

AMERICAN ASSOCIATION OF CLINICAL ENDOCRINOLOGISTS  
AMERICAN COLLEGE OF ENDOCRINOLOGY

AACE/ACE COMPREHENSIVE  
**TYPE 2 DIABETES**  
MANAGEMENT ALGORITHM

2019

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## COMPREHENSIVE TYPE 2 DIABETES MANAGEMENT ALGORITHM

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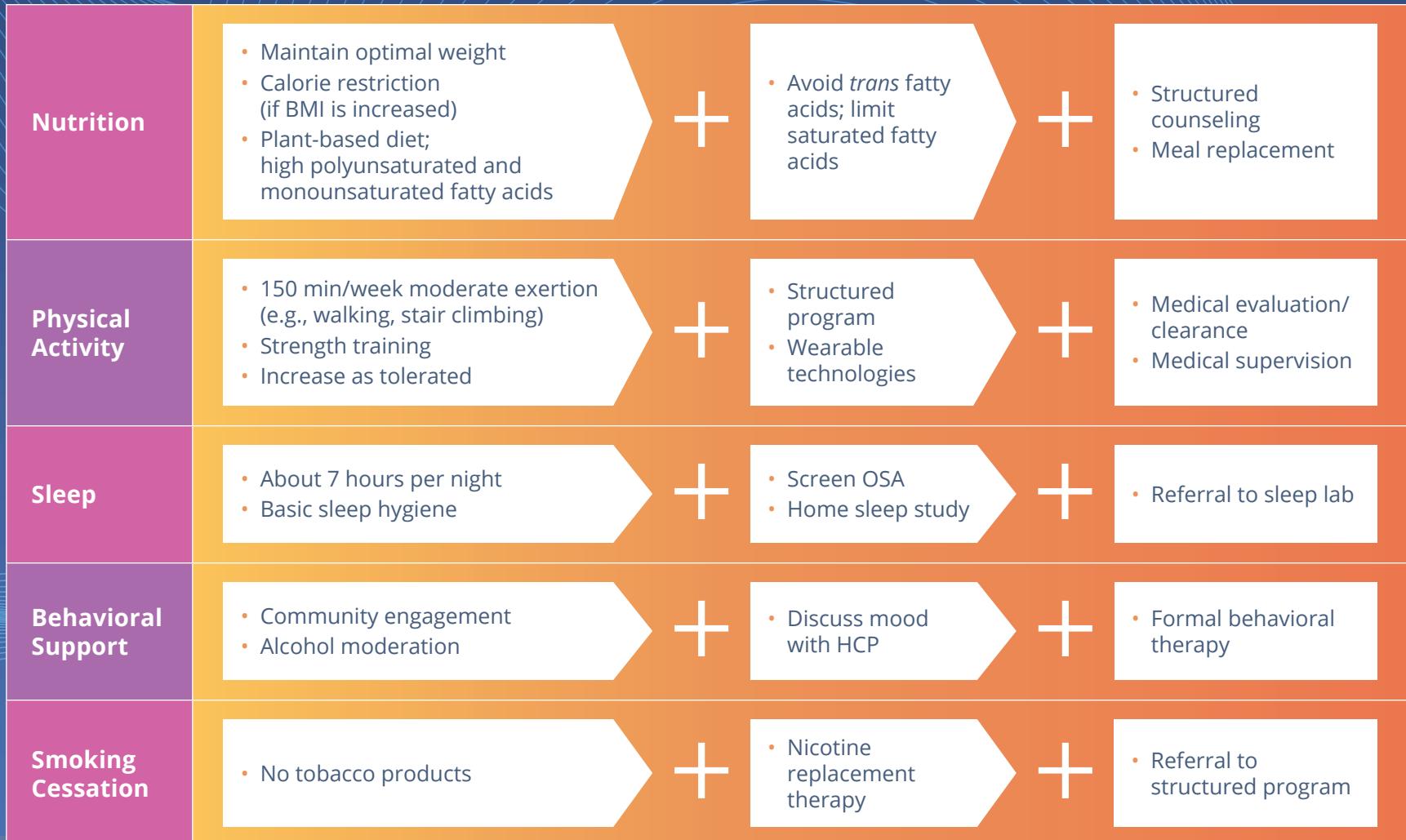
# PRINCIPLES OF THE AACE/ACE COMPREHENSIVE TYPE 2 DIABETES MANAGEMENT ALGORITHM

1.	Lifestyle modification underlies all therapy (e.g., weight control, physical activity, sleep, etc.)
2.	Avoid hypoglycemia
3.	Avoid weight gain
4.	Individualize all glycemic targets (A1C, FPG, PPG)
5.	Optimal A1C is $\leq 6.5\%$ , or as close to normal as is safe and achievable
6.	Therapy choices are affected by initial A1C, duration of diabetes, and obesity status
7.	Choice of therapy reflects cardiac, cerebrovascular, and renal status
8.	Comorbidities must be managed for comprehensive care
9.	Get to goal as soon as possible—adjust at $\leq 3$ months until at goal
10.	Choice of therapy includes ease of use and affordability
11.	A1C $\leq 6.5\%$ for those on any insulin regimen as long as CGM is being used

# LIFESTYLE THERAPY

## RISK STRATIFICATION FOR DIABETES COMPLICATIONS

### INTENSITY STRATIFIED BY BURDEN OF OBESITY AND RELATED COMPLICATIONS



# COMPLICATIONS-CENTRIC MODEL FOR CARE OF THE PATIENT WITH OVERWEIGHT/OBESITY

## STEP 1

### EVALUATION FOR COMPLICATIONS AND STAGING

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.

# PREDIABETES ALGORITHM

IFG (100-125) | IGT (140-199) | METABOLIC SYNDROME (NCEP 2001)

## LIFESTYLE THERAPY

(Including Medically Assisted Weight Loss)

### TREAT ASCVD RISK FACTORS

### WEIGHT LOSS THERAPIES

### TREAT HYPERGLYCEMIA

FPG >100 | 2-hour PG >140

### ASCVD RISK FACTOR MODIFICATIONS ALGORITHM

DYSLIPIDEMIA ROUTE

HYPERTENSION ROUTE

### NORMAL GLYCEMIA

Progression

### OVERT DIABETES

### 1 PRE-DM CRITERION

### MULTIPLE PRE-DM CRITERIA

Intensify Weight Loss Therapies

Low-risk Medications

Metformin

Acarbose

Consider with Caution

TZD

GLP-1RA

### LEGEND

Orlistat, lorcaserin, phentermine/topiramate ER, naltrexone/bupropion, liraglutide 3 mg, or bariatric surgery as indicated for obesity treatment

PROCEED TO GLYCEMIC CONTROL ALGORITHM

If glycemia not normalized

# ASCVD RISK FACTOR MODIFICATIONS ALGORITHM

## 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	HIGH	VERY HIGH	EXTREME
	DESIRABLE LEVELS	DESIRABLE LEVELS	DESIRABLE LEVELS
LDL-C (mg/dL)	<100	<70	<55
Non-HDL-C (mg/dL)	<130	<100	<80
TG (mg/dL)	<150	<150	<150
Apo B (mg/dL)	<90	<80	<70

If not at desirable levels:

Intensify lifestyle therapy (weight loss, physical activity, dietary changes) and glycemic control; consider additional therapy

To lower LDL-C:

To lower Non-HDL-C, TG:

To lower Apo B, LDL-P:

To lower LDL-C in FH:\*\*

Intensify statin, add ezetimibe, PCSK9i, colesevelam, or niacin  
 Intensify statin and/or add Rx-grade OM3 fatty acid, fibrate, and/or niacin  
 Intensify statin and/or add ezetimibe, PCSK9i, colesevelam, and/or niacin  
 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**

ACEi or ARB	+	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 (α-blockers, central agents, vasodilators, aldosterone antagonist)

**Achievement of target blood pressure is critical**

# GLYCEMIC CONTROL ALGORITHM

INDIVIDUALIZE GOALS

**A1C ≤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

## LIFESTYLE THERAPY (Including Medically Assisted Weight Loss)

Entry A1C <7.5%

Entry A1C ≥7.5%

Entry A1C >9.0%

### MONOTHERAPY<sup>1</sup>

✓ Metformin
✓ GLP1-RA <sup>2,3</sup>
✓ SGLT2i <sup>2,3</sup>
✓ DPP4i
⚠ TZD
✓ AGi
⚠ SU/GLN

If not at goal in 3 months proceed to Dual Therapy

### DUAL THERAPY<sup>1</sup>

<b>MET</b> or other 1st-line agent	✓ GLP1-RA <sup>2,3</sup>
+ TZD	✓ SGLT2i <sup>2,3</sup>
+ Basal Insulin	✓ DPP4i
+ Colesevelam	⚠ TZD
+ Bromocriptine QR	✓ Basal Insulin
+ AGi	✓ DPP4i
+ SU/GLN	⚠ Colesevelam

If not at goal in 3 months proceed to Triple Therapy

### TRIPLE THERAPY<sup>1</sup>

<b>MET</b> or other 1st-line agent + 2nd-line agent	✓ GLP1-RA <sup>2,3</sup>
+ TZD	✓ SGLT2i <sup>2,3</sup>
+ Basal Insulin	⚠ TZD
+ DPP4i	✓ DPP4i
+ Colesevelam	✓ Colesevelam
+ Bromocriptine QR	✓ Bromocriptine QR
+ AGi	✓ AGi
+ SU/GLN	⚠ SU/GLN

If not at goal in 3 months proceed to or intensify insulin therapy

### SYMPTOMS

NO

YES

DUAL Therapy

INSULIN ± Other Agents

TRIPLE Therapy

### ADD OR INTENSIFY INSULIN

Refer to Insulin Algorithm

### LEGEND

- ✓ Few adverse events and/or possible benefits
- ⚠ Use with caution

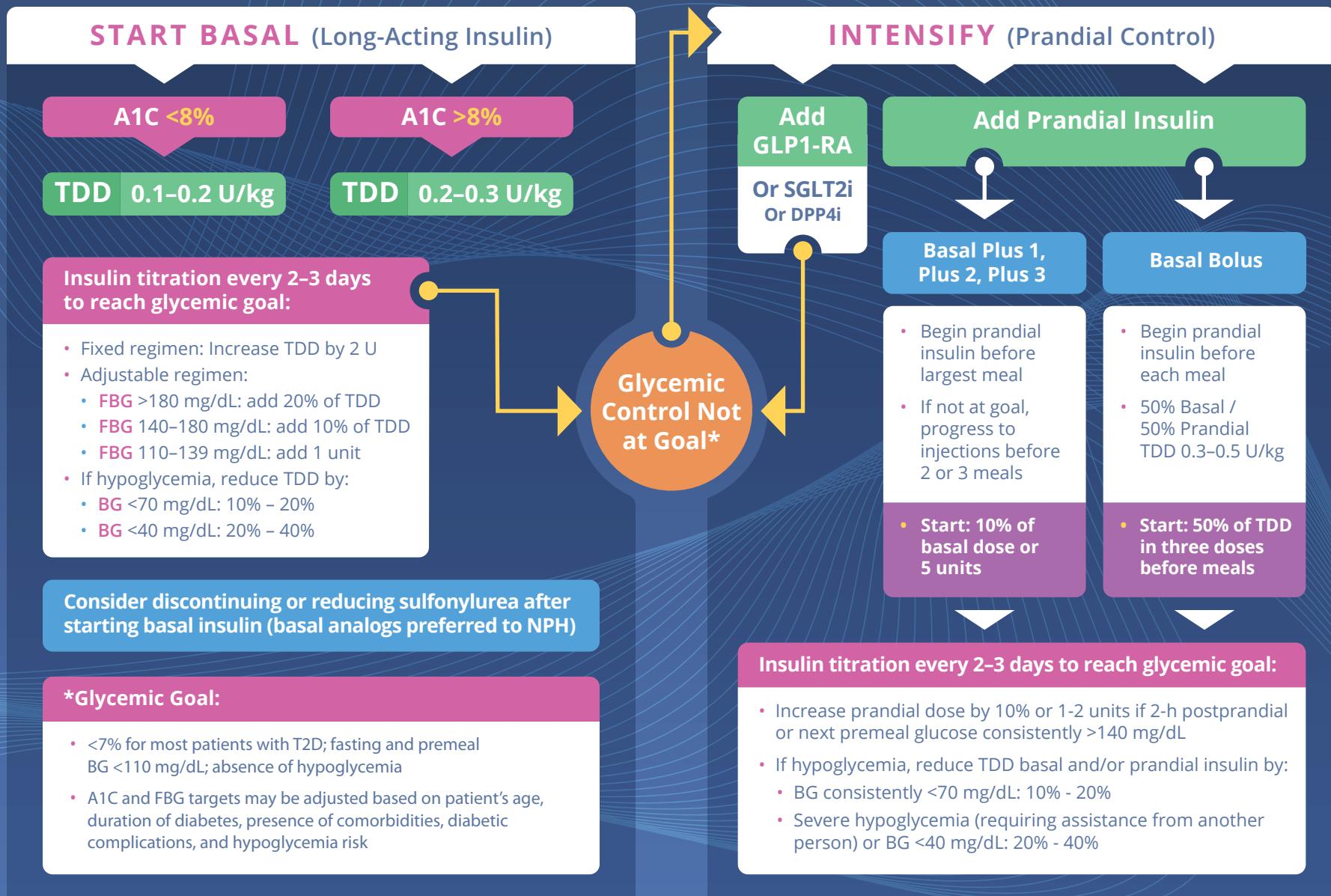
<sup>1</sup> Order of medications represents a suggested hierarchy of usage; length of line reflects strength of recommendation

<sup>2</sup> Certain GLP1-RAs and SGLT2is have shown CVD and CKD benefits—preferred in patients with those complications

<sup>3</sup> Include one of these medications if CHD present

PROGRESSION OF DISEASE

# ALGORITHM FOR ADDING/INTENSIFYING INSULIN



# PROFILES OF ANTIDIABETIC MEDICATIONS

	MET	GLP1-RA	SGLT2i	DPP4i	AGi	TZD (moderate dose)	SU GLN	COLSVL	BCR-QR	INSULIN	PRAML
HYPOTHYROIDISM	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Moderate/ Severe  Mild	Neutral	Neutral	Moderate to Severe	Neutral
WEIGHT	Slight Loss	Loss	Loss	Neutral	Neutral	Gain	Gain	Neutral	Neutral	Gain	Loss
RENAL / GU	Contraindicated if eGFR <30 mL/min/1.73 m <sup>2</sup>	Exenatide Not Indicated CrCl <30	Not Indicated for eGFR <45 mL/min/1.73 m <sup>2</sup>	Dose Adjustment Necessary (Except Linagliptin)  Effective in Reducing Albuminuria	Neutral	Neutral	More Hypo Risk	Neutral	Neutral	More Hypo Risk	Neutral
			Genital Mycotic Infections								
	Possible Benefit of Liraglutide	Possible CKD Benefit									
GI SIDE EFFECTS	Moderate	Moderate	Neutral	Neutral	Moderate	Neutral	Neutral	Mild	Moderate	Neutral	Moderate
CHF	Neutral	See #1	See #2	See #3	Neutral	Moderate	Neutral	Neutral	Neutral	CHF Risk	Neutral
CARDIAC ASCVD						May Reduce Stroke Risk	Possible ASCVD Risk	Benefit	Safe	Neutral	
BONE	Neutral	Neutral	Neutral	Neutral	Neutral	Moderate Fracture Risk	Neutral	Neutral	Neutral	Neutral	Neutral
KETOACIDOSIS	Neutral	Neutral	DKA Can Occur in Various Stress Settings	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

  Few adverse events or possible benefits

  Use with caution

  Likelihood of adverse effects

1. Liraglutide—FDA approved for prevention of MACE events.
2. Empagliflozin—FDA approved to reduce CV mortality. Canagliflozin—FDA approved to reduce MACE events.
3. Possible increased hospitalizations for heart failure with alogliptin and saxagliptin.

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