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Diabetes Management for Inpatients

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Contents

1 Introduction

Diabetes is an endocrine (type 1) and/or a metabolic (type 2) condition that causes a person's blood glucose (sugar) levels to become too high. There are several types of diabetes but the two most commonly known are:

- **Type 1 diabetes** – an autoimmune condition where the body's immune system attacks and destroys the beta cells in the pancreas that produces insulin – These are insulin dependent meaning that the patient will always require Insulin therapy.
- **Type 2 diabetes** – where the body doesn't produce enough insulin (insulin insufficiency), or the insulin produced is working inefficiently (insulin resistance) or it can be a combination of both. They may progress to having insulin therapy and are then known as insulin requiring.

There are rare genetic types of diabetes e.g., monogenic diabetes. Other causes include:

- Gestational Diabetes Mellitus (GDM)
- Drug induced diabetes e.g., steroids; antipsychotic drugs e.g. olanzapine, risperidone
- Damage to the beta cells in the pancreas e.g., carcinoma of the pancreas; Pancreatectomy either total or partial including pancreatitis.
- Other conditions e.g., cystic fibrosis

Type 1 diabetes accounts for approx. 8% of the population and rarer forms of diabetes occur in the remaining 2% (Diabetes NHS 2019). Type 2 diabetes is more common in the UK accounting for approximately 90% of adults with diabetes. Although this is associated with older age and or being overweight or obese, this can occur at any age.

1.1 Our Journey to Change (OJTC)

This procedure is critical to the delivery of OJTC and our ambition to co-create safe and personalised care that improves the lives of people with mental health, a learning disability or autism.

This procedure supports the trust to co-create a great experience for all patients, carers and families from its diverse population by accessing care that is right for you and providing outstanding and compassionate care all of the time through setting standards for managing diabetes in inpatient settings.

2 Why we need this Guideline.

2.1 Purpose

Following these guidelines will help the Trust to:-

- Set standards in practice to ensure safe, effective and evidence-based care of patients with Diabetes.
- Support medical and nursing staff to ensure patient safety is maintained in relation to diabetes management in line with National guidelines.
- Support, inform and guide staff when caring for a diabetic patient.
- Respond appropriately to diabetic medical emergency situations and implement interventions required.

2.2 Who this guideline applies to

This policy applies to all healthcare professionals working within TEWV NHS Foundation Trust who have a responsibility to screen, monitor, review and/or diabetes in patients admitted to hospital.

Consideration has also been given to those who may be affected by this guideline to ensure that the document content aligns to the Trust's values, so that people who may be affected are treated with compassion, respect, and responsibility.

2.3 Roles and responsibilities

Role	Responsibility
Executive Medical Director	• Ensuring that the guideline is implemented
Medical Director	• Ensuring the guideline is adhered to within their area
Medical Staff	• Complete a physical review and assessment on admission, record all relevant information on the electronic care record. • Reassessment of risk when the clinical situation changes

	• Prescribe appropriate medication ensuring correct dose and treatment duration.
Physical Health Practitioners	• Complete a physical review and assessment on admission, record all relevant information on the electronic care record. • Reassessment of risk when the clinical situation changes • Prescribe appropriate medication ensuring correct dose and treatment duration.
Nursing Staff	• Ensure the prescription and treatment plan is clear. • Monitor diabetes and monitor any clinical changes.
Non-Medical prescribers	• Prescribe appropriate treatment plan ensuring correct dose and treatment duration.
Pharmacy	• Prescription and treatment plan are clear with appropriate monitoring.

3 Diabetes Management

3.1 Admission to an inpatient Unit.

All patients with type 1 and type 2 diabetes on admission, including during the out of hours period to an inpatient unit, must have the following completed:

- Physical examination.
- A full set of physiological observations recorded including blood glucose.
- A urine / serum ketones measurement recorded if Blood sugar measurement above 11 mmols/L.
- An assessment for 'red flags' (see 5.1) with imediate transfer to Acute Trust if present.
- A referral to Acute Trust Diabetologist/Medical Registrar on call if medical advice needed.
- Establish compliance / when last dose of diabetes medication was given.
- Review and prescribe current diabetes medication and include management of hypoglycaemia. (see hypoglycaemia guideline)
- Administer appropriate diabetes medication as prescribed.
- If a patient brings in their own insulin on admission and there are concerns about suitability contact pharmacy (contact on call pharmacist if out of hours).
- Ensure the patient has a diabetes care plan.

- Record initial assessment and treatment on patient's electronic care record.

Diabetes Management Young People (12-18 years old)

On admission, in addition young people with type 1 and type 2 diabetes should be referred to the Trust Dietetic Service for dietary support. The catering department should be informed and liaise with the Dietitian.

3.2 Diabetes admission guidance for Medics/Physical health practitioner.

All patients with Insulin treated diabetes **MUST** be seen by a Doctor/physical health practitioner within 4 hours of admission including during the out of hours period

- Review Patient Data.
- Perform Physical Review and Examination of the patient.
- Assess risk of Diabetic Ketoacidosis (DKA) or Hyperglycaemic Hyperosmolar State (HHS) and consider admission to Acute Trust.
- Establish usual insulin regime, including time when Insulin dose was last administered as stat doses may be required.
- In the case of carbohydrate counting (DAFNE) patients, establish the range of doses usually administered and evaluate the individual patient's risk of self-harm behaviours.
- If you can establish the insulin regime, prescribe, and ensure dextrose 40% oral gel and Glucagon 1mg IM is included. If necessary, prescribe a stat dose of insulin, ensure insulin is available and inform the nursing staff.
- If you are able to establish the oral medication regime and the patient is prescribed gliclazide or combination of oral hypoglycaemic agents, prescribe and ensure dextrose 40% oral gel and Glucagon 1mg IM is included.
- If the patient has brought their own supply of insulin into hospital, this must be assessed according to Trust Policy (Patient Own Drugs Procedure), bearing in mind that insulin pens are unlikely to be labelled with the patients details. However the name of the insulin can be checked on the cartridge inside the pen. It is down to professional discretion as to whether to use the insulin or obtain a further supply.
- If you are unable to establish the insulin regime in a timely fashion or the patient is at risk of self-harm, please remember that patients will generally still require insulin to prevent hyperglycaemia. This is particularly important in patients with Type 1 Diabetes. It is imperative that advice is sought immediately from the Diabetologist or Medical Registrar on call (out of hours) at your local acute trust on the patient's management.

3.3 Diabetes Medication Management- Insulin

All diabetic medication must be prescribed and administered in accordance to Trust policy Medicines - Prescribing and Initiation of Treatment PHARM-0002-001

When prescribing and administering insulin the following standards are essential and must be adhered to:

- **Never** use abbreviations. The term 'units' must always be used.
- **Always** prescribe insulin by brand.
- **Always** specify device used (cartridges, disposable pens, vials or insulin pumps). This information should be available on admission from the patient and / or carer / family member. If not available, contact the patient's GP.
- **Always** check with the patient what insulin they are using and show them the pen/ container and confirm that the patient is expecting the product.
- **Always** prescribe Insulin on the trusts standard Insulin Prescription and Administration Chart as well as the patient's medication Kardex.
- **Always** prime the device before using as instructed by the manufacturer.
- **Never** extract insulin from a pre-filled pen using a syringe
- **Never** draw up insulin from a cartridge using a syringe
- **Never** use an IV/IM syringe to draw up insulin.
- **Always** use an insulin syringe to draw up insulin from a vial.
- **Never** dilute insulin before administration.

Insulin is a critical medicine where timeliness of administration is crucial.

Prescribing and administering of insulin is **important!**

Staff **must** report any omitted or delayed doses immediately to medical staff.

On admission medical staff **must** review the patient's current insulin regime.

Medical staff **must** prescribe treatments to manage hypoglycaemia alongside insulin therapy.

Please see the Hypoglycaemia section for the prescribing and administration of dextrose 40% oral gel and glucagon.

3.3.1 Storage of insulin

Care must be taken when storing insulin.

- **Never** freeze insulin (frozen insulin should be disposed of appropriately).
- **Never** use insulin beyond the manufacturer's expiry date stamped on the vial, pen or cartridge.
- **Never** expose insulin to direct heat or light. Avoid direct sunlight and heat e.g. near radiators, fires or window sills. If going outside in hot or cold weather store insulin in an insulated container.
- **Always** inspect insulin prior to use:
  - Solution" insulins should be clear; do not use if they have a cloudy appearance.
  - "Suspension" insulins should be uniformly cloudy following agitation; do not use if there are clumps of powder or the powder is not uniformly suspended after shaking.
- **Always** store unopened insulin in a refrigerator at a temperature between 2-8C.
- **Always** mark open insulin with the date and store below 25 degrees – After 30days of continuous use insulin should be discarded and replaced with new to ensure its efficacy.
- **Always** store insulin without needle attached.

3.3.2 Location of emergency insulin

Insulin for use in an emergency is stored on all inpatient sites. The types of insulin available are:

- **Novo Rapid (Insulin Aspart) 3ml Flex Pen**. This is short acting Insulin with fast onset of action; this is normally prescribed at mealtimes. Novorapid (Aspart) would also be the chosen insulin for correction doses of high sugars if needed. So, may be prescribed as PRN with specific doses depending on high sugars.
- **Lantus (glargine)** is a long-acting basal insulin however you will see it prescribed once or twice daily depending on the patients diabetes management plan. DAFNE graduates often have twice daily basal profiles.

TEWV area	Site	Location
County Durham, Darlington	West Park Hospital	Oak Ward
County Durham, Darlington	Lanchester Road Hospital	Farnham Ward
County Durham, Darlington	Auckland Park Hospital	Ceddesfeld Ward
North Yorkshire	Cross Lane Hospital	Danby Ward
North Yorkshire	Foss Park Hospital	Moorcroft Ward
Tees Valley	Roseberry Park Hospital	Bransdale Ward

3.3.3 e-Learning modules

The Safe Use of Insulin eLearning module is available for staff to complete via this link: The six steps to insulin safety - DiabetesontheNet Prescribe and administer safely and be aware of Patient Safety Alerts and ensure you have the required knowledge and competence to prescribe and administer insulin safely. Ensure you have completed the required eLearning modules on insulin and are aware of insulin types, strengths and devices.

3.4 Continuous Subcutaneous Insulin Infusion (CSII) Pumps.

Any adult patient admitted as an inpatient using an external insulin pump to manage their diabetes needs prompt referral to the acute Diabetes Specialist Nurse Team and guidance to be followed as directed. If out of hours to contact the local Acute Trust for further advice.

3.5 Non-Insulin Injectable therapies – GLP-1 Receptor Agonist Agents.

Incretin mimetics are a group of injectable drugs for treatment of diabetes. The drugs, also commonly known as glucagon-like peptide 1 (GLP-1) receptor agonists or GLP-1 analogues, are usually prescribed for patients who have not been able to manage their condition with tablets and sometimes insulin medication.

These injectable and oral therapies **must** be prescribed on the patients Drug Prescription record only NOT on the Insulin Prescription Chart.

3.6 Monitoring.

3.6.1 Blood Glucose Monitoring

Restoring blood glucose to as near normal as possible is important to reduce diabetes related complications and for monitoring treatment effects. This can be performed using both blood glucose meters and laboratory tests.

Frequency of monitoring will depend on the type of diabetes and the treatment regime. It is individual to the patient and needs to be agreed and clearly documented within the intervention plan including a rationale for monitoring.

3.6.2 Insulin Pump

Some patients may use an insulin pump which requires regular monitoring of blood glucose levels. Nursing staff need to ensure regular blood glucose levels are documented and action taken accordingly to reduce risk of hypoglycaemia and hyperglycaemia. If unsure, please refer to the patients known diabetic specialist.

3.6.3 Flash Monitoring

Some patients may utilise “Flash Monitoring”. These readings should be accepted unless the patient’s intervention plan requires intervention based on blood glucose readings, (e.g. additional insulin to be administered). If an intervention is required, then the BM must be validated / checked using the traditional finger prick test. Flash Monitoring equipment must be obtained via the patient’s primary care G.P.

3.6.4 Blood glucose monitoring chart

A blood glucose monitoring chart must be used and has been developed by the Safe Medication practice group. If the patient is prescribed Insulin, then blood glucose monitoring must be recorded on the second page of the Insulin prescription chart.

3.6.5 Access to appropriate administration and monitoring equipment

It is essential that wards ensure that they have access to appropriate administration and monitoring equipment (refer to Diabetes Management Template in Cardea).

Ward staff **must** establish the patient's current insulin regime during initial physical health assessment on admission

Patients **must** have their insulin and treatments to manage hypoglycaemia prescribed on admission.

Ward staff **must** seek advice immediately if unsure of the patient's insulin regime.

3.7 Nutritional Management.

3.7.1 Support from all health care professionals

All health care professionals are expected to support patients with their dietary management of diabetes from diagnosis onwards. Support should include:

- guidance at mealtimes regarding healthy options/balanced choice on ward menu
- guidance regarding snacks and fluids consumed both on ward and when out on leave.
- signposting to British Dietetic Association and Diabetes UK websites for up-to-date dietary advice
- referral to Dietetic Service if diabetes is poorly controlled and/or if need for dietetic input is indicated on completion of the St Andrew's Nutritional Screening Instrument (SANSI)

3.7.2 Support from Dietetic service

Dietetic service can support education around:

- The effects of different foods on diabetes and blood sugar control
- Choice of content, timing and amount of snacks taken between meals and at bedtime
- Healthy eating advice to help reduce diabetes associated risk factors (low glycaemic index foods, fruit and vegetables, types, and amount of fat). (NICE 2014)

If further advice is required, refer patient to the Dietetic Service.

If a patient is admitted to hospital and uses DAFNE (dose adjustment for normal eating) it is important to assess suitability to continue and to seek specialist advice from the diabetes team within the acute hospital.

Diabetes Management Young People (12-18 years old)

Young people with diabetes should have their weight and height monitored to ensure their weight is stable within a healthy BMI.

Diabetes Management Young People (12-18 years old)
Young people with type 2 diabetes should be referred to the Dietitian for advice regarding weight management including calculating BMI and offering advice on healthy eating to reduce hyperglycaemia and CVD risk and where appropriate to promote weight loss.

3.8 Exercise.

It is important to advise patients that physical activity can reduce complications of diabetes risk in the medium and longer term.

Provide information / refer to Occupational Therapy / Fitness team / health living advisors for further advice on:

- Appropriate intensity and frequency of physical activity.
- Appropriate types of activities.
- Appropriate hypoglycaemia management plan for attendance at activities
- Signpost for further information / management

4 Diabetic Emergency situations.

All Diabetes emergencies must be treated immediately and escalated for a medical review. These patients must receive intensive medical and nursing support especially during the early part of admission. Medical staff must assess the patient immediately and consider advice from the Local Acute services. Out of hours a on call Medical Registrar is available for advice.

4.1 Hypoglycaemia.

Hypoglycaemia is a lower than normal level of glucose. Hypoglycaemia results from an imbalance between glucose supply, glucose utilisation and current insulin levels. Hypoglycaemia should be excluded in any person with diabetes who is acutely unwell, drowsy, unconscious, unable to co-operate, presenting with aggressive behaviour or seizures. For the purposes of people with diabetes who are hospital in-patients, any blood glucose **less than 4.0mmol/L** should be treated.

The hospital environment presents additional obstacles to the maintenance of good glycaemic control and the avoidance of hypoglycaemia is essential. All patients should be assessed on

admission for risk factors for potential hypoglycaemia and review management plans to prevent the incidences.

4.1.1 Risk Factors for Hypoglycaemia

(Joint British Diabetes Societies for Inpatient Care 2022).

Medical Issues	Lifestyle
Strict glycaemic control	Increased exercise
Previous history of severe hypoglycaemia	Irregular lifestyle
Long duration of type 1 diabetes	Alcohol
Duration of insulin therapy in type 2 diabetes	Increases age
Lipo-hypertrophy at injection sites	Early pregnancy
Impaired awareness of hypoglycaemia	Breast feeding
Severe hepatic dysfunction	No or inadequate blood glucose monitoring
Impaired renal function	Reduced carbohydrate intake/absorption
Sepsis	Food malabsorption
Terminal Illness	Bariatric surgery including bowel resection
Cognitive dysfunction/dementia	
Self Harm	

Hypoglycaemia is the commonest side effect of insulin and sulfonylureas treatment and presents a major barrier to satisfactory long term glycaemic control.

Metformin, pioglitazone, the DPP-4 inhibitors, SGLT-2 inhibitors and GLP-1 RA analogues prescribed without insulin or sulfonylurea therapy are unlikely to result in hypoglycaemia.
See MSS-20 for further information download.cfm

4.1.2 Hypoglycaemia Presentation:

The following are signs and symptoms of a patient presenting with a ‘hypoglycaemia’:

- Sweating
- Shaking
- Dizzy
- Hungry
- Tired
- irritable (moody)
- anxious
- confused
- pallor
- palpitations
- headaches

4.1.3 Common causes of hypoglycaemia:

- missed or late meals
- too much insulin
- not enough carbohydrate in meals
- unplanned exercise
- large amount of alcohol especially without food
- acute illness including vomiting.

4.1.4 Treatment of hypoglycaemia:

- Treatment will depend on the severity of symptoms and results of the blood glucose reading.
- Assess if the patient is conscious and able to swallow. A treatment of hypoglycaemia flow chart has been developed as a quick reference guide and should be followed by all healthcare professionals, displayed in all inpatient clinic settings and available in the pharmacy emergency drug bag (Appendix 3 – adults or Appendix 4 – Young person).
- All patients prescribed insulin, monotherapy with Gliclazide or a combination of oral agents should have Dextrose 40% oral gel and Glucagon 1mg prescribed for the treatment of hypoglycaemia.
- All inpatient wards should have access to emergency drug bags which contain the following and can be administered without a prescription in an emergency that threatens life:
  - Dextrose 40% oral gel tubes (One box contains 3x25g) (Brands include Glucogel, Hypostop and Dextrogel)
  - Glucagon injection 1mg for subcutaneous or intramuscular use (Glucagon needs to be reconstituted prior to injecting. The diluent is held alongside the Glucagon).
- Glucagon is an injectable medication that is used to treat people with diabetes who are experiencing severe hypoglycaemia in an emergency. It is only used for severe hypoglycaemia when patients with diabetes is about to or has lost consciousness or has lost the ability to swallow.
- When administering glucagon, put the patient into the recovery position (on their side) to aid their breathing.

- Glucagon can be injected into the arm, thigh or buttocks at 90 degrees administer by subcutaneous or intramuscular injection intramuscularly. There is no danger of overdose with glucagon. If it is not possible to remove clothing in a timely manner, glucagon may be injected through clothing if necessary.
- Glucagon can cause vomiting so make sure the patient remains in the recovery position to prevent the chances of choking.

It is critical that on admission, during the review of the patient's current insulin regime, medical staff prescribe treatments to manage hypoglycaemia alongside insulin therapy.

Diabetes Management Young People (12-18 years old)
Refer to flowchart **in** Appendix 4 for the management of hypoglycaemia in young people.

4.2 Hyperglycaemia

The evidence base for optimal glycaemic control for inpatients remains controversial, however, a pragmatic blood glucose (BG) target of between 6.0-10.0 mmol/l is generally recommended with occasional values of between 4.0-12.0 mmol/l being acceptable. However, patients with persistent hyperglycaemia and values consistently above 11.0 mmol/l should be discussed with the specialist diabetes teams as a prompt review of treatment is likely to be required (NHS UK 2022).

Values above 11.0 mmol/l requires prompt review of treatment.

4.2.1 Hyperglycaemia presentation:

The following are signs and symptoms of a patient presenting with hyperglycaemia

- Passing more urine than usual (especially at night)
- Thirsty
- Headaches
- Tiredness

4.2.2 Causes of Hyperglycaemia:

- A missed dose of medication
- Insufficient insulin
- Eaten more carbohydrate than the body and / or medication can cope with
- Stress

- Unwell from infection
- Over treating a hypoglycaemic event

4.2.3 Treatment of hyperglycaemia:

If a blood glucose level is 11 mmol/L or more take the following action:

- plenty of sugar-free fluids
- encourage the patient to move around / exercise / walk.
- if the patient is feeling unwell seek review from doctor, physical health care practitioner.

Retest after 2 hours if the blood glucose remains above 11 mmol/L take the following action:

- if the patient is on insulin, administer extra insulin if prescribed.
- check urine / serum for the presence of ketones (seek review if present)
- if the patient is feeling unwell (especially vomiting) contact Doctor, Physical Healthcare Practitioner or seek specialist advice from an Acute Trust.
- Assess for red flags

If blood glucose remains high (over 11 mmols/L) despite above actions and the patient appears well, arrange routine review of diabetes control.

- If a blood glucose level is 11mmol/L or more, urine / serum must be checked for ketones

4.2.4 Checking for Red flags / responding abnormal ketone levels

Ketones are chemicals made in your liver. The body produces ketones when you don't have enough of the hormone insulin in your body to turn sugar (or “glucose”) into energy. You need another source, so your body uses fat instead.

Your liver turns this fat into ketones, a type of acid, and sends them into your bloodstream. Your muscles and other tissues can then use them for fuel.

For a person without diabetes, this process doesn’t become an issue. But when you have diabetes you build up too many ketones in your blood. If the level goes too high, it can become life-threatening.

The table below indicated normal Ketone levels and abnormal if a persons ketones are abnormal medical advice must be sought immediantly.

Blood Ketone mmol/l	Advice
<0.6	Normal
>1.0	Hyperketonaemia
>1.5	Risk of DKA
>3	Ketoacidosis
>6	Severe Ketoacidosis

Diabetes Management Young People (12-18 years old)
Staff must be aware that young people with type 1 diabetes should monitor blood ketones if hyperglycaemia is suspected or when they are ill or experiencing high blood glucose levels.

4.3 Emergency Red Flags

Diabetic Emergency Situations

Diabetic ketoacidosis (DKA)	Hyperosmolar Hyperglycaemic State (HHS)
More common in Type 1 but can occur in Type 2	Type 2
Raised Glucose level >11.0mmol/L	Very high glucose level >30.0 mmol/L
Can occur at any age	Often precedes illness or dehydration
Can develop and become very severe within hours	Blood ketones may not be raised
Blood ketones raised	

Symptoms of DKA include:	Symptoms of HSS include:
Thirst	Excessive thirst, dry mouth

Urinating frequently	Urinating more frequently
Dry/Flush skin	Dry/flush skin
Nausea/Vomiting	Nausea/vomiting
Drowsiness/Confusion	Drowsiness/Confusion
Difficulty breathing	Blurred vision
Stomach Pain	Fever
Blurred vision	Hallucinations
Pear drop smell to breath	Convulsions

4.4 Diabetic Ketoacidosis – DKA

Diabetic ketoacidosis (DKA) is a life threatening acute metabolic complication of Type 1 diabetes mellitus, and occasionally Type 2 diabetes. It occurs when insulin therapy is omitted or becomes inadequate for the current physiological state, usually because of concurrent illness such as chest or urine infections or sickness and diarrhoea. DKA is often precipitated by recurrent vomiting in an unwell patient.

Diabetic ketoacidosis (DKA) is an altered metabolic state characterised by ketonaemia, acidosis and hyperglycaemia. It occurs due to absolute or relative insulin deficiency, with an increase in hormonal counter regulation. The hormonal imbalance increases hepatic gluconeogenesis and glycogenolysis resulting in hyperglycaemia with osmotic diuresis, which along with vomiting leads to water and electrolyte depletion. There is enhanced lipolysis and ketone body formation resulting in metabolic acidosis. Protein breakdown, renal impairment and acidosis can result in hyperkalaemia at presentation. DKA is common with a mortality rate which is unacceptably high.

Diabetic ketoacidosis (DKA) — serious and potentially life-threatening cases *of DKA have been reported in people taking SGLT-2 inhibitors. Advise to stop treatment immediately and seek medical advice if any clinical features of DKA develop.*

See MSS-20 for further information download.cfm

Diabetic Ketoacidosis (DKA) and Hyperglycaemic Hyperosmolar State (HHS) are medical emergencies. Call (9)999 to arrange immediate transfer to A&E.

4.4.1 DKA Presentation

DKA manifests as a state of severe uncontrolled hyperglycaemia and gross dehydration which will inevitably progress unless it is corrected by rehydration with intravenous fluids and adequate insulin. Its characteristics include:

- Hyperglycaemia (Raised blood sugar) with metabolic acidosis (low serum bicarbonate)
- Polydipsia / Polyuria / Thirst
- Nausea or Vomiting
- Non-specific abdominal pain
- Weakness / Drowsiness / Altered conscious level
- Hypotension / Tachycardia / Hypothermia / Kussmaul Respirations (Breathlessness due to deep fast respirations)
- Dehydration
- Ketones in blood or urine
- Glycosuria (Glucose in Urine)
- Acetone Odour on breath (smells like pear drops)

4.4.2 Diabetic Ketone Acidosis and Diabetes Management for Young People (12-18 years old)

All staff must be aware that young people taking insulin for diabetes may develop DKA with normal blood glucose levels, therefore vigilance is essential in the management of a young person with diabetes. It is essential to:

- Suspect DKA if the blood glucose is normal in a young person with diabetes with any of the following: nausea or vomiting, abdominal pain, hyperventilation, dehydration and reduced levels of consciousness.
- When DKA is suspected in a young person with known diabetes, measure **blood ketones** (beta-hydroxybutyrate) using near-patient method if available.
- **If elevated, immediately transfer to acute hospital with acute paediatric facilities. Treat as urgent hospital admission.**

(NICE 2023)

4.5 Hyperglycaemic Hyperosmolar State (HHS)

HHS is defined by the presence of marked hyperglycaemia associated with dehydration, raised sodium level in the absence of significant acidosis or ketonuria. It usually occurs as a complication of Type 2 Diabetes in the presence of marked hyperglycaemia without the presence of ketones. Patients can quickly become dehydrated from prolonged hyperglycaemia and eventually if untreated disturbances in osmolality occur and the patient may become hypotensive and collapse.

This often occurs in elderly patients with type 2 diabetes (but can occur at any age), who have just about enough circulating insulin to control lipolysis and therefore do not develop more than minimal ketosis, but not enough to prevent hyperglycaemia.

Glucose rises to very high levels (often greater than 30mmol/l) resulting in an osmotic diuresis with loss of large amounts of potassium, sodium and water.

Patients may have a high serum sodium concentration as water is lost in excess of sodium. Therefore, the principal problems are severe hyperglycaemia and severe dehydration as a consequence of osmotic diuresis.

4.5.1 HHS Presentation

HHS is characterised by the gradual development of marked hyperglycaemia without the presence of ketones or significant acidosis. Its characteristics include:

- Osmotic symptoms such as thirst / polydipsia / polyuria
- Marked Dehydration
- Altered mental state that can range from a confused state to obtundation (reduced level of alertness) and coma
- Malaise
- Signs of infection
- Glycosuria
- Blood Glucose usually greater than 30mmols / L.

5 Annual Monitoring.

It is important that all patients with a diagnosis of diabetes in our care attend for annual screening this includes:

- Height, Weight, BMI

- Blood Pressure
- Bloods: HBa1c, U&E, Lipids
- Urinary ACR
- QRISK
- Retinal screening
- Podiatry for regular foot examinations
- Oral Health reviews as at risk of periodontitis

If the patient's admission is for more than one year the service needs to ensure that the annual monitoring is up to date.

6 Pregnancy and Diabetes.

Patients with known diabetes who are pregnant will be offered extra monitoring appointments and scans to help keep good control of blood glucose and check baby's growth and development. Refer to Diabetic and Midwifery team within 48 hours. Patients should have contact with their diabetes team every one or two weeks. All healthcare professionals should ensure that patients are supported to attend these appointments and any concerns should be raised immediately with the responsible diabetic team.

If a patient is admitted with diabetes, please inform the midwife and the responsible diabetic team.

7 Definitions

Term	Definition
Beta-hydroxybutyrate	• Specific ketone body that's released early in the onset of ketosis.
Diabetic Ketoacidosis DKA	• Diabetic ketoacidosis (DKA) is a life threatening acute metabolic complication of Type 1 diabetes mellitus, and occasionally type 2 diabetes. It occurs when insulin therapy is omitted or becomes inadequate for the current physiological state, usually as a result of concurrent illness such as chest or urine infections or sickness and diarrhoea.
Hypoglycaemia	• Hypoglycaemia is a condition which occurs when the blood glucose levels are too low to provide enough energy for the body's activities.
Hyperglycaemia	• Hyperglycaemia is a condition which occurs when the blood glucose levels are too high. .

Hyperglycaemic Hyperosmolar State (HHS)	• HHS is defined by the presence of marked hyperglycaemia associated with dehydration, raised sodium level in the absence of significant acidosis or ketonuria. It usually occurs as a complication of Type 2 Diabetes in the presence of marked hyperglycaemia without the presence of ketones.

8 Related documents

- Physical Health and Wellbeing Policy (inpatients and community)
- NEWS- National Early Warning Score and the Early detection and Management of the Deteriorating Patient
- Patients own medicine Procedure.
- Prescribing for potential medical emergencies.
- Consent to treatment Policy

9 How this policy will be implemented

- This procedure will be published on the Trust's intranet and external website.
- Line managers will disseminate this procedure to all Trust employees using a briefing.
- This procedure will be disseminated to all trust employees through the All staff weekly briefing email

9.1 Training needs analysis.

It is recommended that all clinical staff complete Diabetes awareness e-learning when a patient is admitted to the ward with diabetes. It is recommended that all clinical staff complete diabetes awareness training annually.

Registered Nurses are required to demonstrate competence as part of a three yearly face to face medication assessment.

Staff/Professional Group	Type of Training	Duration	Frequency of Training
Registered Nurses and Health care assistants	Diabetes Awareness e-learning Insulin Safety e-learning	1 hour	Annually and when a patient is admitted to the ward
Medical Staff	e-learning RCPsych Diabetes and Insulin Safety	1 Hour	Annual

10 How the implementation of this policy will be monitored

Number	Auditable Standard/Key Performance Indicators	Frequency/Method/Person Responsible	Where results and any Associate Action Plan will be reported to, implemented and monitored; (this will usually be via the relevant Governance Group).
1	Clinical Audit of adherence to the procedure to include: • Essential care • BM monitoring • Insulin prescribing • Insulin storage and administration • Management of hypo / hyperglycaemia	Annually Diabetes Clinical Audit facilitated by the Clinical Audit and Effectiveness Team.	Physical Health Group Executive Quality Assurance and Improvement Group (EQAIG)

11 References

- Diabetes – NHS (July 2019) accessed from https://www.nhs.uk/conditions/diabetes/ 06/09/2023

- Joint British Diabetes Societies for Inpatient Care (JBDS-IP) (2022) Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus (Revised) UK accessed from: JBDS_01_HypoGuideline _March_2022.pdf (abcd.care) 09/09/2023

- National Institute for Clinical Excellence (NG18) (2023Diabetes (type 1 and type 2) in children and young people: diagnosis and management. London: NICE.

12 Document control (external)

To be recorded on the policy register by Policy Coordinator

Required information type	Information
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Next review date	23 November 2026
This document replaces	CLIN-0081-v3 Diabetes Management for Inpatients
This document was approved by	Fundamentals standards of holistic care CAG
This document was approved	04 September 2024
This document was approved by	Drug and Therapeutics Committee
This document was approved	28 November 2024
An equality analysis was completed on this policy on	21 August 2024
Document type	Public
FOI Clause (Private documents only)	n/a

Change record

Version	Date	Amendment details	Status
v3	23 November 2023	Full guideline review and update of contents: Diabetes Management – admission to inpatient unit updated as NICE guidance 2023. 4.3 Diabetes Medication Management update to location of emergency insulin. E-learning module update to hyper link.	Withdrawn

		4.4 Continuous subcutaneous insulin pump information added section. 4.5 non-Insulin injectable guidance added section. 4.6 Update to blood glucose monitoring to include additional information on flash monitoring. 4.7 Nutritional management updated. 5.1 emergency situations updated. Risk factors added in form of table. 5 Hyperglycaemia values changed from 15mmol/s to 11mmol/s as NICE guidance. 5.2 Section on ketones added with value table.	
v3.1	28 Nov 2024	Addition of warning regarding SGLT2 to section 4.4 Diabetic Ketoacidosis – DKA. And addition of appendix 5 treatment of Hyperglycaemia in adults.	Approved

Appendix 1 - Equality Impact Assessment Screening Form

Please note: The Equality Impact Assessment Policy and Equality Impact Assessment Guidance can be found on the policy pages of the intranet

Section 1	Scope
Name of service area/directorate/department	Nursing and Governance
Title	Diabetes Management for inpatients
Type	Procedure/Guideline
Geographical area covered	Trust wide
Aims and objectives	To set standards in practice to ensure safe effective care of patients with diabetes whilst an inpatient within TEWV NHS Trust. The guidance will support medical and nursing staff through the process required to ensure patient safety is maintained in relation to diabetes management whilst the patient is in hospital.
Start date of Equality Analysis Screening	21 August 2024
End date of Equality Analysis Screening	21 August 2024

Section 2	Impacts
Who does the Policy, Procedure, Service, Function, Strategy, Code of practice, Guidance, Project or Business plan benefit?	The Guideline benefits service users by standardising the processes/interventions required by staff for the screening, monitoring and management of diabetes. Similarly, the information within the Guideline will help facilitate medical and nursing staff with their decision making to ensure that service users receive safe, effective and appropriate interventions that are supported by current national guidance and best practice.
Will the Policy, Procedure, Service, Function, Strategy, Code of practice, Guidance, Project or Business plan impact negatively on any of the protected characteristic groups? Are there any Human Rights implications?	• **Race** (including Gypsy and Traveller) **NO** • **Disability** (includes physical, learning, mental health, sensory and medical disabilities) **NO** • **Sex** (Men and women) **NO** • **Gender reassignment** (Transgender and gender identity) **NO** • **Sexual Orientation** (Lesbian, Gay, Bisexual, Heterosexual, Pansexual and Asexual etc.) **NO** • **Age** (includes, young people, older people – people of all ages) **NO** • **Religion or Belief** (includes faith groups, atheism and philosophical beliefs) **NO** • **Pregnancy and Maternity** (includes pregnancy, women / people who are breastfeeding, women / people accessing perinatal services, women / people on maternity leave) **NO** • **Marriage and Civil Partnership** (includes opposite and same sex couples who are married or civil partners) **NO** • **Armed Forces** (includes serving armed forces personnel, reservists, veterans and their families) **NO** • **Human Rights Implications NO** (Human Rights - easy read)
Describe any negative impacts / Human Rights Implications	
Describe any positive impacts / Human Rights Implications	

Section 3	Research and involvement
What sources of information have you considered? (e.g. legislation, codes of practice, best practice, nice guidelines, CQC reports or feedback etc.)	National guidance/Reports.
Have you engaged or consulted with service users, carers, staff and other stakeholders including people from the protected groups?	Yes
If you answered Yes above, describe the engagement and involvement that has taken place	Given that this Trust Guideline has been developed in accordance with a number of national key documents published by NICE, the Department of Health, NHS England and also, Public Health England, there has been no consultation with service users in terms of the actual writing of this document. However, there has been involvement with various healthcare professionals within the Trust. This Guideline is therefore a standardised approach that enables clinical staff working within TEWV NHS Foundation Trust to adhere to national recommended best practice and guidance in relation to the management of diabetes for inpatients.
If you answered No above, describe future plans that you may have to engage and involve people from different groups	

Section 4	Training needs
As part of this equality impact assessment have any training needs/service needs been identified?	Yes
Describe any training needs for Trust staff	There are no specific training needs identified for this specific guideline. However, some of the required interventions within the guideline. Therefore the online ESR diabetes awareness and insulin safety e learning.
Describe any training needs for patients	No
Describe any training needs for contractors or other outside agencies	There are no specific training needs identified for this specific guideline. However, some of the required interventions within the guideline.

	Therefore the online ESR diabetes awareness and insulin safety e learning.

Check the information you have provided and ensure additional evidence can be provided if asked.

Appendix 2 – Approval checklist

Title of document being reviewed:	Yes / No / Not applicable	Comments
1. Title		
Is the title clear and unambiguous?	Yes	
Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2. Rationale		
Are reasons for development of the document stated?	Yes	
3. Development Process		
Are people involved in the development identified?	Yes	
Has relevant expertise has been sought/used?	Yes	
Is there evidence of consultation with stakeholders and users?	Yes	
Have any related documents or documents that are impacted by this change been identified and updated?	Yes	
4. Content		
Is the objective of the document clear?	Yes	
Is the target population clear and unambiguous?	Yes	
Are the intended outcomes described?	Yes	
Are the statements clear and unambiguous?	Yes	
5. Evidence Base		
Is the type of evidence to support the document identified explicitly?	Yes	
Are key references cited?	Yes	

Are supporting documents referenced?	Yes	
6. Training		
Have training needs been considered?	Yes	
Are training needs included in the document?	Yes	
7. Implementation and monitoring		
Does the document identify how it will be implemented and monitored?	Yes	
8. Equality analysis		
Has an equality analysis been completed for the document?	Yes	
Have Equality and Diversity reviewed and approved the equality analysis?	Yes 18/10/23	
9. Approval		
Does the document identify which committee/group will approve it?	Yes	
10. Publication		
Has the policy been reviewed for harm?	Yes	
Does the document identify whether it is private or public?	Yes	
If private, does the document identify which clause of the Freedom of Information Act 2000 applies?	N/A	
11. Accessibility (See intranet accessibility page for more information)		
Have you run the Microsoft Word Accessibility Checker? (Under the review tab, 'check accessibility'. You must remove all errors)	Yes	
Do all pictures and tables have meaningful alternative text?	Yes	
Do all hyperlinks have a meaningful description? (do not use something generic like 'click here')	Yes	

Appendix 3 - Treatment of Hypoglycaemia (Adult) flowchart.

DEFINITION: Hypoglycaemia is a condition which occurs when the blood glucose levels are too low to provide enough energy for the body's activities.

SIGNS OF HYPOGLYCAEMIA: sweating, shaking, dizzy, hungry, tired, irritable (moody), anxious, confused, pallor, palpitations, headaches.

Conscious Patient (able to swallow)

Give fast acting carbohydrate . Select 1 from the following:

- 250ml fresh fruit juice
- 250ml of **non-diet** soft drink
- Dextrose 40% gel-1 tube give a second tube after 15 minutes if no improvement.

Recheck blood glucose levels after 10- 15 minutes.

If blood glucose above 4.0mmol/l

Repeat step 1 again

Give long acting carbohydrate (10-20g). Select 1 from the following:

- 1 slice of bread
- 2 biscuits
- Cereal (small bowl)
- Next meal if due.

If blood glucose remains below 4.0mmol/l

Repeat step 1 up to 2 more times. If blood glucose level remains low:

- Contact Doctor/Physical Health Care Practitioner or ring 9/999 if unavailable.
- Consider giving 1mg of IM glucagon if prescribed (over 8 years or weight of 25kg or more)
- If glucagon given, recheck blood glucose levels a further twice in 1 hour and give 30-40g carbohydrate.
- Monitor for signs of 'hypo'.

Unconscious patient (unable to swallow): maybe having a seizure (fit)

- **DO NOT GIVE ANYTHING ORALLY**
- Protect airway and monitor NEWS
- Give 1mg of subcutaneous or intramuscular glucagon as prescribed (over 8 years or weight of 25kg or more)
- Contact Doctor/ physical Healthcare Practitioner or ring 9/999 if not available

Recheck blood glucose level & NEWS after 10- 15 minutes.

If regains consciousness (able to swallow)

Give long acting carbohydrate (30-40g). Select 1 from the following:

- Sandwich
- 2 Biscuits and a glass of milk
- Cereal (large bowl)

If remains unconscious

- If remain unconscious, respond in accordance with the First Response Guidelines.
- Ring 9/999

- Document in patients electronic care record.
- Complete Incident Report on Trust incident reporting system (InPhase)
- Resume previous blood monitoring regime
- **Review diabetes treatment and investigate reason for hypoglycaemia**

Never omit insulin or tablets except under instruction of Doctor or Physical Healthcare Practitioner.

Appendix 4 - Treatment of Hypoglycaemia (Young Person) Flowchart

DEFINITION: Hypoglycaemia is a condition which occurs when the blood glucose levels are too low to provide enough energy for the bodies activities.

SIGNS OF HYPOGLYCAEMIA: sweating, shaking, dizzy, hungry, tired, irritable (moody), anxious, confused, pallor, palpitations, headaches

DIAGNOSIS OF HYPOGLYCAEMIA: Blood glucose of **less than 4.0mmol**

Conscious Patient (able to swallow)

Give fast acting carbohydrate. Select 1 from the following:

- 250ml fresh fruit juice
- 250ml of **non-diet** soft drink
- Dextrose 40% gel-1 tube give a second tube after 15 minutes if no improvement.
-

Recheck blood glucose levels after 10- 15 minutes.

If blood glucose above 4.0mmol/l

Repeat step 1 again

Give long acting carbohydrate (10-20g). Select 1 from the following:

- 1 slice of bread
- 2 biscuits
- Cereal (small bowl)
- Next meal if due.

If blood glucose remains below 4.0mmol/l

Repeat step 1 up to 2 more times. If blood glucose level remains low.

- Contact Doctor/Physical Health Care Practitioner or ring 9/999 if unavailable.
- Consider giving 1mg of IM glucagon if prescribed (over 8 years or weight of 25kg or more)
- If glucagon given, recheck blood glucose levels a further twice in 1 hour and give 30-40g carbohydrate.
- Monitor for signs of 'hypo'.

Unconscious patient (unable to swallow): maybe having a seizure (fit)

- **DO NOT GIVE ANYTHING ORALLY**
- Protect airway and monitor NEWS
- Give 1mg of subcutaneous or intramuscular glucagon as prescribed (over 8 years or weight of 25kg or more)
- Contact Doctor/ physical Healthcare Practitioner or ring 9/999 if not available

Recheck blood glucose level & NEWS after 10- 15 minutes.

If regains consciousness (able to swallow)

Give long acting carbohydrate (30-40g). Select 1 from the following:

- Sandwich
- 2 Biscuits and a glass of milk
- Cereal (large bowl)

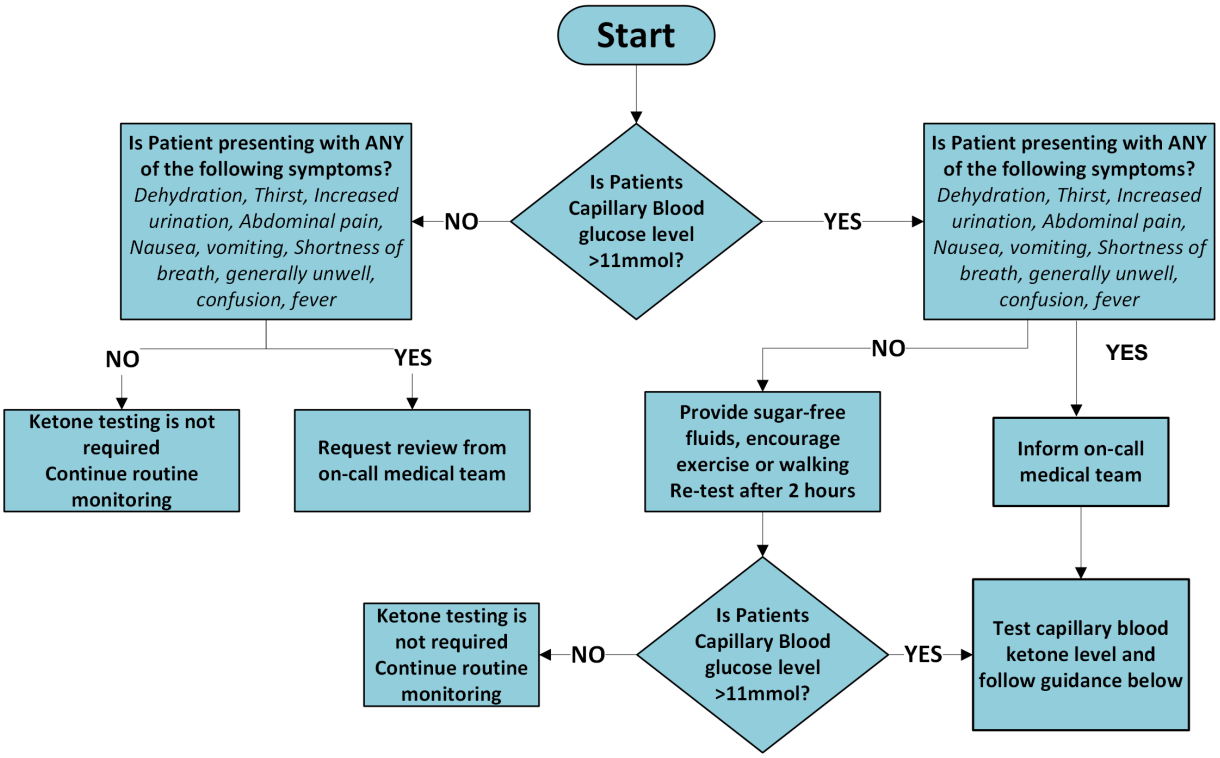
If remains unconscious

- If remain unconscious, respond in accordance with the First Response Guidelines.
- Ring 9/999

- Document event in the patients electronic care record
- Complete Incident Report on Trust incident reporting system (InPhase)
- Resume previous blood monitoring regime
- If eating disorder related hypoglycaemia rather than diabetes related - refer to MEED guidelines.
- **Review diabetes treatment and investigate reason for hypoglycaemia**

Never omit insulin or tablets except under instruction of Doctor or Physical Healthcare Practitioner.

Appendix 5- Treatment of Hyperglycaemia (Adults) Flowchart



Blood Ketone <1.0 mmol/L

· If patient is clinically well, no immediate action is required
· Re-check blood glucose in 4 hours.
· Refer for routine medical/diabetes review

Blood Ketone 1.0 - 1.5 mmol/L

Hyperketonaemia

· Verbally inform the on-call medical team
· Increase sugar free oral fluid intake to 100ml/hour
· Ensure prescribed insulin has been taken
· Recheck glucose 4 hourly.

Blood Ketone 1.5 - 3.0 mmol/L

Risk of DKA

· Verbally inform on-call medical team
· Ensure prescribed insulin has been taken
· Prescriber can consider additional stat dose Novorapid insulin (10% of total daily dose)
· Re-test blood ketone in 2 hours
· Increase sugar free oral fluid intake to 100ml/hour

Blood Ketone >3.0 mmol/L

High risk of DKA

· Immediately arrange admission to an acute hospital/A&E
· Verbally inform on-call medical team
· Prescriber can consider stat dose Novorapid (20% of total daily dose)

RED FLAG

If Ketone is under 1.5 but patient is clinically unwell (Marked Dehydration, severe thirst, existing infection, obvious confusion) escalate for **URGENT** medical review to rule out Hyperosmolar hyperglycaemic state (HSS) usually associated with Type 2 presenting with very high blood glucose>30mmol.