ADA Standards of Medical Care in Diabetes – 2024

January 2024 Volume 47, Supplement 1

This is not an all-inclusive list. Please refer to source document for full recommendations, including level of evidence rating

ADA, American Diabetes Association
ADA STANDARDS OF MEDICAL CARE IN DIABETES – 2024

2024 ADA: Use of Glucose-lowering medications in the management of T2D (Figure 9.3; S166)

Health lifestyle behaviors; Diabetes Self-Management Education and Support (DSMES); Social Determinants of Health (SDOH)

Goal: Cardiorenal risk reduction in high-risk patients with Type-2 diabetes (in addition to comprehensive CV risk management)*

- **ASCVD**
  - Defined differently across CVOTs but all included individuals with established CVD (e.g., MI, stroke, any revascularization procedure). Variably included: conditions such as transient ischemic attack, unstable angina, amputation, symptomatic or asymptomatic coronary artery disease.

- **Indicators of high risk**
  - While definitions vary, most comprise ≥55 years of age with two or more additional risk factors (including obesity, hypertension, smoking, dyslipidemia, or albuminuria).

- **HF**
  - Current or prior symptoms of HF with document ed HFrEF or HFrEF

- **CKD**
  - eGFR<60 mL/min per 1.73 m² OR albuminuria (ACR ≥30 mg/mmol [30mg/g]). These measurements may vary over time; thus, a repeat measure is required to document CKD

Goal: Achievement and maintenance of glycemic and weight management goals

Glycemic management: Choose approaches that provide the efficacy to achieve goals:

- Metformin OR Agents including COMBINATION therapy that provide adequate EFFICACY to achieve and maintain treatment goals.

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals.

Efficacy for glucose lowering

**High**: Dulaglutide (high dose), Semaglutide, Tirzepatide
Insulin Combination Oral, Combination injectable (GLP-1 RA/Insulin)

**Intermediate**: GLP-1 RA (not listed above), Metformin, SGLT2i, Safflurylina, T2D

**Neutral**: DPP-4i

When choosing glucose-lowering therapies: Consider regimen with high-to-very-high dual glucose and weight efficacy

- **ASCVD/Indicators of High Risk**
  - GLP-1 RA* with proven CVD benefit
  - Other CV
  - SGLT2i§ with proven CVD benefit

IF A1C above target

- For patients on a GLP-1 RA, consider incorporating SGLT2i with proven CVD benefit and vice versa
- T2D

IF additional cardiorenal risk reduction or glycemic lowering needed

- **HYF**
  - SGLT2i § with proven HF benefit in this population

- **CKD (on maximally tolerated dose of ACEi/ARB)**
  - PREFERABLY SGLT2i with primary evidence of reducing CKD progression
  - Use SGLT2i in people with an eGFR ≥60 mL/min per 1.73m²; once initiated should be continued until initiation of dialysis or transplantation
  - GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

IF A1C above target, for patients on SGLT2i, consider incorporating a GLP-1RA or vice versa

**Goal**: Achievement and maintenance of weight management goals

- Set individualized weight management goals
- General lifestyle advice: medical nutrition therapy and appropriate patterns/mix of activity
- Intensive evidence-based structured weight management program
- Consider medication for weight loss
- Consider metabolic surgery

Efficacy for weight loss

**High**: Semaglutide, Tirzepatide

**Intermediate**: GLP-1 RA (not listed above), SGLT2i

**Neutral**: DPP-4i, Metformin

When additional weight reduction is needed:

- **Very high**
  - Consider pharmaceutical agents for weight loss
  - Consider surgical options for weight loss

If A1C above target

Identify barriers to goals:

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact achievement of goals

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American Diabetes Association (ADA), Diabetes Care 2024;47(Supplement_1):S158–S178
Goal: Cardiorenal risk reduction in high-risk patients with Type-2 diabetes (in addition to comprehensive CV risk management)*

+ASCVD†

Defined differently across CVOTs but all included individuals with established CVD (e.g., MI, stroke, any revascularization procedure). Variably included: conditions such as transient ischemic attack, unstable angina, amputation, symptomatic or asymptomatic coronary artery disease.

+Indicators of high risk

While definitions vary, most comprise ≥55 years of age with two or more additional risk factors (including obesity, hypertension, smoking, dyslipidemia, or albuminuria)

+HF

Current or prior symptoms of HF with documented HFrEF or HFP EF

+CKD

eGFR < 60 mL/min per 1.73 m² OR albuminuria (ACR ≥ 3.0 mg/mmol [30 mg/g]). These measurements may vary over time; thus, a repeat measure is required to document CKD

+ASCVD/Indicators of High Risk

GLP-1 RA# with proven CVD benefit

Either / OR

SGLT2i§ with proven CVD benefit

If A1C above target

• For patients on a GLP-1 RA, consider incorporating SGLT2i with proven CVD benefit and vice versa

• TZD^

If additional cardiorenal risk reduction or glycemic lowering needed

+HF

SGLT2i § with proven HF benefit in this population

+CKD (on maximally tolerated dose of ACEi/ARB)

PREFERABLY

SGLT2i§ with primary evidence of reducing CKD progression

Use SGLT2i in people with an eGFR ≥20 mL/min per 1.73 m²; once initiated should be continued until initiation of dialysis or transplantation

GLP-1 RA with proven CVD benefit if SGLT2i not tolerated or contraindicated

If A1C above target, for patients on SGLT2i, consider incorporating a GLP-1RA or vice versa

* In people with HF, CKD, established CVD or multiple risk factors for CVD, the decision to use a GLP-1 RA or SGLT2i with proven benefit should be independent of background use of metformin; A strong recommendation is warranted for people with CVD and a weaker recommendation for those with indicators of high CV risk. Moreover, a higher absolute risk reduction and this lower number needed to treat are seen at higher levels of baseline risk and should be accounted for in the treatment decision-making process. See risk for details. + Use A1C may be better tolerated and easier to follow. # For SGLT2i, CV risk reductions trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CV.

§ For SGLT2i, CV/renal outcomes trials demonstrate their efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CVD.

# For GLP-1 RA, the EMPA-REG OUTCOME trial demonstrated the efficacy in reducing the risk of composite MACE, CV death, all-cause mortality, MI, stroke, and renal endpoints in individuals with T2D with established/high risk of CV.

Adapted from Davies et al. (84).

Goal: Achievement and maintenance of glycemic and weight management goals

**Glycemic management:** Choose approaches that provide the efficacy to achieve goals:

- Metformin OR Agent(s) including COMBINATION therapy that provide adequate efficacy to achieve and maintain treatment goals
- Prioritize avoidance of hypoglycemia in high-risk individuals

In general, higher efficacy approaches have greater likelihood of achieving glycemic goals

**Efficacy for glucose lowering**

- **Very high:** Dulaglutide (high dose), Semaglutide, Tirzepatide
- **High:** GLP-1 RA (not listed above), Metformin, SGLT2i, Sulfonylurea, TZD
- **Intermediate:** DPP-4i

**If A1C above target**

**Achievement and maintenance of weight management goals:**

- **Set individualized weight management goals**

**General lifestyle advice:**
- medical nutrition therapy/eating patterns/physical activity
- Intensive evidence-based structured weight management program
- Consider medication for weight loss
- Consider metabolic surgery

**When choosing glucose-lowering therapies:**

- Consider regimen with high-to-very-high dual glucose and weight efficacy

**Efficacy for weight loss**

- **Very high:** Semaglutide, Tirzepatide
- **High:** Dulaglutide, Liraglutide
- **Intermediate:** GLP-1 RA (not listed above), SGLT2i
- **Neutral:** DPP-4i, Metformin

**Identify barriers to goals:**

- Consider DSMES referral to support self-efficacy in achievement of goals
- Consider technology (e.g., diagnostic CGM) to identify therapeutic gaps and tailor therapy
- Identify and address SDOH that impact achievement of goals

**Health lifestyle behaviors; Diabetes Self-Management Education and Support (DSMES); Social Determinants of Health (SDOH)**

**TO AVOID THERAPEUTIC INERTIA REASSESS AND MODIFY TREATMENT REGULARLY (3-6 MONTHS)**

*ATC, glycated hemoglobin; CGM, continuous glucose monitoring; DPP-4i, dipeptidyl peptidase 4 inhibitor; GLP-1 RA, glucagon-like peptide 1 receptor agonist; SDOH, social determinants of health; SGLT2i, sodium-glucose cotransporter 2 inhibitor; T2D, type 2 diabetes; TZD, thiazolidinedione.*

Adapted from Davies et al. (84).

American Diabetes Association (ADA). Diabetes Care 2024;47(Supplement_1):S158–S178

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Use Principles in Figure 9.3 including reinforcement of behavioral interventions (weight management and physical activity) and provision of DSMES to meet individualized treatment goals

If injectable therapy is needed to reduce A1C

Consider GLP-1 RA or dual GIP and GLP-1 RA in most individuals prior to insulin

INITIATION: Initiate appropriate starting dose for agent selected (varies within class)

TITRATION: Titration to maintenance dose (varies within class)

If above A1C target

Add basal insulin

Choice of basal insulin should be based on patient-specific considerations, including cost. Refer to Table 9.4 for insulin cost information. Consider prescription of glucagon for emergent hypoglycemia.

Add basal analog or bedtime NPH insulin

INITIATION: Start 10 units a day OR 0.1-0.2 units /kg per day

TITRATION:
- Set FPG target (see Section 6: Glycemic Targets)
- Choose evidence-based titration algorithm, e.g., increase 2 units every 3 days to reach FPG target without hypoglycemia
- For hypoglycemia determine cause, if no clear reason lower dose by 10-20%

Assess adequacy of basal insulin dose

Consider clinical signals to evaluate for overbasalization and need to consider adjunctive therapies (e.g., basal dose more than ~0.5 units/kg/day, elevated bedtime-morning and/or post-prandial differential, hypoglycemia [aware or unaware], high variability)

1. Consider insulin as the first injectable if evidence of ongoing catabolism, symptoms of hyperglycemia are present, when A1C levels (>10% [86 mmol/mol]) or blood glucose levels (300 mg/dL [16.7 mmol/L]) are very high, or a diagnosis of type 1 diabetes is a possibility.
2. When selecting GLP-1 RA, consider: patient preference, A1C lowering, weight-lowering effect, or frequency of injection. If CVD, consider GLP-1 RA with proven CVD benefit. Oral or injectable GLP-1 RA are appropriate.
3. For patients on GLP-1 RA and basal insulin combination, consider use of a fixed-ratio combination product (IDegLira or iGlarLixi).
4. Consider switching from evening NPH to a basal analog if the patient develops hypoglycemia and/or frequently forgets to administer NPH in the evening and would be better managed with an A.M. dose of a long-acting basal insulin.

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### 2024 ADA: Algorithm for intensifying to injectable therapies (Figure 9.4; S171) (2/2)

If above A1C target and not already on a GLP-1 RA or dual GIP and GLP-1 RA, consider these classes, either in free combination or fixed-ratio combination, with insulin.

- **Add prandial insulin**: Usually one dose with the largest meal or meal with greatest PPG excursion; prandial insulin can be dosed individually or mixed with NPH as appropriate
  - **INITIATION**:
    - 4 units a day or 10% of basal insulin dose
    - If A1C <6% (64 mmol/mol) consider lowering the basal dose by 4 IU a day or 10% of basal dose
  - **TITRATION**:
    - Increase dose by 1-2 units or 10-15% twice weekly
    - For hypoglycemia determine cause, if no clear reason lower corresponding dose by 10-20%

If on bedtime NPH, consider converting to twice-daily NPH regimen

- **Conversion based on individual needs and current glycemic control.** The following is one possible approach:
  - **INITIATION**:
    - Total dose = 80% of current bedtime NPH dose
  - **TITRATION**:
    - 1/3 given at bedtime
    - Titrated based on individualized needs

If above A1C target

**Consider self-mixed/split insulin regimen**

- **INITIATION**:
  - Add prandial insulin: Usually one dose with the largest meal or meal with greatest PPG excursion; prandial insulin can be dosed individually or mixed with NPH as appropriate
  - 4 units a day or 10% of basal insulin dose
  - If A1C <6% (64 mmol/mol) consider lowering the basal dose by 4 IU a day or 10% of basal dose
- **TITRATION**:
  - Increase dose by 1-2 units or 10-15% twice weekly
  - For hypoglycemia determine cause, if no clear reason lower corresponding dose by 10-20%

**Consider twice daily premix insulin regimen**

- **INITIATION**:
  - Usually unit per unit at the same total insulin dose, but may require adjustment to individual needs
  - **TITRATION**:
    - Titrated based on individualized needs

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5. If adding prandial insulin to NPH, consider initiation of a self-mixed or premixed insulin regimen to decrease the number of injections required.

A1C, glycated hemoglobin; FPG, fasting plasma glucose; GLP-1 RA, glucagon-like peptide 1 receptor agonist; GIP, glucose-dependent insulinotropic peptide; NPH, Neutral Protamine Hagedorn; PPG, postprandial glucose

2024 ADA: Management of new onset diabetes in youth with overweight or obesity with clinical suspicion of T2D (Figure 14.1; S270)

Initiate lifestyle management and diabetes education

- **A1C <8.5%**
  - No acidosis or ketosis
  - Metformin
    - Titrate up to 2000 mg per day as tolerated
  - Continue or start metformin
    - If on insulin, titrate guided by glucose values
  - A1C goals not met
    - Continue metformin
      - Consider adding GLP-1 RA or SGLT2i approved for youth with T2D
      - Titrate/initiate insulin therapy; if using long-acting insulin only and glycemic target not met with escalating doses, then add prandial insulin; total daily insulin dose may exceed 1 unit/kg/day

- **A1C ≥8.5%**
  - No acidosis with or without ketosis
  - Metformin
    - Titrate up to 2000 mg per day as tolerated
    - Long-acting insulin: start at 0.5 units/kg/day and titrate every 2-3 days based on BGM
  - Acidosis and/or DKA and/or HHNK
    - Manage DKA or HHNK
      - i.v insulin until acidosis resolves, then subcutaneous, as for type 1 diabetes until antibodies are known
    - Continue or initiate MDI insulin or pump therapy, as for type 1 diabetes
    - Discontinue metformin

**Pancreatic autoantibodies**

- **NEGATIVE**
  - No acidosis with or without ketosis
  - Metformin
    - Titrate up to 2000 mg per day as tolerated
    - Long-acting insulin: start at 0.5 units/kg/day and titrate every 2-3 days based on BGM

- **POSITIVE**
  - Acidosis and/or DKA and/or HHNK
    - Manage DKA or HHNK
      - i.v insulin until acidosis resolves, then subcutaneous, as for type 1 diabetes until antibodies are known
    - Continue or initiate MDI insulin or pump therapy, as for type 1 diabetes
    - Discontinue metformin

A1C 8.5% = 69 mmol/mol. Adapted from the ADA position statement Evaluation and Management of Youth-Onset Type 2 Diabetes.

BGM, blood glucose monitoring; CGM, continuous glucose monitoring; DKA, diabetic ketoacidosis; HHNK, hyperosmolar hyperglycemic nonketotic syndrome; i.v, intravenous; MDI, multiple daily injections; SGLT2i, sodium-glucose co-transporter 2 inhibitor.

American Diabetes Association (ADA). Diabetes Care 2024;47(Supplement_1):S258–S281
2024 ADA: A proposed algorithm for risk stratification in individuals with nonalcoholic fatty liver disease (NAFLD) or nonalcoholic steatohepatitis (NASH). *(Figure 4.2; S67)*

**Diagram:**
- **Noninvasive testing for fibrosis (FIB-4)**
  - **Low Risk**
    - Repeat in 2-3 years
  - **Indeterminate Risk**
  - **High Risk**
    - Vibration-controlled transient elastography or ELF blood tests
      - **Low Risk**
        - Repeat in 2-3 years
      - **High Risk**
        - Refer to a gastroenterologist or hepatologist

*ELF, enhanced liver fibrosis; FIB-4, fibrosis 4 index* Adapted from Kanwal et al (174)

American Diabetes Association (ADA). Diabetes Care 2024;47(Supplement_1):S52–S76
Flowchart for investigation of suspected type 1 diabetes in newly diagnosed adults, based on data from White European populations (Fig. 2.1; S25)

1No single clinical feature confirms T1D in isolation. 2Glutamic acid decarboxylase (GAD) should be the primary antibody measured and, if negative, should be followed by islet tyrosine phosphatase 2 (IA-2) and/or zinc transporter 8 (ZnT8) where these tests are available. In individuals who have not been treated with insulin, antibodies against insulin may also be useful. In those diagnosed at <35 years of age who have no clinical features of T2D or monogenic diabetes, a negative result does not change the diagnosis of T1D, since 5–10% of people with T1D do not have antibodies. 3Monogenic diabetes is suggested by the presence of one or more of the following features: A1C >8 mmol/mol (>7.5%) at diagnosis, one parent with diabetes, features of a specific monogenic cause (e.g., renal cysts, partial lipodystrophy, maternally inherited deafness, and severe insulin resistance in the absence of obesity), and monogenic diabetes prediction model probability >5% (diabetesgenes.org/exter-diabetes-agg/Mody/Calculators). 4A C-peptide test is only indicated in people receiving insulin treatment. A random sample (with concurrent glucose) within 5 h of eating can replace a formal C-peptide stimulation test in the context of classification. If the result is ≥600 pmol/L (≥1.8 ng/mL), the circumstances of testing do not matter. If the result is <600 pmol/L (<1.8 ng/mL) and the concurrent glucose is <4 mmol/L (<70 mg/dL) or the person may have been fasting, consider repeating the test. Results ≥0.24 ng/mL do not need to be repeated. Where a person is insulin treated, C-peptide must be measured prior to insulin discontinuation to exclude severe insulin deficiency. Do not test C-peptide within 2 weeks of a hyperglycemic emergency. Features of type 2 diabetes include increased BMI (≥25 kg/m2), absence of weight loss, absence of ketoacidosis, and less marked hyperglycemia. Less discriminatory features include non-White ethnicity, family history, longer duration and milder severity of symptoms prior to presentation, features of the metabolic syndrome, and absence of a family history of autoimmunity. 5If genetic testing does not confirm monogenic diabetes, the classification is unclear and a clinical decision should be made about treatment. 7T2D should be strongly considered in older individuals. In some cases, investigation for pancreatic or other types of diabetes may be appropriate. 8A person with possible T1D who is not treated with insulin will require careful monitoring and education so that insulin can be rapidly initiated in the event of glycaemic deterioration. C-peptide values 200–600 pmol/L (0.6–1.8 ng/mL) are usually consistent with T1D or maturity-onset diabetes of the young but may occur in insulin-treated T2D, particularly in people with normal or low BMI or after long duration. Reprinted and adapted from Holt et al. Diabetes Care. 2021; 44:2589-2625.
Holistic approach for improving outcomes in patients with diabetes and CKD (Fig. 11.2; S225)

LIFESTYLE
- Healthy diet
- Physical activity
- Smoking cessation
- Weight management

FIRST-LINE DRUG THERAPY
- SGLT-2i (initiate eGFR ≥20; continue until dialysis or transplant)
- Metformin (if eGFR ≥30)
- RAS inhibitor at a maximum tolerated dose (if HTN*)
- Moderate- or high-intensity statin

ADDITIONAL RISK BASED THERAPY
- GLP-1 RA if needed to achieve individualized glycemic target
- Nonsteroidal MRA † if ACR ≥30 mg/g and normal potassium
- Dihydropyridine CCB and/or diuretic* if needed to achieve individualized BP target
- Steroidal MRA if needed for resistant hypertension if eGFR ≥45

Other glucose-lowering drugs if needed to achieve individualized glycemic target

Regular risk factor assessment (every 3–6 months)

*ACEi or ARB (at maximal tolerated doses) should be first-line therapy HTN when albuminuria is present. Otherwise, CCB or diuretic can also be considered; all 3 classes are often needed to attain BP targets. eGFR is presented in units of mL/min/1.73m²
†Finerenone is currently the only ns-MRA with proven clinical kidney and cardiovascular benefits.

Diabetes Care 2024;47(Supplement_1):S219–S230; Reprinted from de Boer et al. (1)
Decision cycle for person-centered glycemic management in T2D (Fig. 4.1; S53)

Review and agree on management plan
- Review management plan
- Mutually agree on changes
- Ensure agreed modification of therapy is implemented in a timely fashion to avoid therapeutic inertia
- Decision cycle undertaken regularly (at least once/twice a year)
- Operate in an integrated system of care

Provide ongoing monitoring and support of
- Emotional well-being
- Lifestyle and health behaviors
- Tolerability of medication
- Biofeedback including BGM/CGM, weight, step count, HbA1c blood pressure, lipids

Implement management plan
- Ensure there is regular review: more frequent contact initially is often desirable for DSMES

Agree on management plan
Specify SMART goals:
- Specific
- Measurable
- Achievable
- Realistic
- Time limited

Assess key patient characteristics
- The individual's priorities
- Current lifestyle and health behaviors
- Comorbidities, i.e., CVD, CKD, HF
- Clinical characteristics, i.e., age, HbA1c, weight
- Issues such as motivation, cognition, depression
- Social determinants of health

Consider specific factors that impact choice of treatment
- Individualized glycemic and weight goals
- Impact on weight, hypoglycemia and cardiorenal protection
- Underlying physiological factors
- Side effect profile of medication
- Complexity of regimen, i.e., frequency, mode of administration
- Regimen choice to optimize medication use and reduce treatment discontinuation
- Access, cost, availability of medication and lifestyle choices

Utilize shared decision making to create a management plan
- Ensures access to DSMES
- Involves an educated and informed patient (and the individual's family/caregiver)
- Explore personal preferences
- Language matters (include person-first, strengths based, empowering language
- Includes motivational interviewing, goal setting, and shared decision making

Goals of Care
- Prevent complications
- Optimize quality of life

Standards of Care in Diabetes - 2024: Diabetes Care, December 2023, Vol.47, Supplement 1; Figure 4.1