *Lancet Public Health* 2018; **3**: E323–E332.
- 3 Clegg A, Young J, Iliffe S, Rikkert MO, Rockwood K. Frailty in elderly people. *Lancet* 2013; **381**: 752–762.
- 4 Joint British Diabetes Societies for Inpatient Care. *Inpatient Care of the Frail Older Adult with Diabetes*, August 2018. Available at https://abcd.care/sites/abcd.care/files/resources/Inpatient_Care_of_the_Frail_Older_Adult.pdf Last accessed 25 February 2020.
- 5 Sinclair AJ, Abdelhafiz A, Dunning T, Izquierdo M, Rodriguez Manas L, Bourdel-Marchasson *et al.* An international Position Statement on the management of frailty in diabetes mellitus: summary of recommendations 2017. *J Frailty Aging* 2018; **7**: 10–20.
- 6 Fried LP, Tangen CM, Walston J, Newman AB, Hirsch C, Gottdiener J *et al.* Cardiovascular Health Study Collaborative Research Group. Frailty in older adults: evidence for a phenotype. *J Gerontol A Biol Sci Med Sci* 2001; **56**: M146–M156.

- 7 Rockwood K. Conceptual models of frailty: accumulation of deficits. *Can J Cardiol* 2016; **32**: 1046–1050.
- 8 Malmstrom TK, Miller DK, Morley JE. A comparison of four frailty models. *J Am Geriatr Soc* 2014; **62**: 721–726.
- 9 Dunning T, Sinclair A, Colagiuri S. New IDF Guideline for managing type 2 diabetes in older people. *Diabetes Res Clin Pract* 2014; **103**: 538–540.
- 10 Sinclair AJ, Dunning T, Dhatariya K; an International Group of Experts. Clinical guidelines for type 1 diabetes mellitus with an emphasis on older adults: an Executive Summary. *Diabet Med* 2020; **37**: 53–70.
- 11 Rubenstein LZ, Stuck AE, Siu AL, Wieland D. Impact of geriatric evaluation and management programs on defined outcomes: overview of the evidence. *J Am Geriatr Soc* 1991; **39**: 8–16.
- 12 Pialoux T, Goyard J, Lesourd B. Screening tools for frailty in primary health care: A systematic review. *Geriatr Gerontol Int* 2012; **12**: 189–197.
- 13 Rubenstein LZ, Josephson KR, Wieland GD, English PA, Sayre JA, Kane RL. Effectiveness of a geriatric evaluation unit. A randomized clinical trial. *N Engl J Med* 1984; **311**: 1664–1670.
- 14 World Health Organisation (WHO). *Ageing and Life-Course: What is Healthy Ageing?* Available at <http://www.who.int/ageing/healthy-ageing/en/> Last accessed 24 February 2020.
- 15 *Definition of Disability under the Equality Act 2010*. Available at <https://www.gov.uk/definition-of-disability-under-equality-act-2010> Last accessed 24 February 2020.
- 16 Sinclair AJ, Dunning T, Rodriguez-Mañas L. Diabetes mellitus in older people. New insights and residual challenges. *Lancet Diabetes Endocrinol* 2015; **3**: 275–285.
- 17 Rodriguez-Mañas L, Laosa O, Vellas B, Paolisso G, Topinkova E, Oliva-Moreno J *et al.*; European MID-Frail Consortium. Effectiveness of a multimodal intervention in functionally impaired older people with type 2 diabetes mellitus. *J Cachexia Sarcopenia Muscle* 2019; **10**: 721–733.

18 Strain WD, Hope SV, Green A, Kar P, Valabhji J, Sinclair AJ. Type 2 diabetes mellitus in older people: a brief statement of key principles of modern day management including the assessment of frailty. A national collaborative stakeholder initiative. *Diabet Med* 2018; **35**: 838–845.

FIGURE 1 Inpatient Frailty Care Pathway – a template. MAU, medical assessment unit; A&E, Accident and Emergency; RCP, Royal College of Physicians; CGA, comprehensive geriatric assessment; IP, inpatient; OT, occupational therapist.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Doc. S1. References for each of the eight recommendation areas in the full guideline.

Figure 1: Inpatient Care Pathway for Frail Older Adults – A Template

