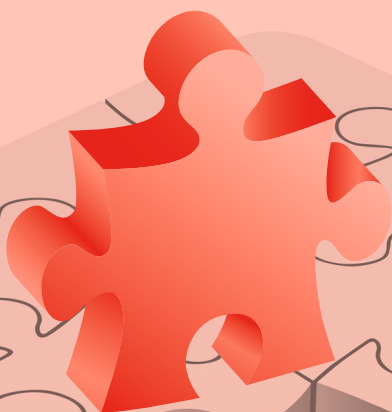


JBDS-IP

Joint British
Diabetes Societies
for inpatient care

Inpatient Care of the Frail Older Adult
with Diabetes
February 2023



This document is coded JBDS 15 in the series of JBDS documents:

Other JBDS documents:

<i>The hospital management of hypoglycaemia in adults with diabetes mellitus</i>	<i>JBDS 01</i>
<i>The management of diabetic ketoacidosis in adults</i>	<i>JBDS 02</i>
<i>Management of adults with diabetes undergoing surgery and elective procedures: improving standards</i>	<i>JBDS 03</i>
<i>Self-management of diabetes in hospital</i>	<i>JBDS 04</i>
<i>Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes</i>	<i>JBDS 05</i>
<i>The management of the hyperosmolar hyperglycaemic state (HHS) in adults with diabetes</i>	<i>JBDS 06</i>
<i>Admissions avoidance and diabetes: guidance for clinical commissioning groups and clinical teams</i>	<i>JBDS 07</i>
<i>Management of hyperglycaemia and steroid (glucocorticoid) therapy</i>	<i>JBDS 08</i>
<i>The use of variable rate intravenous insulin infusion (VRII) in medical inpatients</i>	<i>JBDS 09</i>
<i>Discharge planning for adult inpatients with diabetes</i>	<i>JBDS 10</i>
<i>Management of adults with diabetes on dialysis</i>	<i>JBDS 11</i>
<i>Managing diabetes and hyperglycaemia during labour and birth</i>	<i>JBDS 12</i>
<i>The management of diabetes in adults and children with psychiatric disorders in inpatient settings</i>	<i>JBDS 13</i>
<i>A good inpatient diabetes service</i>	<i>JBDS 14</i>
<i>Inpatient care of the frail older adult with diabetes</i>	<i>JBDS 15</i>
<i>Diabetes at the front door</i>	<i>JBDS 16</i>
<i>The management of glycaemic control in people with cancer</i>	<i>JBDS 17</i>
<i>Concise advice on Inpatient Diabetes (COVID:Diabetes):</i>	<i>JBDS 18</i>

These documents are available to download from the ABCD website at:

<https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group> and the Diabetes UK website at www.diabetes.org.uk/joint-british-diabetes-society

These guidelines can also be accessed via the Diabetologists (ABCD) app (need ABCD membership to access the app)

 **@JBDSIP**

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Statement for inpatient guidelines

These guidelines have been developed to advise the discharge planning process for people with Diabetes currently in Hospital.

The guideline recommendations have been developed and reviewed by a multidisciplinary team led by the Joint British Diabetes Society (JBDS) and including representation from Primary Care Diabetes Society, Diabetes UK. People with diabetes have been involved in the development of the guidelines via stakeholder events organised by Diabetes UK.

It is intended that the guideline will be useful to clinicians and service commissioners in planning, organising and delivering high quality diabetes inpatient care. There remains, however, an individual responsibility of healthcare professionals to make decisions appropriate to the circumstance of the individual, informed by them

and/or their guardian or carer and taking full account of their medical condition and treatment.

When implementing this guideline full account should be taken of the local context and in line with statutory obligations required of the organisation and individual. No part of the guideline should be interpreted in a way that would knowingly put staff, those with diabetes or anyone else at risk.

Copyright statement

These guidelines are free for anyone to distribute, amend and use. However, we would encourage those who use them to acknowledge the source of the document and cite the Joint British Diabetes Societies for Inpatient Care. The Guidelines produced by the Joint British Diabetes Societies for Inpatient Care are licensed under CC BY-NC 4.0

Disclaimer

The information contained in this guidance is a consensus of the development and consultation groups' views on current treatment. It should be used in conjunction with any local policies/procedures/guidelines and should be approved for use according to the trust clinical governance process. Care has been taken in the preparation of the information contained in the guidance. Nevertheless, any person seeking to consult the guidance, apply its recommendations or use its content is expected to use independent, personal medical and/or clinical judgement in the context of the individual clinical circumstances, or to seek out the supervision of a qualified clinician. The group makes no representation or guarantee of any kind whatsoever regarding the guidance content or its use or application and disclaim any responsibility for its use or application in any way.

To enable the guideline to stay relevant, it is envisaged that all of the JBDS guidelines will be updated or reviewed each year. As such these are 'living' documents – designed to be updated based on recently published evidence or experience. Thus, feedback on any of the guidelines is welcomed. Please email christine.jones@nnuh.nhs.uk with any comments, suggestions or queries.

Conflict of interest statement: The authors declare no conflicts of interest

We are eager to find out about your experiences using this guideline, particularly any data from audits of its use in situ to be used in the next revision. Please contact Dr Umesh Dashora u.dashora@nhs.net

Terms and Abbreviations

DKA – Diabetic ketoacidosis

HHS – Hyperosmolar Hyperglycaemic State

CBG – Capillary blood glucose

BP – Blood pressure

CGA – Comprehensive geriatric assessment

eFI – Electronic Frailty Index

MMSE – Mini-mental state examination score

ADL – Activities of daily living

IADL – Instrumental activities of daily living

NICE – National Institute for Health and Care Excellence

CVD – Cardiovascular disease

IDF – International Diabetes Federation

CKD – Chronic kidney disease



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Permissions

Please contact Christine Jones (christine.jones@nnuh.nhs.uk) or Professor Ketan Dhatariya (ketan.dhatariya@nnuh.nhs.uk) for permission to quote from or reproduce any part of this guideline.

Scope of the Guideline

This document aims to improve standards of diabetes care of older frail inpatients in hospitals by providing recommendations for clinicians working directly with this sector of the diabetes inpatient population. Where possible, published evidence has been used to develop these recommendations but in the absence of such evidence, expert opinion and consensus among the multidisciplinary Writing Group has been utilised to create best practice guidelines statements. This can be audited nationally and revised based on the experience gained.

Who should read these guidelines?

Every member of the inpatient team who has direct care responsibility for frail older people admitted in hospitals and those health and social care professionals who provide care for them before and after their hospital admission to prevent and minimise hospital stay. This will include hospital doctors, nurses, pharmacists, health care assistants, GPs, social care workers, carers, secretaries ward clerks and other supporting staff.

Executive Summary

This *Inpatient Guideline* on the management of frailty in diabetes mellitus is an important development for the *Joint British Diabetes Societies (JBDS)* for Inpatient Care portfolio of guidelines and represents the first clinical guideline to focus predominantly on the special issues of diabetes inpatient care of the older adult. This detailed guideline complements the 2017 International Guidance on the Management of Frailty in Diabetes¹. The *Writing Group* acknowledges that the evidence base for recommendations requires being more robust but has combined available evidence with expert consensus where possible. *JBDS* has produced this *guideline* in order for its recommendations to be implemented within the NHS in the United Kingdom to promote improved quality care for older inpatients with diabetes and frailty, since evidence is emerging that frailty has a significant impact on inpatients in terms of increased adverse outcomes and reduced survival. We hope that this *guideline* will provide extra value to the clinician in clinical decision making.

Purpose of Guideline

Our wish has been to highlight the importance of identifying and detecting frailty early in the inpatient course of someone with diabetes to enhance clinical outcomes. We have attempted to do this via a UK specialist consensus that has sought to provide recommendations to support clinicians in management. We hope that commissioners of healthcare and policy makers use the guideline plan and coordinate inpatient care pathways.

Scope and Format of Guideline

In this *Inpatient Guideline* we have defined frailty according to a common accepted model and have recommended practical and easy to implement measures to diagnose frailty. It places key emphasis on the importance of focused assessment of both physical and cognitive domains during the course of admission and recognises 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 the community and primary care.

Apart from glycaemic targets, other key outcomes that require assessment are physical performance measures, an objective assessment of hypoglycaemia risk, falls risk assessment, and quality of life.

The structure of the *Guideline* is based on the template of the International Diabetes Federation (IDF) Global Guideline on Managing Older People with Type 2 Diabetes (2013)² and provides for each topic area an initial set of recommendations, followed by the rationale and evidence base that supports the recommendations, which in turn is followed by a small section on how to implement these recommendations into routine clinical practice including one or more audit indicators, and finally a succinct list of key supporting references is provided.

Areas Covered

The document starts with a review of the guiding principles of the *guideline* followed by a theoretical brief review of the concept of frailty including definitions and then a discussion on frailty detection using various assessment tools that can be employed in routine clinical practice. We then provide recommendations, rationale and evidence base, and routine NHS clinical implementation notes in eight areas:

- General Inpatient Management Principles
- Preventative Care
- Functional Assessment and Detection of Frailty
- Managing Therapy Choices for the Frail Older Inpatient with Diabetes
- Managing Associated Comorbidities and Concerns:
 - Cognition, delirium and dementia
 - Hypertension and Lipids
 - Falls
 - Inpatient hypoglycaemia – risk reduction principles
 - Chronic kidney disease
 - Acute stroke illness

- Pre-operative Assessment and Care
- Discharge Planning and Principles of Follow-Up
- End of Life Care

Recommendations

In arriving at this consensus document, we made every effort to undertake a robust search strategy and article recovery 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 scrutinised such as, Diabetes, Diabetologia, and Diabetes Care, as well as the Journal of Frailty & Aging, Journal of the American Medical Directors Association, and Journals of Gerontology - Series A Biological Sciences and Medical Sciences.

Overall, we made 113 recommendations to guide effective clinical decision-making over the eight key areas. In the area, 'Managing associated comorbidities and concerns', we included recommendations in nine other clinical areas. The strength of the recommendations has varied and points to an important limitation of this work. Overall, whilst recommendations in several areas would have been graded as of higher strength (4A) and moderate strength (3A), the quality of

the evidence we have presented is reflected by many recommendations being likely to be of lower strength (2A) and expert opinion (1A). This is not surprising considering the marked lack of research in this area.

Appendices

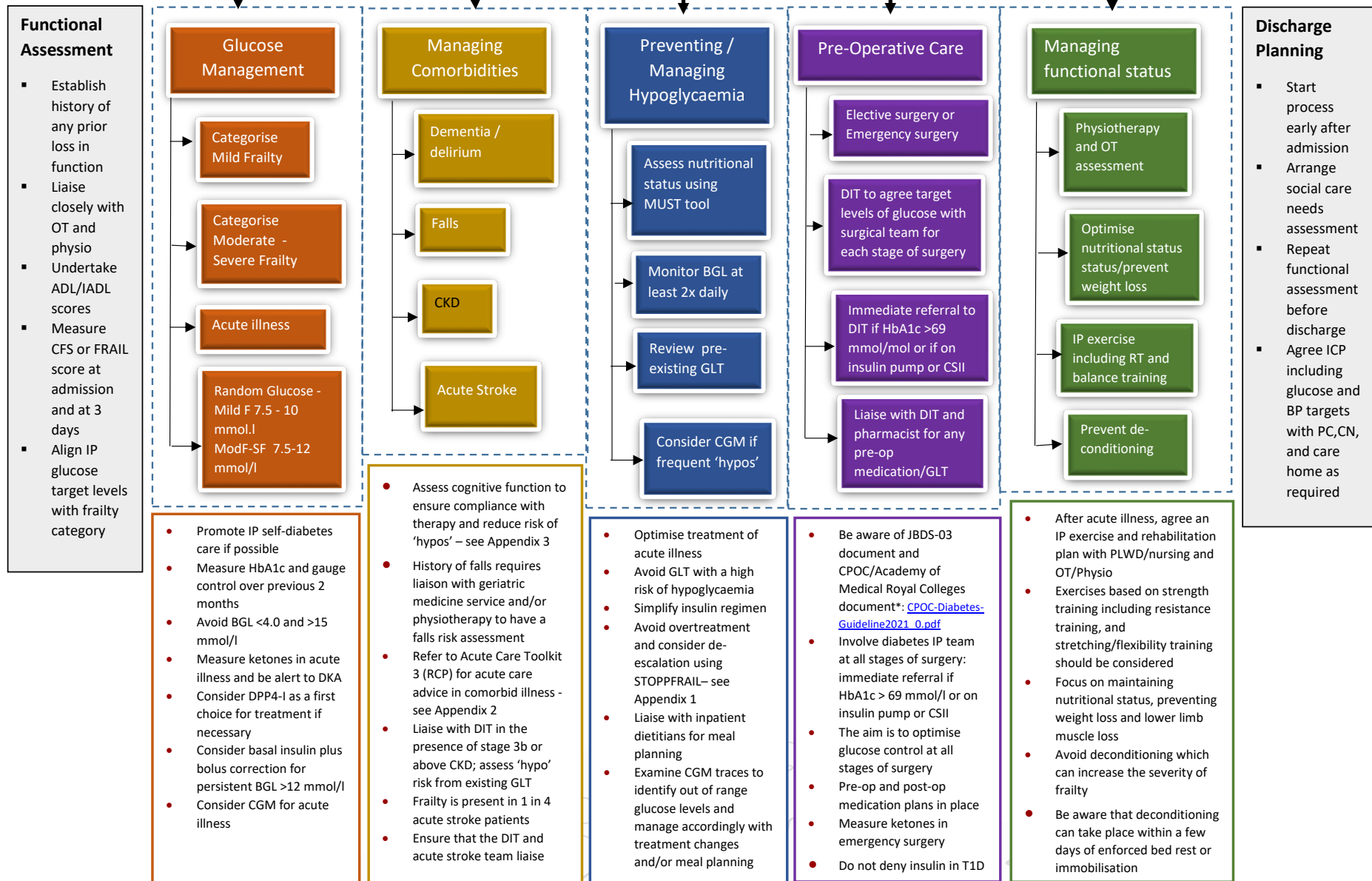
A special feature of this guideline are Appendices 1-4 which provide additional information that should support the clinician in managing frailty in older adult inpatients with diabetes. They comprise:

- **Appendix 1** – STOPPFRAIL criteria
- **Appendix 2** – Acute care toolkit 3 – Royal College of Physicians, London
- **Appendix 3** – Physical Performance and Frailty Measures for Routine NHS application
- **Appendix 4** – Inpatient Frailty Care Pathway - Template

JBDS-IP Management Algorithm

A summary Management Algorithm to assist inpatient care of those with diabetes and frailty is shown below and should be read in conjunction with Chapter 7 – *General Inpatient Management Principles*, and other relevant chapters. This is particularly included to assist those clinicians to gain experience in focussing on key issues in managing older people with both diabetes and frailty.

JBDS-IP Generic Approach to Managing Diabetes (type 1 and type 2) and Frailty Detected at Admission



Abbreviations for JBDS-IP Frailty Management Diagram

'Hypo' – hypoglycaemia

ADL – activities of daily living

BGL – blood glucose level

BP – blood pressure

CFS – Clinical Frailty Scale

CGM – continuous glucose monitoring

CKD – chronic kidney disease

CN – community nurses

CSII – continuous subcutaneous insulin infusion

DIT – diabetes inpatient team

DKA – diabetic ketoacidosis

T1D – type 1 diabetes

DPP4-I – dipeptidyl peptidase -4 inhibitor

GLT - glucose lowering therapy

IADL – instrumental activities of daily living

ICP – individualized care plan

IP - inpatient

Mild F – mild frailty

ModF – SF – moderate frailty to severe frailty

MUST – malnutrition universal screening too

OT – occupational therapist

PC – primary care

RT – resistance training

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1. Dunning T, Sinclair A, Colagiuri S. New IDF Guideline for managing type 2 diabetes in older people. *Diabetes Res Clin Pract.* 2014 Mar;103:538-40
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Foreword and Rationale for this *Inpatient Guideline*

This *Inpatient Guideline* on the management of frailty in older people with diabetes mellitus is a timely but necessary development following the increasing recognition of frailty as an important feature that influences survival and clinical outcomes in diabetes. In addition, recent publications of international clinical guidelines addressing the special needs of older people with diabetes are now available. Despite the often paucity of clinical trial information, these are beginning to demonstrate consistent recommendations relating to glucose targets, the importance of functional assessment and detection of frailty, the need to avoid hypoglycaemia, and the use of lifestyle interventions to enhance intrinsic capacity and functional ability. What has been less clear is a considered approach to identifying and treating those with both frailty and diabetes admitted into hospital where acute illness is a complicating factor in how effective management should be pursued. 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.

The *International Diabetes Federation (IDF) Global Guidance on Managing Older People with type 2 Diabetes* provided for the first time care recommendations for those with dependency including frailty, dementia and end of life care, and the recent publication of an *International Position Statement on the Management of Frailty in Diabetes Mellitus* has drawn significant attention to the area of frailty and diabetes and highlighted the importance of all hospital clinicians involved in the care of such patients to have a high degree of familiarity and clinical experience in managing the associated problems of frailty and functional impairment. The expectation is that this new experience will provide extra value in decision-making when giving advice to primary care colleagues, and those working in the community.

The *Writing Group* for this *Inpatient Guideline* acknowledges that the syndrome of frailty has received little or no attention in the management

plans of older people with diabetes and only relatively recently has some attempt been made to consider this clinical area. It should be recognised 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 and that diabetes is one of five major comorbidities that is associated with the actual development of frailty.

The *Writing Group* also recognises that there is a paucity of specific studies on managing frailty in those with diabetes in any clinical setting, and emphasise the need for a minimum best clinical practice approach where such evidence is totally lacking. The recent recommendation by the UK government that all general practitioners should look for the presence of frailty in all those aged 65 years and over brings more support for all diabetes care professionals to acquire new skills and competencies in assessment of functional status and detection of frailty, and the ongoing need for education and practical guidance in managing frailty in those with diabetes. The *Writing Group* firmly identifies frailty as a pre-disability condition that creates opportunity for intervention to enhance functional performance but also recognises that such intervention approaches may be of limited value in inpatient settings.

Many older people admitted into hospital with the recent pandemic associated with covid-19 have experienced significant comorbidity and mortality and these adverse events have been particularly worse in those with diabetes and frailty in view of their increased vulnerability. The management of their acute Covid-related illness in hospital should be according to all the principles and appropriate recommendations outlined in this guideline

This *JBDS Inpatient Guideline* is unique as it has been developed to provide the clinician with recommendations that assist in the clinical management of older adults with diabetes with a pre-existing or a new diagnosis of frailty within a hospital inpatient setting. Such patients may already have various stages of ill-health associated with other medical comorbidities and provides the urgency to

individualise management in all cases in order to achieve optimal outcomes.

This *Inpatient Guideline* has tried to address these shortfalls in frailty care within hospitals by creating a comprehensive set of practical recommendations that are as evidence-based as possible bearing in mind the relative lack of published data of clinical trials in this area. We hope that all clinicians engaged in this emerging arena of clinical care will work collaboratively to develop an inpatient frailty pathway of care that serves to enhance clinical outcomes and overall health status for this vulnerable population of older people with diabetes.

Supporting References

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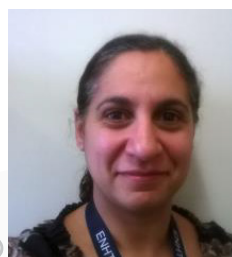
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1. Scope of this *Guideline*

In this *Inpatient Guideline* we have defined frailty according to a common accepted model and have recommended practical and easy to implement measures to diagnose frailty. We have provided a brief but not exhaustive account of prevailing models of frailty including its original phenotypic description and contrasted it with the accumulation of deficits model. The *Writing Group*, however, leaves the final choice of measurement to the clinician irrespective of whether it is based on a particular understanding of the cause or nature of the condition, but assumes it will be a valid process.

Although this *Inpatient Guideline* recognises that the management of the acute underlying illness that may have precipitated admission into hospital should be the first clinical priority of care, it also wishes to emphasise the importance of focused assessment of both physical and cognitive domains during the course of admission as this will assist the clinician in making decisions about the functional status and comorbidity level of inpatients which in turn will guide management.

The *Writing Group* has also concluded 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 the community and primary care. Apart from glycaemia targets, other key outcomes that require assessment but usually are not a feature of every day diabetes clinical practice are physical performance measures, an objective assessment of hypoglycaemia risk, falls risk assessment, and quality of life: these outcome measures will prove to have an important influence in deciding if a specific management strategy is worthwhile in routine clinical care of older people with diabetes and frailty. The *Writing Group* acknowledges that to introduce these measures will require a culture change by the diabetes healthcare team and a phase of upskilling in assessment procedures.

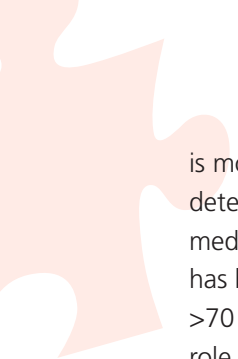
An important limiting factor for producing specific evidence-based clinical recommendations for older people with diabetes and frailty in hospital

settings is the relative lack of clinical evidence from randomised controlled trials involving older subjects with both index conditions. As frailty is also a specific entity and is only now emerging as a diagnosable condition, it is also not possible to extrapolate evidence from clinical studies in younger adults as the condition would not have been looked for or likely to be absent in the latter in most cases. The *Writing Group* has considered this implication and has sought evidence from a wide range of studies that provide sufficient confidence for the basis of each recommendation. This limitation influenced our decision not to grade our recommendations at a particular level of evidence but we have provided the rationale and key references for our recommendations in each section of this *Inpatient Guideline*.

This *Guideline* acknowledges that even in well-funded healthcare systems, the provision of diabetes services for older people may be associated with problems such as poor access to care services, lack of educational resources, lack of specialist input, and poor follow-up practices. With this in mind, the *Writing Group* has placed emphasis on how to enhance the quality of overall public health by providing recommendations for the prevention of hospital admissions and other preventative care in those with diabetes and frailty residing in their own homes or in institutional settings.

The *Writing Group* has taken the decision to develop this *Inpatient Guideline* to address management decisions in older people aged 70 years and over with frailty and diabetes following admission to hospital. However, these definitions can be quite arbitrary and are compounded by the lack of correlation between chronological and biological age in many individuals.

We feel that a threshold of >70 years ensures that people with diabetes will more likely exhibit those characteristics of functional loss associated with frailty and that these better determine the recommendations we have given. Age thresholds for management, however, can be an ad hoc viewpoint and the clinician has the important responsibility to decide what clinical guideline



is most appropriate for their older patients by determining their functional status, level of medical comorbidities, and degree of frailty. As it has been recognised elsewhere an age threshold of >70 years also usually signifies a change in social role and the emergence of changes in dependency.

The *Writing Group* feels that this *Inpatient Guideline* has included sufficient information to guide providers of diabetes or geriatric medicine services on where to direct resources to manage older people with diabetes and frailty following admission into hospital in an optimal way. Insufficient research evidence, however, limits the sequential steps that need to be employed in the design of a 'frailty care pathway'. The *Writing Group* has attempted to address this shortfall in available research by asking all section authors to provide an evidenced-based rationale and specify key references wherever possible.

We hope that this *Inpatient Guideline* will form a platform of modern diabetes care for all clinicians working in the NHS (UK) as part of renewed emphasis on specific management approaches to those who are frail and have diabetes.

2. Purpose, Format and Methodology of the *Guideline*

This *Inpatient Guideline* has four **main purposes**:

- (1) To highlight the importance of identifying and detecting frailty early in the inpatient course of someone with diabetes in order to have the best opportunity to enhance clinical outcome
- (2) Arrive at a consensus among UK specialists in diabetes on how we approach the management of important issues in managing frailty in older inpatients with diabetes
- (3) Identify a series of recommendations in key areas that will support clinicians in everyday hospital clinical practice to manage more effectively the complex issues seen in older adults with frailty and diabetes
- (4) Provide a platform for commissioners of healthcare and policy makers to plan and coordinate care pathways in their local regions for those older people with diabetes who are developing frailty (pre-frail), have developed frailty, and those progressing to disability: this requires effective communication and collaboration across multiple clinical and social care boundaries

Format: the content of the *Guideline* has been developed from teleconference discussion between *Writing Group* members and the larger Joint British Diabetes Societies (JBDS) committee members, face to face meetings among some *Writing Group* members, and the conclusions of a stakeholders' meeting held on the 7th December 2017 in Bedfordshire chaired by one of the co-chairs for this *Guideline* (AJS).

Several updates of the guidelines have been undertaken (last being March 2022). This has consisted of online virtual meetings with relevant

writing group members over a three month period, insertion of a new algorithm for junior medical staff on frailty management in diabetes within hospital settings, and editing by the Chair of the Writing Group (AJS) and the Chair of the JBDS-IP group (KKD).

The structure of the *Guideline* is based on the template of the International Diabetes Federation (IDF) Global Guideline on the Management of Type 2 Diabetes (2013) and provides for each topic area an initial set of recommendations, followed by the rationale and evidence base that supports the recommendations, which in turn is followed by a small section on how to implement these recommendations into routine clinical practice including an audit indicator, and finally a succinct list of key supporting references.

Search Methodology: searches were generally limited to English language citations over the previous 15 years. The primary strategy attempted to locate any relevant systematic reviews or meta-analyses, or randomised controlled and controlled trials, but as discussed above, there were inherent limitations to this approach. The following databases were examined: Embase, Medline/ PubMed, Cochrane Trials Register, Cinahl, and Science Citation. Hand searching of 16 key major peer-reviewed journals was undertaken by the coordinator of the *Writing Group* (AJS) and these included Lancet, Diabetes, Diabetologia, Diabetes Care, British Medical Journal, New England Journal of Medicine, Journal of the American Medical Association, Journal of Frailty & Aging, Journal of the American Medical Directors Association, and Journals of Gerontology - Series A Biological Sciences and Medical Sciences.

3. Guiding Principles of the Guideline

The *Writing Group* has established a number of key principles which 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. These include:

- Individualising 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:
 - identifying and subsequent assessment of key risks in frail older adults with diabetes
 - preventing inpatient hypoglycaemia
 - reduce worsening of ADL (activities of daily living) and IADL (instrumental activities of daily living)
 - maintain mobility
 - reduce in-hospital falls
 - minimise adverse events from treatment
- A management strategy that is clearly defined and agreed with all parties 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 institutionalisation by recognising 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
- An encouragement to promote high quality clinical research and audit in the area of frailty management in diabetes

4. Background to Frailty and Definitions Used

Definition of Frailty

For the purposes of this Inpatient Guideline the Writing Group characterises 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 physical or psychological stressors
- a pre-disability condition

The phenotypic manifestations of frailty were objectively defined by Linda Fried and colleagues in the United States in 2001¹ which were centred around five components of exhaustion, physical activity, walk speed, hand grip strength, and weight loss. A further competing model of describing frailty based on the Canadian Health Study was introduced by Kenneth Rockwood and colleagues where a score (Frailty Index, FI) is developed that is based on the number of deficits (or comorbidities) that are present which in turn determines the risk an individual has of an adverse outcome². Both measures have been validated and have prognostic significance in terms of predicting outcomes.

Rockwood's assessment tool is now available electronically (eFI) and is advocated as a suitable tool for GPs in the UK to identify frailty in people aged 65 years and over. The Frail test developed by John Morley and colleagues, and validated in multiple populations, is increasingly seen as an effective screening tool for frailty and combines components of both former approaches³. The *Writing Group* recognise that cognitive and psychosocial elements of frailty exist but this *Inpatient Guideline* has focused on the physical performance aspects in diabetic subjects only.

The *Writing Group* acknowledge the many likely causative factors involved in developing frailty. The development/onset of diabetes leads to an acceleration of the muscle loss and various factors appear to be operating including insulin resistance, advanced glycosylation end (AGE) products toxicity,

changes in capillary circulation, neuropathic effects, inflammatory processes including genetic factors and so on⁴.

As mentioned previously, this *Inpatient Guideline* places a major emphasis on the importance of focused assessment of both physical and cognitive domains in assisting the clinician in making decisions about the functional status and comorbidity level of inpatients as a guide to treatment strategies adopted.

Physicians predominately working with older people often combine this series of assessments into a management tool called a comprehensive geriatric assessment (CGA)⁵.

Comprehensive Geriatric Assessment (CGA)

CGA can be defined as 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 up⁶.

When carried out formally, the procedure 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 plan⁷. 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 institutionalisation⁸. For the purposes of this *Guideline*, we are advocating a comprehensive evaluation approach based on the ideals of CGA.

Intrinsic Capacity and Functional Ability⁹

The WHO defines *Healthy Ageing* as "the process of developing and maintaining the **functional ability** that enables **wellbeing** in older age". **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; to learn, grow and make decisions; to be mobile; to build and maintain relationships; and to 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 diseases, injuries 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*.

Disability¹⁰

Disability often complicates and accompanies the ageing process and in this *Guideline* our predominant focus has been centred round the loss of physical function.

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.

Clinicians usually assess for the presence of disability by examining the ability of individuals to accomplish a series of activities – activities of daily living (ADLs) or instrumental activities of daily living (IADLs), both of which are measured by questionnaire methods.

Additional Resources for this Guideline

Appendix 1: STOPPFRAIL criteria

In Appendix 1, we list the 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 patients¹¹. The criteria have been shown to have high inter-rater reliability.

Appendix 2: Acute care toolkit 3 – Royal College of Physicians, London

The acute care toolkit 3 provides guidance for NHS medical and nursing staff in acute medical units (AMUs) who are managing more and more numbers of older frail adults requiring access to acute care. Recommendations in the toolkit include configuring pathways and services to incorporate the main essentials of comprehensive geriatric assessment (CGA), structured medication reviews, referral pathways for those who have fallen, and liaising with GP commissioners to bring about integrated care across all relevant sectors including community and primary care.

By applying some of these principles of care and supporting initiatives for frail older adults in general, then those with diabetes and frailty are likely to benefit by improving clinical outcomes, reducing inappropriate hospitalisation, and potentially reducing the need for long term care.

The toolkit is available at:

<https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-3-acute-medical-care-frail-older-people>

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5. Functional Assessment and Detection of Frailty in inpatients

Recommendations

- 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:
 - the FRAIL score
 - The Frailty Index and its electronic version in primary care, eFI
 - The get up and go test
 - PRISMA 7 tool
 - 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, etc

Rationale and Evidence Base

The practical assessment of functional status including the detection of frailty is possible in most clinical settings including hospital and outpatient settings (see Appendix 3). Both health and social care professionals will require, however, a set of easily learnt skills. An overall idea of functional well-being can be obtained by using simple assessment tools such as the questionnaire-based Katz (Barthel) ADL score or the Lawton IADL scale^{1,2}. These provide information ranging from basic abilities (bathing, toileting, mobility) to more complex skills as financial or medication

management. An indication of physical functioning can be obtained by measuring grip strength (using a dynamometer) or timing individuals walking a distance of 4 metres (gait speed), and a useful 'performance' measure is the SPPB (short physical performance battery) which assesses balance, gait speed, and proximal lower limb strength and is predictive of future disability³. All of these can be incorporated into hospital evaluation protocols at different stages of the precipitating illness causing hospital admission.

Frailty can be screened for quickly by applying the *Clinical Frailty Scale* which is a 7-point scale that summarises the characteristics of individuals being screened and has been shown to be predictive of future events including mortality⁴. Its larger version assessment tool called the *Frailty Index* has been incorporated into GP databases as the electronic Frailty index (eFI). Alternatively, frailty can be screened for by the FRAIL scale which is well validated and has similar sensitivity and specificity as the Fried scale⁵. It asks 5 questions only which cover fatigue, climbing stairs, walking, number of illnesses, and weight loss.

The British Geriatrics Society has compiled a set of frailty measures which based on their analysis of the literature can be usefully employed in routine clinical practice⁶. These also include:

- **PRISMA 7 Questionnaire**⁷ – this is a seven item questionnaire to identify disability that has been used in earlier frailty studies and is also suitable for postal completion. A score of >3 is considered to identify frailty
- **Timed up and go test**⁸ - The TUGT measures, in seconds, the time taken to stand up from a standard chair, walk a distance of 3 metres, turn, walk back to the chair and sit down: cut-off score ranging from about 8 seconds (age 60-69 y) to 11 seconds (88-99 y) but use a cut-off of 10 seconds for practical purposes

Both of the above measures appear to have good sensitivity but only moderate specificity for identifying frailty.

Other measures in the diabetes clinic scenario that assist the overall perception of functional health status and possibility of disability are standard clinical assessment for visual loss, cardiovascular health, detection of depression, and the presence of neuropathy (age- or diabetes-related) by the monofilament or vibration perception test.

A practical guide to detection of frailty (see **Appendix 3**) and overall functional status evaluation has been presented as part of the frailty pathway in diabetes (see Template in **Appendix 4**) which we hope will assist local clinicians to plan their own care pathway in this area.

Implementation into Routine NHS Practice

This *Inpatient Guideline* provides examples of commonly used measures for screening for frailty (see **Appendix 3**). Each clinical team should gain familiarity with at least one assessment tool and agree to use it in the examination of older adult inpatients with diabetes. Additional ADL or IADL measures (see above) can also be used to complement this approach. Functional status should also include a screen for cognitive assessment using either the MMSE (mini mental state examination score – now copyrighted and so check its use in your hospital)⁹ or the Mini-Cog test, a simple 3-item recall test with drawing of the

clock face¹⁰ and which takes about 3 minutes to complete. The Montreal cognitive assessment test (MoCA)¹¹ is also worth gaining experience with.

Records of assessment can be kept in the medical records and can be the basis of any future audit activity.

Detection of Frailty in Secondary Care Settings

All of the above assessment tools can be utilised with relative ease in hospital and sub-acute settings. More recently, a new tool (The Hospital Frailty Risk Score) (HFRS)¹² has been validated to identify patients aged 75 years and over being admitted into hospital who have features of frailty and are at greatest risk of adverse outcomes. The HFRS can be calculated from routine used hospital data based on ICD-10 diagnostic codes. Further evaluation of this tool is required and its applicability to those with diabetes needs to be ascertained.

Detection of Frailty in Primary Care Settings

It is essential for future integrated diabetes services to actively involve primary care and their greater involvement in frailty detection and management should be encouraged. Within any one secondary care, primary and community care service area, agreement on assessment tools should be aimed for. In **Appendix 3**, we have outlined a set of measures that can be implemented in routine NHS practice in most clinical settings.

Audit Indicator

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with diabetes receiving an assessment for frailty in a single clinical unit or hospital ward in the past year	Total number of older inpatients with diabetes admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with diabetes who have received a frailty assessment as a percentage of the total number of older people with diabetes admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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6. Preventative Care: Assessing Risk Factors and Avoiding Hospital Admissions¹

Recommendations

Related to the Patient

- 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, co-morbidities including recent disabling stroke or fracture, polypharmacy with potential drug interactions, poor support or self-care, activities of daily living, risk of DKA and hyperglycaemia, risk of falls, susceptibility for infections, residence in care homes, depression and dementia
- Individualised care plans detailing co-morbidities, presence of frailty or functional loss (including cognition), individualised agreed goals of treatment plan, medications, frequency of monitoring, agreed target capillary blood glucose (CBG) when appropriate, with HbA1c, blood pressure and serum cholesterol levels being helpful in some cases
- Older patients with diabetes particularly those with catheters should be regularly reviewed for urinary infections by a responsive community team. They should have quick access to microbiology and ability to start antibiotics for suspected infection
- To minimise 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

Related to NHS Services provision and other support

- In order 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 patients 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 patients 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

Rationale and Evidence Base

Half of the population over 65 years of age has pre-diabetes and up to a quarter may have diabetes². Nearly one in every 6 hospital beds are occupied by someone with diabetes and most of them are elderly⁴. Diabetes admissions in England alone accounted for over 607,000 excess bed days at an estimated cost of £573 million in a year⁵. The largest absolute excess number of hospital admissions are in the older age group bands with 69% of excess admissions being in those over 55 years old, 25% in the over 75s⁶.

People living in lower socio-economic and deprived areas are more likely to need emergency hospital admission^{6,7}. The presence of two or more long term conditions predicts a high risk of hospital admission⁸. Additional factors are present in older age and may influence management e.g. depression, dementia^{9,10}.

A number of predictive models have shown variable accuracy of predicting admission risk. The models which depend on data from primary and secondary care data appear to be 10% more accurate⁶. The use of risk prediction models is valuable and integrated health and social care networks have demonstrated a reduction in emergency admissions with diabetes¹¹.

One in four care home residents have diabetes and a person with diabetes is admitted to hospital from a residential home every 25 min^{12,13}.

An England-wide care home diabetes audit showed that about 35% of residents had no knowledge of the signs and symptoms of hypoglycaemia, 36% of care homes had no written policy of managing hypoglycaemia and 63% of care homes had no designated staff member with responsibility for diabetes care¹⁴.

Integrated care with team work between primary and secondary care has the potential to reduce admission when done well^{6,15,16}. A recent study in care homes showed that each care home resident was taking eight medicines each on average and on any single day 70% of the patients experienced at least one medication error because of inaccessible doctor, not usual doctor, work load pressure, lack of medication training, drug round interruptions, lack of team work among home practice and pharmacy and inefficient ordering system¹⁷. Between August 2003 and 2009 the National Patient Safety Agency received 3881 incidents of insulin errors¹⁸. Medicine review and management in the community can reduce hospital admission by 36.5%¹⁹.

Older patients with type 1 diabetes are especially vulnerable to hospital admission with DKA and HHS particularly when unwell²⁰. Ketone and CBG testing in older patients living in the community and in care homes may identify metabolic decompensation early to avoid hospital admission,²¹⁻²³ but this will require upskilling of care home staff. Older patients who are not well may need to stop nephrotoxic drugs²⁴.

A high quality diabetes education programme can empower patients and carers and has the potential to reduce hospital admissions^{25,26}. Foot assessment is particularly important for older people with diabetes who are at risk because of factors like longer duration of diabetes, poor vision, may have poor foot wear, smoking, social deprivation or living alone²⁷. NICE recommends that special arrangements should be in place to ensure adequate feet assessment for people who are housebound or living in a care or nursing home²⁸.

Older people with diabetes who are catheterised have complex mobility and neurological issues and are prone to frequent urine infections. They need a responsive support system in the community and oral and very often intravenous antibiotics²⁸. Risk factors which indicate potential decompensating in a patient with diabetes are male sex, low GFR, use of ACE inhibitors, proteinuria, and insulin treatment among others²⁹. Older people whose nutritional state is compromised due to diarrhoea or poor intake can develop pressure ulcers quickly and may require admissions³⁰. Pneumococcal vaccination reduces hospitalisation and risk of ICU admission or death in older people^{31,32}. Patients with cognitive impairment are five times more likely to get hospitalised with various reasons including lower respiratory and urinary infections but they do not get any additional care from primary care³³. Residents of care homes have at least double the risk of urine infections and four times the risk of infections with resistant organisms³⁴.

Implementation into Routine NHS Practice

There should be a document for each older person in the community above 65 years of age which identifies the type of diabetes, the specific risks for hospital admissions for each individual person, and strategies to avoid hospital admissions. The document should clarify the target range of HbA1c and whether management is being supported by CBG readings. There should be a clear action plan when the readings are out of target. This may require a consensus among primary care, secondary care clinicians, care home managers (for residents of care homes) and patients and carers. The document should clarify triggers that prompt a call to the diabetes specialist team or GP. Closer coordination with community-based pharmacists is encouraged.

Audit Indicators

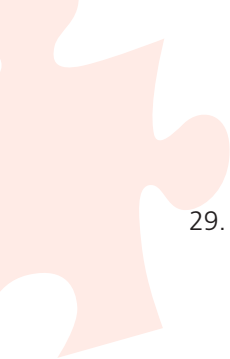
Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with frailty and diabetes having received a community-based risk factor assessment prior to hospital admission in a single clinical unit or hospital ward in the past year	Total number of older inpatients with frailty and diabetes admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with frailty and diabetes who have received a community-based risk factor assessment as a percentage of the total number of older people with frailty and diabetes admitted into a single unit or hospital ward in the past year	Documentation of community based assessment in the inpatient medical records
Percentage of older inpatients with frailty and diabetes having an individualised care plan* prior to hospital admission in a single clinical unit or hospital ward in the past year	Total number of older inpatients with frailty and diabetes admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with frailty and diabetes who have an individualised care* plan prior to hospital admission as a percentage of the total number of older people with frailty and diabetes admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

* Detailing co-morbidities, presence of frailty or functional loss (including cognition), individualised agreed goals of treatment plan, medications, frequency of monitoring, agreed target CBG when appropriate, HbA1c, BP and cholesterol levels exist for patients on a high risk register

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7. General Inpatient Management Principles

Recommendations

- Assess the older person's ability, capacity and preference for self-management of diabetes (including blood-glucose testing and insulin administration)
- All frail inpatients with diabetes who are not using technology (mobile phone apps, flash glucose monitoring (FGM), other 'wearables') to monitor their blood glucose levels should be assessed for their suitability to use these and their interest in them
- Frail older patients 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

Rationale and Evidence Base

Managing diabetes in inpatient settings can be challenging. However, in the context of the frail older person this challenge can be even more complex. Frailty by definition reduces the margin of tolerance to physiological stress, for example, hyper- or hypoglycaemia. Frailty can also be associated with cognitive deficits affecting a person's capacity to self-manage their diabetes and communicate with family or carers. It is essential that every ward has a robust strategy for risk assessment and management to reduce the potential for adverse events which include: death; falls; sepsis; cardiovascular events; and increased length of stay and readmissions.

The use of 'wearables' such as flash glucose monitoring (FGM) or mobile phone apps (eHealth) to assist in the monitoring blood glucose levels should not be denied to older people with diabetes and prompts a discussion with the inpatient in this area in relation to their suitability and wish to consider them as part of self-management.

There are multiple iatrogenic factors that can contribute to adverse events in those who are frail inpatients; these include: a failure of the care team to review medications; medicine errors; inadequate glucose monitoring; a failure to recognise symptoms of hyper- and hypoglycaemia; mis-timing of meals with insulin; and inadequate discharge planning. It is also important to recognise that many frail older people are reliant on supplemental support from family members and/or carers which is absent in hospital.

These supporters need to be closely involved in care delivery and planning particularly when discharge is being considered. Every ward should develop a diabetes frail friendly strategy with auditable policies and procedures focussing on assessing and minimising risk and to organise the care environment to ensure that it is protective for older frail people with diabetes during their admission and on discharge. Some potential areas and strategies for enabling this are outlined below:

Hyperglycaemia in hospital settings

Hyperglycaemia is a common problem in hospital settings in people with diabetes. In frail older people with diabetes factors such as infections, acute illness and/or the physiological stress associated with surgery, can place older people at increased risk of hyperglycaemia.

Osmotic symptoms may be less apparent in older frail people as the renal threshold for glycosuria can be elevated and this and other symptoms such as fatigue can be attributed to features associated with aging, such as confusion and general inactivity¹.

Hence robust monitoring is required optimally at pre-meal times and before bed, with less stringent targets to avoid hypoglycaemia in the 'ideal' range 7.8-10 mmol/L² or acceptable range of 6 – 12

mmol/L. The discussions around ideal and acceptable glycaemic targets, and national and international policy statements in this area, have been summarised in JBDS guidance.³

Older people are also at increased risk of significant hypoglycaemia in hospital settings⁴, and systematic monitoring is indicated.

Care planning

Hospitals are extremely high pressure, high volume, care environments, with a focus on minimising hospital length of stay, and the needs of older people can often be under managed leading to adverse treatment outcomes. In addition to the need for vigilance on glucose monitoring, it is also important to consider:

- Activity and nutrition. Nutritional deficits have been reported in older hospitalised patients⁵, therefore assessing on admission patients' BMI and weight and capacity to self-feed are important. During the hospital stay, monitor weight and refer for dietetic assessment if BMI <18 or if weight declines during admission. Care should be taken in identifying nutritional supplements, avoiding those with high glucose loads and rapid dispersal
- It is important to assess physical function on admission and ensure adequate compensating strategies if patient has limited mobility
- Pressure areas and feet require frequent inspection, international and national data suggest that at least a third of patients with diabetes in hospital have an at-risk foot, and this is higher in older people^{6,7}. Older frail patients with an at-risk foot should be assessed by a multi-disciplinary diabetes foot team or podiatrist⁸
- Mental function and cognition should also be assessed, as there are known associations between deficits in cognitive function and dementia in patients with diabetes⁹. Such deficits may have an impact on the patient's capacity to voice problems such as osmotic symptoms or hypoglycaemia; and may impair self-management ability in the context of insulin this may indicate the need for 3rd party insulin administration on discharge
- It is important to involve relatives and carers in assessments and in discussing care arrangements but always place the patient at the centre of decision making and make every opportunity to enable them to exercise their personal autonomy

Medicines safety

An ongoing cause of concern and a major risk factor for frail older people with diabetes is the incidence of prescribing and administration errors in the context of diabetes therapies, most notably insulin⁶. While progress has been made to reduce these it is important that each ward works with their diabetes team and pharmacists to improve their medicines systems. Other important actions are:

- Implementing a strategy to reduce insulin errors by enabling self-administration for patients already established on insulin therapy. However, in the frail older person 3rd party administration is more common and hence extra diligence is needed to ensure doses are correct, and that rapid or short acting insulins are timed with meals
- Another important dimension of medicines safety is to review all medications either pre-admission for elective procedures or on admission for acute admissions and risk minimise these

Pre-admission and Discharge planning

Key points here are:

- If patients are coming in for elective procedures, then some assessment of frailty should be considered as part of the pre-admission process¹⁰
- If there are functional or nutritional deficits in pre-surgery patients, consider whether an exercise and nutritional intervention programme is worthwhile and/or feasible
- A medicines review should be undertaken prior to admission with clear instructions written and verbally given to the patient and any relevant carers in respect of pre-operative requirements

For **discharge planning**, the following areas need considering:

- Assess a patient's capacity and any safety issues in respect of their hypoglycaemic therapies; communication with community diabetes teams, general practice and pharmacists; and involve family members and carers
- It is recommended that each ward or unit develop discharge planning policies and documentation with reference to the JBDS Inpatient Guideline: Discharge Planning¹¹ and for guidance on avoiding post discharge hypoglycaemia in the frail older refer to the hypoglycaemia guidance in these guidelines

(see section on Discharge Planning and Principles of Follow-Up)

Implementation into Routine NHS Practice

All inpatient diabetes teams should consider developing their own protocol of care and a care pathway for all frail older inpatients. This will require agreement on assessment procedures, referral criteria for exercise and nutritional review, glucose control targets and implementation of a risk minimisation approach using a medicines review template.

Communication between primary care teams and inpatient care teams is essential prior to admission where possible to ensure that there is available pre-admission information on treatment plans, functional ability, mobility, and cognitive status.

An algorithm for key management areas for inpatients with diabetes and frailty is shown at the end of the Executive Summary.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with frailty and diabetes receiving a medicines review within 48h of their admission into a single clinical unit or hospital ward in the past year	Total number of older inpatients with frailty and diabetes admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with frailty and diabetes who have received a medicines review within 48h of their admission into a single unit or hospital ward as a percentage of the total number of older people with frailty and diabetes admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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8. Managing Therapy Choices for the Frail Older Inpatient with Diabetes

Recommendations

Category – Blood glucose monitoring

- An appropriate blood glucose regimen should be employed through the inpatient stay
- Strict avoidance of both hypoglycaemia (defined as <4.0 mmol/L) and osmotic symptoms (usually seen when glucose levels are greater than 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 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 summarised in JBDS guidance¹ and glycaemic targets should be individualised
- 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

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 minimised 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)² and ultra long acting insulin analogues (degludec)³ 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 DKA 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 4 times per day, pre-meal and pre-bed
- Where possible or indicated, flash glucose monitoring and other 'wearables' should be considered to enhance blood glucose monitoring, and avoid frequent skin pricking for capillary glucose measurement
- 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
- In order 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

- The continuation of pre-admission insulin should be decided on glycaemic goals to be achieved, nutritional status, and the risk of inpatient hypoglycaemia

Category – Setting of Inpatient Glycaemic Goals

- Attempts should be made to access previous HbA1c readings carried out in the previous 6-12 months. This allows the HCP to assess previous control in the context of the current admission and to set goals for discharge planning with regards to glycaemia
- This is an opportunity to revisit previous targets and to now individualise goals appropriate to their comorbid medical conditions or functional and cognitive status. Simplification may be necessary if the patients' cognitive or functional ability has declined
- The relationship of HbA1c with mortality and morbidity is U shaped⁴⁻⁶. It has been shown that the admission HbA1c can predict a patient's propensity to have in hospital hypoglycaemia with levels less than 7% having the highest rate of episodes⁷. Higher HbA1c levels predict a higher risk of hospitalisation⁸
- If no assessment is available a measurement should be carried out on admission – taking into consideration that certain medical conditions may interfere with these measurements
- HbA1c 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 days of a few days duration

Category - Communication with Primary Care

- A hospital stay is an ideal opportunity for a patient's diabetes regimen to be reviewed and rationalised
- Any changes made regarding monitoring, treatment regimes and goals need to be communicated clearly to the patient's primary care practitioner and other care givers such as district nurses and nursing home staff or family members to prevent previous regimes, which may now be inappropriate being re-established
- 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 to those needed at home or 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

Rationale and Background

Managing diabetes in the older person should be aligned with their individual functional status, presence of frailty and dependency, co-morbidity, quality of life and life expectancy. The target in the frail older adult should be to achieve the best glycaemic control which does not compromise the quality of life with additional treatment burdens and does not increase the risk of hypoglycaemia⁹. Every effort should be taken to routinely review medication lists and decide the advantages and disadvantages of continuing with a particular therapy whilst the individual is an inpatient. For example, as the inpatient is frail and may have an acute illness, is a GLP-1 receptor agonist still an appropriate choice (in view of further potential weight loss as a side-effect)? Alternatively, if the inpatient is on a SGLT2 inhibitor and is acutely unwell or undergoing major surgery, it should be discontinued temporarily or permanently (because of the risk of precipitating ketoacidosis).

In the US the number of admissions in those over 65 years due to adverse drug reactions is around 120,000 with 700,000 emergency department visits. Four medication classes (alone or combination) were the main culprits of which insulin was the second most common (13.9%) and oral glucose lowering agents being the 4th at 10.7%¹⁰. Similarly, in England, between 2005 and 2014 there were over 72,000 admissions due to hypoglycaemia in the over 60s. This equates to 72% of admissions due to hypoglycaemia in this cohort¹¹.

Health care professionals making treatment decisions should have the expertise to take these factors into account when determining goals for therapy both during the inpatient stay but also when planning for life beyond discharge. Both the inpatient and family members (including other carers) should be involved in these decisions.

An individualised approach to glucose regulation for hospitalised frail inpatients is essential to avoid hypoglycaemia and continuing symptoms of hyperglycaemia which can exacerbate recovery from other acute events causing admission. Hospitalised older patients often experience a failure of counter-regulatory mechanisms to illness and particularly hypoglycaemia, for example, an attenuated release of glucagon and adrenaline and often fail to perceive neuroglycopenic symptoms

or be unable to alert staff because of dementia or cognitive dysfunction¹².

Setting a realistic inpatient glucose range is mandatory and guidance is available to instigate this in several of the JBDS guidelines available at <https://abcd.care/joint-british-diabetes-societies-jbds-inpatient-care-group>. The discussions over appropriate and acceptable glycaemic targets in different clinical situations, and national and international policy guidance, have been summarised in previous and recent JBDS documents¹ Careful monitoring by frequent capillary glucose measures will guide the clinician in relation to treatment decisions (Table 1).

Table 1: Appropriate Monitoring Frequencies for Capillary Blood Glucose (CBG)

Type of Diabetes and Treatment Regime	Minimum Frequency of Monitoring
Diet only- no addition of steroids, etc	Randomly once daily
Diet only- poor control recently on pre-admission HbA1c; or instigation of high dose steroids*	Once daily pre-lunch or pre-evening meal *If the CBG is >12 mmol/L, frequency should be increased to four times daily; if the CBG is consistently above 12 mmol/L, the steroid-induced diabetes treatment algorithm should be employed – see Appendix 1 JBDS steroid guideline
Metformin	Randomly once daily
Sulphonylureas	Pre- meal three times a day
DPP4 inhibitors, pioglitazone, Meglitinides or SGLT2 inhibitors	Randomly once daily
GLP1 agonists	Randomly once daily
Insulin	4 times a day- Pre-meal and pre-bed

*<https://abcd.care/resource/jbds-08-management-hyperglycaemia-and-steroid-glucocorticoid-therapy>

There are many subcutaneous insulin regimes which are used both in the inpatient and outpatient settings. Advice from the inpatient diabetes team should be sought as soon as possible as to the suitability of each regime if needed.

- **Basal Only** - where a background insulin is used either on its own or in addition with oral agents. This is often used in patients for whom avoidance of symptoms of hyperglycaemia and hypoglycaemia is the primary aim and for whom a simple regime allows safety to be ensured but where tight targets are not required for long term prevention of complications and as such are often used in the frail elderly population
- **Basal Bolus** - Here a background insulin is supplemented by rapid insulin given at meal times. This regime is flexible and allows for mealtimes to be varied, but timing of insulin to meals is essential. For inpatients, if staff on the wards are able to administer this with dose changes being reviewed frequently this can be quite effective in maintaining control where food intake is variable. However, it requires multiple injections a day and can often be too complex for frail elderly patients to maintain or for inexperienced staff to adjust appropriately
- **Premixed insulins** - These insulins contain mixtures of fast acting and intermediate acting insulin in set proportions which is designated in their names. The contents may be either human or analogue insulins and this needs to be taken into account when timing injections. They are most often used twice daily (occasionally three times a day) and are used when patients have a more fixed food and activity regime. If patients are admitted on such regimes, they may not be suitable during times of illness when appetite may be variable and the risk of hypoglycaemia is increased if meals are missed

Variable rate intravenous insulin infusions (VRIII)

Patients who are nil by mouth may need a variable rate intravenous insulin infusion (VRIII). The duration of this should be minimised and the patients' nutritional status optimised. For patients who were on a basal bolus regime prior to the instigation of a VRIII any basal insulin should be continued concurrently with a VRIII to allow for safe transfer

back to this regime. Any patients who were on premixed insulin timing of transfer back to their usual regime needs to be planned so that there is an overlap of at least 30 minutes between the subcutaneous insulin and the VRIII stopping.

Type 1 diabetes

Patients with Type 1 diabetes have an absolute deficiency of insulin and there must always be insulin on board at all times. This means that attention must be paid to the type of insulin regime that the patient is admitted with and its suitability to the prevailing circumstances. In particular during the use of variable intravenous insulin, steps must be taken to ensure that there is always background insulin on board to guard against interruptions of the intravenous insulin which can occur for many reasons e.g. loss of intravenous access.

How to Implement in Routine Clinical Practice

- HCPs need to familiarise themselves with the different types of oral and non-insulin injectable medications available in the treatment of diabetes in order to adjust these according to prevailing comorbidity
- HCPs need to familiarise themselves with the different types of insulins commonly used along with how to use insulin safely. There are many e-learning modules available and most hospitals have these available for staff as part of recommended training- some have even placed these modules in their mandatory training. An example of this is: <https://www.diabetesonthenet.com/course/the-six-steps-to-insulin-safety/details>. Other examples are available as part of the e-learning for healthcare suite made available by NHS Health Education England. Available at: <https://hee.nhs.uk/>
- HCPs who are prescribers need to be able to adjust insulin doses according to the prevailing blood glucose trends. In general a 10% adjustment is advised per insulin dose. HCPs should interrogate the blood glucose record chart, the meal chart and the patient's clinical status and take all into account in making a decision about dose adjustments. Reasons for glycaemic variability are shown in the Table 2 below

Table 2. Causes for variation in blood glucose

	Factors causing rise in glucose	Factors causing fall in glucose
Concurrent Illness	Insulin resistance due to stress of illness e.g. infection	Acute kidney injury; severe hepatic dysfunction
Glucose Lowering Medication	Insulin and OHA prescription / administration errors	Insulin and OHA prescription / administration errors/ inappropriate use of 'stat' doses of glucose lowering medication
Other Medication	Steroids used to treat respiratory, rheumatological, neurological disorders	Warfarin, quinine, salicylates, fibrates, sulphonamides (including co-trimoxazole), monoamine oxidase inhibitors, NSAIDs, probenecid, SSRIs.
Nutrition	Increase in caloric intake from nutritional supplements or NG feeds above that taken pre-admission; different nutritional content to usual food; meal times different to those in community	NBM; Different nutritional content to usual food, delayed or missed meals for investigations, Less caloric intake due to anorexia from illness; dislike of hospital food; lack of support to eat from care givers; meal times different to those in community, lack of access to snacks
Activity	More sedentary due to concurrent illness	Unexpected physical activity- e.g. with physiotherapist; mobilisation after illness
Others	Injection into areas of lipohypertrophy/ lipoatrophy	Terminal Illness Injection into areas of lipohypertrophy/ lipoatrophy

Abbreviations: OHA, oral hypoglycaemic agents; NSAIDs, non-steroidal anti-inflammatory drugs; SSRI, serotonin selective re-uptake inhibitors

Audit Indicators


Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with frailty and diabetes receiving adjustments to their medications by trained and experienced HCPs who take into account current clinical status, prevailing glucose levels and appropriate glycaemic targets in a single clinical unit or hospital ward in the past year	Total number of older inpatients with frailty and diabetes admitted into hospital within a single clinical unit or hospital ward in the past year receiving medication adjustments	Number of older inpatients with frailty and diabetes who have received medication adjustments by trained and experienced HCPs as a percentage of the total number of older people with frailty and diabetes receiving medication adjustments in a single unit or hospital ward in the past year	Documentation of inpatient assessment and medication adjustments in the medical records

Other suggested areas for audit review

- Individualised monitoring regimes should be instigated appropriate to the patient's therapeutic regime and clinical status
- Changes in medication should be communicated to the patient, their carers and their primary care and community teams to ensure that renewed goals, and rational for the new regime is communicated

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9. Managing Associated Comorbidities and Concerns

a) Cognitive Impairment, Delirium and Dementia

Recommendations

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

Rationale and Evidence Base

Patients with diabetes and cognitive impairment are a subgroup of the frail older adult that need a specific focus. There is limited data on this area specifically in terms of clinical management

for inpatients with or without frailty. The risk of dementia in patients with diabetes is quoted between 1.5- 2 x increased risk^{1, 2}.

Data on prevalence of dementia in patients with diabetes is scant. However a study from USA noted just over a third of patients in nursing homes with diabetes had mild degree of cognitive impairment³.

Hyperglycaemia has been implicated in reducing cognitive function suggesting control should not be too lax. However given the risks of falls, confusion and risks of hypoglycaemia, a pragmatic approach is needed to avoid unnecessary risk and harm from hypoglycaemia as well⁴.

Current guidance sets HbA1c targets between 53 to 64 mmol/mol (7-8%). However, laxer targets up to 70 mmol/mol (8.5%) are also accepted on an individualised basis^{5,6}.

There is little data on delirium in diabetes and its management, which is a suggested area of future research. A systematic review found patients with diabetes are at higher risk of post-operative delirium. Therefore it would be sensible to be aware of this in post-operative patients and glycaemic control to be closely monitored⁷. Clinicians must be aware of the implications of delirium on oral intake and the implications of dehydration and caloric intake on diabetes care and medication dosing.

Both sulphonylureas and insulin are well known to increase the risk of hypoglycaemia, and in patients with impaired cognition – either temporarily or permanently, the impact of hypoglycaemia is significant^{8,9}. Variable food intake, reduced hydration status can predispose to renal impairment which can increase the risk of hypoglycaemia in patients on these medications. Current evidence for dementia in diabetes is predominantly from patients with type 2 diabetes given their older nature hence the majority of recommendations centre around medication review especially of oral medications. However, given the increasing life expectancy of

the population, there will inevitably be a type 1 population with cognitive impairment and care must be taken to not excessively reduce insulin doses in order to avoid rebound hyperglycaemia and diabetic ketoacidosis. Medication choices specifically in type 2 patients centre around simplifying regimes and reducing hypoglycaemia risk. There is no correct regime; however, the regime which reduces hypoglycaemia risk as well as prevents excessive hyperglycaemia and is simple to administer either by patients themselves or carers is appropriate^{10,11}.

Implementation into Routine NHS Practice

There needs to be a proactive approach to identifying and providing support to this subgroup of patients with diabetes, frailty and cognitive impairment. Each hospital should identify patients with these conditions as a particularly vulnerable group with specific needs and highlight to a named specialist (either a diabetes

specialist nurse (DSN) or clinician with interest in this area). The majority of these patients will be known to the elderly care and dementia nurse or specialist teams and so it is important that they are made aware of the need to identify such patients. Staff (particularly in elderly care wards) must be educated to recognise that patients with diabetes and dementia have specific needs and clinical concerns.

Conversely, it is important that diabetes teams should identify a dedicated specialist/DSN to deal with such patients. Skill is needed in managing such patients with use of frailty assessment scales beneficial in identifying the degree of function in order to plan management. A management plan focussing on de-intensification, simplified regimes and relaxed targets including target HbA1c and blood sugar levels is advised and should ideally be included in the discharge summary or in a separate letter to primary care. Evidence in type 1 diabetes is limited but the same principles of safety and minimising risk and hypo avoidance remain.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of patients with diabetes and frailty screened for delirium or cognitive impairment in a single clinical unit or hospital ward in the past year	Total number of patients with diabetes and frailty admitted into hospital within a single clinical unit or hospital ward in the past year	Number of patients with diabetes and frailty screened for delirium and cognitive impairment as a percentage of the total number of patients with diabetes and frailty admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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(b) Hypertension and Lipids

Recommendations

Hypertension

- Screening and treating hypertension in frail older people with diabetes is essential
- All major antihypertensive drug classes can be used to achieve the target
- 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 patient with diabetes
- Statin therapy is recommended in order to reduce cardiovascular risk unless specifically contraindicated: consider offering Atorvastatin 20mg for the primary prevention of CVD in those with type 2 diabetes if the person is aged 84 years and younger, are well functioning with mild evidence of frailty only, and their estimated 10-year risk of developing cardiovascular disease using the QRISK^{®2} assessment tool is 10% or more
- Consider offering statin treatment with Atorvastatin 20 mg for the primary prevention of CVD to people who are 85 years of age or older, 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 seen⁴
- 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

Rationale and Evidence Base

Older people with diabetes are at high risk of cardiovascular disease and there is now good outcome data available measuring the effects of antihypertensive therapy in hypertensive subjects with diabetes which have involved some older subjects^{1,2}. These indicate that achieving a BP of <140 mmHg systolic may not be additionally beneficial although no data in frail subjects are available.

We have meta-analysis evidence to support targeting blood pressure in older populations to achieve reductions in major cardiovascular outcomes, though not mortality reduction⁵. It is pertinent for the clinician to weigh the benefit of multiple antihypertensive therapies, against the potential for side effects in the frail, older individual treated with multiple therapies. Measuring the realistic potential for cardiovascular risk reduction against a pragmatic assessment of life expectancy and quality of life is not straightforward and tailored antihypertensive therapy is appropriate.

Initially non-pharmacological interventions may be employed in order to reduce BP – reduced salt intake and increased activity where feasible. An appropriate initial therapy for the management of hypertension in the older person with diabetes would be an ACE inhibitor⁶. In the event of ACE inhibitor intolerance, an angiotensin receptor blocker (ARB) may be considered. A calcium channel blocker may be an appropriate as a second line agent if the BP is uncontrolled on a single agent. Thiazide diuretics and beta blockers may also have a role as a third line therapy in specific circumstances.

The majority of people with diabetes admitted into hospital are likely to be treated with a statin or other lipid lowering therapy. There is evidence supporting the management of hypercholesterolaemia in people aged 65 or over in the secondary prevention of IHD⁷. There is also evidence to support the benefits of statins in the more advanced aged population⁸.

The benefits of statin therapy in secondary prevention in those over 80 year of age is limited. In primary prevention there is evidence of medium term benefits, though minimal short term benefits, the benefits perhaps related to the increased atheromatous burden in older people⁹.

Lipid lowering agents should be reviewed in the context of the primary cause for admission, evidence of increasing frailty, and be in conjunction with the patient's wishes, and with the input of the patient's family. Lipid targets can be taken from recent IDF guidance¹⁰.

Implementation into Routine NHS Practice

Monitoring, and active management of blood pressure should be part of routine care in an

older person with diabetes who is an inpatient. Evaluation of end organ damage and other comorbidities should be performed. Attending clinicians and caregivers should have an understanding of medicines effects and side effects including the potential effects of polypharmacy. The requirement for de-prescribing of lipid lowering agents and other medicines should be considered in the frail older inpatient¹¹.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with diabetes and frailty receiving a cardiovascular risk assessment including blood pressure and lipids review in a single clinical unit or hospital ward in the past year	Total number of older inpatients with diabetes and frailty admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with diabetes and frailty who have received a cardiovascular assessment including blood pressure and lipids review as a percentage of the total number of older people with diabetes and frailty admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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(c) Falls

Recommendations

- Older people with diabetes and frailty should have access to a multidisciplinary team focussed on rehabilitation in the hospital environment and optimising functional status
- Routine monitoring for the complications of diabetes should be undertaken in all hospitalised individuals with diabetes to minimise 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 minimise the unwanted iatrogenic effects that may increase falls risk
- Prior to discharge, an evaluation of potential falls hazards should be asked for in the patient's home

Rationale and Evidence Base

Falls remain a leading cause of morbidity and mortality in older people with diabetes and results in considerable disability and decreased quality of life – frailty exacerbates this impact.

It is recognised that older people with diabetes have an increased falls risk due to the presence of multiple risk factors¹. Risk factors include: polypharmacy, muscle weakness, a history of a previous stroke, use of insulin, cognitive dysfunction, orthostatic hypotension, and visual loss².

Peripheral neuropathy may play a major role in making this risk significant³ and thus assessment for peripheral neuropathy should be mandatory in the assessment of all inpatients with diabetes as suggested in the Diabetes UK document: putting feet first documents (e.g. Six Step Guide to improving Diabetes Footcare)⁴. People on insulin may be prone to hypoglycaemia and potentially nocturia will result from persistent hyperglycaemia, both of which may increase inpatient falls risk.

All of these issues highlight the need for a full multidisciplinary evaluation for the presence of risk factors and a review of glycaemic targets to ensure that diabetes control is appropriate, with each opportunity facilitating a review of dietary choices and medication to ensure that hypoglycaemia risk is proactively managed and symptomatic hyperglycaemia avoided. Falls prevention programmes should be initiated in high risk patients, and falls risk assessments undertaken, in line with local hospital policy. Prescribed exercise, or a culture aimed at dressing and mobilising all hospital inpatients, may also reduce falls risk.

Implementation into Routine NHS Practice

All inpatients with diabetes and frailty should receive an inpatient review by a professional with knowledge of diabetes care, in order to minimise the risk of hypoglycaemia and hyperglycaemia, review inpatient glycaemic targets, and undertake a medicine's review during their inpatient hospital stay. All older people with diabetes and frailty should have an individual care plan which maximises the opportunity for mobilisation and reduction of falls risk.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with diabetes and frailty receiving a falls risk assessment in a single clinical unit or hospital ward in the past year	Total number of older inpatients with diabetes and frailty admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with diabetes and frailty who have received a cardiovascular assessment including blood pressure and lipids review as a percentage of the total number of older people with diabetes and frailty admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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(d) Inpatient Hypoglycaemia - Risk Reduction Principles

Recommendations

- 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 scenarios¹.
- 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 patients at risk are clearly identified
- Develop and enact a hospital/ward policy for the assessment and monitoring of all frail older patients at risk of hypoglycaemia
- Identify risk of hypoglycaemia on discharge and identify a strategy to prevent this in the discharge plan and refer all patients discharged on insulin to the community diabetes team or district nurses²

Rationale and Evidence Base

Frail older people may be at increased risk of significant hypoglycaemia in hospital settings. Studies of older hospitalised patients with diabetes have highlighted that hypoglycaemia is more common in older people and the hazards associated with it are greater, particularly mortality³. It has also been identified that hypoglycaemia in hospital: extends length-of-stay (LOS); is associated with increased cardiovascular events; increased risk of fracture inducing falls; and readmissions⁴⁻⁷.

In the context of the frail older person these risks may be additionally elevated as their autonomic response and hypoglycaemia symptom arousal may be blunted⁸. Furthermore, the frail older person may not be as able to communicate their symptoms as effectively as younger people with diabetes and behaviours such as confusion may be attributed to their frail older condition rather than observed as a risk. A recent review of hospital diabetes management of older people identified multiple risk

factors for hypoglycaemia many of which cluster in the frail older population, such as: dementia; renal insufficiency; and nutritional deficits⁹.

Therefore, there are significant hazards for older people in hospital from hypoglycaemia.

The mechanisms that may increase the risk of hypoglycaemia in frail older people include iatrogenic factors, which include: inappropriate types/doses of glucose lowering therapies; medicine errors; meal timings that are not co-ordinated with insulin doses; and a failure to review medicines or set appropriate glucose targets¹⁰. Insulin therapy poses the greatest risk and if it is required it must be used cautiously. It has been reported that mixed insulins may convey a greater hazard than a background insulin (NPH or analogue) alone or in conjunction with a short acting insulin with meals¹¹. It is difficult to regulate mixed insulins particularly when meal timings and carbohydrate consumption are unpredictable. Sulfonylureas (SU) have also been identified as a hazard particularly in hospitalised older people: special caution may be required in patients with renal impairment¹². A UK based study, observed that hypoglycaemia in SU treated patients was more common in the early hours of the morning which is clearly a very high risk period¹³. It was also noted that those most at risk were older and had lower HbA1c levels. A final consideration is the need to prevent discharge hypoglycaemia which can be factor for readmission¹⁴.

Implementation into Routine NHS Practice

Given that many of the mechanisms that drive hypoglycaemia risk are related to care delivery processes, it is possible to identify strategies that may attenuate the risk of hypoglycaemia in this population. To minimise the risks of hypoglycaemia assessment, vigilance and care organisation are the most important things to consider. Ideally these should be protocolised and subject to regular audit and review. In terms of assessment, this should include a thorough medicines review and in the absence of excess hyperglycaemia, consideration should be given to suspending some therapies such as SUs and mixed insulins.

In the frail older patient intensive glucose control is contraindicated. Glucose targets should be less stringent, current guidance recommends a target range of 7.8 to 10 mmol/L⁸. To monitor these targets

patients should have regular capillary glucose tests, preferably in the fasting state. Glucose levels should also be assessed if patients exhibit any hypoglycaemic symptoms (confusion, drowsiness, sweating, blurred vision, tremor or an unsteady gait).

If rapid acting insulins are being used then co-ordinating with meal timings is important, and if there is doubt in relation to whether an amount of carbohydrate adequate to the insulin dose will be consumed then either reduce the dose by 50% if pre-meal glucose >7.8 mmol/L or omit if <7.8 mmol/L. If patient consumes carbohydrate then give dose immediately after meal if a rapid acting analogue or give a reduced dose (50%) if it is a standard short acting insulin. Then assess post-prandial glucose at 2hr.

Ensure a protective ward environment with good communication and systems to alert ward staff to the risk of hypoglycaemia. Clearly identify those at risk with some labelling system. Have a ward protocol for assessing patients, reviewing medication, setting glucose targets and monitoring glucose levels. Identify a procedure for co-ordinating meals with insulin doses. Ensure there is a hypoglycaemia treatment kit on the ward which is checked daily so that the contents are complete and in-date; and that all ward staff (including temporary staff) are familiar with it and how to use it. Medicine errors are still too high in hospitalised diabetes patients, and in those who are frail and especially those with

communication deficits these risks may be amplified. Hence, robust prescribing and administration systems are required with careful cross checking to reduce these hazards.

In line with the principles outlined in the section, *Discharge Planning and Principles of Follow-Up*, when planning a discharge for patients taking insulin, take care to ensure that a clear plan is in place to manage the insulin at home or in their place of residence (i.e. care or nursing home). Firstly, identify with the in-patient diabetes team and/or the ward pharmacists the insulin regime with the lowest risk. This needs to consider insulin profile and complexity of delivery. If there is a limited risk of excess hyperglycaemia then one dose of NPH or a long acting analogue should be considered. If the patient is to self-administer then carefully consider their capacity and competence to do this. They need to be observed and allowed to rehearse the skills (testing glucose and injecting insulin), preferably with any carer or family member. If there is any doubt about their capacity then consider third-party administration. Discuss and refer all patients to the community diabetes team prior to discharge or to the local district nursing service. It is important to note that when someone is unwell or has undergone surgery their glucose levels will be elevated, hence robust glucose monitoring with soft glucose targets (7 mmol/L) should be observed until the insulin requirements are established.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with diabetes and frailty receiving a comprehensive evaluation of hypoglycaemia risk in a single clinical unit or hospital ward in the past year	Total number of older inpatients with diabetes and frailty admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with diabetes and frailty who have received a comprehensive evaluation of hypoglycaemia risk as a percentage of the total number of older people with diabetes and frailty admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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e) Chronic kidney disease¹

Recommendations

- In frail older adults with chronic kidney disease, glycaemic control should be relaxed with a HbA1c range of 7.5-8.5% (59-69 mmol/mol)
- 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 patients

Rationale and evidence base

Diabetes is associated with an accelerated ageing process that promotes frailty². Diabetes-associated complications such as chronic kidney disease (CKD) further increase the risk of frailty³. Frailty is independently linked with adverse clinical outcomes in all stages of CKD and has been shown to be associated with an increased risk of mortality and hospitalisation⁴. Anorexia and under nutrition, which increases as renal function declines, are underlying factors that lead to frailty especially in patients with end stage renal disease (ESRD) or those on dialysis⁵. Protein energy malnutrition and muscle wasting in CKD may lead to spontaneous resolution of hyperglycaemia and low HbA1c levels which requires regular review of hypoglycaemic medications.

Other factors that may lead to resolution of hyperglycaemia in CKD are gradual reduction of renal gluconeogenesis as renal function declines, physical inactivity and comorbid conditions⁶. One third of patients with diabetes and ESRD on haemodialysis in the US have HbA1c <6%⁷. Up to 20% of older patients (≥75 years old) with diabetes and CKD are unnecessarily intensively treated with hypoglycaemic medications increasing their risk of severe hypoglycaemia⁸. Also, excessive HbA1c reduction (<6.0% (<42 mmol/mol)) has been shown to be associated with discontinuation of disability-free survival in community dwelling

older people with comorbid diabetes and CKD⁹. Therefore, less tight glycaemic control is appropriate to reduce the risk of hypoglycaemia and further deterioration of frailty in patients with combined diabetes and CKD.

Maintaining independence and improving symptoms of uraemia may be more important for patients to achieve good quality of life than tight glycaemic control^{10,11}. An HbA1c of 7.5% to 8.5% (59-69 mmol/mol) is appropriate as higher values >8.5% (>69 mmol/mol) has been shown to be independently associated with poor muscle quality, which may lead to sarcopenia¹². Multimodality intervention with adequate nutrition and progressive resistance exercise training has been shown to result in muscle hypertrophy, increase in muscle strength, muscle mass and performance¹³.

Implementation into Routine NHS Practice


Comprehensive geriatric assessment (CGA) is a multidisciplinary and a systematic approach to identify the medical, psychosocial and functional needs of older people to maximize overall health with increasing age¹⁴. This allows the formulation of a targeted management plan that include a medication review, nutritional assessment and exercise programme which has been shown to be associated with improved functional and survival outcomes¹⁴. It has been demonstrated that it is feasible to use a CGA within nephrology care units, although further studies are needed to assess the outcome¹⁵. Baseline CGA should be performed then regular assessments to measure change over time with implementation of suitable interventions. For example, regular medication review as part of CGA should be undertaken as patients get older with consideration of gradual reduction or even complete withdrawal when frailty or significant weight loss emerges. It is good practice to have some integration between nephrology and gerontology units so that patients identified as frail receive specialist geriatric assessment. Monitoring of renal function and timely adjustment of hypoglycaemic medications is required to avoid excessive lowering of HbA1c.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of older inpatients with diabetes, frailty and chronic kidney disease (CKD) receiving comprehensive geriatric assessment (CGA) including nutritional assessment in a single clinical unit or hospital ward in the past year	Total number of older inpatients with diabetes, frailty and CKD admitted into hospital within a single clinical unit or hospital ward in the past year	Number of older inpatients with diabetes, frailty and CKD who have received comprehensive geriatric assessment (CGA) including a nutritional assessment as a percentage of the total number of older people with diabetes, frailty, and CKD admitted into a single unit or hospital ward in the past year	Documentation of inpatient assessment in the medical records

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(f) Acute stroke illness¹

Recommendations

- All patients 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 patients in sinus rhythm and anticoagulation for those with atrial fibrillation should be offered if no contraindications exist
- Carotid stenting may be considered in patients with asymptomatic (>70%) or symptomatic (>50%) carotid stenosis
- In frail patients 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

Rationale and evidence base

Diabetes increases the risk of ischaemic stroke by about two fold especially in women².

In contrast, acute ischaemic stroke can lead to acute disturbances in glucose metabolism affecting stroke outcome³. Furthermore, diabetes is associated with an increased risk of post-stroke long term functional impairment and dementia^{4, 5}. Therefore, the relationship between ischaemic stroke and disturbed glucose metabolism seems to be bidirectional. Hyperglycaemia occurs in about 30–40% of patients admitted with acute ischaemic stroke which may reflect pre-existing diabetes or stress hyperglycaemia⁶.

Hyperglycaemia on admission (defined as blood glucose level >6.1 mmol/L) is associated with poor outcome regardless of diabetes status⁷.

The relative risk of in-hospital or 30-day mortality after an ischaemic stroke in individuals with hyperglycaemia but no history of diabetes is 3.3 {95% confidence interval (CI) 2.3 to 4.7}

and in those with diabetes is 2.0 (0.04 to 90.1) compared with patients with normoglycaemia on admission³. Therefore, evidence of normalisation of blood glucose during the pre-admission phase for acute stroke may improve clinical outcomes⁸. However, intensive glycaemic control may have no additional benefits than just keeping the blood glucose in the normal range and may in fact increase the risk of hypoglycaemia. In a meta-analysis of 11 randomised controlled trials (1583 patients with acute stroke), patients who were intensively treated with intravenous insulin to maintain blood glucose level around 4.0 to 7.5 mmol/L showed no difference in clinical outcomes of death or dependency {odds ratio (OR) 0.99, 95% confidence interval (CI) 0.79 to 1.23} or final neurological deficit {standard mean difference (SMD) -0.09, 95% CI -0.19 to 0.01} compared to the usual care, but the risk of hypoglycaemia was significantly higher in the intensively treated group (OR 14.6, 95% CI 6.6 to 32.2)⁹.

A recent study has demonstrated that post stroke hyperglycaemia (>8.5 mmol/L) was associated with poor outcomes in an older cohort (average age of 72 years) but no data on frailty status was reported or data on whether tighter glucose control would have a favourable impact on stroke outcomes¹⁰. Frailty may increase the risk of hypoglycaemia¹¹ therefore, blood glucose levels should not be lowered below a safer level of 6.0 mmol/L. Secondary prevention with healthy life style, antiplatelet therapy in patients in sinus rhythm or anticoagulation treatment in those with atrial fibrillation will reduce the risk of stroke recurrence¹²⁻¹⁴. Carotid artery stenting is a less invasive intervention suitable for frail older patients than carotid endarterectomy and has been shown to reduce the risk of recurrent stroke¹⁵. Due to polypharmacy and increased risk of side effects in frail older people, targets for secondary prevention of cardiovascular risk factors should be relaxed¹¹.

Implementation into Routine NHS Practice

Blood glucose levels should be measured in all patients admitted with acute stroke.

Hyperglycaemia should be treated initially with subcutaneous insulin on a sliding scale but if persistent, intravenous insulin infusion can be used

for the first 24-48 hours. Regular bedside glucose monitoring is necessary to avoid hypoglycaemia and to make appropriate adjustments to insulin regimens. For patients on enteral tube feeding, intravenous insulin infusion can be used but a tailored insulin twice daily regimen adjusted according to capillary glucose level has been shown to be effective¹⁶. A multidisciplinary approach involving stroke and diabetes teams to develop local protocols and periodic training for the staff on the comprehensive assessment and management of hyperglycaemia is appropriate, as

is an agreed approach to functional assessment and management of frailty. On discharge, effective communication with primary care physicians is needed to maintain smooth transfer of care. Patients who have no history of diabetes and presented with stress hyperglycaemia will require HbA1c testing to determine diabetes status and they should be followed up. The early integration of palliative care team for patients who suffered severe stroke and early discussions with patient and family regarding prognosis and early decisions about resuscitation is a good practice.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of patients with diabetes and frailty admitted with acute stroke who have documented evidence of frailty management as part of their post-stroke rehabilitation plans in a single clinical unit or hospital ward in the past year	Total number of patients with diabetes and frailty admitted with acute stroke admitted into hospital within a single clinical unit or hospital ward in the past year	Number of patients with diabetes and frailty admitted with acute stroke who have documented evidence of frailty management as part of their post-stroke rehabilitation plans assessment as a percentage of the total number of patients with diabetes and frailty admitted with acute stroke into a single unit or hospital ward in the past year	Documentation of inpatient assessment and rehabilitation plans in the medical records

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10. Perioperative Assessment and Care

Recommendations

- 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 individualised as the risks associated with hypoglycaemia will be greater in a frail inpatient group
- The current recommendations for inpatients with diabetes should be 7.8-10 mmol/L (acceptable range 6 - 12 mmol/L), and JBDS guidance on glycaemic targets in all inpatient situations is available.¹ In the presence of frailty, and in the absence of sufficient evidence to the contrary, we suggest that the ranges should be 7.5 – 10 mmol/L, and 7.5 – 12 mmol/L for moderate to severe frailty where the risk of hypoglycaemia is higher. This also simplifies management
- Patients 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. Patients who can self-administer their insulin should be monitored initially and then encouraged to continue with minimal supervision from the staff
- Patients should be well hydrated and their renal function checked before having any radiologic investigation that includes contrast injection
- At discharge, patients should have clear documentation of any change of medications and future care plans smoothly communicated to primary care teams

Rationale and evidence base

The guidance document published by the Joint British Diabetes Societies in 2011 titled: “Management of adults with diabetes undergoing surgery and elective procedures: improving standards” has important relevance and applicability to a frail inpatient population undergoing surgery². Frailty has been recognized as an important risk factor for the development of postoperative complications and increased length of stay^{3,4}. Attention to functional health status, comorbidity profile and medications is essential for successful management as changes in any of these domains can have a disproportionate adverse effect in view of diminished physiological reserve to deal with perioperative demands and stresses.

Diabetes leads to increased mortality and increased length of stay in patients attending hospital. This is a particular problem for those patients attending for surgery or elective procedures. The national diabetes inpatient audit suggests that 10% of those admitted to hospital for surgery have diabetes⁵. The length of stay is reported to be 45% longer for people admitted to hospital for surgery⁶. The risks for surgical (predominantly elective) admissions are particularly high⁷.

Frail patients are at risk of deconditioning if managed in a hospital environment. This risk is greater if the diagnosis of frailty is combined with the diagnosis of diabetes. Unless a management plan for diabetes is included within the plan for treatment before and during an elective admission there is a risk of prolonging the admission. This is particularly dangerous for those with frailty. Although planning the admission is more complex for this group the benefits in outcomes are likely to be greater.

The glycaemic target for frail patients with diabetes needs modification as there are specific risks relating to hyper- or hypoglycaemia and goals of care are different - careful consideration should be given to adjusting the glycaemic target appropriately. There are few data suggesting that hyperglycaemia per se is the cause of increased morbidity in this group although hyperglycaemia is associated with increased

mortality in the frail population⁸. Data linking hypoglycaemia and morbidity in the frail group are more robust. On balance more weight should be given to avoiding hypoglycaemia even at the risk of running slightly higher blood glucose during elective admissions.

Self-management of diabetes in hospital is an important safeguard against prescribing and administration errors. The individual is likely to know how best to adjust diabetes medication to control their own blood glucose. This is particularly relevant for individuals using insulin. Frailty per se is not a contraindication to self-management. Particular care must be taken if there is cognitive impairment.

Implementation into Routine NHS Practice

Careful planning, taking into account the specific needs of the patient with diabetes, is required at all stages of the patient care pathway from GP referral to post-operative discharge. Neither diabetes nor frailty is in themselves a contraindication to elective procedures. Careful planning should prevent unnecessary admission to hospital and reduce length of stay. This will also reduce the risk of deconditioning during an inpatient stay.


Frailty is not a contraindication to self-management of diabetes in hospital. This needs discussing with the individual prior to the procedure.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of inpatients with diabetes and frailty who have a perioperative plan in place in a single clinical unit or hospital ward in the past year	Total number of inpatients with diabetes and frailty requiring a non-acute surgical intervention within a single clinical unit or hospital ward in the past year	Number of inpatients with diabetes and frailty with a perioperative plan in place as a percentage of the total number of inpatients with diabetes and frailty requiring a non-acute surgical intervention in a single unit or hospital ward in the past year	Documentation of inpatient assessment and a perioperative plan

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11. Discharge Planning incorporating Principles of Follow-Up

Recommendations

- 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 individualised management and risk minimisation 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 re-admission 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 individualised 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 general practitioner

Rationale and Evidence Base

Frail patients will often have ongoing complex health and social care needs and require to be identified at the time of admission¹. Ideally, the multidisciplinary specialist diabetes team (where available) need to be part of both the inpatient phase as well as the discharge planning process. Coordination of care and formalised proactive planning are key themes in providing a safe discharge from hospital^{2,3}.

Managing frailty involves a complex interaction between medical, social and psychological needs. Managing diabetes requires an awareness of diet as well as other lifestyle factors and, for some, an ability to adjust medication or insulin doses. Frail patients experiencing a decompensation due to ill health may temporarily or permanently lose the ability to manage this complex condition. Managing diabetes for this group during the hospital stay is likely to be overseen by the ward team. Planning safe care when the patient leaves hospital requires careful thought to prevent readmission or other harm. It is important firstly that the need to plan care is recognised and begins as early as possible in the admission. The specialist inpatient diabetes team play a crucial role in developing the plan for diabetes care after discharge.

Frail patients with diabetes are likely to have a reduced life-expectancy^{4,5}. Aggressive glycaemic and cardiovascular targets should be avoided in this group of patients. The focus should be more on quality of life, maintaining independence and avoiding hospital admission^{6,7}.

Discharge plans from hospital including a problem list, management goals communicated appropriately to the community care team involving a nurse case manager devoted to diabetes could be very efficient in the general follow up of patients in the community⁸.

Detailed discussions with the person with diabetes in hospital and family are essential to ensure that

any discharge to a care home is well planned and welcoming, and residual fears and concerns are addressed.

Frail patients who have been admitted to hospital with diabetes complications need a particular focus by the community team on discharge. Continuity of care in the community by a general practitioner has shown a reduction of hospitalisation rate in patients who have access to regular follow ups compared to those who have not (53.5% vs 68.2% respectively)⁹.

Implementation into Routine NHS Practice

Health care professionals looking after older frail people with diabetes should be trained in

comprehensive geriatric assessment including the recognition of frailty. Guidelines about the care of older people with diabetes and its complications should be available in each ward and staff are made familiar with its use.

Frail people with diabetes admitted to hospital will usually require multidisciplinary planning for discharge from hospital. This need should be recognised at the time of admission and planning begun as early as possible.

Recognising frailty at the time of admission and appropriately responding with a combined approach from the hospital and community teams is crucial.

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of inpatients with diabetes and frailty who have an individualised care plan in place at the time of discharge from a single clinical unit or hospital ward in the past year	Total number of inpatients with diabetes and frailty discharged from a single clinical unit or hospital ward in the past year	Number of inpatients with diabetes and frailty with an individualised care plan in place at the time of discharge as a percentage of the total number of inpatients with diabetes and frailty discharged from a single unit or hospital ward in the past year	Documentation in the medical notes of an individualised care plan in place at the time of discharge

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12. End of Life Care

Recommendations

- Recommended blood glucose targets in recent guidelines⁸ are 6-15 mmol/L although levels of 6 and 7 mmol/L may pose an unacceptable hypoglycaemia risk in patients 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
- HbA1c 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 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

Rationale and Evidence Base

In the UK it is estimated that each year half a million people die in the UK¹; the National Diabetes Audit² (2015-16) identified 102,010 deaths in people with diabetes from England and Wales. The average age expectancy of the population increases year on year³;

and the average age of diabetes inpatients is 75 years⁴. In 2014, nearly half of all deaths in England occurred in hospitals⁵. This is despite the majority of people who when given a preference would prefer not to die in hospital⁶. The possibility of a home death depends on various factors, including illness progression, symptom control, complications, family support available and access to community based palliative care services and equipment. Acute Emergency Services are seeing an increase in those already considered to be in the last phase of life with an estimated 1.6 million admissions in the last year of life recorded in 2016⁷. These include oncology patients, the frail and people with advanced dementia, some of whom will already have advanced care planning (ACP) in place.

Diabetes management at the end of life centres on symptomatic relief at the right stage of end of life irrespective of the presence of frailty. It aims to prevent glycaemic emergencies such as diabetic ketoacidosis and hyperosmolar hyperglycaemic state or hypoglycaemia, as well as dehydration and the development of foot ulceration or pressure sores. Hypoglycaemia is common in the dying as appetites reduce and if renal impairment is present due to the slow clearance of medications such as insulin and sulphonylureas.

Implementation into Routine NHS Practice

Practical guidance on implementing up to date end of life management of adults with diabetes can be found in the recently updated Diabetes UK Clinical Care Recommendations⁸. The majority of recommendations will in most cases apply equally to those who are frail or non-frail.

Advanced care planning (ACP) is an important procedure that can be undertaken in most NHS settings. It may take the form of:

- **An Advance Decision** – this document is legally binding – it should be signed and witnessed. It informs all those involved in the individual's care e.g. family, carers, health professionals, that the individual has a specific wish to refuse specific treatments in the future

and this becomes essential if that individual loses the ability to communicate effectively

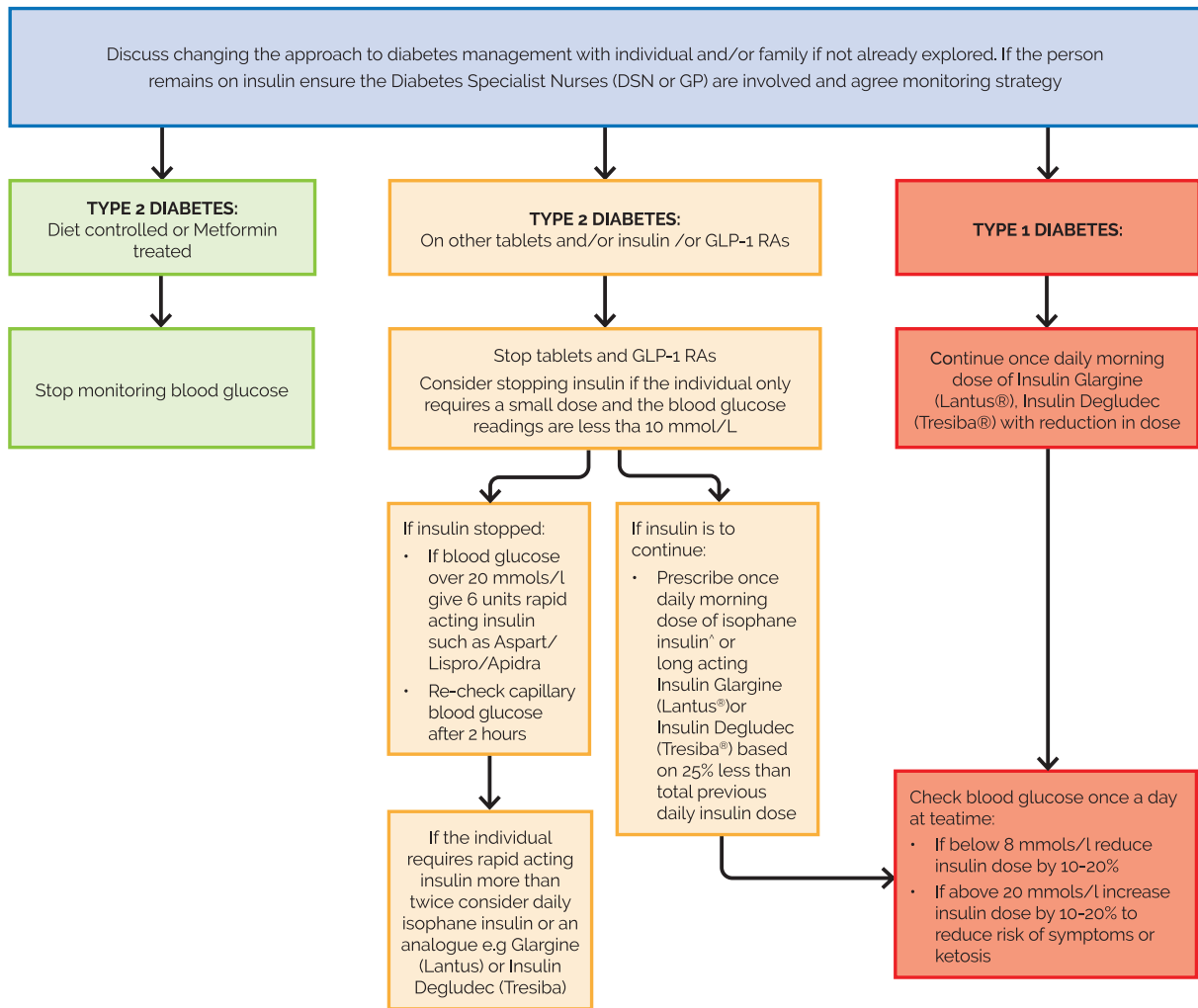
- **An Advance Statement** – this document is not legally binding but sets out the individuals' wishes, preferences and beliefs about future care
- **Emergency Health Care Planning (EHCP)** – An EHCP makes communication easier in the event of a healthcare emergency. It includes shared decision making and recording around expectations and capabilities of the individual and carers in the event of predictable situations

or emergencies. The plan should include a list of regular and as required (PRN) medications, and indications for any rescue medications left in the individual's home for emergency use. It could include a plan for insulin adjustment or rescue doses of short acting insulin analogues

Diabetes management in the last few days is an emotional and often professionally challenging time. In Figure 1 we have included a copy of the algorithm for care in the last few days of life.

Figure 1 Diabetes Management in the Last Few Days of Life

Figure 1 - Algorithm for the last days of life



IMPORTANT INFORMATION:

- Aim for capillary blood glucose readings of 6–15 mmol/L
- Keep tests to a minimum. It may be necessary to perform some tests to ensure unpleasant symptoms do not occur due to low or high blood glucose
- It is difficult to identify symptoms due to "hypo" or hyperglycaemia in a dying person
- If symptoms are observed it could be due to abnormal blood glucose levels
- Test urine or blood for glucose if the person is symptomatic
- Observe for symptoms in previously insulin treated individual where insulin has been discontinued.
- Flash glucose monitoring may be useful in these individuals to avoid finger prick testing

Audit Indicators

Indicator	Denominator	Calculation of indicator	Data to be collected for calculation of indicator
Percentage of inpatients with diabetes and frailty at end of life who have a documented end of life management plan in place in a single clinical unit or hospital ward in the past year	Total number of inpatients with diabetes and frailty at end of life within a single clinical unit or hospital ward in the past year	Number of inpatients with diabetes and frailty at end of life with an end of life management plan in place as a percentage of the total number of inpatients with diabetes and frailty at end of life in a single unit or hospital ward in the past year	Documentation of the end of life management plan in the medical records

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Appendices

These are listed as:

- **Appendix 1** – STOPPFRAIL criteria
- **Appendix 2** – Acute care toolkit 3 – Royal College of Physicians, London
- **Appendix 3** – Physical Performance and Frailty Measures for Routine NHS application
- **Appendix 4** – Inpatient Frailty Care Pathway - Template

Appendix 1

STOPPFrail criteria

STOPPFrail is a list of potentially inappropriate prescribing indicators designed to assist clinicians with stopping such medications in older patients who meet all of the following criteria:

- End-stage irreversible pathology
- Poor one year survival prognosis
- Severe functional impairment or severe cognitive impairment or both
- Symptom control is the priority rather than prevention of disease progression

The decision to prescribe/not prescribe medications for the patient should also be influenced by the following issues:

- Risk of the medication outweighing the benefit
- Administration of the medication is challenging
- Monitoring of the medication effect is challenging
- Drug adherence/compliance is difficult

Inpatients with diabetes and frailty will in many cases satisfy these criteria and the application of the STOPPFRAIL criteria will be an important action that clinicians can take

Section A: General

A1: Any drug that the patient persistently fails to take or tolerate despite adequate

education and consideration of all appropriate formulations.

A2. Any drug without clear clinical indication.

Section B: Cardiovascular system

B1. **Lipid lowering therapies** (statins, ezetimibe, bile acid sequestrants, fibrates, nicotinic acid and acipimox)

These medications need to be prescribed for a long duration to be of benefit. For short-term use, the risk of ADEs outweighs the potential benefits

B2. **Alpha-blockers for hypertension**

Stringent blood pressure control is not required in very frail older people. Alpha blockers in particular can cause marked vasodilatation, which can result in marked postural hypotension, falls and injuries

Section C: Coagulation system

C1: **Anti-platelets**

Avoid anti-platelet agents for primary (as distinct from secondary) cardiovascular prevention (no evidence of benefit)

Section D: Central Nervous System

D1. **Neuroleptic antipsychotics**

Aim to reduce dose and gradually discontinue these drugs in patients taking them for longer than 12 weeks if there are no current clinical features of behavioural and psychiatric symptoms of dementia (BPSD)

D2: **Memantine**

Discontinue and monitor in patients with moderate to severe dementia, unless memantine has clearly improved BPSD (specifically in frail patients who meet the criteria above)

Section E: Gastrointestinal system

E1. **Proton Pump Inhibitors**

Proton Pump Inhibitors at full therapeutic dose $\geq 8/52$, unless persistent dyspeptic symptoms at lower maintenance dose

E2: H2 receptor antagonist

H2 receptor antagonist at full therapeutic dose for $\geq 8/52$, unless persistent dyspeptic symptoms at lower maintenance dose

E3. Gastrointestinal antispasmodics

Regular daily prescription of gastrointestinal antispasmodics agents unless the patient has frequent relapse of colic symptoms because of high risk of anti-cholinergic side effects

Section F: Respiratory system

F1. Theophylline

This drug has a narrow therapeutic index, requires monitoring of serum levels and interacts with other commonly prescribed drugs putting patients at an increased risk of ADEs

F2. Leukotriene antagonists (Montelukast, Zafirlukast)

These drugs have no proven role in COPD, they are indicated only in asthma

Section G: Musculoskeletal system

G1: Calcium supplementation

Unlikely to be of any benefit in the short term

G2: Anti-resorptive/bone anabolic drugs FOR OSTEOPOROSIS (bisphosphonates, strontium, teriparatide, denosumab)

Unlikely to be of any benefit in the short term

G3. SORMs for osteoporosis

Benefits unlikely to be achieved within 1 year, increased short–intermediate term risk of associated ADEs particularly venous thromboembolism and stroke

G4. Long-term oral NSAIDs

Increased risk of side effects (peptic ulcer disease, bleeding, worsening heart failure, etc.) when taken regularly for ≥ 2 months

G5. Long-term oral steroids

Increased risk of side effects (peptic ulcer disease, etc.) when taken regularly for ≥ 2 months. Consider careful dose reduction and gradual discontinuation

Section H: Urogenital system

H1. 5-Alpha reductase inhibitors

No benefit with long-term urinary bladder catheterisation

H2. Alpha blockers

No benefit with long-term urinary bladder catheterisation

H3. Muscarinic antagonists

No benefit with long-term urinary bladder catheterisation, unless clear history of painful detrusor hyperactivity

Section I: Endocrine system

I1. Diabetic oral agents

Aim for monotherapy. Target HbA1c: $< 8\%/64$ mmol/mol. Stringent glycaemic control is unnecessary. Increases risk of stroke and VTE disease. Discontinue and only consider recommencing if recurrence of symptoms

Section J: Miscellaneous

J1. Multi-vitamin combination supplements

Discontinue when prescribed for prophylaxis rather than treatment

J2. Nutritional supplements (other than vitamins)

Discontinue when prescribed for prophylaxis rather than treatment

J3: Prophylactic antibiotics

No firm evidence for prophylactic antibiotics to prevent recurrent cellulitis or UTIs

Appendix 2 – Acute care toolkit 3

A Royal College of Physicians document called: *Acute medical care for frail older people (March 2012)*.

The document is discussed in the Chapter 4 'Background to Frailty and Definitions Used' and is available at:

<https://www.rcplondon.ac.uk/guidelines-policy/acute-care-toolkit-3-acute-care-older-people-living-frailty>

Last accessed 16th January 2023

Appendix 3: Physical Performance and Frailty Measures for Routine NHS application

The practical assessment of functional status including the detection of frailty is a new learning need for health and social care professionals. In this table, we describe several assessment

tools that can be utilised with ease and safety in most clinical settings including hospital and the outpatient clinic. The first relate to practical assessment of physical performance which might better be undertaken after the acute illness has subsided or in a subsequent outpatient clinic or primary care appointment:

Commonly Employed Measures to Screen for Physical Impairment

Measure	Comments
Timed Get up and Go test	<p>Most adults can complete this test. Good correlation with gait speed, Barthel Index and measures of balance (Mathias S et al (1986); Bischoff HA et al, 2003). Sometimes used a screen for frailty</p> <p>Available at: https://www.verywellhealth.com/the-timed-up-and-go-test-2696072 (cdc.gov) Last Accessed 16th January 2023</p>
4-m gait speed	<p>Robust, clinically-friendly measure. Easy to perform. Can be used a measure functional status in older adults and a predictor of future health and well-being. Population norms available (Studenski S et al, 2003; Cesari M, 2011)</p> <p>Available at: https://www.england.nhs.uk/publication/toolkit-for-general-practice-in-supporting-older-people-living-with-frailty/</p> <p>Last Accessed 16th December 2022</p>
Grip strength	<p>Requires a dynamometer for objective measurement; normative ranges in older people available. Predictive of increased future functional limitations and disability, increased fracture risk, and increased all-cause mortality (Roberts HC et al, 2011)</p> <p>Available at: https://www.sralab.org/rehabilitation-measures/hand-held-dynamometergrip-strength</p> <p>Last accessed 16th December 2022</p>

Tools to detect frailty (Sinclair AJ et al, 2017 and 2018)

Assessment Tool	Comments
Fried Score	<p>Well established physical frailty tool based on data from the Cardiovascular Health Study; often seen as a reference frame for studies of frailty in community-dwelling older adults; required 2 procedures/measures (gait speed and grip strength) and answers to 3 questions; can identify 'pre-frail' individuals (Fried L et al, 2001). Requires some training</p> <p>Original article and criteria explained - available at: https://academic.oup.com/biomedgerontology/article/56/3/M146/545770 Last Accessed 16th January 2023</p>
<p>Clinical Frailty Scale</p> <p><i>NB. A larger 70-item assessment tool called the Frailty Index is also available, and a shorter electronic version (eFI) is now available in primary care in the UK</i></p>	<p>Based on data from the Canadian Study of Health & Aging; 7-point scale originally – now 9-point; visual description; predictive of future events including mortality; easy to employ in routine clinical practice (Rockwood K et al, 2005)</p> <p>Available at: https://www.england.nhs.uk/publication/toolkit-for-general-practice-in-supporting-older-people-living-with-frailty/ Last Accessed 16th January 2023</p>
FRAIL score	<p>Well validated in multiple population groups; similar sensitivity and specificity as the Fried scale. Comprises only 5 questions (no procedures) which cover fatigue, climbing stairs, walking, number of illnesses, and weight loss (Abellan van Kan, G et al, 2008)</p> <p>Available (read and view) at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4515112/ Last Accessed 16th January 2023</p>
PRISMA 7 questionnaire	<p>7 item questionnaire; a score of 3 or more indicates frailty;</p> <p>Useful in primary care and other clinical settings. Often used as a postal questionnaire. May be useful if patient too unwell to undertake a performance procedure such as walk speed</p> <p>https://www2.gov.bc.ca/assets/gov/health/practitioner-pro/bc-guidelines/frailty-prisma7.pdf Last accessed 16th January 2023</p>

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Appendix 4: Inpatient Frailty Care Pathway - A Template

