This guideline does **NOT** apply to:
- Patients with Type 1 Diabetes or Diabetic Ketoacidosis (DKA).
  - [Diabetes: Type 1 Diabetes Mellitus (T1DM) and Diabetic Ketoacidosis (DKA)](https://www.osuwmc.org/)
- Post-cardiac surgery patients on 4 Ross Heart Hospital.
  - [Diabetes: 4 Ross ONLY: Type 2 Diabetes Mellitus and Other Non-Diabetes-Associated Hyperglycemia](https://www.osuwmc.org/)

If the type of diabetes is unknown, treat as type 1 diabetes.
This guideline should be used for patients with gestational diabetes requiring insulin infusion.

### Table 1. IV Insulin Infusion

<table>
<thead>
<tr>
<th>Current Glucose</th>
<th>Decreased &gt; 100 mg/dL</th>
<th>Decreased 50-100 mg/dL</th>
<th>Decreased 25-50 mg/dL</th>
<th>Increased or decreased &lt; 25 mg/dL</th>
<th>Increased 25-50 mg/dL</th>
<th>Increased &gt; 50 mg/dL</th>
</tr>
</thead>
</table>
| > 400 mg/dL     | • Contact the prescriber.  
|                 | • Increase infusion rate according to the row for 301-400 mg/dL.  
|                 | • If glucose is > 400 mg/dL and the decline in glucose is < 25 mg/dL per hour for two consecutive glucose checks, consider doubling the rate of infusion. |
| 301-400 mg/dL   | No Change | Increase infusion rate by 1 unit/hr | Increase infusion rate by 2 units/hr | Increase infusion rate by 2-3 units/hr | Increase infusion rate by 3 units/hr | Increase infusion by 4 units/hr |
| 201-300 mg/dL   | Run infusion at 75% of current rate | No Change | Increase infusion by 1 unit/hr | Increase infusion rate by 1 unit/hr | Increase infusion by 1-2 units/hr | Increase infusion by 2-3 units/hr |
| 151-200 mg/dL   | Run infusion at 50% of current rate | Decrease infusion by 1 unit/hr | No Change | Increase infusion by 0.5-1 unit/hr | Increase infusion by 1 unit/hr | Increase infusion by 1 unit/hr |
| 120-150 mg/dL   | Run infusion at 25% of current rate | Run infusion at 50% of current rate | Decrease infusion by 0-2 units/hr | No Change | No Change | Increase infusion by 0-1 unit/hr |
| 80-120 mg/dL    | Stop the infusion, contact the prescriber and recheck glucose in 15 minutes | Reduce infusion to 0-0.5 unit/hr; consider contacting prescriber | Run infusion at 25% of current rate | Run infusion at 50% of current rate | Run infusion at 75% of current rate | No Change |
| < 80 mg/dL      | • Stop infusion of insulin and contact the prescriber.  
|                 | • Double current infusion rate of dextrose solution.  
|                 | • If not receiving dextrose IV infusion, start D5W at 50 ml/hr.  
|                 | • Consider giving D50% according to the [Hypoglycemia Treatment in Non-Pregnant Adults](https://www.osuwmc.org/) guideline.  
|                 | • Recheck glucose and treat according to the Hypoglycemia Treatment in Non-Pregnant Adults guideline every 15 minutes until glucose > 80 mg/dL.  
|                 | • Resume insulin at 0.5-1 unit/hr and reduce dextrose back to previous rate when glucose > 150 mg/dL in the absence of subcutaneous basal insulin (detemir, glargine, NPH).  
|                 | • This applies to patients with type 2 diabetes or other causes of hyperglycemia. Click here to access the OSUWMC [Type 1 Diabetes Mellitus (T1DM) and Diabetic Ketoacidosis (DKA)](https://www.osuwmc.org/) guideline. |

1 Contact prescriber if rate of decline in glucose >100 mg/dL/hr. Patient may need a more rapid taper of the drip than indicated in the table above.

2 Example for 25% of current rate: 1 unit/hr (old rate) x 0.25 = 0.25 unit/hr (new rate)

3 Example for 75% of current rate: 4 units/hr (old rate) x 0.75 = 3 units/hr (new rate)
Steps for IV Insulin Infusion

1. Measure patient’s glucose q1hr.
2. Initiate insulin infusion at 2 units/hr.
3. Adjust the insulin infusion rate as directed in the table.

General Considerations for Dose Ranges

When unsure of dose within the range, use the lower infusion rate.
- More severely ill patients will generally require more insulin.
- Insulin naïve patients will generally require less insulin.
- Patients with chronically poor control generally require more insulin.
- Use the patient’s response to previous changes in insulin infusion rate to guide subsequent changes.
- If the patient is on vasopressors that are being titrated down, consider decreasing infusion by half.

If Patient Is Eating While on Insulin Infusion

- Order meal coverage with I:CHO ratio before meals SQ, but DO NOT give the correction (sliding scale) component.
- The dose should be commensurate with the estimated total daily insulin requirements from all sources (see Table 2 below); increase for patients that have a substantial increase in insulin infusion rate following meals.

Table 2. Insulin: Carb Coverage for Patients on IV Insulin Infusion

<table>
<thead>
<tr>
<th>Total Daily Dose (units)</th>
<th>Insulin: Carb (units: grams)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 20</td>
<td>1:20 (low dose)</td>
</tr>
<tr>
<td>20-40</td>
<td>1:15</td>
</tr>
<tr>
<td>41-50</td>
<td>1:10 (standard dose)</td>
</tr>
<tr>
<td>51-80</td>
<td>1:8</td>
</tr>
<tr>
<td>81-120</td>
<td>1:5 (high dose)</td>
</tr>
</tbody>
</table>

Indications for Discontinuing IV Insulin

Recommend continuing insulin infusion at least 24 hours once started.
- BG is controlled on insulin infusion with minimal rate changes for at least 6 hours
- Ideally, patient should be extubated, off vasopressors, and ready to begin oral intake

Transitioning off Intravenous Insulin Infusion

If patient requires < 1 unit/hr, patient may not need basal insulin.
- Patients may still require an oral agent if basal insulin is not needed.
- Provide correction factor + I:CHO with meals.
- Monitor glucose q1hr x4 when infusion is stopped followed by 4 times/day.

If patient requires between 1-3 unit/hr (whether patient has known diabetes):
- Patient should receive basal insulin in the hospital.
- Formulas for calculating the basal insulin dose are only valid in those who are NPO or receiving adequate SQ prandial insulin.
  - In patients with stable IV insulin requirements, multiply average insulin rate (i.e., 1 unit/hr) by 15, (1 x 15 = 15 units).
- Basal dose must be compared to home dose
- Cut infusion rate in half after the initial dose of basal insulin and wean infusion to off over at least 2 hours.
  - If glucose > 200 mg/dL within 6 hours, consider re-starting infusion guideline at lower infusion rate.
- Discontinue dextrose, if ordered, when insulin infusion is stopped.
- Glucose monitoring q1hr X 4 when insulin infusion is stopped and then qachs.

Note: If requiring > 3 units/hr or control is labile, consider DM consult for transition guidance.

If Patient Requires Tube Feeds

- Continue the IV infusion until patient reaches goal tube feed rate for at least 12-24 hours.
- If tube feeds are interrupted, the infusion should be stopped and restarted at no more than half the previous rate if the glucose subsequently exceeds 150 mg/dl. Contact the prescriber for additional dextrose order. Recommend increasing dextrose containing fluids to same rate as tube feeds were running if not contraindications.
- When transitioning to SQ insulin, the total daily scheduled dose should be calculated from 80% of the IV insulin requirements, and then administered as one-fourth long-acting basal insulin once daily and three-quarters regular insulin divided q6hr.
- IV insulin should be used with caution in patients requiring bolus tube feeds or overnight tube feeds. Subcutaneous rapid-acting insulin (aspart or lispro) may be more appropriate for bolus tube feeds, and NPH may be more appropriate for overnight tube feeds. Consider Diabetes Consultation.
Consultation

- For a **Diabetes Consult**, enter consult in IHIS.
- To speak to a **Diabetes Specialist**:
  8 a.m. – 5 p.m.:
  - OSUMC: Page 7592, 5234 or 3165
  - OSU East: Page 1821 or 2516
  5 p.m. – 8 a.m.:
  - IM Consult Serv Endocrine/Diabetes, page via WebXchange

OSUWMC Resources

Guidelines
- **Diabetes Mellitus in Non-Pregnant Adults: Inpatient Management**
- **Diabetes Mellitus in Pregnancy: Inpatient Management**
- **Perioperative / Periprocedure Glucose Management**
- **Diabetic Foot Burn Management**
- **MICU Hyperglycemia Treatment Guideline**

Other Resources
- **Clinical Nutrition- Carbohydrate Content**

References Resources


Quality Measures

- Number of episodes of > 150 mg/dl while on infusion
- Number of episodes of < 80 mg/dl while on infusion
- Average time to 150 mg/dl (hrs)
- Effective insulin therapy after infusion cessation
- Potentially ineffective insulin therapy
- Initiation of insulin if infusion rate >1 unit per hour at the time of infusion discontinuation

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