GENERAL PRINCIPLES:

1. Blood glucose (BG) goal is **100-180** in the hospitalized, non-critically ill patient (**100-140** pre-meal and < **180** for a random glucose). Consider higher targets in the elderly, frail and patients with altered sensorium.

2. Monitor BG values in patients **with known** DM: before meals and at bedtime (AC and HS) in patients who are eating and q 4-6 hours in patient who are NPO or receiving continuous enteral nutrition (EN) or parenteral nutrition (TPN).

3. Monitor BG in patients **without known** DM but who are at risk for hyperglycemia (screening glucose > 140, receiving steroids, EN or TPN). BG checks can be discontinued after 24-48 hours if all BG values are < 180.

4. In patients with DM, discontinue oral (or non-insulin injectable) hypoglycemic agents at time of admission.

5. If eating, please place diabetic patients on carbohydrate consistent (CC) diet.

6. **Discontinue the insulin infusion at least 2 hours after the first injection of basal insulin.**

7. Check HbA1C in patient with diabetes or hyperglycemia if no value in > 3 months.

8. ALWAYS GIVE basal insulin to insulin-deficient patients (T1DM and pancreatectomy patients).

9. Sliding Scale Insulin does not prevent hyperglycemia. It should not routinely be used as the sole insulin therapy in diabetic patients.

10. For diabetic patients not on insulin at home, **start basal insulin on admission if patient is NPO and BG > 140 or basal-bolus insulin if patient is eating and BG > 140** (guidelines below).

11. For patients already on insulin therapy, dose will need to be adjusted based on weight-based guidelines to avoid hypoglycemia.

12. For patients already on insulin therapy, dose will need to be adjusted based on weight-based guidelines to avoid hypoglycemia.

13. Basal insulin often requires daily adjustments, and meal-time insulin can (and should be!) adjusted meal to meal (assuming good renal function).

14. Make 10% adjustment in insulin dose if patient is close to goal and 20% adjustment if far from goal. Adjustments to basal and mealtime insulin should be made based on timing of hyperglycemia.

DISCHARGE PLANNING

Remember common contraindications to oral therapy: GFR < 30 for Metformin and Class III or IV heart failure for TZDs like Pioglitazone. SGLT-2 inhibitors (“glifozins”) and DDP4 inhibitors (“gliptins”) need to be renally adjusted.

If you think patients will go home on insulin, start insulin teaching on day 1!

Make sure the patient knows how to self-inject insulin and self-monitor blood sugars.

All patients on insulin should be prescribed: glucagon emergency kit, pen needles, lancets, glucose strips; if T1DM: add Ketone test strips (ketostix).
INSULIN FORMULATIONS

<table>
<thead>
<tr>
<th>INSULIN PREPARATION</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>BOLUS INSULIN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aspart (Novolog)</td>
<td>10-15 min</td>
<td>1-2 hours</td>
<td>3-5 hours</td>
</tr>
<tr>
<td>Lispro (Humalog)</td>
<td>10-15 min</td>
<td>1-1.5 hours</td>
<td>3-5 hours</td>
</tr>
<tr>
<td>Glulisine (Apidra)</td>
<td>5-15 min</td>
<td>1-2 hours</td>
<td>4-6 hours</td>
</tr>
<tr>
<td>Regular (Humulin R, Novolin R)</td>
<td>30-60 minutes</td>
<td>2-4 hours</td>
<td>6-8 hours</td>
</tr>
<tr>
<td>BASAL INSULIN</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glargine (Lantus, Toujeo)</td>
<td>2-3 hours</td>
<td>No peak</td>
<td>≈ 24 hours</td>
</tr>
<tr>
<td>Detemir (Levemir)</td>
<td>2-3 hours</td>
<td>No peak</td>
<td>≈ 24 hours</td>
</tr>
<tr>
<td>NPH (Humulin, Novolin)</td>
<td>2.5–3 hours</td>
<td>5-7 hours</td>
<td>13-16 hours</td>
</tr>
<tr>
<td>Degludec (Tresiba)</td>
<td>0.5 – 1.5 hours</td>
<td>9 hours</td>
<td>Up to 42 hours</td>
</tr>
</tbody>
</table>

GUIDELINE FOR INITIATING BASAL-BOLUS INSULIN (BASED ON 2012 ADA GUIDELINES)

<table>
<thead>
<tr>
<th>CLINICAL SITUATION</th>
<th>INSULIN DOSING GUIDELINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin-sensitive patients age &gt;= 70 and/or GFR &lt; 60 ml/min</td>
<td>Basal: 0.10-0.15 U/Kg daily Bolus: 0.03-0.05 U/Kg per meal TDID: 0.2-0.3 U/Kg</td>
</tr>
<tr>
<td>“Standard” T2DM patients not meeting above criteria who have BG 140-200</td>
<td>Basal: 0.20 U/Kg daily Bolus: 0.07 U/Kg per meal TDID: 0.4 U/Kg</td>
</tr>
<tr>
<td>T2DM with severe insulin resistance not meeting criteria above when BG 201-400</td>
<td>Basal: 0.25 U/Kg daily Bolus: 0.08 U/Kg per meal TDID: 0.50 U/Kg</td>
</tr>
</tbody>
</table>

TDID = Total Daily Insulin Dose

STEROID INDUCED HYPERGLYCEMIA

Hyperglycemic effect of oral prednisone occurs between 4-16 hours

1. Initiate basal bolus insulin therapy OR
2. Administer NPH insulin at the same time as the daily oral prednisone.
   a. Start 10 units of NPH in insulin sensitive patients.
   b. Start 15 units of NPH in usual or insulin resistant patients.
   c. Adjust daily based on afternoon BG values.
   d. For patients already on basal bolus insulin, above dose of NPH can be added to existing insulin regimen.

HYPERGLYCEMIA IN THE SETTING OF ENTERAL NUTRITION (EN) OR PARENTERAL NUTRITION (TPN)

1. Continuous EN or TPN
   a. Calculate the TDID (as per chart on page 2).
   b. Administer 50% of the TDID as basal insulin once daily, and the other 50% divided into equal doses as short acting insulin (Aspart q 4 hours or regular insulin q 6 hours).
   c. An alternative method is to use premixed Insulin 70/30 scheduled every 8 hours.
   d. Example: For an 80 kg male with normal renal function and BG consistently > 200 receiving continuous TPN. TDID = 40 units. Order 20 units of Glargine once daily and 5 units of Regular insulin q 6 hours OR 13 units of 70/30 insulin q 8 hours.
2. Cycled feeding
   a. Administer basal insulin in combination with short acting insulin at the time of initiation of EN.
   b. Repeat dose of the short acting insulin at intervals of 4 h (aspart) or 6 h (regular) for the duration of the EN.
   c. Give last dose of aspart 4 hours before or regular insulin 6 hours before discontinuation of the EN.
   d. Example: For an 80 kg male with normal renal function and BG consistently > 200 receiving TF from 7 pm to 7 am. TDID = 40 units. Order 20 units of Glargine once daily and 10 units of regular insulin at 7 pm and 1 am (or 7 units of Aspart at 7 pm, 11 pm and 2 am).
3. Bolus feeding
   a. Administer aspart or regular insulin before each bolus administration of EN.