# Comprehensive Type 2 Diabetes Management Algorithm

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<th>Lifestyle Therapy</th>
<th>Risk Stratification for Diabetes Complications</th>
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<tr>
<td><strong>Nutrition</strong></td>
<td>Maintain optimal weight&lt;br&gt;Calorie restriction (if BMI is increased)&lt;br&gt;Plant-based diet; high polyunsaturated and monounsaturated fatty acids</td>
</tr>
<tr>
<td><strong>Physical Activity</strong></td>
<td>150 min/week moderate exertion (eg. walking, stair climbing)&lt;br&gt;Strength training&lt;br&gt;Increase as tolerated</td>
</tr>
<tr>
<td><strong>Sleep</strong></td>
<td>About 7 hours per night&lt;br&gt;Basic sleep hygiene</td>
</tr>
<tr>
<td><strong>Behavioral Support</strong></td>
<td>Community engagement&lt;br&gt;Alcohol moderation</td>
</tr>
<tr>
<td><strong>Smoking Cessation</strong></td>
<td>No tobacco products</td>
</tr>
</tbody>
</table>
COMPLICATIONS-CENTRIC MODEL FOR CARE OF THE PATIENT WITH OVERWEIGHT/OBESITY

STEP 1
EVALUATION FOR COMPLICATIONS AND STAGING

CAR迪OMETABOLIC DISEASE | BIOMECHANICAL COMPLICATIONS

BMI < 25
NO OVERWEIGHT OR OBESITY

NO COMPLICATIONS
BMI ≥ 25
OVERWEIGHT OR OBESITY

COMPLICATIONS
BMI ≥ 25
MILD TO MODERATE
SEVERE

STAGE 0
STAGE 1
STAGE 2

STEP 2
SELECT:

Therapeutic targets for improvement in complications
+ Treatment modality
+ Treatment intensity based on staging

Lifestyle Therapy:
Physician/RD counseling, web/remote program, structured multidisciplinary program

Medical Therapy (BMI ≥ 27):
Individualize care by selecting one of the following based on efficacy, safety, and patients’ clinical profile: phentermine, orlistat, lorcaserin, phentermine/topiramate ER, naltrexone/bupropion, liraglutide 3 mg

Surgical Therapy (BMI ≥ 35):
Gastric banding, sleeve, or bypass

STEP 3
If therapeutic targets for complications not met, intensify lifestyle, medical, and/or surgical treatment modalities for greater weight loss. Obesity is a chronic progressive disease and requires commitment to long-term therapy and follow-up.
GOALS FOR GLYCEMIC CONTROL

INDIVIDUALIZE GOALS

**A1C \leq 6.5\%**
For patients without concurrent serious illness and at low hypoglycemic risk

**A1C > 6.5\%**
For patients with concurrent serious illness and at risk for hypoglycemia
**Algorithm for Adding/Intensifying Insulin**

### START BASAL (Long-Acting Insulin)

- **A1C < 8%**
  - TDD: 0.1–0.2 U/kg
- **A1C > 8%**
  - TDD: 0.2–0.3 U/kg

**Insulin titration every 2–3 days to reach glycemic goal:**
- Fixed regimen: Increase TDD by 2 U
- Adjustable regimen:
  - \(\text{FBG} > 180 \text{ mg/dL}\): add 20% of TDD
  - \(\text{FBG} 140–180 \text{ mg/dL}\): add 10% of TDD
  - \(\text{FBG} 110–139 \text{ mg/dL}\): add 1 unit
- If hypoglycemia, reduce TDD by:
  - \(\text{BG} < 70 \text{ mg/dL}\): 10% – 20%
  - \(\text{BG} < 40 \text{ mg/dL}\): 20% – 40%

**Consider discontinuing or reducing sulfonylurea after starting basal insulin (basal analogs preferred to NPH)**

**Glycemic Goal:**
- <7% for most patients with T2D; fasting and premeal \(\text{BG} < 110 \text{ mg/dL}\); absence of hypoglycemia
- A1C and FBG targets may be adjusted based on patient’s age, duration of diabetes, presence of comorbidities, diabetic complications, and hypoglycemia risk

### INTENSIFY (Prandial Control)

#### Add GLP-1 RA
- Or SGLT-2i
- Or DPP-4i

#### Add Prandial Insulin
- **Basal Plus 1, Plus 2, Plus 3**
  - Begin prandial insulin before largest meal
  - If not at goal, progress to injections before 2 or 3 meals
  - Start: 10% of basal dose or 5 units

- **Basal Bolus**
  - Begin prandial insulin before each meal
  - 50% Basal / 50% Prandial
  - TDD 0.3–0.5 U/kg
  - Start: 50% of TDD in three doses before meals

**Insulin titration every 2–3 days to reach glycemic goal:**
- Increase prandial dose by 10% or 1–2 units if 2-h postprandial or next premeal glucose consistently > 140 mg/dL
- If hypoglycemia, reduce TDD basal and/or prandial insulin by:
  - \(\text{BG} \) consistently < 70 mg/dL: 10% – 20%
  - Severe hypoglycemia (requiring assistance from another person) or \(\text{BG} < 40 \text{ mg/dL}\): 20% – 40%

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**DYSLIPIDEMIA**

**LIFESTYLE THERAPY** (Including Medically Assisted Weight Loss)

**LIPID PANEL:** Assess ASCVD Risk

**STATIN THERAPY**
If TG > 500 mg/dL, fibrates, Rx-grade omega-3 fatty acids, niacin

If statin-intolerant

- Try alternate statin, lower statin dose or frequency, or add nonstatin LDL-C-lowering therapies
- Repeat lipid panel; assess adequacy, tolerance of therapy
- Intensify therapies to attain goals according to risk levels

**RISK LEVELS**

<table>
<thead>
<tr>
<th>RISK LEVELS</th>
<th>DESIRABLE LEVELS</th>
<th>VERY HIGH</th>
<th>EXTREME</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL-C (mg/dL)</td>
<td>&lt;100</td>
<td>&lt;70</td>
<td>&lt;55</td>
</tr>
<tr>
<td>Non-HDL-C (mg/dL)</td>
<td>&lt;130</td>
<td>&lt;100</td>
<td>&lt;80</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>&lt;150</td>
<td>&lt;150</td>
<td>&lt;150</td>
</tr>
<tr>
<td>Apo B (mg/dL)</td>
<td>&lt;90</td>
<td>&lt;80</td>
<td>&lt;70</td>
</tr>
</tbody>
</table>

**IF NOT AT DESIRABLE LEVELS:**
- Intensify lifestyle therapy (weight loss, physical activity, dietary changes) and glycemic control; consider additional therapy

**TO LOWER LDL-C:**
- Intensify statin, add ezetimibe, PCSK9i, coleselam, or niacin

**TO LOWER Non-HDL-C, TG:**
- Intensify statin and/or add Rx-grade OM3 fatty acid, fibrate, and/or niacin

**TO LOWER Apo B, LDL-P:**
- Intensify statin and/or add ezetimibe, PCSK9i, coleselam, and/or niacin

**TO LOWER LDL-C in FH:**
- Statin + PCSK9i

Assess adequacy & tolerance of therapy with focused laboratory evaluations and patient follow-up

* EVEN MORE INTENSIVE THERAPY MIGHT BE WARRANTED  ** FAMILIAL HYPERCHOLESTEROLEMIA

**HYPERTENSION**

**GOAL:** SYSTOLIC <130, DIASTOLIC <80 mm Hg

**ACEi or ARB**

For initial blood pressure >150/100 mm Hg: DUAL THERAPY
- Calcium Channel Blocker
- β-blocker
- Thiazide

If not at goal (2–3 months)

- Add calcium channel blocker, β-blocker or thiazide diuretic

If not at goal (2–3 months)

- Add next agent from the above group, repeat

If not at goal (2–3 months)

- Additional choices (β-blockers, central agents, vasodilators, aldosterone antagonist)

Achievement of target blood pressure is critical
## Profiles of Antidiabetic Medications

<table>
<thead>
<tr>
<th>Category</th>
<th>MET</th>
<th>GLP-1 RA</th>
<th>SGLT-2i</th>
<th>DPP-4i</th>
<th>AGi</th>
<th>TZD (moderate dose)</th>
<th>SU</th>
<th>GLN</th>
<th>COLSVL</th>
<th>BCR-QR</th>
<th>INSULIN</th>
<th>PRAML</th>
</tr>
</thead>
<tbody>
<tr>
<td>HYPO</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate/Severe</td>
<td>Mild</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate to Severe</td>
<td>Neutral</td>
</tr>
<tr>
<td>WEIGHT</td>
<td>Slight Loss</td>
<td>Loss</td>
<td>Loss</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Gain</td>
<td>Gain</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Gain</td>
<td>Loss</td>
</tr>
<tr>
<td>RENAL / GU</td>
<td>Contraindicated if eGFR &lt; 30 mL/min/1.73 m²</td>
<td>Exenatide Not Indicated for CrCl &lt; 30</td>
<td>Genital Mycotic Infections</td>
<td>Dose Adjustment Necessary (Except Linagliptin)</td>
<td>Effective in Reducing Albuminuria</td>
<td>Neutral</td>
<td>Neutral</td>
<td>More Hypo Risk</td>
<td>Neutral</td>
<td>Neutral</td>
<td>More Hypo Risk</td>
<td>Neutral</td>
</tr>
<tr>
<td>GI Sx</td>
<td>Moderate</td>
<td>Moderate</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Mild</td>
<td>Moderate</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate</td>
</tr>
<tr>
<td>CHF</td>
<td>Neutral</td>
<td>Possible Benefit of Liraglutide</td>
<td>Possible Benefit of Empagliflozin</td>
<td>Possible Risk for Saxagliptin and Alogliptin</td>
<td>Neutral</td>
<td>Moderate</td>
<td>More CHF Risk</td>
<td>Neutral</td>
<td>Neutral</td>
<td>More CHF Risk</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>CARDIAC*</td>
<td>Neutral</td>
<td>Possible Benefit of Liraglutide</td>
<td>Possible CV Benefit</td>
<td>Possible CV Benefit</td>
<td>Neutral</td>
<td>Neutral</td>
<td>May Reduce Stroke Risk</td>
<td>?</td>
<td>Benefit</td>
<td>Safe</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>ASCVD</td>
<td>Neutral</td>
<td>Neural</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neural</td>
<td>Moderate Fracture Risk</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>BONE</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate Fracture Risk</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
<tr>
<td>KETOACIDOSIS</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Moderate Fracture Risk</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
<td>Neutral</td>
</tr>
</tbody>
</table>

- Few adverse events or possible benefits
- Use with caution
- Likelihood of adverse effects
- Uncertain effect
- FDA indication to prevent CVD death in diabetes plus prior CVD events

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