

Guidelines for insulin management for adult diabetics with unrelated ED presentations



1. Initial assessment & BGL monitoring	3. Chart insulin	4. Insulin adjustments for hypoglycaemia
<ul style="list-style-type: none"> Take a BGL on arrival. Hypoglycaemia should be treated immediately. In non-trivial presentations, repeat BGLs should be taken at least every 2-3 hours until it is clear that the BGL is stable, then at least every 4-6 hours. In any non-trivial medical, surgical, or psychiatric presentation, diabetic ketoacidosis (DKA) or a hyperglycaemic hyperosmolar state (HHS) should be considered and excluded. DKA can occur in Type 1 or 2 diabetes, especially with intercurrent illness. 	<p>a. Basal insulin</p> <p>On the NSW Adult Subcutaneous Insulin Prescribing Chart, basal insulin should be charted for a specified time (e.g. 0800), and not “Before Breakfast” etc., as the latter might falsely imply that it is to be omitted if fasting.</p> <p>Type 1 diabetics always require basal insulin, even if they are fasting, and even if they have recently had hypoglycaemia (but see box 4). Omitting basal insulin will cause DKA. The existing basal insulin should usually be charted unchanged.</p> <p>Insulin pumps should be discussed with an endocrinologist, preferably the patient’s usual one. It may be preferred to cease using the patient’s insulin pump and instead start a constant-rate insulin infusion using an ordinary infusion pump.</p> <p>Type 2 diabetics on basal insulin will generally require this to be continued. If fasting, a somewhat reduced dose, e.g. 80% of normal, will usually be safe, but this should be increased if there is hyperglycaemia.</p> <p>b. Bolus insulin: A non-fasting diabetic should have their normal mealtime bolus insulin charted. If they are eating less than normal, the dose should be reduced accordingly.</p> <p>Fasting diabetics should have their normal mealtime bolus insulin charted and marked with a circled “F” to indicate it is being omitted due to fasting.</p> <p>In a patient using an insulin pump, it must be decided whether boluses are given by the insulin pump or by separate injection. This should be discussed with an endocrinologist.</p> <p>c. Supplemental insulin: Chart supplemental insulin on a sliding scale. A recommended sliding scale is on the back of the NSW Adult Subcutaneous Insulin Prescribing Chart. If a patient is fasting, specify that the sliding scale is to be given “q6h” and not “Before meals”. Higher sliding scale doses may be required for those who are usually on large insulin doses, e.g. more than 100 units/day in total. Note that supplemental insulin should usually be given no more than every 4-6 hours, as otherwise the doses will have an additive effect and may lead to severe hypoglycaemia.</p>	<p>a. Treat the hypoglycaemia</p> <p>Hypoglycaemia should be acutely managed as normal. A recommended algorithm is on the back of the NSW Adult Subcutaneous Insulin Prescribing Chart.</p> <p>b. Determine the cause of the hypoglycaemia</p> <p>In order to determine what adjustments should subsequently be made to insulin doses, it is necessary to determine the cause of the hypoglycaemia. If in doubt, consult an endocrinologist or general physician.</p> <p>Illness states causing hypoglycaemia: such states, e.g. sepsis or glucocorticoid deficiency, are beyond the scope of these guidelines. See box 2.</p> <p>Hypoglycaemia due to an excessive dose of bolus or supplemental insulin: if not directly due to an illness state, hypoglycaemia within 3-4 hours of a bolus or supplementary dose of insulin can be assumed to be due to it. In such cases the hypoglycaemia is unrelated to the basal insulin and the <i>basal insulin should not be reduced or withheld</i>.</p> <p>A bolus dose may simply have been too large, or the following meal may have been smaller than normal or vomited. A careful history should elucidate whether subsequent bolus doses need to be reduced.</p> <p>If hypoglycaemia follows administration of supplemental insulin, first check that the supplemental insulin has been charted and given no more frequently than every 4-6 hours. Stat doses given in addition to a sliding scale are risky and should be used with caution. If administration has been correct according to according to a sliding scale, then a sliding scale should still be continued, but re-charted with reduced doses.</p> <p>Hypoglycaemia due to excessive basal insulin: If not directly due to an illness state, hypoglycaemia while fasting, or at random sporadic times, can be ascribed to excessive basal insulin. Subsequent basal insulin doses should be reduced, but not drastically unless the hypoglycaemia was repeated or severe (in which case get expert advice). A reduction to 75-90% of the previous dose will normally be appropriate. If basal doses are being given twice daily, often only one of the doses will need to be reduced, e.g. reduce only the evening dose if hypoglycaemia occurs pre-breakfast.</p> <p>c. Continue insulin with any necessary adjustments</p> <p><i>Do not withhold insulin due to previous hypoglycaemia.</i> Any necessary adjustments to the insulin doses should be determined as described above. If an insulin dose is due during a hypoglycaemic episode, it should be delayed until the hypoglycaemia has resolved, <i>but not withheld</i>. A bolus insulin dose due during or immediately after hypoglycaemia can be reduced on a one-off basis, e.g. to 80% of normal. Do not reduce basal insulin doses unless they are causing hypoglycaemia.</p>
<p>2. Special circumstances</p> <p>These guidelines are for adult diabetic patients on insulin where it is expected that reasonable BGL control can be achieved in ED, and subsequently on a general ward, with subcutaneous insulin injections. Specific exclusions are:</p> <ul style="list-style-type: none"> DKA or HHS. See separate guidelines under References. Illness states causing hypoglycaemia, including hypermetabolic states such as sepsis, or glucocorticoid insufficiency. Other presentations, particularly with severe incurrent illness, where BGL cannot be adequately controlled without an insulin infusion. <p>Such cases are beyond the scope of these guidelines and should be discussed with an endocrinologist or general physician, and an intensivist and/or retrieval service as appropriate.</p>	<p>Dealing with pre-mixed insulin</p> <p>During fasting and/or hospital admissions, pre-mixed insulins (Mixtard® 30, NovoMix® types, Humalog® Mix types, or Humulin® 30/70) or are better replaced by separate basal and bolus injections.</p> <p>An equivalent basal-bolus regimen can be estimated as follows:</p> <ol style="list-style-type: none"> Calculate the total daily insulin dose (“total”). Estimate equivalent basal insulin as Lantus® or Levimir® doses: <ul style="list-style-type: none"> 25% of the total at 0700-0800 25% of the total at 2000-2100 Estimate equivalent bolus insulin as Novorapid® or Humalog® doses: <ul style="list-style-type: none"> 16% of the total pre-breakfast 16% of the total pre-lunch 18% of the total pre-dinner Start the revised regimen 8-14 hours after the last mixed insulin dose. If the patient has had morning mixed insulin, and does not normally take lunchtime insulin, then do not give bolus insulin with lunch on that day. 	<p>References</p> <p>NSW Adult Subcutaneous Insulin Prescribing Chart, www.aci.health.nsw.gov.au/networks/endocrine/subcut-insulin Guidelines for the Management of patients with DKA and HHS in the ED, ECI 2013, www.ecinw.com.au → Clinical Tools → Endocrine</p>
<p>Definitions</p>		
<p>Basal insulin: maintains normoglycaemia when fasting. When correctly adjusted, it is the insulin required when a patient is nil by mouth and not receiving parenteral glucose. It is given in one of three ways:</p> <ul style="list-style-type: none"> Long (or intermediate) acting insulin: types available in Australia include Lantus®, Levimir®, and various brands of isophane or “NPH”. Pre-mixed insulin: these include both long and short acting insulins. The long-acting component acts as basal insulin. Types available in Australia include Mixtard® 30/70 and 50/50, NovoMix® 30, Humalog® Mix25 and Mix50, and Humulin® 30/70. Insulin pumps: these are programmed to provide basal insulin by providing a slow continuous infusion of short acting insulin. <p>Bolus insulin: maintains normoglycaemia following a meal. It is given in one of three ways:</p> <ul style="list-style-type: none"> Short (or ultra-short) acting insulin: types available in Australia include NovoRapid®, Humalog®, Apidra®, Actrapid®, and Humulin® R. Pre-mixed insulin: these include both long and short-acting insulins. The short-acting component acts as bolus insulin. Insulin pumps: at each mealtime, the user selects a bolus dose of short acting insulin which is administered immediately. <p>Supplemental insulin: is short-acting insulin given when the BGL is high. Supplemental insulin may be given according to a sliding scale, or as one-off stat doses. Supplemental insulin should usually be given in addition to basal insulin and, unless a patient is fasting, bolus insulin. In other words, a sliding scale alone is usually not sufficient, an exception being some type 2 diabetics on low insulin doses.</p>		