

**ndss**  
national diabetes services scheme



# Diabetes in hospitals

Healthcare providers guide  
to **Diabetes Management**  
for inpatients

## Why is optimal diabetes management in hospital important?

**Diabetes is a frequent co-morbidity** amongst hospital inpatients. Up to 40% of hospital patients may have diabetes. It is common for diabetes to become unstable when a patient is in hospital. Importantly, high glucose levels in hospital have been associated with **increased infection rates, poorer wound healing and increased mortality.**

Most people with diabetes are **admitted to hospital not for their diabetes, but for other conditions.** People with diabetes have **longer lengths of hospital stay**, averaging about two days longer than people without diabetes. The fact that they have longer hospital lengths of stay is an indicator that suboptimal glucose control is a significant problem. The Australian Institute of Health and Welfare estimated that the cost of diabetes to hospital services in 2008-9 was \$649M, almost doubling the figure from 2004-2005. Studies have demonstrated that when the diabetes is **promptly and appropriately managed**, hospital lengths of stay are reduced.

**Many new cases of diabetes are also detected** in hospital following routine tests. It is important to ensure that people with newly detected diabetes are appropriately managed, not just in hospital, but after discharge. In particular we need to ensure that they have the opportunity to participate in self-management, register with the NDSS, have their GP made aware of the diagnosis and involved in the ongoing management plan following hospital discharge. Appropriate management of hyperglycaemia has the potential to improve hospital and long-term outcomes.

Hyperglycaemia as an inpatient, may be due to

- pre-existing known diabetes,
- pre-existing undiagnosed diabetes,
- a consequence of acute illness (stress hyperglycaemia),
- a consequence of medical interventions (eg medications, feeding regimens, surgical procedures).



## How is hyperglycaemia in hospital best managed?

**Dietary Management** is important and consultation with a dietitian may be required, especially if there is variable intake, nausea, or the patient is in a catabolic state.

**Exercise/activity** is usually not an option for management of hospital patients.

**Oral glucose lowering agents** - can be problematic due to variable oral intake, altered drug therapies, new co-morbidities, administration of iodine contrast (in the case of metformin therapy), and altered renal and hepatic function. Consideration should be given as to whether continuation of oral diabetes therapy is appropriate.

**Insulin** – allows for dose adjustment. The patient's usual insulin regimen may be continued but dose adjustments, and/or supplemental correction insulin may be needed. Can be given as an infusion with glucose when the patient is nil by mouth.

Insulin should be charted by considering:

- Basal insulin, usually long acting, scheduled daily at bedtime, or BD if appropriate
- Mealtime insulin, usually quick/short acting scheduled for mealtimes
- Correction insulin, usually quick/short acting scheduled for mealtimes.

Oral glucose lowering agents or pre-mixed insulin can be used in certain stable hospitalised patients who are eating regularly. Supplemental correction insulin may also be written up.

**Sliding scale insulin should not be used** alone, to optimize glucose control in the inpatient general medical or surgical ward as it is a reactive, not proactive approach, and causes erratic control.

**Insulin therapy is a frequent source of prescribing error** so care must be taken in its prescription and administration.

## Glucose targets in Hospital

- Glucose targets in Hospital
- These will vary according to the age and co-morbidities of the patient.
- Most patients in general hospital wards with hyperglycaemia should be treated to **achieve and maintain glucose levels below 10mmol/L**.
- However, aiming for tight glucose control increases the risk of hypoglycaemia. **Treatment should not aim to lower the glucose levels below 5 mmol/L**.
- To help avoid hypoglycaemia **frequent glucose monitoring is recommended**.

## Changes in Oral Intake

- Diabetes therapy usually needs to change where there is a **major change in oral intake**. When a patient becomes 'Nil By Mouth', an insulin infusion may need to be commenced. Additional care must also be taken when people with diabetes are managed by Total Parenteral Nutrition (TPN) or enteral feeds.
- When patients **resume oral intake**, it is important to plan a smooth transition, whether the patient has been on an insulin/glucose infusion, enteral feeding, or TPN. It is vital that appropriate changes are made to the patient's insulin doses. Notify the Diabetes Team in advance if a patient is due to cease TPN, so insulin can be appropriately adjusted and the risk of glycaemic instability is minimised.

## Blood Glucose Testing in Hospital

- For all patients with diabetes or newly discovered hyperglycaemia scheduled regular routine point of care glucose monitoring should be performed both **pre and post meals, and occasionally overnight**. Post meal tests are typically performed 2 hours after meals. This is particularly in patients who are medically unstable, or have altered nutritional intake.

### Blood Glucose Testing:

- Alerts staff to episodes of **hyper or hypoglycaemia**,
- Is useful to exclude pre-existing diabetes,
- Guides **diabetes therapy adjustments** where a patient is known to have diabetes, or hyperglycaemia has been detected,
- Assists where the admission condition is associated with diabetes (eg AMI, stroke, PVD, sepsis),
- Assists where hospital therapies (such as glucocorticoids or octreotide, or feeding regimens such as Parenteral Nutrition, or enteral feeds) will potentially exacerbate hyperglycaemia,
- Assists where undiagnosed hyperglycaemia will worsen outcomes for the patient

For patients with longer length of stays, once normal BGL patterns have been achieved, the frequency of BGL testing can be reduced.

## Personal Insulin Pumps

In general, **Insulin Pump Therapy (IPT) should be continued** in hospital where the patient can competently and safely self-manage the pump and self-dosing. Details of pump therapy should be documented, and supported by the Diabetes Team.

IPT may be continued for short operative procedures **if those responsible for the patient's intraoperative care have experience** with its use.

### Document:

- Pump type,
- Insulin type,
- Total daily basal rate,
- Bolus settings (amount of insulin for carbohydrates).

### Ask the patient:

- what is their insulin:carb ratio, and,
- what is their insulin sensitivity factor, (amount of insulin used to correct hyperglycaemia).

The **anaesthetist should be advised** if an insulin pump is in situ.

## Diabetes and End of Life Situations

- Palliative care patients may still benefit from a level of glucose control in hospital, so diabetes treatment remains relevant.
- The level of intervention would generally be less intensive than for other hospital patients, and needs to be individualised, depending on the phase of end of life, and other situational factors.

### Key Recommendations and Practice Points

- Aim to achieve a glucose level less than 10mmol/L for most patients, but avoid reducing the glucose levels to below 5mmol/L. Check blood glucose levels frequently.
- Hypoglycaemia (BG <5 mmol/L) should be treated in accordance with your hospital hypoglycaemia protocol.
- Individualised nutritional plans should be provided as insulin therapy will depend on the nature of the feeding cycle.
- Sliding scale insulin should not be used alone to optimize glucose control in patients, including those receiving enteral or parenteral nutrition.
- Insulin therapy should include regular basal insulin (intermediate or long acting insulin) with prandial and correctional insulin if required.
- Close liaison with the dietitian or team managing the enteral or parenteral nutrition is critical. With bolus enteral or parenteral nutrition, perform BG testing before each bolus is given and every 4-6 hours.
- Patients with unstable metabolic control or variable parenteral feeding may benefit from an intravenous insulin infusion therapy.
- Contact your Diabetes Educator or Diabetes Team for advice and support.

## How can the Diabetes Team support you and your patient?

The Diabetes Team, where available, can assist in guiding ward management and transitioning of the patient to an ambulatory setting.

### Consult the team early where:

- o Insulin is started (even where it is not clear if it will be continued after discharge),
- o Patient's ability to self-manage DM has been altered,
- o New diagnosis of diabetes,
- o Unstable glucose levels,
- o Patient has Type 1 diabetes.

Early involvement of the Diabetes team can assist with

- o Stabilising diabetes,
- o Provide ward staff upskilling,
- o Facilitating early discharge,
- o Recommending management plans for community based services.

Improving glycaemic control has been shown to reduce adverse outcomes associated with hyperglycaemia.

The newer concept of a **Specialist Diabetes Inpatient Management Team** has demonstrated improved outcomes.

The Diabetes team would normally comprise a **Credentialed Diabetes Educator (CDE)** and an **Endocrinologist, or a Physician with expertise in diabetes**. The role of the team includes improving diabetes management expertise throughout the hospital, the development and implementation of diabetes management protocols, direct management of diabetes with specific referral criteria, ward liaison, troubleshooting, and management advice.



# Where can I get further information?

Improving health outcomes for people with diabetes across Australia is the objective of the National Diabetes Services Scheme (NDSS). Diabetes may be undiagnosed but still impact upon hospital episodes of care, and the following guidelines were developed in response to identified issues.

## **ADS Guidelines for Routine Glucose Control in Hospital 2012**

Provide support for hospital staff who are not diabetes specialists, in the management of diabetes in hospital, and aim for a level of national consistency.

## **ADS Peri-operative Diabetes Management Guidelines 2012**

These guidelines were developed to provide assistance for those practitioners whose primary focus is not diabetes, in their management of patients with diabetes undergoing surgical procedures.



The development of this NDSS booklet was coordinated by the Inpatient Working Party, on behalf of the Australian Diabetes Society which is an agent of the NDSS. The NDSS is an initiative of the Australian Government administered by Diabetes Australia.

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