

# JBDS-IP

Joint British  
Diabetes Societies  
for inpatient care

## Self-management of diabetes in hospital

Revised August 2021



**DiABETES UK**  
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CLINICAL PHARMACY ASSOCIATION

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*The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus JBDS 01*

*The Management of Diabetic Ketoacidosis in Adults JBDS 02*

*Management of adults with diabetes undergoing surgery and elective procedures: improving standards JBDS 03*

*Self-Management of Diabetes in Hospital JBDS 04*

*Glycaemic management during the inpatient enteral feeding of stroke patients with diabetes JBDS 05*

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*The use of variable rate intravenous insulin infusion (VRII) in medical inpatients JBDS 09*

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*The management of diabetes in adults and children with psychiatric disorders in inpatient settings JBDS 13*

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*Inpatient Care of the Frail Older Adult with Diabetes JBDS 15*

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*The management of glycaemic control in patients with cancer JBDS 17*

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



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

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

**Conflict of interest statement**

The authors declare no conflicts of interest

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# Foreword

These guidelines have been commissioned by the Joint British Diabetes Societies for Inpatient Care Group.

The aim of the document is to improve the safety of the in hospital management of diabetes. A diabetes care plan is specific to the individual, especially if that person is using insulin. It follows that the person with the greatest expertise in managing diabetes is commonly the individual themselves.

Allowing individuals to self-manage their diabetes in hospital should significantly improve patient safety. The default position should be the expectation that the individual will self-manage their diabetes unless there are specific reasons not to. The correct support structures need to be provided to ensure that this is properly monitored but this must be done without creating unnecessary bureaucracy.

## Target Audience

These guidelines emphasise that, at all stages of care in hospital, the individual should remain in charge of their diabetes care unless there is a specific reason not to. It is hoped that they will be of use to all healthcare professionals who are involved in the delivery of diabetes care in hospital. The target audience specifically includes:

Ward nursing staff

Ward pharmacists

The inpatient diabetes specialist team

Most importantly those involved in the writing and implementation of local diabetes care policies.



Dr Daniel Flanagan

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Erwin Castro

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**The guiding principle of this document is that people with diabetes manage their condition on a day to day basis when out of hospital and should continue to self-manage during a hospital admission unless there is a specific reason why they cannot. The choice to continue to self-manage during admission, if well enough to do so, should be that of the patient. This document details how this decision can be integrated with the rest of the hospital care to provide safe and effective management of diabetes in hospital. If ward staff are uncomfortable with the patient's decision to self-manage, expert advice should be sought from the hospital diabetes team.**

#### **Definitions:**

**Self-management of diabetes** is the process of deciding on and administering an insulin dose in response to self-measured capillary glucose values.

**Self-administration** is the taking of medication (injected or oral) as prescribed by a doctor.

### **Main recommendations**

1. Hospitals should provide written information to explain the responsibilities of self-management to people with diabetes and hospital staff.
2. The responsible health care professional (e.g. nurse or pharmacist) and the person with diabetes should agree, on admission, the circumstances in which the patient should self-manage. An agreement form should be signed by the person with diabetes and a registered nurse.
3. For elective surgical admissions, a care plan should be agreed at the pre-operative assessment clinic to establish whether the person with diabetes wishes to self-manage and the circumstances in which this may not be possible.
4. During the admission the clinical circumstances should be assessed regularly to ensure that the individual's ability to self-manage has not been compromised by their clinical condition.
5. The diabetes specialist team should be involved if there is disagreement about the person with diabetes' ability to self-manage or if there are difficulties with diabetes control. Diabetes specialist nurse staffing levels should be sufficient to support this role.
6. People with diabetes should be able to self-monitor their blood glucose but should make the results available to hospital staff.
7. The insulin dose administered by the person with diabetes should be recorded on the prescription chart.
8. The hospital should ensure that the timing and content of meals is suitable for people with diabetes.
9. Facilities should be available for safe storage of insulin in the ward environment.

# 1. Introduction

This guideline has been produced by the Joint British Diabetes Societies Inpatient Care Group and has been informed by focus groups from Diabetes UK. The aims of the guideline are to improve the inpatient experience and safety for people with diabetes. It is primarily aimed at health care professionals working in hospitals, although some aspects are relevant to staff involved in pre-admission preparation. The guideline is designed to enable adaptation to local circumstances where required.

## Background

*“All children, young people and adults admitted to hospital, for whatever reason, will receive effective care of their diabetes. Wherever possible, they will continue to be involved in decisions concerning the management of their diabetes”* (Standard 8 - Diabetes National Service Framework)<sup>1</sup>.

Historically, people with diabetes have often been prevented from managing their own diabetes whilst in hospital. This has exposed them to mismanagement of their diabetes as a result of

- Errors in the administration of insulin<sup>2-4</sup>.
- Errors of diabetes management.
- Inappropriate content and timing of meals.
- Mistreatment of hypoglycaemia.
- Misuse of variable rate intravenous insulin infusions.

At best these errors lead to patient dissatisfaction, disempowerment and prolonged length of stay; at worst patients may suffer serious harm or even death<sup>5,6</sup>. The 2018 National Diabetes Inpatient Audit (NaDIA) reported that people with diabetes experienced substantially longer hospital stays, poor glucose control, frequent medication errors and insufficient contact with the diabetes specialist team<sup>7</sup>. All of these factors contribute to the increased cost of caring for inpatients with diabetes.

In the NaDIA report of the 2019 audit, the Hospital Characteristics survey found a large reduction in the percentage of hospital sites with a policy or guideline

for self-management of diabetes<sup>8</sup>. It recommended that “All trusts should have and promote a self-management policy, which supports patients who want to self-manage their diabetes to safely do so while in hospital, as clinically appropriate and in line with wider NHS England and NHS Improvement policies on inpatient self-management”<sup>8</sup>.

A number of organisations have issued guidance to address the problems associated with diabetes care in hospital.

- The National Institute for Health and Clinical Excellence (NICE) quality standard for inpatient care<sup>9</sup> requires that “People with diabetes admitted to hospital are cared for by appropriately trained staff, provided with access to a specialist diabetes team, and given the choice of self-monitoring and managing their own insulin.”
- Diabetes UK have produced a comprehensive report highlighting the current requirements for a modern and safe inpatient diabetes service<sup>5</sup>.
- The National Patient Safety Agency issued guidance to reduce the number of errors involving insulin<sup>2</sup>.
- Insulin alert calling for staff training in use of insulin.
- People with diabetes to be allowed to self-manage their diabetes during hospital admission wherever possible.
- Various organisations have, over the last few years, produced e-learning modules. The most recent of these is from Trend Diabetes<sup>10</sup>.
- The Department of Health included insulin maladministration in the ‘never event’ list<sup>11</sup>.

The task facing diabetes specialist teams is to integrate the policies listed above with local guidelines. This guideline focuses on self-management of insulin therapy but provides guidance on other aspects of diabetes self-management.



## Rationale for self-management

Insulin therapy remains a common cause of untoward incidents in hospitals. Problem areas highlighted by the National Diabetes Inpatient Audit (NaDIA) include<sup>8</sup>:

- Prescription and administration of insulin.
- Timing of insulin administration in relation to meals.
- Lack of knowledge amongst medical and nursing staff-managing patients with diabetes.
- Lack of access to specialist advice about diabetes management.

Many insulin treated people with diabetes will have greater knowledge and experience of insulin adjustment than the medical and nursing staff responsible for their care<sup>12-14</sup>. They will routinely monitor their capillary glucose and adjust the insulin dose depending on the result. This process

is referred to as self-management of diabetes and is distinct from self-administration of insulin (defined as self-injection of insulin in response to medical advice). Self-management of diabetes by people with the condition who are willing and able is an important part of the strategy to improve the safety of insulin use in hospital<sup>5</sup>.

Hospitals should have a policy for diabetes self-management. This should be clear and patient-centred but flexible enough to deal with changing clinical situations. Written information explaining staff responsibilities in the process of agreeing self-management should be provided for medical and nursing staff.

**The key principle is that people with diabetes should be primarily responsible for making the decision about whether they should self-manage their diabetes.**

## 2. The role of the diabetes specialist team

- All hospitals should provide a specialist diabetes team to support inpatients with diabetes and the staff caring for them.
- Input from the diabetes specialist team is essential to ensure that people with diabetes are managed safely and effectively during their hospital stay<sup>3</sup>.
- Availability of diabetes specialist input varies from hospital to hospital and the role of the inpatient diabetes team will vary depending upon the size of the team.
- The 'Making hospitals safe for people with diabetes' document provides guidance for referring patients to the diabetes specialist team<sup>5</sup>.
- Diabetes self-management needs to be specifically discussed. The diabetes specialist team should be involved in:
  - Development and implementation of local self-management policies.
  - Providing staff education in the use of self-management policies to ensure that staff understand when people are safe to self-manage their diabetes.
  - Preplanning for elective inpatients to ensure safe self-management.
  - Providing support where difficulties arise in deciding whether people with diabetes are able to self-manage; specific individual patient education may be required.
  - Investigation of untoward incidents that arise as a result of self-management.
  - Audit of the self-management process.

People with diabetes and ward staff may disagree about the level of self-management. The diabetes specialist team should be available to support the decision.

# 3. Self-management of diabetes with insulin

## Objectives

- Allow people with diabetes who are able and willing to continue to self-administer and/or adjust insulin doses whilst in hospital.
- Improve patient safety and reduce insulin errors for inpatients with diabetes.
- Optimise the timing of insulin in relation to meals.
- Reduce length of stay and re-admission rates by avoiding treatment errors.
- Identify and rectify gaps in knowledge of the person with diabetes, thereby increasing independence and decision making on discharge.
- Identify patients with difficulties in administration of insulin e.g. poor eyesight or dexterity.

## Criteria for self-management

People who manage their diabetes prior to admission must be assumed competent to continue to self-manage during the admission unless the clinical situation prevents this. The role of the registered nurse, pharmacist or doctor is to discuss the individual's wishes and agree and document the circumstances in which self-management will not be possible (e.g. following anaesthesia).

The clinical situation may change during the admission and the person with diabetes may become temporarily or permanently unable to self-manage. Clear guidance should be provided to allow for changes in responsibility for diabetes management depending on the clinical circumstances. The guidance needs to be individualised; the diabetes team may help with this.

## Exclusion criteria

- Those who prefer their diabetes to be managed by the health care team during their admission.
- Those at risk of self-harm.
- Those deemed unable to participate due to lack of capacity as defined under the Mental Capacity Act (2005)<sup>15</sup>.
- Those admitted as a result of poor glycaemic control (until assessed by the diabetes specialist team).

- Those who will not be self-medicating upon discharge.

## Temporary exclusion criteria

- If the person with diabetes' clinical condition deteriorates (e.g. become confused, more unwell or more dependent).
- Following anaesthesia, or if patient-controlled analgesia is in progress.

## Caution criteria

- History of drug abuse.
- Psychiatric illness, severe depression, suicidal tendencies.
- Physical disabilities which may prevent self-administration.
- Those receiving treatment that might impact on diabetes control outside of the experience of that individual (e.g. steroid treatment).

Note: It is important not to exclude people with diabetes who are confused if they are expected to manage their own medicines when they go home. It may be possible to establish a safe routine before they are discharged.

## Staff responsibilities

- Clinical staff are responsible to the person with diabetes for provision of safe and effective care.
- The role of ward staff (nursing, pharmacy and medical) is to assess the clinical condition of the person with diabetes to determine whether this may impair their ability to self-manage.
- Whenever possible the person with diabetes should be involved in decisions and, as with all other aspects of their care, should be allowed to make the final decision about self-management.
- If there is doubt about the individual's ability to self-manage the diabetes specialist team should be involved.
- Written agreement from the person with diabetes is required prior to self-administration of medicines in hospital. (see Appendix 1)

See Appendix 4 for Nursing and Midwifery Guidelines for self-administration of medicines.

## Nursing and/or pharmacy staff

### Are responsible for:

#### Assessment on admission

- Discussing, negotiating and agreeing the option to self-manage with the person with diabetes, bearing in mind that they will normally have more knowledge and experience of managing their diabetes than the ward nurse.
- Providing a patient information leaflet to support the discussion (see Appendix 2).
- Completing an 'agreement to self-manage' form with the person with diabetes to document the decision (see Appendix 1).
- Explaining the responsibilities people with diabetes have when self-managing insulin e.g. disposal of sharps; safe and secure storage of insulin.
- Ensuring that blood glucose results and insulin doses are documented.
- Ensuring safe and secure storage of the insulin with access for the individual patient.
- Communicating the self-management decision at nursing hand-over especially if the person with diabetes is transferred between wards.
- Identifying gaps in patient education and involving the diabetes specialist team.

#### Re-assessment

People with diabetes must be re-assessed by the responsible registered nurse or pharmacist if:

- Their condition deteriorates (e.g. they become confused, more unwell or increasingly dependent).
- Following anaesthesia or if patient controlled analgesia in progress.
- If their condition improves (they may regain the ability to self-manage).
- If an insulin-related self-management incident occurs (e.g. the person with diabetes inappropriately misses a dose).

#### Medical staff

##### Medical staff must:

- Be aware that an individual is self-managing their diabetes.
- Respect the person with diabetes' view when discussing diabetes management.

- Inform the nursing staff and the person with diabetes if they amend the medicine chart.

#### Pharmacy staff

##### Pharmacy staff should:

- Supply and dispense each person with diabetes with his or her own insulin or an equivalent (ensuring that the appropriate injection device is supplied).
- Respond promptly to the request to supply medication to ensure that people with diabetes do not miss doses.
- Ensure insulin doses on admission are accurately documented as part of medicines reconciliation
- Ensure supplies of insulin pen needles, blood glucose monitoring equipment as appropriate in each locality
- For Trusts where assessments are completed by nursing staff, to review and ensure these are completed for each person on insulin or prompt review if their condition or circumstances change

## Planning Elective Admissions

People with diabetes should be involved in the planning of diabetes management for all stages of an elective admission from pre-admission to post discharge<sup>16</sup>.

The following should be agreed in advance:

- Whether the individual wishes to self-manage during the admission.
- The circumstances when self-management may not be possible (anaesthesia, patient-controlled anaesthesia).
- Process for agreement to self-manage (patient information leaflet, agreement to self-manage form).
- The detailed self-management plan (blood glucose monitoring, recording of insulin doses).
- The need to involve the diabetes specialist team in advance (e.g. insulin pump therapy).
- Guidelines for involving the diabetes specialist team.

Outcomes of self-management of diabetes in elective admissions for people with diabetes should be audited and should include patient satisfaction questionnaires.

## Patient Education

- People with diabetes must be given the patient information leaflet (see Appendix 2) in an appropriate language prior to commencing self-management. It is good practice to ask the person with diabetes what they understand after reading the leaflet.
- If diabetes educational needs are identified the person with diabetes should be referred to the diabetes specialist team.
- Individuals who are not self-administering insulin should be given education on the dose, timing and injection technique every time insulin is administered. Information should be provided on the action of insulin, the role of the individual in the administration process and the potential to take greater control over the administration of their insulin during their hospital stay.
- People with diabetes not currently self-managing but expected to be independent at discharge should be referred to the diabetes specialist team well before discharge and provided with written information including details of glucose testing equipment, glucose diary, contacts details and follow-up arrangements.
- All people with diabetes taking insulin should be provided with an information leaflet advising on safe use of insulin and an insulin passport documenting the name of the insulin they are taking and the type of administration device in line with NPSA guidance<sup>2</sup>.

## Dispensing and Storage of insulin

### Use of Patient's Own Medications

The person with diabetes' own insulin can be used for self-administration provided the following criteria are met:

- The person with diabetes has consented to use his/her own medications whilst in hospital.
- The expiry date has not passed.
- Insulin vials/cartridges/disposable pens have been opened less than 4 weeks ago.
- Insulin pens/ devices have a patient identification (ID) label.

### Storage

- It is important that insulin, delivery devices and glucose testing equipment do not present a risk to other patients and staff working in clinical

areas. Ideally insulin and the related equipment should be stored in a lockable cabinet at the patient's bedside. As the timing of insulin delivery is important the person with diabetes should have immediate access to this. If this is not available, clearly labelled boxes that can be kept in the patient bedside locker are an acceptable alternative. The absence of a locked cabinet should not be a barrier to self-management of diabetes but it is essential that a risk assessment is performed and reviewed at regular intervals. In most cases the safety benefits of self-management will greatly outweigh the risks to other people in a clinical area but the risk to other people must be minimised.

- If the person with diabetes leaves the ward for a procedure the key should be returned to the registered nurse.
- The registered nurse should hold a master key for each cabinet and a spare should be kept on the ward.

If the ward is unable to provide a locked cabinet this should not be a barrier to self-administration of insulin provided that:

- The person with diabetes is made aware of the potential risks of leaving insulin, needles, syringes, pen devices, or blood glucose monitoring equipment within reach or sight of others,
- There is a regular risk assessment and the person with diabetes does not remain in the same area as other people on the ward who
  - are at risk of deliberate self-harm
  - are acutely confused
  - have a current history of drug or alcohol abuse
  - have a history of medication overdose

Details of the risk assessment process should form part of the self-administration policy written by each hospital. As the risks will differ between clinical areas, each area will need to produce their own modified risk assessment and be able to provide assurance that this is being followed.

- People with diabetes should be aware of the risks to other ward users and this should form part of the consent process.

## Checking and recording patient self-administration of medicines

The registered nurse is responsible for confirming the patient has self-administered insulin and the dose they have taken. This should be recorded on the prescription chart. If the person with diabetes becomes unable or unwilling to administer insulin, nursing staff must take over responsibility. Electronic prescribing does allow for this flexibility.

### Medication errors and missed doses

- All drug errors should be reported by the normal incident reporting method.
- Minor discrepancies, e.g. variation in timing, must be discussed with the person with diabetes. If there is disagreement between the person with diabetes and ward staff about the appropriateness of the person with diabetes' decision, the diabetes specialist team should be asked to advise.
- If the person with diabetes makes an undisputed error in management or administration nursing or medical staff must assess their ability to continue to self-manage.
- All errors or discrepancies, including the action taken, must be documented in the nursing and medical records.
- All Trusts should consider setting up an insulin safety group to review insulin related serious incidents on a regular basis.

## Blood glucose monitoring in hospital

Self-monitoring of blood glucose in hospital is an important issue that raises both patient safety and point-of-care testing (POCT) concerns over the quality assurance of individual patient meters. It is essential that local trust policies agreed by the POCT committee, or the biochemistry department if no POCT committee exists, are in place before allowing exclusive self-monitoring of blood glucose.

- People with diabetes who are self-managing their diabetes should be able to test their blood glucose, using their own equipment where possible. This should be done alongside intermittent nurse testing to ensure there are no discrepancies.
- People with diabetes who are self-monitoring should make the results of tests available to nursing staff for inclusion in the inpatient record.

- People with diabetes should test at regular intervals (minimum 4 times per day before meals and bed for those taking insulin) to allow hospital staff to assess the level of control.
- The diabetes specialist team should be consulted if there are any issues related to blood glucose monitoring and patient self-management.
- People with diabetes who are new to self-monitoring should receive education and support from the diabetes specialist team.
- People with diabetes who use self-monitoring equipment not stocked by the hospital pharmacy may need to provide their own equipment or change to hospital supplied equipment.
- Hospitals that have quality control policies mandating the use of hospital provided glucose meters should develop policies which allow people with diabetes to retain control of blood glucose monitoring and diabetes management.

## Management of hypoglycaemia and hyperglycaemia

- If the person with diabetes becomes hypoglycaemic (blood glucose less than 4.0 mmol/L), treat in accordance with inpatient hypoglycaemia guidelines<sup>17</sup>. Refer to the diabetes specialist team if hypoglycaemia is recurrent or severe (requiring third party assistance).
- If the person with diabetes becomes hyperglycaemic (blood glucose levels above 14.0 mmol/L) ask them what they would normally do in this situation. If the patient is self-managing they should decide what action is needed.
- If the person with diabetes is not self-managing but is well, seek advice from the diabetes specialist team or from medical staff.
- If the person with diabetes is unwell, check blood or urine for ketones and inform medical staff of the results. Consider use of a variable rate intravenous insulin infusion. Refer to local guidelines for management of hyperglycaemia, if available.

## Content and timing of meals

- Hospitals should ensure that the content and timing of meals is appropriate for people with diabetes and that they are able to take their insulin with their meal.
- The carbohydrate content of meals should be on menus.
- People with diabetes should be allowed to make their own food choices. Guidance may be needed from a dietitian to ensure these choices are appropriate.
- People with type 1 diabetes may have received structured education (e.g. the dose adjustment for normal eating (DAFNE) programme) that enables them to eat what they like and to adjust their insulin accordingly. They know more about nutrition and diabetes than most health professionals and should not be stopped from choosing food from the 'normal' menu.



## 4. Self-management of insulin pumps (continuous subcutaneous insulin infusion (CSII) during hospital admission)

Insulin pumps may be used by people with type 1 diabetes to optimise blood glucose control. Pump users undergo detailed education and training in the use of the pump by the diabetes specialist team<sup>18</sup>.

### Essential information about insulin pumps

- Rapid- or short-acting insulin is infused continuously subcutaneously at a pre-programmed rate set by the patient or the diabetes specialist team.
- Bolus doses are taken to cover food.
- If the pump is discontinued for any reason without an alternative provision of insulin, diabetic ketoacidosis is likely to develop within a short space of time because there is no reservoir of long-acting insulin.

### Principles of self-management of insulin pumps by inpatients<sup>18</sup>

- Inpatients using insulin pumps should self-manage if well enough to do so.
- If the person with diabetes is not well enough to self-manage the pump or is unconscious/incapacitated the pump should be discontinued and a variable rate intravenous insulin infusion should be commenced immediately.
- An insulin pump should NEVER be discontinued without immediate substitution of rapid-acting insulin via an alternative administration route. The pump user should already have an alternative basal/bolus insulin regimen in the event of pump failure.
- Insulin pumps should only be adjusted by the person with diabetes or a member of the diabetes team.

- If an insulin pump is discontinued it should be stored safely until the person with diabetes is ready to recommence the pump. The place of storage should be documented.
- If the person with diabetes is not able to self-manage but continued intravenous insulin is not necessary, the diabetes specialist team should be asked to advise on a subcutaneous insulin injection regimen.
- The altered tissue perfusion in diabetic ketoacidosis (DKA) affects insulin absorption, making CSII unreliable. CSII should be temporarily discontinued in people with diabetes presenting in DKA: remove the cannula and detach the pump. For further management, follow standard DKA protocol<sup>19</sup>.
- When an insulin pump is recommenced the intravenous insulin infusion should not be discontinued until a mealtime bolus dose of has been given via the pump.
- All people with diabetes admitted to hospital using an insulin pump should be referred to the diabetes specialist team.

### Pump management for procedures requiring a period of starvation<sup>18</sup>

#### General principles

- Continuous infusion of subcutaneous insulin via a pump is designed to maintain stable blood glucose during the fasting state.
- Procedures requiring the patient to be nil by mouth for a limited period (no more than one missed meal) should be manageable with a pump.
- Plans for continued use of the pump during an elective procedure should be discussed and agreed with the patient before admission.



- Pump patients should not require overnight admission prior to the procedure.

For detailed guidelines for management of insulin pumps during procedures requiring a short period of starvation (only one missed meal) see Appendix 5<sup>20</sup>.

For guidelines for management of an insulin pump during radiological investigations and hyper-hypoglycaemia, see Appendix 6.



## 5. Electronic prescribing and medicines administration

Many hospitals have now adopted electronic prescribing and medicines administration systems. There are a variety of systems in use but all share the common features of improving safety by flagging potential or actual prescribing or administration errors. These systems should enhance the potential for self-administration of insulin by prompting the prescriber to consider this process for insulin users. This can be linked to a series of safety prompts and other information needed to complete the process, and can be linked to the necessary proforma that needs to be completed for self-administration.

Overall these systems should improve patient safety by increasing the amount of insulin self-administered but there are some specific challenges:

- Self-administered medications need to be prescribed in a specific format to allow for variable doses of insulin being given and for insulin to be given at times that are different to the standard medication rounds. Both prescribers and those recording administration need to be specifically trained in this aspect of their hospital's electronic system. The inability of clinicians to use an electronic system must not be allowed to prevent

an individual self-administering medication.

The inpatient diabetes specialist team may need to provide specific support and training for this.

- Systems need to be able to record the specific dose of insulin given at each injection. The timing that the dose was administered also needs to be recorded. This is especially important for short-acting insulins that should be given at meal times as these are unlikely to correspond with the timing of other medicines being administered. Ensuring that short-acting insulins are given at mealtimes is particularly important for maintaining glycaemic control and avoiding hypoglycaemia.
- Most systems will not allow people with diabetes to directly enter information. There is potential for adverse events if the information relating to timing and dose of insulin is not sought from the person with diabetes and entered in a timely way.
- Hospital insulin safety groups need to specifically focus on electronic prescribing systems to ensure that they are contributing to improved insulin self-administration and safety as focussed diabetes specialist input may be required particularly when systems are being introduced.

## 6. Continuous and flash glucose monitoring

The use of continuous or flash glucose monitoring systems either alongside or in place of capillary glucose monitoring is now well established and likely to continue to rapidly rise. Current evidence would suggest that glycaemic control is improved and hypoglycaemia reduced using glucose monitoring systems compared with capillary glucose monitoring alone. Systems that combine continuous glucose monitoring with an insulin pump are now commercially available and likely to be in wide clinical use in the near future.

An increasing proportion of people using insulin will be comfortable and familiar with using this technology. Clinical staff in most inpatient areas will have little experience with the use of these devices in monitoring glucose. Although wards will have had specific training in testing capillary glucose and injecting insulin, they are unlikely to have had training in the full range of interstitial fluid glucose monitoring devices.

The issues that arise are very similar to those associated with insulin pump therapy. The general principles described for insulin pump therapy apply here. If the person with diabetes is capable and

comfortable to continue using the device then they should be allowed to do so<sup>21,22</sup>. Depending upon the organisation there may still be a requirement to perform regular capillary glucose tests on a quality controlled hospital device to meet clinical governance standards.

Precautions need to be taken during investigations and procedures as described in the appendix for insulin pump therapy, Appendix 5.

Continuous and flash glucose monitoring can provide significantly more information about blood glucose trends over the course of day. Although there is a body of evidence supporting these devices outside of hospital there are few published studies showing benefits in hospital. Limited data does however suggest that these devices will be of great value within hospitals in the future<sup>21</sup>. If a person with diabetes attends hospital wearing one of these devices then they should continue to use it if capable. The diabetes specialist team should then be asked to give advice on how the device can be used to improve clinical care. Individual organisations then need to formalise how this information will be used to inform patient care.

## 7. Self-administration of other diabetes medication

It is beyond the scope of this document to give a detailed appraisal of when and how other diabetes treatment should be altered during acute illness. Below is a brief summary of how this may affect self-management of diabetes.

- People with type 2 diabetes may take tablets, with or without insulin to treat their diabetes.
- Hospitals may have local policies in place for self-management of all medication; oral diabetes medication would fall within the scope of these documents.
- There are some specific considerations for the self-administration of oral diabetes agents relating to the timing of the dose in relation to food:
  - metformin must be taken with food to reduce the incidence of gastrointestinal side effects,
  - sulphonylureas (gliclazide, glimepiride) and gliptins (sitagliptin, vildagliptin, saxagliptin, linagliptin) should ideally be taken about half an hour before food,
  - pioglitazone, repaglinide, nateglinide may be taken just before eating,
  - the use of GLP1 analogues may need to be reviewed on admission to hospital.
  - SGLT2 inhibitors may also need to be withheld on admission.

## 8. Audit standards

Specific audits will need to be developed and performed to support the introduction and continuing management of diabetes self-management. Below is an overview of the areas that will need to be covered:

Indicator	Standard
<b>Education:</b>	
Ensure staff are adequately trained to facilitate self-management of diabetes by completing a use of insulin e-learning module (a number are available).	100% of staff responsible for supervising insulin use have completed the module.
Ensure people with diabetes receive adequate education and support to safely self-manage diabetes.	Yes
<b>Protocols:</b>	
Percentage of individuals with diabetes where the assessment and monitoring protocols have been correctly followed	100%
<b>Patient Satisfaction:</b>	
Percentage of people who feel confident that diabetes is being adequately managed in hospital	100%
Percentage of individuals who feel that the ward staff have sufficient knowledge of diabetes	100%
Percentage of people who feel they are allowed to maintain control their own diabetes management in hospital	75%
Percentage of individuals who feel that the timing and content of meals was appropriate for management of diabetes	75%
<b>Outcome measures:</b>	
Death or serious harm as a result of maladministration on insulin	0%
Serious untoward incidents relating to insulin administration	0%
Frequency of hypoglycaemic episodes recorded	
Frequency of medication errors relating to diabetes treatment.	

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# Appendices

## Appendix 1: Agreement to self-manage diabetes during hospital admission

I wish to take responsibility for managing my diabetes (blood glucose monitoring and insulin adjustment) during my admission to (insert Trust name)

I agree that:

- I will keep my medication safe and inaccessible to other patients
- I will check my blood glucose regularly and record the results
- I will record the dose of insulin taken and make the information available to staff
- If I am unable, for any reason, to make decisions about my diabetes management, medical or nursing staff should make decisions on my behalf until I am able to resume self- management

Signed:

PRINT name:

Date:

Witnessed by Healthcare Professional (signature):

PRINT name:

Date:

Position:

Any change in circumstances which may affect this agreement should be documented in the notes.



## Appendix 2: Patient information leaflet

### Introduction

We hope the following information will be helpful to you. If you have any questions please do not hesitate to contact the Diabetes Specialist Nurses on (telephone contact and working hours).

### Self-management of your diabetes

If you have diabetes treated with insulin and are admitted to hospital you will be asked whether you wish to continue to make your own decisions about the management of your diabetes during your admission, if you are feeling well enough to do so.

As you are the person with most experience in caring for your diabetes we would encourage you to continue to make your own decisions about your treatment wherever possible.

If you choose not to self-manage during your admission, medical and nursing staff will take decisions on your behalf but wherever possible you will be consulted.

If the medical condition for which you were admitted means that you are not well enough to make your own decisions (for example if you need sedation or if you need to be treated with intravenous insulin), medical and nursing staff will take over the management of your diabetes until you feel ready to look after yourself.

If you wish to take responsibility for managing your diabetes during your admission you will be asked to sign a form to confirm this.

You will also be asked to keep a record of your blood glucose levels and the insulin you have taken so that medical and nursing staff are aware of the decisions you have taken.

If you would like to see a member of the diabetes team during your admission please inform the nursing staff.

## Appendix 3: Information for health care professionals

### Insulin self-management for adult inpatients with diabetes

#### Introduction

There is evidence that inpatients with diabetes, particularly those taking insulin, may suffer harm during their admission as a result of prescribing and management errors by hospital staff. The National Patient Safety Agency (2010, 2011) has issued alerts to improve the safety of inpatients with diabetes and recommends that people with diabetes who wish to take responsibility for managing their diabetes and are well enough to do so should be allowed to self-manage.

Wherever possible, inpatients with insulin-treated diabetes should be encouraged to make their own decisions about insulin doses in response to their blood glucose results. People with diabetes who are not well enough to take overall control but who are able to discuss their diabetes management should be encouraged to participate in decision making.

#### Elective admissions

The pre-operative assessment clinic nurse or pharmacist should:

- Discuss the diabetes management plan for elective surgical admissions and establish whether the person with diabetes wishes to self-manage,
- Explain that there may be a time during the immediate post-operative period when nursing and medical staff may need to make decisions on the individual's behalf until they are fit to resume self-management,
- Ask the person with diabetes to sign the self-management agreement form if he or she wishes to self-manage,
- Ensure that the diabetes team is aware of the planned admission.

The admitting nurse or pharmacist should:

- Ask the person with diabetes whether he or she wishes to self-manage their diabetes
- Discuss the circumstances in which the person with diabetes will NOT manage their diabetes e.g. peri-operative / under sedation / illness impairing ability to take decisions / requiring an intravenous insulin infusion,
- Explain that circumstances may change during the admission and that the self-management decision may need to be reviewed in response to the medical situation,
- Explain that ultimate responsibility lies with the Trust and if the person with diabetes is not considered well enough to self-manage the nurses will take over,
- Request that the person with diabetes record their blood glucose results and the dose of insulin administered – this may be in their own record book but should be made available to staff,
- Emphasise the need for the person with diabetes to take responsibility for keeping his or her medicines safe and for ensuring that other patients cannot access them,
- Ask the person with diabetes to complete the agreement form taking responsibility for diabetes self-management if this has not been done already,
- Inform the diabetes team that the person with diabetes has been admitted and has opted to self-manage.

#### Emergency admissions

Admitting staff should assess the person with diabetes' overall condition to decide whether there are any factors which would prevent them from safely self-managing their diabetes e.g. impaired conscious level, diabetic ketoacidosis or other indication for an intravenous insulin infusion.

If the person with diabetes is able and wishes to self-manage, the points listed for elective admissions should be discussed and the consent form completed.

If the person with diabetes is not considered well enough to self-manage, the situation should be reviewed once the clinical condition improves.

**If the person with diabetes has agreed to self-manage but the clinical circumstances subsequently change so that self-management is no longer possible, this should be recorded in the notes. If the person with diabetes reverts to self-management on recovery this should also be recorded.<sup>2,23</sup>**

## Appendix 4: Self-administration levels – adapted from the Nursing and Midwifery Council 2007

The level should be recorded in the medicine chart together with the date and name and signature of the assessor. This should be amended as the patient changes from one level to another.

<b>Level 1</b>	<p><b><i>The Nurse administers medicines in conjunction with the patient providing full explanation</i></b></p> <p>The nurse is responsible for medication storage and the supervision of the administration process ensuring the patient understands the medications being administered.</p> <ul style="list-style-type: none"> <li>• At the time of administration the nurse and patient discuss what drugs should be taken at that time and the effect they have on the body.</li> <li>• The nurse may prompt the patient to test his/her knowledge of the drugs.</li> <li>• Patients felt to be capable of correct selection, of obtaining their dose and where necessary measuring it out for at least 1 day may be admitted onto Level 2</li> <li>• Patients who have been anaesthetised in the last 24 hours or are receiving (PCA) must be classified as level 1.</li> </ul>
<b>Level 2</b>	<p><b><i>Patient self-administers under nurse supervision</i></b></p> <p>Whilst the nurse is responsible for safe storage of medications the patient self-administers the medications under supervision.</p> <ul style="list-style-type: none"> <li>• The patient dispenses the medications under the supervision of a nurse who checks that the dose and the insulin selected are correct.</li> <li>• The nurse can still provide information to the patient but retains control over access to medications.</li> <li>• Having satisfied the nurse responsible of their proficiency in self-administering, after review of the nursing assessment and in consultation with the doctor, the patient may be moved on to Level 3. This should not normally be considered before the patient has taken their medication correctly for at least 1 day.</li> </ul>
<b>Level 3</b>	<p><b><i>Patient self-manages medications independently</i></b></p> <p>The patient demonstrates sufficient knowledge of his drugs and self-medicates unsupervised. For patients self-administering insulin:</p> <ul style="list-style-type: none"> <li>• Insulin and associated equipment (needles/syringes, pen devices, sharps bins, etc.) will be kept by the patient. These must be stored by the patient out of sight and in a secure location of their keeping only accessible by themselves when needed.</li> <li>• The patient administers insulin without direct supervision.</li> <li>• The nurse checks suitability and compliance verbally.</li> <li>• The prescription chart is annotated with 'self' (denoting self-administered medication) and the nurse's signature in the administration section for each medication self-administered.</li> </ul>

## Appendix 5: Guidelines for insulin pump therapy in specific situations.

### Pumps and radiology investigations

The pump must be suspended and removed prior to MRI, and should not be taken into the scanning room. Pump manufacturers also advise removing the pump prior to CT scanning. For plain x-rays, there is no need to remove the pump, unless its position obscures the area of interest. The person with diabetes should reconnect the pump immediately following any radiological investigation. Pumps can be safely suspended/removed for up to an hour at a time without needing alternative insulin. A correction bolus may be needed on reconnecting the pump.

### Hypoglycaemia in patients on CSII

#### Patients able to manage their pump

Treat hypoglycaemia with rapid-acting carbohydrates (e.g. dextrose tablets, fresh fruit juice). Unlike patients on long-acting insulin, follow-up with long-acting carbohydrates is *not usually* needed. Pump infusion rates may need adjustment, especially if there is a history of recurrent hypoglycaemia: **consult the diabetes team**.

#### The unconscious/incapacitated patient:

Initial treatment of hypoglycaemia should follow standard local guidelines. If hypoglycaemia is persistent then remove the cannula and pump. Once blood glucose has returned to normal, re-start insulin, either CSII if patient now alert and able to self-manage, or alternative regimen (e.g. VRIII or subcutaneous insulin); this is needed to prevent the development of ketoacidosis (DKA).

### Pump management for unconscious/incapacitated patient and in diabetic ketoacidosis

It is usually best for the person with diabetes to continue to self-manage their diabetes with the pump except:

- if unconscious, confused or incapacitated e.g. if illness/pain prevents self-management.
- if undergoing major procedures under general anaesthetic lasting >2 hours.
- in the case of diabetic ketoacidosis (DKA).

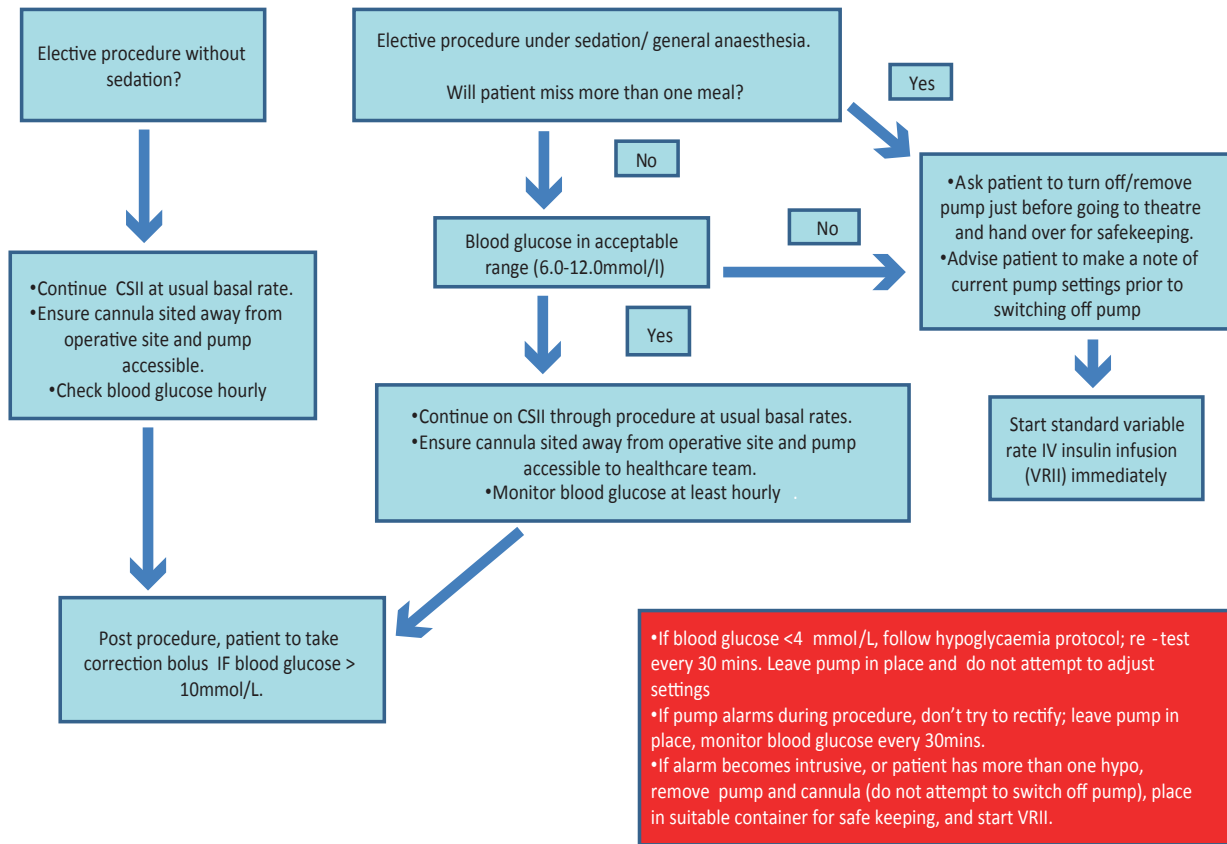
#### The unconscious or incapacitated patient

If the person with diabetes is unable to self-manage the pump (i.e. unconscious or incapacitated): remove the cannula and detach the pump. Place the pump in a safe place and document - ask a relative to take the pump home for safe keeping if possible. Immediately start alternative insulin (e.g. VRIII or subcutaneous insulin regimen) unless hypoglycaemic. If hypoglycaemic, start alternative insulin once hypoglycaemia is treated. CSII can be restarted once the person with diabetes has recovered.

#### Diabetic ketoacidosis

The altered tissue perfusion in DKA affects insulin absorption, making CSII unreliable. CSII should be temporarily discontinued in patients presenting in DKA: remove the cannula and detach the pump. For further management, follow standard DKA protocol<sup>19</sup>. CSII can be restarted once DKA has been treated. All people with diabetes should have specialist diabetes input to review CSII settings which may need adjusting to prevent subsequent DKA, and to re-enforce "sick day rules".

## Pump management for elective procedures under sedation or anaesthesia



CSII, continuous subcutaneous insulin infusion

**Please discuss all pump patients with a member of the diabetes specialist team<sup>18</sup>.**

