Diabetes Care
Towards End of Life
Clinical care recommendations

Developed by the Midlands
Diabetes Nurse Specialist
Group and HSE Midlands
Specialist Palliative Care Service

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CONTENTS

ABBREVIATIONS

BD:	Twice daily
BG:	Blood glucose
CGM:	Continuous glucose monitoring
DKA:	Diabetic ketoacidosis
DPP4 inhibitor:	Dipeptidyl peptidase 4 inhibitor
eGFR:	Estimated glomerular filtration rate
euDKA:	Euglycaemic diabetic ketoacidosis
FPG:	Fasting plasma glucose
GFR:	Glomerular filtration rate
GLP-1RA:	Glucagon-like peptide-1 receptor agonist
HbA1c:	Glycosylated haemoglobin
HHS:	Hyperglycaemic hyperosmolar state
IFG:	Impaired fasting glycaemia
IGT:	Impaired glucose tolerance
IM:	Intramuscular injection
MDI:	Multi daily insulin regimen
MDRD:	Modification of Diet in Renal Disease (MDRD) method of calculating eGFR
OGTT:	Oral glucose tolerance test
OHA:	Oral hypoglycaemic agent
SGLT2i:	Sodium-glucose co-transporter-2 inhibitor
SPC:	Summary of Product Characteristics
TZD:	Thiazolidinedione

PREFACE

End of life care involves providing support to allow people to continue to live with dignity, keeping them as comfortable as possible until the end and helping families to deal with this often distressing time. In Ireland, diabetes care towards the end of life is an area lacking in quality standards and guidance on best clinical practice. In the past we have used UK guidelines to direct care.

The Irish Midland Diabetes Nurse Specialist Group and the Midlands Specialist Palliative Care Services have come together to help provide better quality standardised care for Irish people with diabetes as they approach end of life. With permission from the UK steering committee we have adapted their End of Life Diabetes Care, Clinical Care Recommendations[1] to produce this document.

Towards the end of life the focus shifts from prevention of long-term complications associated with diabetes to ensuring that the symptoms of high and low blood glucose levels are controlled and minimised. The priorities become avoiding metabolic decompensation and diabetes-related emergencies. All of this should be achieved with the least invasive testing and minimum effective amount of medication.

We are proud to present these recommendations which we feel will greatly enhance the quality of life of patients with diabetes and a terminal illness, and will also give healthcare professionals greater confidence in dealing with such patients. Being given a terminal diagnosis is usually a seismic shock to patients and their families, and they will need a huge amount of support. We hope these guidelines will help to make their quality of life a top priority, and that they will be able to accept less strict control of their diabetes where appropriate.

In the words of Dame Cicely Saunders, the founder of the modern hospice movement: *You matter because you are you, and you matter to the end of your life. We will do all we can not only to help you die peacefully, but also to live until you die.*

One in fifteen people in Ireland are living with diabetes[2]. In the UK, it is estimated that almost one in seven people who die will have diabetes[1].

This document aims to provide practical guidance for healthcare professionals caring for individuals living with diabetes towards the end of life, and their families.

Our aim is to:

- Promote a consistent high quality approach to diabetes care towards the end of life
- Inform the wider healthcare workforce about the key issues of diabetes care towards the end of life that will provide a platform for sensitive, appropriate and supportive care
- Provide guidance for glycaemic targets which aim to avoid symptomatic hyperglycaemia and hypoglycaemia with emphasis on less stringent blood glucose and HbA1c values for those approaching end of life
- Create awareness for the need to provide training and education in end of life diabetes care

STEERING GROUP

Siobhan Meehan (Chair)	Clinical Nurse Specialist Diabetes, Midlands Diabetes Structured Care Programme (MDSCP)
Dr Michael Cushen	Consultant in Palliative Medicine, Midland Regional Hospitals at Portlaoise and Tullamore (MRHP and MRHT)
Demelza Dooner	Advanced Nurse Practitioner Diabetes, MRHT
Georgina Doyle	Advanced Nurse Practitioner Diabetes, MRHP
Mairead Walsh	Clinical Nurse Specialist Diabetes, MDSCP

MIDLANDS DIABETES NURSE SPECIALIST GROUP MEMBERS

Elaine Bannon	Clinical Nurse Specialist Diabetes, MDSCP
Cassandra Campion	Diabetes Nurse Specialist, MRHT
Maeve Dempsey	Clinical Nurse Specialist Diabetes, Regional Hospital Mullingar (RHM)
Susan Haverty	Clinical Midwife Specialist Diabetes, MRHP
Regina Healion	Clinical Nurse Specialist Diabetes, MRHP
Catherine Hennessy	Diabetes Nurse Specialist, RHM
Siobhan McCann	Clinical Nurse Specialist Diabetes, MRHP
Margaret McEvoy	Clinical Nurse Specialist Diabetes, MRHP
Mairead Mannion	Clinical Nurse Specialist Diabetes, MDSCP
Yvonne Reidy	Clinical Nurse Specialist Diabetes, RHM

MAJOR CONTRIBUTORS

Amie Giles	Senior Pharmacist, MRHT
Dr Ultan Healy	Consultant Endocrinologist, RHM
Dr Shu Hoashi	Consultant Endocrinologist, RHM
Dr Pauline Kane	Consultant in Palliative Medicine, RHM
Caoimhe Kenny	Senior Dietitian, MRHP
Dr Ma Pyeh Kyithar	Consultant Endocrinologist, MRHP
Dr Joanna McGlynn	Consultant Geriatrician, MRHT
Dr Patrick Murphy	Consultant Physician, MRHT
Dr Jayant Sharma	Consultant Endocrinologist, MRHP
Susan Spollen	Chief 1 Pharmacist, MRHT

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June James, Nurse Consultant in Diabetes, University Hospitals of Leicester NHS Trust
Diabetes Nurse Specialist Team, Sligo University Hospital
Caroline Gettings, Clinical Nurse Specialist Palliative Care, RHM
Anne Tan, CNM III, Laois Offaly Specialist Palliative Care Team
Carol Lynam, CNM III, Longford Westmeath Specialist Palliative Care Team
Drug and Therapeutics Committees MRHP, MRHT, RHM

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INTRODUCTION

DEFINITION:

Individuals are 'approaching the end of life' when they are likely to die within the next 12 - 24 months[3,4]. This includes individuals whose death is imminent (expected within a few hours or days) and those with:

- Advanced, progressive, incurable conditions
- General frailty and co-existing conditions that mean they are expected to die within 12 - 24 months
- Existing conditions from which they are at risk of dying from a sudden acute crisis in their condition
- Life-threatening acute conditions caused by sudden catastrophic events

Early Identification

The Gold Standards Framework for end of life care in the UK (see appendix 1)[5] proposes three triggers that may help the health care professional to determine if the individual is nearing the end of life:

1. **The "Surprise Question": 'Would you be surprised if this individual were to die in the next year, months, weeks, days'?**

The answer to this question should pull together a range of clinical, co-morbidity, social and other factors that give a whole picture of deterioration. If you would not be surprised, then it is important to consider what measures might be taken to improve the individual's quality of life now and in preparation for possible further decline.

2. General indicators of decline are observed such as deterioration / increasing need / choice for no further active care.

These include:

- Decreasing activity – functional performance status, declining self-care, in bed or chair 50% of day and increasing dependence in most activities of daily living
- Co-morbidity, which is regarded as the biggest predictive indicator of mortality and morbidity
- General physical decline and increasing need for support; advanced disease with an unstable, deteriorating complex symptom burden
- Decreasing response to treatments
- Decreasing reversibility
- Individual choice of no further active treatment e.g. to come off renal replacement therapy
- Progressive weight loss (>10%) in past six months
- Repeated unplanned or crisis admissions
- Sentinel event e.g. serious fall, bereavement, transfer to nursing home.
- Serum albumin less than 25g/L

The development of hypoglycaemia in people who have not previously been prone to this is also a poor prognostic sign

3. Specific clinical indicators related to certain conditions.

These relate to specific conditions. Although diabetes is not mentioned, it frequently occurs in association with those conditions specifically mentioned:

- Cancer
- Organ failure (including heart, liver, kidney failure, neurological diseases and COPD)
- Frailty, dementia and multiple morbidity

PRINCIPLES OF HIGH QUALITY DIABETES CARE TOWARDS THE END OF LIFE

• Focusing on quality of life • Liberalising the goals of care
• Simplification of treatment and reduction of medication burden
• De-escalation of treatment towards the end of life

These principles can be achieved by:

- Ensuring that effective symptom control is provided during the dying stage
- Providing an appropriate level of intervention according to stage of illness, symptom profile and respect for dignity
- Supporting and maintaining the empowerment of the individual (in their diabetes self-management) and carer for as long as is safe
- Tailoring glucose-lowering therapy, adjusting glycaemic targets and minimising diabetes-related adverse treatment effects
- Avoiding metabolic decompensation and diabetes-related emergencies:
  - Frequent and unnecessary hypoglycaemia
  - Diabetic ketoacidosis (DKA)
  - Hyperosmolar hyperglycaemic state (HHS)
  - Persistent symptomatic hyperglycaemia
- Managing the effects of other medications such as glucocorticoids
- Avoiding foot complications and pressure sores in frail, bed-bound individuals with diabetes
- Avoiding symptomatic clinical dehydration

Management Goals in Key Clinical Areas

Blood glucose control targets

The following are the glucose control target ranges, as recommended in the UK guidelines on End of Life Diabetes Care[1], for those approaching the end of life and taking glucose lowering therapies (including insulin) where there may be a risk of hypoglycaemia. It is likely that the optimal range will vary according to the stage of the illness, ability of the individual to eat and drink normally, the presence of hypoglycaemia, the nutritional status and the treatment given.

- **Aim 1 – no blood glucose level less than 6 mmol/l**
- **Aim 2 – no blood glucose level higher than 15 mmol/l**

It should be remembered that many individuals with existing diabetes will be aware of blood glucose targets previously set and will need explanation and reassurance to agree a new set of targets.

Non-insulin glucose lowering therapies can be reduced and eventually stopped depending on factors such as poor appetite and weight loss. It may be necessary to discontinue insulin treatment in people with Type 2 diabetes, but **insulin should never be stopped in those known to have Type 1 diabetes.**

Other Medication

Once it has been recognised that a person is approaching end of life, a review of all prescribed medication is indicated. This decision should be taken in conjunction with the individual and their family to avoid giving the impression that their healthcare professionals are "giving up" on them.

STAGES TOWARDS THE END OF LIFE

A - Less than 2 years to end of life

Oral hypoglycaemic agents (OHAs)/insulin should be reviewed and targets for blood glucose control reassessed. Anorexia or weight loss may require lower doses of OHAs/insulin.

The use of cardio-protective therapies (e.g. ACE inhibitors, angiotensin-receptor blockers, aspirin, statins) should be reviewed in the light of the diagnosis and the presence of other medical co-morbidities, and dosage reductions (even withdrawal) of some of the therapies considered.

Individuals may experience more gastrointestinal effects from aspirin with poor dietary intake or concurrent steroid use. Individuals on aspirin and steroids should be considered for gastro-intestinal protection with a proton-pump inhibitor or suitable alternative.

B - Months to end of life - unstable / advanced disease

Type 1 diabetes

At this stage the aim is to keep drug interventions to a minimum that will control symptoms.

It is generally simpler for individuals to switch from a multi daily insulin regimen (MDI) to a once or twice daily insulin regimen

When switching from a multi daily insulin regimen it is recommended that the total daily insulin dose be reduced by 20-30%

When switching from a twice daily insulin regimen to a basal insulin it is recommended that total insulin daily dose be reduced by 20-30%[1]

The likelihood of carers being involved in insulin therapy administration increases at this stage and may inform the choice of insulin regimen.

Consultation with the diabetes team is recommended

Type 2 diabetes

At this stage the aim is to keep drug interventions to a minimum that will control symptoms.

Complex treatment regimens should be reviewed especially where individuals are on multiple oral hypoglycaemic agents with or without insulin.

For some individuals a once daily insulin regimen may be preferable to multiple oral hypoglycaemic agents

Some Individuals with Type 2 diabetes may choose to take oral agents only.

The likelihood of carers being involved in medication administration increases at this stage and may inform the choice of medication regimen.

Consultation with the diabetes team is recommended

C - Weeks to end of life - deteriorating condition

Individuals may present or be referred to the diabetes team at this time, in which case all of the changes suggested in ***A (Blue box)*** and ***B (green box)*** should be considered but keeping in mind that there may be little time to get used to a new insulin regimen.

Managing diabetes can be an added stress at an emotional time for individuals and carers.

Relaxing blood glucose targets for control may seem like “giving up” for some, while others may view managing diabetes in addition to their terminal illness as “pointless”.

D - Final days / terminal care - days prognosis

Ideally by this stage diabetes treatment has been minimised so that few changes are needed in the last days of life.

The Flowchart for Diabetes at End of Life (page 16), describes how to manage diabetes in the dying individual.

It can be reassuring for relatives and carers to know that this additional plan of care is being followed and that the diabetes is being managed differently rather than being “ignored”.

The aim of the flowchart is to minimise symptoms of diabetes and keep invasive testing to a minimum.

MEDICINES MANAGEMENT - NON INSULIN THERAPIES[6,7]

Individuals with Type 2 diabetes can progress from being diet controlled to commencing on oral agents, usually starting with metformin, with the addition of other agents to achieve the desired individualised HbA1c target.

Towards the end of life, glycaemic targets and diabetes medications need to be discussed and reviewed. The aim is to reduce symptoms of hyperglycaemia, avoid hypoglycaemia and minimise side effects.

As appetite reduces and weight drops, agents such as GLP-1 receptor agonists or SGLT2 inhibitors that promote satiety and weight reduction may no longer be required and may even be contraindicated.

If maintaining hydration is a problem, SGLT2 inhibitors, which have a diuretic effect, are contraindicated.

Not all agents when used alone cause hypoglycaemia, and this may be an important factor in deciding what to use.

Non - Insulin therapies

Please note that eGFR may not give an accurate measurement of renal function, especially in patients with weight loss. Go to the end of this section (bottom of page 12) for further information.

Drug class	Risk of hypoglycaemia	Renal considerations	Hepatic and other considerations
Biguanides • Metformin	No	eGFR 45-60 : up to 1g bd eGFR 30-45 : 500mg bd eGFR<30 : stop due to risk of lactic acidosis	Review if gastrointestinal symptoms present (nausea, vomiting, loss of appetite, heartburn or diarrhoea). Review in frail individuals.
			Contraindicated in: • Hepatic impairment • Liver metastases • Acute alcohol intoxication • Alcoholism
Sulphonylureas • Gliclazide • Glimepiride	Yes		Review if dietary intake is reduced and/or there is significant weight loss due to increased risk of hypoglycaemia
		• Use with caution in renal failure • Consider avoiding use of Gliclazide MR in renal failure	Contraindicated in severe hepatic impairment
Glinides • Repaglinide	Yes		Review if dietary intake is reduced and/or there is significant weight loss due to increased risk of hypoglycaemia
		Use with caution in renal failure	Caution in moderate hepatic failure, contraindicated in severe hepatic failure

Refer to SPC as considerations change regularly

Drug class	Risk of hypoglycaemia	Renal considerations	Hepatic and other considerations
DPP4 Inhibitors • Linagliptin • Saxagliptin • Sitagliptin • Vildagliptin	Low		Should not be used in combination with GLP-1 agonists. Discontinue in acute pancreatitis
		Linagliptin Can be used for all stages of renal disease	**Linagliptin** Pharmacokinetic studies suggest that no dose adjustment is required for patients with hepatic impairment but clinical experience in such patients is lacking.
		Saxagliptin eGFR ≥ 45 : 5mg daily eGFR < 45 : 2.5 mg daily Avoid use in haemodialysis	**Saxagliptin** No dose adjustment is necessary for patients with mild hepatic impairment Use with caution in moderate hepatic impairment Not recommended in severe hepatic impairment.
		Sitagliptin eGFR≥45 : 100mg eGFR 30-45 : 50mg eGFR <30 : 25mg	**Sitagliptin** No dose adjustment is necessary for patients with mild to moderate hepatic impairment. It has not been studied in patients with severe hepatic impairment and care should be exercised However, because Sitagliptin is primarily eliminated renally, severe hepatic impairment is not expected to affect its pharmacokinetics
		Vildagliptin eGFR ≥50 : 50mg twice daily eGFR<50 : 50mg daily	**Vildagliptin** Should not be used in patients with hepatic impairment.
Thiazolidinediones (TZD's) • Pioglitazone	No	No dose adjustment is usually necessary.	May cause fluid retention. Use with caution in individuals with or at risk of heart failure. Contraindicated in established heart failure May cause fractures of small bones, therefore avoid in those at risk of falls or fractures Contraindicated in those with a history of bladder tumour. Pioglitazone should not be used in patients with hepatic impairment

Refer to SPC as considerations change regularly

Drug class	Risk of hypoglycaemia	Renal considerations	Hepatic and other considerations
GLP-1 analogues • Dulaglutide • Exenatide • Liraglutide • Semaglutide	No		Should not be used in combination with DPP4 inhibitors Review in frail individuals Withdraw if abdominal pain or pancreatitis develops Review if eating patterns change or significant weight loss occurs.
		Dulaglutide eGFR <15 : avoid use	**Dulaglutide** - No dose adjustment is required in patients with hepatic impairment
		Exenatide eGFR <30 : avoid use	**Exenatide** - No dose adjustment is necessary for patients with hepatic impairment
		Liraglutide eGFR <15 : avoid use	**Liraglutide** - No dose adjustment is recommended for patients with mild or moderate hepatic impairment. Not recommended for use in patients with severe hepatic impairment
		Semaglutide eGFR <15 : avoid use	**Semaglutide** - No dose adjustment is required for patients with hepatic impairment. Experience with the use of Semaglutide in patients with severe hepatic impairment is limited.

Drug class	Risk of hypoglycaemia	Renal considerations	Hepatic and other considerations
SGLT2 inhibitors • Canagliflozin • Dapagliflozin • Empagliflozin	Low	All drugs in this group should only be started with eGFR ≥60 mL/min/1.73 m^2 and stopped if eGFR persistently <45	Increased risk of fungal infections/ candida & genitourinary infections. Increased risk of foot ulceration and/or amputation Risk of volume depletion Increased risk of Diabetic Ketoacidosis (DKA) and Euglycaemic Ketoacidosis (euDKA) To reduce the risk of ketoacidosis stop these medications • during periods of illness (eg flu, food poisioning.) • one day before a planned procedure (eg surgery, colonoscopy). Restart two days after the procedure.
			Canagliflozin In mild or moderate hepatic impairment, no dose adjustment is required. Not recommended in severe hepatic impairment due to lack of evidence
			Dapagliflozin No dose adjustment is necessary for patients with mild or moderate hepatic impairment. In severe hepatic impairment, a starting dose of 5 mg is recommended. If well tolerated, the dose may be increased to 10 mg
			Empagliflozin In mild or moderate hepatic impairment, no dose adjustment is required. Not recommended in severe hepatic impairment due to lack of evidence

Diabetic ketoacidosis[8,9]

Diabetic ketoacidosis (DKA) is an acute, major, life-threatening complication of diabetes characterised by hyperglycaemia, ketoacidosis, and ketonuria.

Euglycaemic DKA (euDKA), is DKA without marked hyperglycaemia.

Symptoms of DKA include nausea or vomiting, abdominal pain, excessive thirst, rapid laboured breathing, confusion, abnormal fatigue, fruity breath odour, sweet or metallic taste in the mouth and change in the odour of urine or sweat

If a patient on SGLT2 inhibitors has such symptoms, it is important to check for ketones even if the blood glucose level is within the target range (see sick day rules pages 21 and 22).

eGFR = estimated glomerular filtration rate in ml/min/m^2 (using MDRD equation).

If the patient's weight is significantly reduced, this will result in over-estimation of the creatinine clearance, which can be calculated more accurately using formulae such as the Cockcroft-Gault equation. For example, an 85 year old lady with a body weight of 45Kg, and a Creatinine of 130, will have an eGFR of 54.6ml/min/m^2 but a calculated GFR of only 20ml/minute.

MEDICINES MANAGEMENT - INSULIN THERAPY[6,7]

Individuals with type 1 diabetes have an absolute requirement for insulin treatment, without which they will rapidly become hyperglycaemic and develop diabetic ketoacidosis (DKA). In contrast, most individuals with type 2 diabetes who are prescribed insulin continue to produce some endogenous insulin that protects them from ketoacidosis if it is stopped. Some will develop hyperosmolar hyperglycaemic state (HHS), particularly if given corticosteroids. Insulin dose requirements will change towards the end of life

Type 1 diabetes	Type 2 diabetes
Insulin absolutely essential. No endogenous supply	May have residual endogenous insulin secretion
Do not stop insulin in individuals with Type 1 diabetes	Many individuals with Type 2 Diabetes do not require insulin
Risk of DKA	Risk of HHS and DKA if ongoing blood glucose levels are too high
Hypoglycaemia risk will need to be reassessed with changes in eating patterns and with weight loss	Hypoglycaemia risk will need to be reassessed with changes in eating patterns and with weight loss
The simplest regimen should be chosen. Once or twice daily injection can be considered	The simplest regimen should be chosen if switching to insulin only. Both once or twice daily injection can be considered
A change of insulin regimen may be needed to match changes in activity levels	A change of insulin regimen may be needed to match changes in activity levels
Equipment for insulin delivery may need to be reassessed if physical capabilities alter, vision is poor, or carers become involved in giving insulin	Equipment for insulin delivery may need to be reassessed if physical capabilities alter, vision is poor, or carers become involved in giving insulin
Doses may need to change with changes in renal function including those on renal replacement therapy	Doses may need to change with changes in renal function, including those on renal replacement therapy
Blood glucose monitoring will be individualised and reduced to once daily or pre administration of insulin to ensure glucose is within target range avoiding hypoglycaemia	Blood glucose monitoring will be reduced to a minimum and stopped completely if possible

▲ **It is important to know what type of diabetes the individual has in order to provide best advice in terms of insulin management as end of life approaches. Insulin dose requirements will change at this time.**

CONTINUOUS SUBCUTANEOUS INSULIN INFUSION (Insulin Pump Treatment)

The use of insulin pumps by people with type 1 diabetes is becoming increasingly common. The majority of users are competent in managing their diabetes. Insulin pump users frequently perform capillary blood glucose tests and adjust insulin bolus doses according to the carbohydrate content of their food. This technology offers flexibility to respond to the changing insulin requirements towards end of life, providing the individual or carers have the skills and support to use it. If the person is an inpatient, please refer to local hospital policy for insulin pump use.

Individuals will need advice about the likely impact of their condition on their diabetes, so early involvement of the diabetes team is desirable. Avoidance of hypoglycaemia & hyperglycaemia with emphasis on less stringent blood glucose control is required. A range of basal insulin profiles may need adjustment in anticipation of changing insulin requirements. Mealtime and correction boluses will need to be adjusted to reflect predictable changes in insulin sensitivity, and to address the effects of diminishing appetite.

Consider with patient's changing condition:

- Basal and bolus insulin requirement may need to be adjusted regularly based on the person's changing condition and treatments.
- If at any time the individual wishes to stop using their insulin pump, it should be removed one hour after a subcutaneous dose of basal insulin has been given. Fast acting insulin should be prescribed as necessary.

Continuous blood glucose monitoring

Continuous glucose monitoring (CGM) may be used in conjunction with Insulin pumps (sensor augmented pumps) or as stand-alone CGM. The sensor augmented pump has a low glucose alarm or low glucose insulin suspend function. This is an additional safety feature that reduces the risk of hypoglycaemia. Patients with such technology should continue to use it providing that they and their carers are prepared to perform the necessary calibration of capillary blood glucose tests. Even in the last days of life when the person is eating little or nothing, and is no longer able to manage their own pump, it can be used to deliver their basal insulin requirements if carers have the necessary competencies and support from the diabetes team in their chosen place of care. For the inpatient setting please refer to local policy on insulin pump/CGM management.

Flash glucose monitoring

FreeStyle Libre® flash glucose monitoring is a pre-calibrated sensor that measures the interstitial glucose concentration repeatedly for two weeks. Latest glucose concentration and trend directions are obtained by scanning the sensor with a reader. There is a lag time of 5 minutes between readings from flash glucose monitoring and capillary glucose levels. For the inpatient setting please refer to local policy on blood glucose monitoring.

FINAL DAYS / TERMINAL CARE

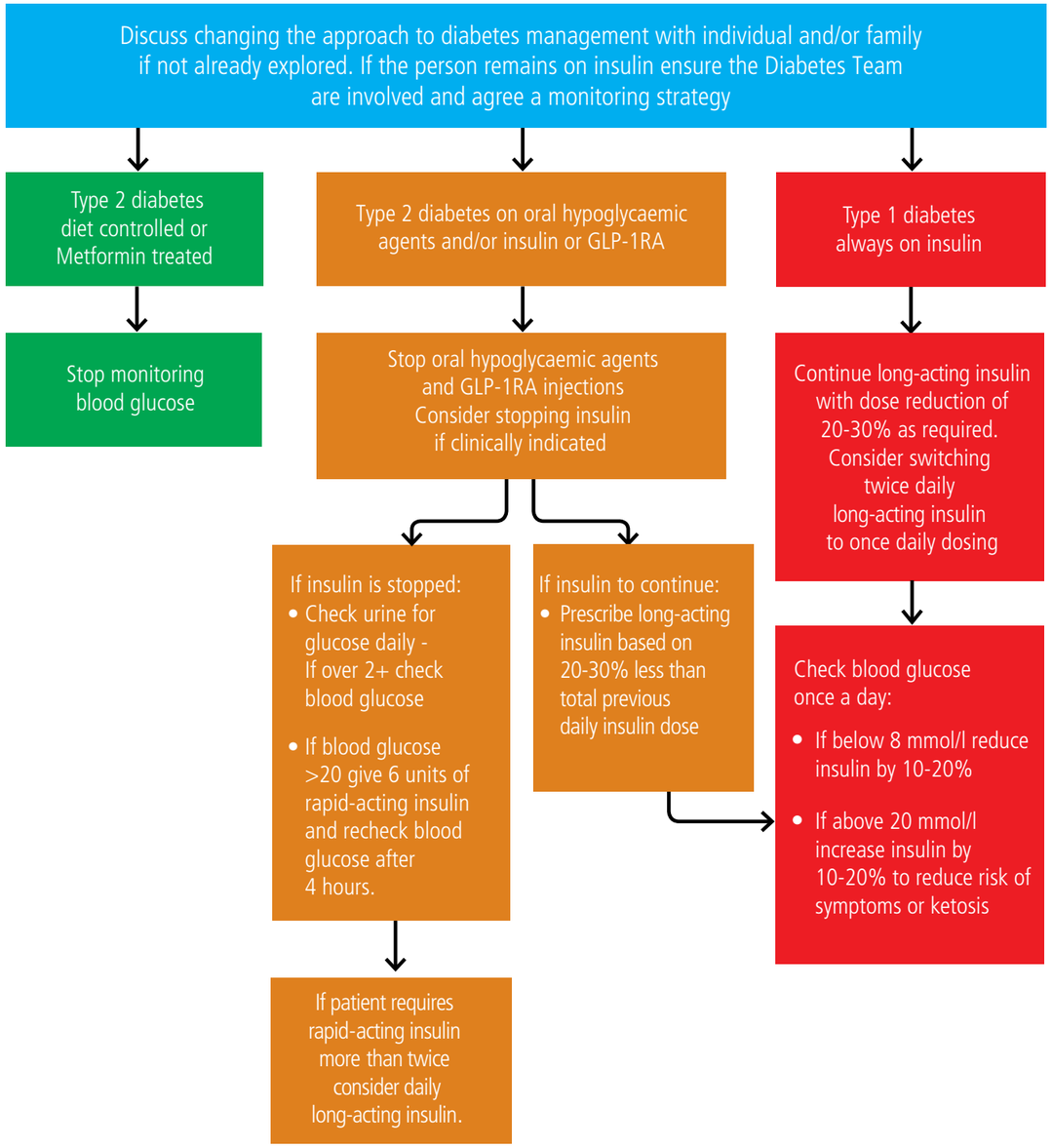
As patients approach the end of life, management of their diabetes becomes less about meeting blood glucose targets and more about the overall quality of life, where the patient wants to be and who they want around them.

If the patient is in hospital, there should be frank discussion about where they wish to be for end of life care, and if they want to go home everything possible should be done to facilitate this, provided their family or carers are in agreement and able to provide appropriate care. Such discussions may include resuscitation status and ceilings of care, and the outcome of these discussions should be clearly documented.

If the patient is at home, there should be some discussion with the patient about what should happen in the event of deterioration that might normally result in hospital admission, with a view to making a clear plan of care, and avoidance of hospital admission if this is the patient's wish. The specialist palliative care team will often take the lead on such discussions, but any member of the healthcare team who has a good relationship with the patient and family can do this.

Most medications, apart from essential drugs such as antiemetics and analgesics, can be stopped at this stage. Ideally by this time diabetes treatment has been minimised so that few changes are needed in the last days of life. The recommended blood glucose targets of 6-15mmol/l can often be relaxed further in the last few days of life, for example to targets of 10-20mmol/l, with reduced blood sugar monitoring and simplification of treatment regimens. At this time, most patients with type 2 diabetes can come off their diabetes treatments and stop blood glucose monitoring altogether, while those with type 1 diabetes will still need some insulin, but at significantly lower doses than before, and should require only once daily blood glucose monitoring.

FLOW CHART FOR DIABETES CARE AT END OF LIFE[1]



Points to consider

- Keep blood glucose testing to a minimum
- It can be difficult to identify symptoms of hypoglycaemia or hyperglycaemia at the end of life
- Test blood glucose only if the individual is symptomatic or it is clinically indicated (see flow chart)
- Flash glucose monitoring may be useful to avoid finger prick testing

STEROID THERAPY

The use of glucocorticoid treatment in people with diabetes will frequently result in hyperglycaemic symptoms, which is a challenge. This may warrant temporary additional and more active glycaemic management. Regardless of the indication, steroid use can have an impact on blood glucose levels.

Short courses of steroid use (3 Days) resulting in hyperglycaemia may not warrant intervention. However, high dose steroids for longer periods may result in symptomatic hyperglycaemia including fatigue, polyuria and polydipsia with the real potential for acute complications such as HHS or the need for urgent insulin initiation.

- **Steroid induced hyperglycaemia** – use of steroids in people with pre-existing diabetes resulting in deterioration of blood glucose control.
- **Steroid induced diabetes -** a rise in blood glucose levels when taking steroids without a known diagnosis of diabetes. This may not resolve when the steroids are withdrawn.

Steroid Therapy – impact on blood glucose

There are various steroid treatment regimens.

- Review timing of steroids and avoid administration after lunch where possible.
- Oral administration of steroids in the morning usually gives rise to elevated blood glucose levels by late morning that can continue into the evening. The blood glucose level rises approximately 4-8 hours after administration. However, be mindful that overnight the blood glucose level tends to fall back to baseline fasting levels. The treatment should be tailored to treat hyperglycaemia while avoiding nocturnal and early morning hypoglycaemia.
- Intravenous steroids cause a quicker and more sustained elevation in blood glucose levels.
- Blood glucose levels may return to pre steroid levels within 24 hours after stopping intravenous steroids.
- If oral steroids are going to be weaned down over a period of days or weeks the blood glucose levels may reduce in a dose dependant fashion.

Commonly used Oral and Intravenous Steroids with duration of action

Steroid	Doses orally	Doses Intravenously	Duration of action
Hydrocortisone	10-20mg	100mg up to QDS	8-12 hours
Prednisolone	5mg and upwards	N/A	16-36 hours
Dexamethasone	0.5mg-16mg OD/BD	4-16mg OD/BD	36-54 hours

Algorithm for managing hyperglycaemia secondary to steroid therapy

No Known Diabetes

- Check random blood glucose before starting on steroids to identify individuals at risk.
- Impaired Fasting Glucose (IFG) = fasting plasma glucose (FPG) 5.6 - 6.9mmol/l
- Impaired Glucose Tolerance (IGT) = blood glucose 7.0 - 11.0mmol/l or HbA1c 39 - 47mmol/mol.
- Diabetes = FPG ≥ 7.0mmol/l or HbA1c 48mmol/mol or above[10].
- Elevated blood glucose should be managed as Type 2 Diabetes below.

Known Diabetes[11]

Reassess glucose control and current therapy

Type 2 Diabetes (Diet controlled or Metformin alone or metformin & DPP4 inhibitor, GLP-1RA, TZD, SGLT2i)

Consider Gliclazide MR

Test blood glucose before evening meal.

Aim for blood glucose 6-15mmol/l before evening meal.

If blood glucose > 15mmol/l consider adding Gliclazide MR 30mg with breakfast.

Can be increased by 30mg increments daily up to a max of 120mg daily.

If no hypoglycaemic symptoms and blood glucose >15mmol/l pre evening meal, consider adding medium/long-acting insulin - see appendix 2 - insulin

Avoid hypoglycaemia.

If blood glucose >15mmol/l pre evening meal increase medium/ long-acting insulin as required.

If blood glucose pre lunch >15mmol/l consider adding fast-acting insulin as required. Avoid hypoglycaemia.

Review blood glucose daily until stable.

Consider Standard Gliclazide

Test blood glucose before evening meal.

Aim for blood glucose 6-15mmol/l before evening meal.

If blood glucose > 15mmol/l consider adding Gliclazide 40mg with breakfast.

Increase the morning dose by 40mg increments daily up to a max of 160mg in the morning.

If no hypoglycaemic symptoms and blood glucose remains > 15mmol/l on Gliclazide 160mg in the morning consider adding evening dose of Gliclazide 40mg and increase up to a maximum of 160mg twice daily.

If no hypoglycaemic symptoms and blood glucose >15mmol/l pre evening meal, consider adding medium/long-acting insulin - see appendix 2 - insulin

Avoid hypoglycaemia.

If blood glucose >15mmol/l pre evening meal increase medium/ long-acting insulin as required.

If blood glucose pre lunch >15mmol/l consider adding fast-acting insulin as required. Avoid hypoglycaemia.

Review blood glucose daily until stable.

Insulin Treated

Twice Daily Insulin

Test blood glucose prior to each meal.

Morning dose insulin will need to increase according to the blood glucose reading before the evening meal

Aim for blood glucose 6-15mmol/l before evening meal.

If fasting blood glucose >15mmol/l consider increasing insulin dose pre-evening meal.

Basal bolus insulin.

Breakfast & lunchtime insulin may need to be increased to avoid high readings before lunch or evening meal.

Aim for blood glucose 6-15mmol/l before lunch and evening meal.

If blood glucose above 15mmol/l before lunch or evening meal

Increase breakfast or lunchtime insulin dose by 10-20%.

Review daily until stable. Increase insulin dose as necessary.

Assuming no hypoglycaemia, if pre-meal time blood glucose is above 15mmol/l an increase in insulin dose is needed.

Increase insulin dose by 10-20%.

Review daily until blood glucose is stable.

If steroids are reduced or discontinued

- Review any changes made and consider reverting to previous therapy or insulin doses.
- If unsure at any stage about next steps or want specific advice on how to meet with patient's needs or expectations please contact the diabetes team.
- If steroids are reduced and the individual is on a sulphonylurea agent or insulin there is a **significant** risk of hypoglycaemia. Please reduce the dose of these drugs in tandem with the steroid dose reduction

HYPOGLYCAEMIA

It is particularly important to recognise signs and symptoms of hypoglycaemia (<4mmol/l)[12] and treat appropriately. You may need to stop hypo-inducing blood glucose lowering treatment at this time, whether the patient is at home or in hospital. Patients who are imminently dying may have blood glucose <4mmol/l and may have asymptomatic hypoglycaemia which may not require treatment.

Hypoglycaemia Management

Hypoglycaemia can be troublesome at any time in individuals with diabetes.
Every effort should be made to avoid this at the end of life.

- Agree a care plan and glucose targets
- Tailor insulin therapy and avoid insulin dose errors
- Other factors/steps that should be considered are:
  - Rationalisation of glucose-lowering treatment for diabetes
  - Involve a community dietitian
  - Early identification of risk factors for hypoglycaemia
  - Person with hypoglycaemia unawareness
  - Treat pain effectively
  - Assess impact of weight loss
  - Assess influence of nutritional deficits
  - Assess influence of opiates/other pain killers on appetite

Identifying those at risk:

These include all insulin preparations, sulphonylurea (e.g. Gliclazide, Glipizide, Glimepiride) and glinides (Repaglinide). Individuals who are at particularly high risk include those who also have one or more of the following:

- Poor appetite/erratic eating pattern
- Weight loss
- Renal deterioration
- Liver impairment/carcinoma
- Individual with previous hypoglycaemia
- Nausea and vomiting
- Previous gastrectomy
- Frailty
- Cognitive impairment

Identifying hypoglycaemia: signs and symptoms:

- Sudden onset of hunger
- Sweating
- Palpitations/feeling anxious
- Feeling "jittery"
- Tingling in lips
- Feeling dizzy or faint
- Feeling confused or finding it difficult to concentrate
- Patient may look pale, become confused, have behaviour changes, become very drowsy, and lose consciousness. Sweating, fits, and skin colour changes in a drowsy or unconscious person may be due to hypoglycaemia. Do not assume if the individual is comatose that it is due to the end of life primary condition.

HYPOGLYCAEMIA

Sick Day Management for people with Type 1 Diabetes[1]

Sick day management for use in individuals who may have an **intercurrent illness or be unwell** as a result of side effects of chemotherapy

Never discontinue long-acting insulin

General advice

1. If unable to eat usual meals keep hydrated
   Offer sips of sugar free fluids (aim for 100mls /hour)
2. Offer frequent small portions of easily digested foods eg soup, ice cream, yoghurt, custard, flat 7up
3. Check blood glucose and ketones every 2-4 hours
4. If ketones are high, extra insulin is needed
5. Aim for blood glucose levels between 6 and 15mmol/l
6. If blood glucose < 4 mmol/l please refer to hypoglycaemia guideline (pp19-20)

If individual has hyperglycaemia (blood glucose >15mmol/l)

1. Test for blood/urinary ketones as per local guidance
2. If blood glucose is >15 mmol/l, without elevated ketones, consider giving a correctional dose of rapid-acting insulin (Novorapid, Apidra, Humalog, Fiasp) to achieve blood glucose target of <15 mmol/l.

1 unit of rapid-acting insulin will usually lower blood glucose by approximately 2-3 mmol/l over 2-4 hours.

Blood ketone level	Urine ketone level	Interpretation[13]
Below 0.6mmol/l	+1	This is normal for the person with diabetes. If blood glucose is >15mmol/l treat hyperglycaemia.
0.6-1.5mmol/l	+2	Moderate ketones are present. This indicates a need for extra insulin. Consider increasing insulin doses / carbohydrate intake and recheck blood glucose and ketone levels every 1-2 hours. At risk of Diabetic ketoacidosis (DKA)
More than 1.5mmol/l	+3	Large ketones are present. Extra insulin is required. At risk of DKA. Contact the diabetes team. Re-check blood glucose and ketone levels every 1-2 hours Continue usual **fast-acting insulin** dose with meals. Give additional 10% of total daily insulin dose# as **fast-acting insulin** every 2 hours until ketones <1.5mmol/l as per hospital policy.
More than 3mmol/l	**More than 3**	Ketoacidosis is posing an immediate threat to health. Summon diabetes team for assistance immediately. Continue usual **fast-acting insulin** dose with meals. Give additional 20% of total daily insulin dose# as **fast-acting insulin** every 2 hours until ketones <1.5mmol/l as per hospital policy.

Total daily insulin dose calculation: Add up total amount of insulin administered in previous 24 hours

 # adapted from Sligo University Hospital

Sick Day Management for people with Type 2 Diabetes[1]

Sick day management for use in individuals who may have an **intercurrent illness or be unwell** as a result of side effects of chemotherapy

Individuals should continue to take their regular diabetes medications provided they are eating and drinking normally

General advice

1. If unable to eat usual meals keep hydrated
   Offer sips of sugar free fluids (aim for 100mls/hour)
2. Offer frequent small portions of easily digested foods eg soup, ice-cream, yoghurt, custard, flat 7-up.
3. Check blood glucose 4 hourly.
4. Aim to maintain blood glucose levels at 6-15mmol/l.
5. Contact the diabetes team if the individual has persistent vomiting and is unable to keep diet/fluids down.
6. Consider increasing diabetes medications/ insulin if blood glucose >15mmol/l
7. Consider adding insulin if individual on maximum dose of oral hypoglycaemic agents and blood glucose >15mmol/l
8. Consider reducing/ discontinuing diabetes medications if blood glucose <6mmol/l and individual is not eating
9. Gradually reduce the adjustments made as illness improves.

Type 2 Diabetes on oral hypoglycaemic agents / GLP-1 agonists

Caution

Metformin / SGLT2 inhibitors / GLP1 agonists can contribute to dehydration in the presence of nausea / vomiting

Stop Metformin and SGLT2 inhibitors in acute illness

Consider stopping GLP-1Agonists

Type 2 Diabetes on Sulfonylureas / Insulin

Caution

Treatment may cause hypoglycaemia if unable to eat / drink

Dose adjustment may be required if blood glucose levels rise above 15 mmol/l or drop below 6 mmol/l

NUTRITION

Introduction

Nutrition and hydration are basic human needs. However, as a patient enters the end of life phase their longing for foods and fluids can significantly decrease. It would be preferable to discuss the risks and benefits of options for nutrition and hydration with the person who is approaching death or their family / next of kin, to allow their wishes to be taken into account. In general the first option for nutrition and hydration is the oral route. However if an individual is unable to consume food or fluids safely other artificial options may need to be explored. It is acknowledged in NICE guidelines that clinically assisted hydration may ease some distressing symptoms caused by dehydration but additionally could have adverse consequences e.g. fluid overload[14].

Swallowing Issues and Poor Appetite

Patients with diabetes presenting with poor appetite or swallowing issues can pose as a concern due to the significant impact reduced meal size can have on blood glucose levels. Limiting high fat and free sugars may no longer be appropriate if a patient's food choices become limited and patients may benefit from medical management of their diabetes around their new dietary patterns.

Support from a dietitian regarding appropriate food choices based on a patient's overall condition can be very beneficial at this stage. It is not uncommon that this patient group would be advised to follow a high energy, high protein diet to help minimise loss of lean muscle mass. This comprises energy and protein dense meals and snacks, and may affect the patient's glycaemic control. It would be an ideal scenario to aim for optimal intakes without compromising discomfort due to symptoms of uncontrolled blood glucose levels e.g. increased thirst, urination, fatigue, thrush etc.

Ideally, to avoid limiting diet it would be preferable for medications to be adjusted in line with meal size and frequency. Consider asking a pharmacist or clinician to review medication with regard to availability of liquid or alternative formulations, alternative routes of administration or advice on the suitability of crushing a medication. For example, gliclazide MR tablets are modified release and cannot be crushed (option to switch to standard release gliclazide). Clinicians should consider some of the following points regarding medication adjustments in this specific patient group:

- Liquid medications e.g. Metformin in solution form should be considered for patients unable to manage tablets.
- If smaller meals are being consumed it would be preferable to avoid long-acting sulphonylurea preparations e.g. Gliclazide, or Glimepiride.
- For patients managing small, regular meals Repaglinide can be useful. This should only be taken with meals.
- If blood glucose levels remain high despite small oral intakes, a low-dose insulin may be required.
- Patients who are on insulin and have reduced oral intakes may require reduced insulin dose[15].

Enteral Feeding

The current evidence about the benefits, burdens and risks of artificial nutrition as patients approach the end of life is not clear-cut[14]. As an individual approaches end of life the main focus should be quality of life and quality of death as opposed to length of life. Alternative methods of feeding such as enteral nutrition may be considered in patients who are unable to meet their nutritional needs via the oral route. However, it should be noted that losing the ability to swallow can be part of the dying process and in most instances artificial nutrition and hydration are not appropriate[15].

When considering artificial nutrition for patients with diabetes at the end of life phase, the aims of treatment should revolve around:

- Providing adequate/ appropriate nutrition
- Patient safety i.e. avoiding hypoglycaemia
- Managing symptoms related to hyperglycaemia

A feeding regime should be put in place, following an assessment from a dietitian. This will include appropriate macronutrient and micronutrient amounts based on individual patient needs.

The team should liaise with dietitians and pharmacists, when prescribing diabetic medications for tube fed patients. As most oral hypoglycaemic agents are not available in liquid form, considerations must be made on the appropriate medication changes required, to best suit a patient's needs.

Some considerations must be made for patients on insulin therapy while on enteral feeds. The type of insulin required will depend on the enteral feed content, duration and frequency of feeds being provided, to optimise glycaemic control.

Continuous Feeding- e.g. feeding for a set period of time without break e.g. over-night feeding, may require intermediate insulin given at the beginning of the feed or alternatively a mixture of intermediate and fast-acting insulin may be given at the beginning of the feed and half-way through.

Bolus Feeding- e.g. feeding for shorter periods at multiple points throughout the day, may require a fast-acting insulin at the beginning of every feed. Basal insulin may also be required. **Note:** Ensure there is a 4 hour gap between each bolus if considering fast-acting insulin for each bolus.

Continuous feeding with regular/ ad-hoc meals- an intermediate or long acting insulin should be provided at the beginning of feeds. A fast-acting insulin should be considered with each meal or supplementary feed consumed[1].

Managing Hypoglycaemia in Enterally Fed Patients

If a patient on an enteral feed experiences hypoglycaemia during or after the feed, certain measures should be taken to manage the episode, while also aiming to prevent further incidences of hypoglycaemia. It is recommended that a 15g fast-acting carbohydrate hypo treatment e.g. LIFT™ (formerly known as Glucojuice) should be given via the enteral feeding tube and the tube feed should be continued. Blood glucose level checks should be repeated after 10-15 minutes and hypo treatment may be repeated if blood glucose levels remain <4mmol/L. In the event that hypoglycaemia has occurred while the tube feed is not currently running, or is not due to start within 30 minutes, approximately 75ml bolus of Ensure Compact (or approximately 20g carbohydrate equivalent of another sip feed) should be given, after being first treated with LIFT™ and when blood glucose levels have risen to >4mmol/L. Possible causes of hypoglycaemia should be explored e.g. blocked tube, malabsorption, vomiting, incorrect timing of insulin etc. and a reduction in insulin dose should be considered by the team if appropriate / required[16].

Conclusion

It is important to note that the purpose of food does not lie fully with nutrition. Eating can play an important part in social interaction, enjoyment, celebrations, hospitality and nurture. Individuals who are unable to eat normally, can miss out on these benefits. In addition to this, food also plays a huge role in the self-management of diabetes. Therefore, this loss of control, choice and enjoyment of eating can lead to a host of complex issues that should be kept in consideration. A good communication pathway with the full multidisciplinary team, patient and family members, is an integral part of managing this complex patient group and therefore, clear goals / aims of treatment should be agreed upon on an individual patient basis.

ADVANCE HEALTHCARE PLANNING

For people with diabetes towards the end of life, effective care planning needs to include decisions about future care. The patient's wishes are paramount and the views of family and carers should be considered, especially where the patient is unable to express his or her own wishes. The multidisciplinary care team should document the outcome of such discussions.

These discussions are often triggered by a marked deterioration in the individual's functional status or the development of medical complications which may result in a shortening of the individual's prognosis to a few weeks – however, effective care planning occurs when important decisions about future treatments or overall healthcare are taken at a much earlier stage.

The **Assisted Decision-Making (Capacity) Act (ADMA) 2015**[17], when it is implemented, will allow an adult to make a legally binding statement known as an **Advance Healthcare Directive** at a time when they have full mental capacity. This will allow people to refuse any form of treatment, including life-sustaining treatment. This Directive comes into effect if an adult loses capacity at some time in the future and is unable to make treatment decisions for themselves.

Some key points about Advance Healthcare Directives:

1. Advance Healthcare Directives have been recognised in common law for some time but the Act provides for a legislative framework.
2. Under the new provision, a person aged 18 and over who has capacity can prepare an Advance Healthcare Directive.
3. They must put their decisions on future medical treatment in writing and their Advance Healthcare Directive must be witnessed.
4. A person can revoke an Advance Healthcare Directive at any time providing the person still has capacity to do so. This must be done in writing.
5. No one can be forced to create an Advance Healthcare Directive.
6. Having witnesses to the Advance Healthcare Directive is designed to prevent people being forced to make certain decisions.
7. A person making an Advanced Healthcare Directive can nominate people who will be legally recognised as acting on their behalf at a time when they lose capacity and can ensure their Advance Healthcare Directive is enforced.
8. An Advance Healthcare Directive only comes into force when the person has lost capacity and cannot make a decision.
9. Having an Advance Healthcare Directive helps healthcare professionals in caring for patients the way they want.
10. Having an Advance Healthcare Directive helps families as it removes doubt about what care their loved one would have wanted.
11. If there is any doubt about an Advance Healthcare Directive, a person can go to the courts.

The Irish Hospice Foundation has very useful information about Advance Care Planning.

This is available on its website (https://hospicefoundation.ie/programmes/advance-care/).

It includes the following:

- Update on Advance Care Planning (IHF guidance document)
- Information on The Think Ahead programme, which includes an Advance Healthcare Directive that is compliant with the legislation
- The Support and Advocacy Service for Older People (SAGE) guides and information
- Law Reform Commission reports on vulnerable adults and the law and on Advance Healthcare Directives
- Medical and Nursing codes of conduct and ethics

SUMMARY OF CLINICAL CARE RECOMMENDATIONS FOR END OF LIFE CARE

These clinical care recommendations emphasise the following:

- Early identification and support for patients approaching end of life.
- The need to balance benefits of diabetes interventions with prognosis.
- Patients and families / carers should be involved in decisions about diabetes management.
- Diabetes management requirements can change quickly with steroid use, weight loss, liver or renal disease.
- The diabetes team should be involved, when necessary, in the care of the patient approaching end of life.
- Interventions and monitoring should be kept to a minimum as end of life approaches, with the aim of keeping the patient comfortable without compromising safety (i.e Avoid DKA, symptomatic hyperglycaemia and hypoglycaemia).

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Useful Websites:

Irish Hospice Foundation www.hospicefoundation.ie

All Ireland Institute of Hospice and Palliative Care www.aiihpc.org

The Palliative Hub – An All Ireland Gateway to Palliative Care Information www.thepalliativehub.com

Diabetes Ireland www.diabetes.ie

National Clinical Programme for Palliative Care www.hse.ie/eng/about/who/cspd/ncps/palliative-care

National Clinical Programme for Diabetes www.hse.ie/eng/about/who/cspd/ncps/diabetes

Irish Cancer Society www.cancer.ie

Irish Association for Palliative Care www.iapc.ie

Care Alliance Ireland www.carealliance.ie

Hospice UK https://www.hospiceuk.org

Diabetes UK www.diabetes.org.uk

American Diabetic Association www.professional.diabetes.org

UK Gold Standards Framework www.goldstandardsframework.org.uk

Association of British Clinical Diabetologists (resources including guidelines for inpatient care) www.abcd.care

Trend-DIABETES (resources including Hypo, Illness, and Steroid Leaflets - Log-in required) www.trenddiabetes.online

APPENDIX 1 - GOLD STANDARDS FRAMEWORK

The Gold Standards Framework Proactive Identification Guidance (PIG)

Royal College of General Practitioners

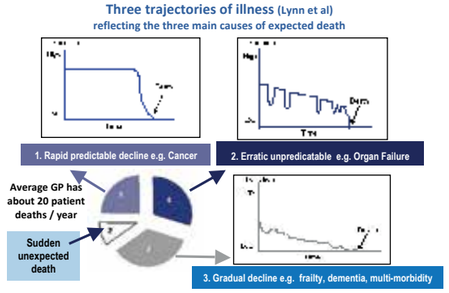
The National GSF Centre's guidance for clinicians to support earlier identification of patients nearing the end of life leading to improved proactive person-centred care

GSF PIG 6th Edition Dec 2016 K Thomas, Julie Armstrong Wilson and GSF Team, National Gold Standards Framework Centre in End of Life Care
http://www.goldstandardsframework.org.uk for more details see **GSF PIG**

Proactive Identification Guidance – proactively identifying patients earlier.

This updated 6th edition of the GSF PIG, renamed as Proactive Identification Guidance and formally known as Prognostic Indicator Guidance, aims to enable the earlier identification of people nearing the end of their life who may need additional supportive care. This includes people who are nearing the end of their life following the three main trajectories of illness for expected deaths – rapid predictable decline e.g. cancer, erratic decline e.g. organ failure and gradual decline e.g. frailty and dementia. Additional contributing factors when considering prediction of likely needs include current mental health, co-morbidities and social care provision.

Three trajectories of illness (Lynn et al)
reflecting the three main causes of expected death



Why is it important to identify patients early?

Earlier identification of people who may be in their final stage of life leads to more proactive person-centred care. About 1% of the population die each year, with about 30% hospital patients and 80% of care homes residents in their last year of life. Most deaths can be anticipated though a minority are unexpected (estimated about 10%). Earlier recognition of decline leads to earlier anticipation of likely needs, better planning, fewer crisis hospital admissions and care tailored to peoples' wishes. This in turn results in better outcomes with more people living and dying in the place and manner of their choice. Once identified, people are included on a register and where available the locality/electronic register, triggering specific active supportive care, as used in all GSF programmes and in GSF cross boundary care sites.

The 3 key steps of GSF

Identify
patients who may be in their last year of life and identify their needs-based code/stage

Assess
current and future, clinical and personal needs

Plan
living well and dying well

PIG and GSF – Early proactive identification of patients is the crucial first step of GSF, used by many thousands of doctors and nurses in the community and hospitals. For more information on GSF, how it is used in practice to help **identify** patients early, **assess** needs and wishes through advance care planning discussions and **plan** care tailored to patient choices, see the GSF website.

National Policy support for earlier identification.

General Medical Council – 2010

www.gmc-uk.org/static/documents/content/End_of_life.pdf

The GMC definition of End of Life Care; 'People are 'approaching the end of life' when they are **likely to die within the next 12 months**. This includes people whose death is imminent (expected within a few hours or days) and those with:

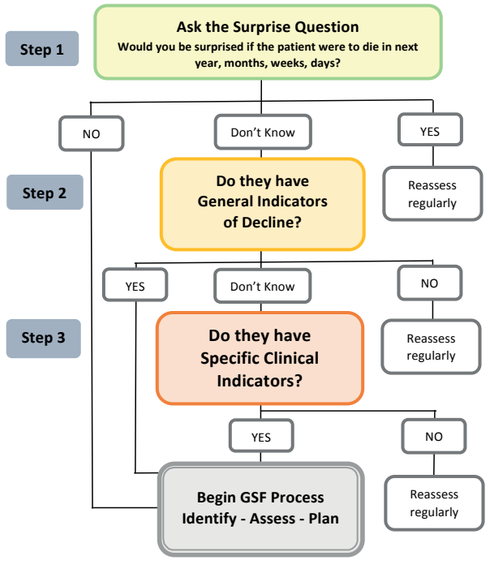
- Advanced, progressive, incurable conditions.
- General frailty and co-existing conditions that mean they are expected to die within 12 months.
- Existing conditions if they are at risk of dying from a sudden acute crisis in their condition.
- Life threatening acute conditions caused by sudden catastrophic events.'

NICE Guidance in End of life care 2011 Quality statement 1

https://www.nice.org.uk/guidance/qs13/chapter/Quality-statement-1-Identification

- '**Identification** – People approaching the end of life are identified in a timely way.
- **Systems** – Evidence of local systems in place to document identification of people approaching the end of life.'

Proactive Identification Guidance – GSF PIG Flow-chart



The GSF PIG 2016 – Proactive Identification Guidance

Step 1 The Surprise Question

For patients with advanced disease or progressive life limiting conditions, would you be surprised if the patient were to die in the next year, months, weeks, days?

The answer to this question should be an intuitive one, pulling together a range of clinical, social and other factors that give a whole picture of deterioration. If you would not be surprised, then what measures might be taken to improve the patient's quality of life now and in preparation for possible further decline?

Step 2 General indicators of decline and increasing needs?

- General physical decline, increasing dependence and need for support.
- Repeated unplanned hospital admissions.
- Advanced disease – unstable, deteriorating, complex symptom burden.
- Presence of significant multi-morbidities.
- Decreasing activity – functional performance status declining (e.g. Barthel score) limited self-care, in bed or chair 50% of day and increasing dependence in most activities of daily living.
- Decreasing response to treatments, decreasing reversibility.
- Patient choice for no further active treatment and focus on quality of life.
- Progressive weight loss (>10%) in past six months.
- Sentinel Event e.g. serious fall, bereavement, transfer to nursing home.
- Serum albumin <25g/l.
- Considered eligible for DS1500 payment.

Step 3 Specific Clinical Indicators related to 3 trajectories

1. Cancer

- Deteriorating performance status and functional ability due to metastatic cancer, multi-morbidities or not amenable to treatment – if spending more than 50% of time in bed/lying down, prognosis estimated in months.
- Persistent symptoms despite optimal palliative oncology. More specific prognostic predictors for cancer are available, e.g. PPS.

2. Organ Failure

Heart Disease
At least two of the indicators below:
- Patient for whom the surprise question is applicable.
- CHF NYHA Stage 3 or 4 with ongoing symptoms despite optimal HF therapy – shortness of breath at rest on minimal exertion.
- Repeated admissions with heart failure – 3 admissions in 6 months or a single admission aged over 75 (50% 1yr mortality).
- Difficult ongoing physical or psychological symptoms despite optimal tolerated therapy.
- Additional features include hyponatraemia <135mmol/l, high BP, declining renal function, anaemia, etc.

Chronic Obstructive Pulmonary Disease (COPD)
At least two of the indicators below:
- Recurrent hospital admissions (at least 3 in last year due to COPD)
- MRC grade 4/5 – shortness of breath after 100 metres on level
- Disease assessed to be very severe (e.g. FEV1 <30% predicted), persistent symptoms despite optimal therapy, too unwell for surgery or pulm rehab.
- Fulfils long term oxygen therapy criteria (PaO2<7.3kPa).
- Required ITU/NIV during hospital admission.
- Other factors e.g., right heart failure, anorexia, cachexia, >6 weeks steroids in preceding 6 months, requires palliative medication for breathlessness still smoking.

Kidney Disease
Stage 4 or 5 Chronic Kidney Disease (CKD) whose condition is deteriorating with at least two of the indicators below:
- Patient for whom the surprise question is applicable.
- Repeated unplanned admissions (more than 3/year).
- Patients with poor tolerance of dialysis with change of modality.
- Patients choosing the 'no dialysis' option (conservative), dialysis withdrawal or not opting for dialysis if transplant has failed.
- Difficult physical or psychological symptoms that have not responded to specific treatments.
- Symptomatic Renal Failure in patients who have chosen not to dialyse – nausea and vomiting, anorexia, pruritus, reduced functional status, intractable fluid overload.

Liver Disease
Hepatocellular carcinoma.
Liver transplant contra indicated.
Advanced cirrhosis with complications including:

Liver Disease *continued*
- Refractory ascites
- Encephalopathy
- Other adverse factors including malnutrition, severe comorbidities, Hepatorenal syndrome
- Bacterial infection current bleeds, raised INR, hyponatraemia, unless they are a candidate for liver transplantation or amenable to treatment of underlying condition.

General Neurological Diseases
- Progressive deterioration in physical and/or cognitive function despite optimal therapy.
- Symptoms which are complex and too difficult to control.
- Swallowing problems (dysphagia) leading to recurrent aspiration pneumonia, sepsis, breathlessness or respiratory failure.
- Speech problems: increasing difficulty in communications and progressive dysphasia.

Parkinson's Disease
- Drug treatment less effective or increasingly complex regime of drug treatments.
- Reduced independence, needs ADL help.
- The condition is less well controlled with increasing "off" periods.
- Dyskinesias, mobility problems and falls.
- Psychiatric signs (depression, anxiety, hallucinations, psychosis).
- Similar pattern to frailty – see below.

Motor Neurone Disease
- Marked rapid decline in physical status.
- First episode of aspirational pneumonia.
- Increased cognitive difficulties.
- Weight Loss.
- Significant complex symptoms and medical complications.
- Low vital capacity (below 70% predicted spirometry), or initiation of NIV.
- Mobility problems and falls.
- Communication difficulties.

Multiple Sclerosis
- Significant complex symptoms and medical complications.
- Dysphagia + poor nutritional status.
- Communication difficulties e.g., Dysarthria + fatigue.
- Cognitive impairment notably the onset of dementia.

3. Frailty, dementia, multi-morbidity

Frailty
For older people with complexity and multiple comorbidities, the surprise question must triangulate with a tier of indicators, e.g. through Comprehensive Geriatric Assessment (CGA).
- Multiple morbidities.
- Deteriorating performance score.
- Weakness, weight loss exhaustion.
- Slow Walking Speed – takes more than 5 seconds to walk 4 m.
- TUGT – time to stand up from chair, walk 3 m, turn and walk back.
- PRISMA – at least 3 of the following:

Aged over 85, Male, Any health problems that limit activity?, Do you need someone to help you on a regular basis?, Do you have health problems that cause require you to stay at home?, In case of need can you count on someone close to you?, Do you regularly use a stick, walker or wheelchair to get about?

Dementia
Identification of moderate/severe stage dementia using a validated staging tool e.g., Functional Assessment Staging has utility in identifying the final year of life in dementia. (BGS) Triggers to consider that indicate that someone is entering a later stage are:
- Unable to walk without assistance and
- Urinary and faecal incontinence, and
- No consistently meaningful conversation and
- Unable to do Activities of Daily Living (ADL)
- Barthel score >3

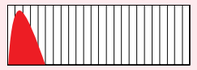
Plus any of the following: Weight loss, Urinary tract Infection, Severe pressures sores – stage three or four, Recurrent fever, Reduced oral intake, Aspiration pneumonia.
NB Advance Care Planning discussions should be started early at diagnosis.

Stroke
- Use of validated scale such as NIHSS recommended.
- Persistent vegetative, minimal conscious state or dense paralysis.
- Medical complications, or lack of improvement within 3 months of onset.
- Cognitive impairment / Post-stroke dementia.
- Other factors e.g. old age, male, heart disease, stroke sub-type, hyperglycaemia, dementia, renal failure.

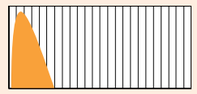
APPENDIX 2 - INSULIN

INSULIN PREPARATIONS CHART

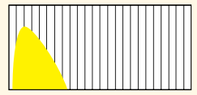
ULTRA RAPID Insulin Analogue

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Fiasp® (Insulin Aspart) NOVO NORDISK		10ml Vial 100units/ml	NP5 NPE	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled FlexTouch Pen 100units/ml	Administer immediately before a meal or up to 20minutes after starting a meal  Onset: 5 minutes Max effect: 1-3hrs Duration: 3-5hrs

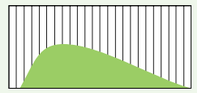
RAPID ACTING Insulins Analogue

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Apidra® (Insulin Glulisine) SANOFI		10ml Vial 100units/ml	AS JS	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled SoloStar Pen 100units/ml	Administer immediately before a meal  Onset: 10 - 20 minutes Max effect: 1 - 3 hours Duration: 3 - 5 hours
Humalog® (Insulin Lispro) ELI LILLY		10ml Vial 100units/ml	HS	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled KwikPen 100units/ml Pre-filled KwikPen 200units/ml	
NovoRapid® (Insulin Aspart) NOVO NORDISK		10ml Vial 100units/ml	NP5 NPE	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled FlexPen 100units/ml	

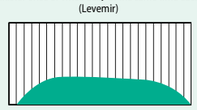
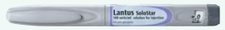
SHORT ACTING Insulins Human Soluble

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Actrapid® NOVO NORDISK		10ml Vial 100units/ml	N/A	N/A	N/A	Administer 30 minutes before a meal  Onset: 30 minutes Max effect: 2 - 4 hours Duration: 6 - 8 hours
Humulin S® ELI LILLY		10ml Vial 100units/ml	HS	 3ml cartridge 100units/ml for use with refill pen	N/A	

MEDIUM ACTING Insulins Isophane Human Insulin

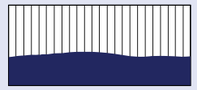
		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Humulin I ELI LILLY		10ml Vial 100units/ml	HS	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled KwikPen 100units/ml	Administer once daily at the same time each day OR Twice daily 30 minutes prior to breakfast and evening meal. Mix to form a uniform cloudy or milky suspension before each use.  Onset: 1.5 hours Max effect: 4 - 12 hours Duration: Up to 24 hours
Insulatard NOVO NORDISK		10ml Vial 100units/ml	NP5 NPE	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled Innolet device 100units/ml	

LONG ACTING Insulins Analogues

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Abasaglar (Insulin Glargine) ELI LILLY		N/A	N/A	N/A	 Pre-filled KwikPen 100units/ml	Administer once daily at the same time each day (Lantus and Abasaglar) Administer once or twice daily at the same time each day (Levemir)  Onset: 1 - 2 hours Max effect: From 2 and up to 24 hours Duration: Up to 24 hours
Lantus (Insulin Glargine) SANOFI		10ml Vial 100units/ml	AS JS	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled SoloStar Pen 100units/ml	
Levemir (Insulin Detemir) NOVO NORDISK		N/A	NP5 NPE	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled Innolet device 100units/ml Pre-filled FlexPen 100units/ml	

INSULIN PREPARATIONS CHART

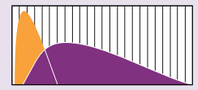
LONGER ACTING Insulins Analogues

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Toujeo (Insulin Glargine) SANOFI		N/A	N/A	N/A	 Pre-filled SoloStar Pen 300units/ml	Administer once daily ideally at the same time every day Dose adjustment: No more frequently than every 5 - 7 days  Onset: Takes at least 3 days to reach steady state Duration: Toujeo up to 36 hours / Tresiba up to 42 hours
Tresiba (Insulin Degludec) NOVO NORDISK		N/A	N/A	N/A	 Pre-filled FlexTouch Pen 200units/ml  Pre-filled FlexTouch Pen 100units/ml	

LONGER ACTING Insulin Combo with GLP1

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Xultophy ((Insulin Degludec/ Liraglutide)) NOVO NORDISK		N/A	N/A	N/A	 Administered as dose steps	Xultrophy is administered as 'dose steps' 1 dose step = 1unit of insulin degludec (Tresiba) and 0.036mgs of liraglutide (Victoza)

BIPHASIC Insulins

		Vial	Refill Pen	Cartridge	Pre-filled Pen	Profile
Humalog Mix 25 Mixture of Fast-Acting Analogue and Protamine Analogue ELI LILLY		N/A	HS	 3ml cartridge 100units/ml for use with refill pen	 Pre-filled KwikPen 100units/ml	Administer immediately before breakfast and evening meal. Mix to form a uniform cloudy or milky suspension before each use.  Onset: 10 - 20 minutes Max effect: 1 - 4 hours Duration: Up to 24 hours
Humalog Mix 50 ELI LILLY		N/A	HS	3ml cartridge 100units/ml for use with refill pen	Pre-filled KwikPen 100units/ml	
NovoMix 30 NOVO NORDISK		N/A	NP5 NPE	3ml cartridge 100units/ml for use with refill pen.	Pre-filled FlexPen 100units/ml	
Humulin M3 Mixture of NPH and Regular Insulin ELI LILLY		10ml Vial 100units/ml	HS	3ml cartridge 100units/ml for use with refill pen	Pre-filled KwikPen 100units/ml	Administer 30 minutes before breakfast and evening meal. Mix to form a uniform cloudy or milky suspension before each use. Onset: 30 - 60 minutes Max effect: 2 - 8 hours Duration: 12 - 24 hours

REFILL PENS FOR USE WITH 3ML CARTRIDGES

AS *AllSTAR pen*

JS *JuniorSTAR pen*

HS *HumaPen Savvio*

NP5 *NovoPen 5*

NPE *NovoPen Echo*

PLEASE NOTE:
In order to reduce Insulin errors it is recommended to prescribe all insulins using their trade names.

INSULIN STORAGE
All Insulin should be stored in the fridge prior to use. Once opened insulin vials, cartridges and pens should be stored at room temperature in a locked drug trolley.
All insulin in use should have opening date recorded and not be in use for more than 4 weeks.
Insulin pens in use should be labelled with legible patient name and Hospital Number.

PLEASE NOTE: All insulins are administered S/C. Insulins marked with an * may also be administered I/V.
Insulin should only be drawn up from a vial using an insulin U100 syringe. Insulin MUST NOT be drawn up from cartridges or disposable pens.
Administration advice is a general guideline only. For specific product instructions refer to summary of product characteristics.

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