GOBIERNO DE PUERTO RICO

Departamento de Salud

Quick Clinical Reference Guidelines for Asthma, Diabetes, Hypertension, Obesity, and Metabolic Syndrome

Puerto Rico Department of Health, Health Promotion Secretariat,
Chronic Disease Prevention and Control Division

Disclaimer: These guidelines are intended for use only as a tool to assist a clinician/healthcare professional and should not be used to replace clinical judgment.

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Classification and Stepwise Treatment of Asthma

In asthma, the classification of severity or level of control is based on the most severe impairment or risk category in which any feature occurs. Asthma severity is the intrinsic intensity of the disease process and dictates which step to initiate treatment. Asthma control is the degree to which the goals of therapy are met (e.g., prevent symptoms/exacerbations; maintain normal lung function and activity levels). Assess impairment domain by patient's recall of previous 2–4 weeks and/or by spirometry or peak flow measures. Symptom assessment for longer periods should reflect a global assessment, such as inquiring whether the patient's asthma is better or worse since last visit.

For usual dosages of asthma medications, refer to pages 46–52 of the EPR–3 Summary Report 2007 (NIH Publication Number 08-5846). The full guidelines, summary report, evidence tables, and links to other relevant resources are all available on the NHLBI website: http://www.nhlbi.nih.gov/guidelines/asthma/index.htm.

Adapted from 2007 NHLBI Guidelines for the Diagnosis and Treatment of Asthma Expert Panel Report 3 and the University of Michigan Health System (UMHS) Clinical Care Guidelines on Asthma reviewed by the UMHS Asthma Quality Improvement Steering Committee on 06/30/2008

Components of SEVERITY		Age (Years)	Classification of Asthma SEVERITY (Intermittent vs. Persistent)			
			Intermittent	Persistent		
				Mild	Moderate	Severe
Impairment	Symptoms	All	≤ 2 days/week	> 2 days/week but not daily	Daily	Throughout the day
	Nighttime awakenings	0 – 4	0	1–2x/month	3–4x/month	> 1x/week
		≥ 5	≤ 2x/month	3–4x/month	> 1x/week but not nightly	Often 7x/week
	SABA use for symptom control	All	≤ 2 days/week	> 2 days/week but not daily	Daily	Several times a day
	Interference with normal activity	All	None	Minor limitation	Some limitation	Extremely limited
	Lung function:					
	FEV1 (predicted) or PEF (personal best)	≥ 5	Normal FEV1 between exacerbations > 80%	> 80%	60–80%	< 60%
	FEV1/FVC	5 – 11	> 85%	> 80%	75–80%	< 60%
		≥ 12	Normal	Normal	Reduced 5%	Reduced > 5%
Risk	Exacerbations requiring oral corticosteroids	0 – 4	≤ 1x/year	≥ 2x in 6 months or ≥ 4 wheezing episodes/year lasting > 1 day AND risk factors for persistent asthma		
		5 – 11		≥ 2x/year		
		≥ 12		for patients in any severity category. Relative annual risk of exacerbations may be related to FEV1		
Recommended step for starting treatment		0 – 4	Step 1	Step 2	Step 3	Step 3
		5 – 11				Step 3 or 4
		≥ 12				Step 4 or 5
		All			Consider short course of oral corticosteroids	
		All	In 2–6 weeks, evaluate level of asthma control that is achieve and adjust therapy accordingly. For children 0–4 years old, if no clear benefit is observed in 4–6 weeks, stop treatment and consider alternative diagnosis or adjusting therapy.			

FEV1, forced expiratory volume in 1 second; FVC, forced vital capacity; PEF, peak expiratory flow; SABA, short-acting beta2-agonist

Components of CONTROL		Age (Years)	Level of Asthma CONTROL		
			Well Controlled	Not Well Controlled	Very Poorly Controlled
Impairment	Symptoms	0 – 4	≤ 2 days/week but ≤ 1x/day	> 2 days/week or multiple times on ≤ 2 days/week	Throughout the day
		5 – 11			
		≥ 12	≤ 2 days/week	> 2 days/week	
	Nighttime awakenings	0 – 4	≤ 1x/month	> 1x/month	> 1x/week
		5 – 11		≥ 2x/month	≥ 2x/week
		≥ 12	≤ 2x/month	1–3x/week	≥ 4x/week
	Interference with normal activity	All	None	Some limitation	Extremely limited
	SABA use for symptoms	All	≤ 2 days/week	> 2 days/week	Several times per day
	Lung function				
	FEV1 (predicted) or PEF (personal best)	≥ 5	> 80%	60-80%	< 60%
	FEV1/FVC	5 – 11	> 80%	75-80%	< 75%
	Validated questionnaires				
	ATAQ	≥ 12	0	1–2	3–4
	ACQ	≥ 12	≤ 0.75	≥ 1.5	n/a
	ACT	≥ 12	≥ 20	16–19	≤ 15
Risk	Exacerbations requiring oral corticosteroids	0 – 4	≤ 1x/year	2-3x/year	> 3x/year
		5 – 11		≥ 2x/year Consider severity and interval since last exacerbation	
		≥ 12			
	Reduction in lung growth	5 – 11	Evaluation requires long-term follow-up care		
	Loss of lung function	≥ 12	Evaluation requires long-term follow-up care		
	Treatment-related adverse effects	All	Medication side effects can vary in intensity from none to very troublesome and worrisome.		
Recommended treatment actions		All	Maintain current step; regular follow-up at every 1–6 months; consider stepping down if well controlled for ≥ 3 months	Step up 1 step	Step up 1–2 steps and consider short course of oral
				Before stepping up, review adherence to medication, inhaler technique, environmental control, and comorbid conditions. If an alternative treatment option was used in a step, discontinue and use the preferred treatment for that step.	
				Reevaluate the level of asthma control in 2–6 weeks and adjust therapy	
				For side effects, consider alternative treatment options.	

Stepwise Approach for Managing Asthma Long Term (0 – 11 years of age)

		Step UP if needed (first check inhaler technique, adherence, environmental control, and comorbid conditions) ASSESS CONTROL Step DOWN if possible (and asthma is well controlled for at least 3 months)					
		Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
0 – 4 Years		**Intermittent Asthma**	**Persistent Asthma: Daily Medication** Consult with asthma specialist if step 3 care or higher is required. Consider consultation at step 2.				
	Preferred	SABA as needed	Low-dose ICS	Medium-dose ICS	Medium-dose ICS + LABA *or* montelukast	High-dose ICS + LABA *or* montelukast	High-dose ICS + Oral corticosteroids + LABA *or* montelukast
	Alternative		Cromolyn *or* montelukast				
	Patient education and environmental control at each step.						
	Rescue Medication	• SABA as needed for symptoms. Treatment intensity depends on symptom severity. • With viral respiratory symptoms, SABA every 4–6 hours up to 24 hours (longer with physician consult). • Consider short course of oral corticosteroids if exacerbation is severe or if patient has history of previous severe exacerbations. • Frequent or increasing use of SABA may indicate inadequate control and the need to step up treatment.					
5 – 11 Years		**Intermittent Asthma**	**Persistent Asthma: Daily Medication** Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.				
	Preferred	SABA as needed	Low-dose ICS	Low-dose ICS + LABA, LTRA, *or* Theophylline	Medium-dose ICS + LABA	High-dose ICS + LABA	High-dose ICS + LABA + Oral corticosteroids
	Alternative		Cromolyn, LTRA, Nedrocromil, *or* Theophylline	*OR* Medium-dose ICS	Medium-dose ICS + LTRA *or* Theophylline	High-dose ICS + LTRA *or* Theophylline	High-dose ICS + LTRA *or* Theophylline
	Patient education and environmental control, and management of comorbidities at each step. Step 2-4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.						
	Rescue Medication	• SABA as needed for symptoms – up to 3 treatments at 20-minute intervals initially. Treatment intensity depends on symptom severity. • Consider short course of oral corticosteroids. • Increasing use of SABA or use > 2 days/week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step up treatment					

EIB, exercise-induced bronchospasm; ICS, inhaled corticosteroids; LABA, long-acting beta$_2$-agonist; LTRA, leukotriene receptor antagonist

Stepwise Approach for Managing Asthma Long Term (≥ 12 years of age)

		Step UP if needed (first check inhaler technique, adherence, environmental control, and comorbid conditions) ASSESS CONTROL Step DOWN if possible (and asthma is well controlled for at least 3 months)					
		Step 1	Step 2	Step 3	Step 4	Step 5	Step 6
≥ 12 Years		Intermittent Asthma	Persistent Asthma: Daily Medication Consult with asthma specialist if step 4 care or higher is required. Consider consultation at step 3.				
	Preferred	SABA as needed	Low-dose ICS	Low-dose ICS + LABA OR Medium-dose ICS	Medium-dose ICS + LABA	High-dose ICS + LABA	High-dose ICS + Oral corticosteroids + LABA
	Alternative		Cromolyn, LTRA, Nedrocromil, or Theophylline	Low-dose ICS + LTRA, Theophylline, *or* Zileuton	Medium-dose ICS + LTRA, Theophylline, or Zileuton	Consider Omalizumab for patients who have allergic asthma	Consider Omalizumab for patients who have allergic asthma
		Patient education and environmental control, and management of comorbidities at each step. Step 2-4: Consider subcutaneous allergen immunotherapy for patients who have allergic asthma.					
	Rescue Medication	• SABA as needed for symptoms – up to 3 treatments at 20-minute intervals initially. Treatment intensity depends on symptom severity. • Consider short course of oral corticosteroids. • Increasing use of SABA or use > 2 days/week for symptom relief (not prevention of EIB) generally indicates inadequate control and the need to step treatment.					
All	**Notes**	• If an alternative treatment is used and response is inadequate, discontinue it and use the preferred treatment before stepping up. • Theophylline requires serum concentration levels monitoring; zileuton requires liver function monitoring. • LABAs are not indicated for acute symptom relief and should be used in combination with an ICS.					

EIB, exercise-induced bronchospasm; ICS, inhaled corticosteroids; LABA, long-acting beta$_2$-agonist; LTRA, leukotriene receptor antagonist

Diabetes Screening, Diagnosis, and Treatment

Criteria for Diabetes Screening and Diagnosis

Screening	Diagnosis of Pre-Diabetes and Diabetes		
	Test	**Pre-diabetes**	**Diabetes**
Screen every 3 years in individuals ≥40 years of age or in individuals at high risk using a risk calculator.	HbA1C	5.7% - 6.4%	≥ 6.5%
	FPG	100–125 mg/dL	≥126 mg/dL
	OGTT	140–199 mg/dL	≥200 mg/dL*
Screen earlier and/or more frequently in people with additional risk factors for diabetes or for those at very high risk using a risk calculator. For risk calculator go to http://www.diabetes.org/are-you-at-risk/diabetes-risk-test/	RPG	-------	≥200 mg/dL†
	**In the absence of unequivocal hyperglycemia, results should be confirmed by repeat testing.* *† Only diagnostic in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis. RPG, random plasma glucose.*		

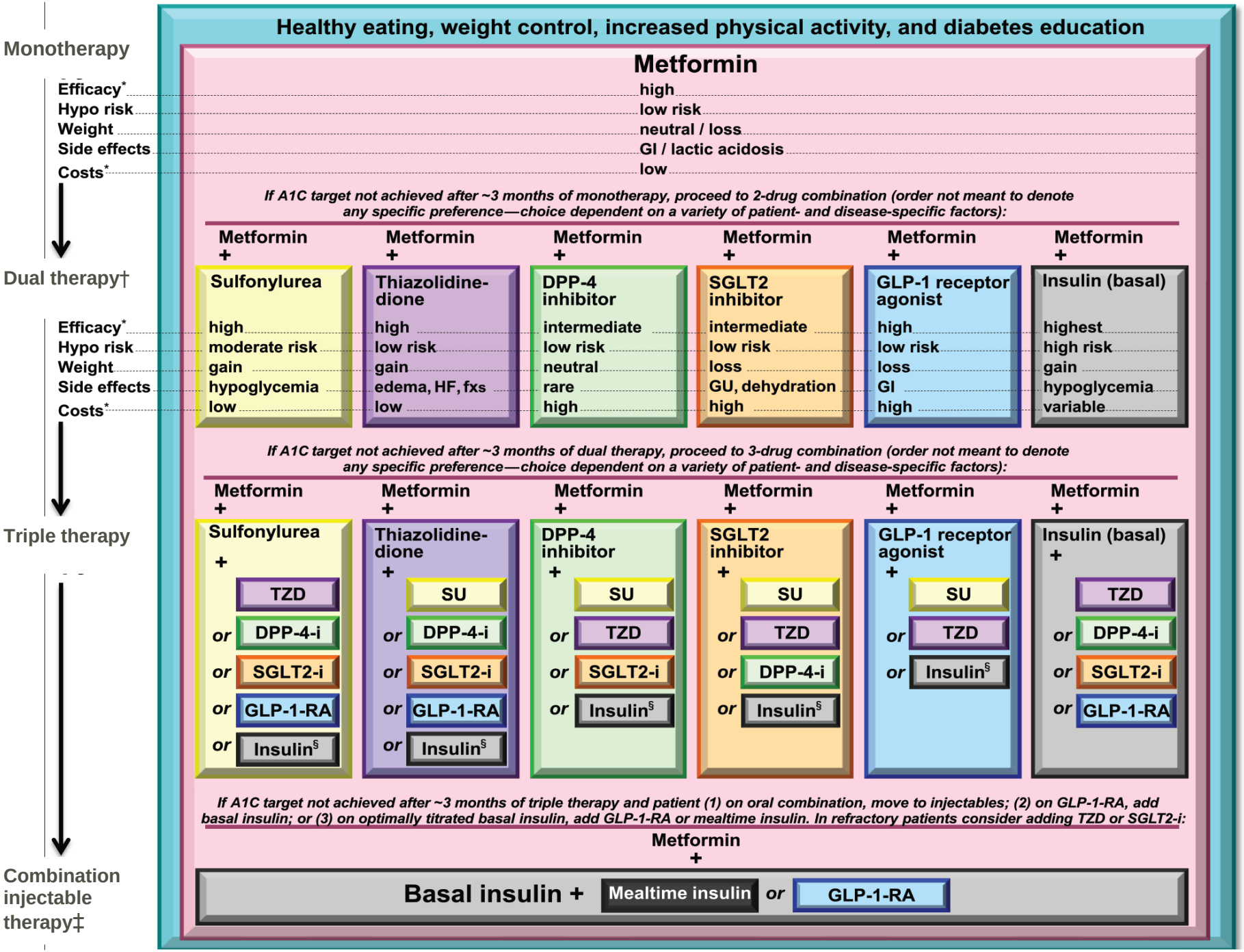
Adapted from the American Diabetes Association, Standards of Medical Care in Diabetes – 2015, doi: 10.2337/diaclin.33.2.97

Antihyperglycemic therapy in type 2 diabetes

The order in the following chart was determined by historical availability and the route of administration, with injectables to the right; it is not meant to denote any specific preference. Potential sequences of antihyperglycemic therapy for patients with type 2 diabetes are displayed, with the usual transition moving vertically from top to bottom (although horizontal movement within therapy stages is also possible, depending on the circumstances). DPP-4-i, DPP-4 inhibitor; fxs, fractures; GI, gastrointestinal; GLP-1-RA, GLP-1 receptor agonist; GU, genitourinary; HF, heart failure; Hypo, hypoglycemia; SGLT2-i, sodium-glucose cotransporter 2 inhibitor; SU, sulfonylurea.

†Consider starting at this stage when A1C is ≥9%. ‡Consider starting at this stage when blood glucose is ≥300–350 mg/dL (16.7–19.4 mmol/L) and/or A1C is ≥10–12%, especially if symptomatic or catabolic features are present, in which case insulin + mealtime is the preferred initial regimen. § Usually a basal insulin (NPH, glargine, detemir, degludec).

Adapted from the American Diabetes Association, Standards of Medical Care in Diabetes – 2015, doi: 10.2337/diaclin.33.2.97


Healthy eating, weight control, increased physical activity, and diabetes education
Monotherapy
Metformin
Efficacy*
high
Hypo risk
low risk
Weight
neutral / loss
Side effects
GI / lactic acidosis
Costs*
low
If A1C target not achieved after ~3 months of monotherapy, proceed to 2-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):
Dual therapy†
Metformin + Sulfonylurea
high
moderate risk
gain
hypoglycemia
low
Metformin + Thiazolidine-dione
high
low risk
gain
edema, HF, fxs
low
Metformin + DPP-4 inhibitor
intermediate
low risk
neutral
rare
high
Metformin + SGLT2 inhibitor
intermediate
low risk
loss
GU, dehydration
high
Metformin + GLP-1 receptor agonist
high
low risk
loss
GI
high
Metformin + Insulin (basal)
highest
high risk
gain
hypoglycemia
variable
If A1C target not achieved after ~3 months of dual therapy, proceed to 3-drug combination (order not meant to denote any specific preference—choice dependent on a variety of patient- and disease-specific factors):
Triple therapy
Metformin + Sulfonylurea + TZD or DPP-4-i or SGLT2-i or GLP-1-RA or Insulin§
Metformin + Thiazolidine-dione + SU or DPP-4-i or SGLT2-i or GLP-1-RA or Insulin§
Metformin + DPP-4 inhibitor + SU or TZD or SGLT2-i or Insulin§
Metformin + SGLT2 inhibitor + SU or TZD or DPP-4-i or Insulin§
Metformin + GLP-1 receptor agonist + SU or TZD or Insulin§
Metformin + Insulin (basal) + TZD or DPP-4-i or SGLT2-i or GLP-1-RA
If A1C target not achieved after ~3 months of triple therapy and patient (1) on oral combination, move to injectables; (2) on GLP-1-RA, add basal insulin; or (3) on optimally titrated basal insulin, add GLP-1-RA or mealtime insulin. In refractory patients consider adding TZD or SGLT2-i:
Combination injectable therapy‡
Metformin +
Basal insulin + Mealtime insulin or GLP-1-RA

Hypertension Screening, Diagnosis, and Control

Criteria for Hypertension Screening and Diagnosis

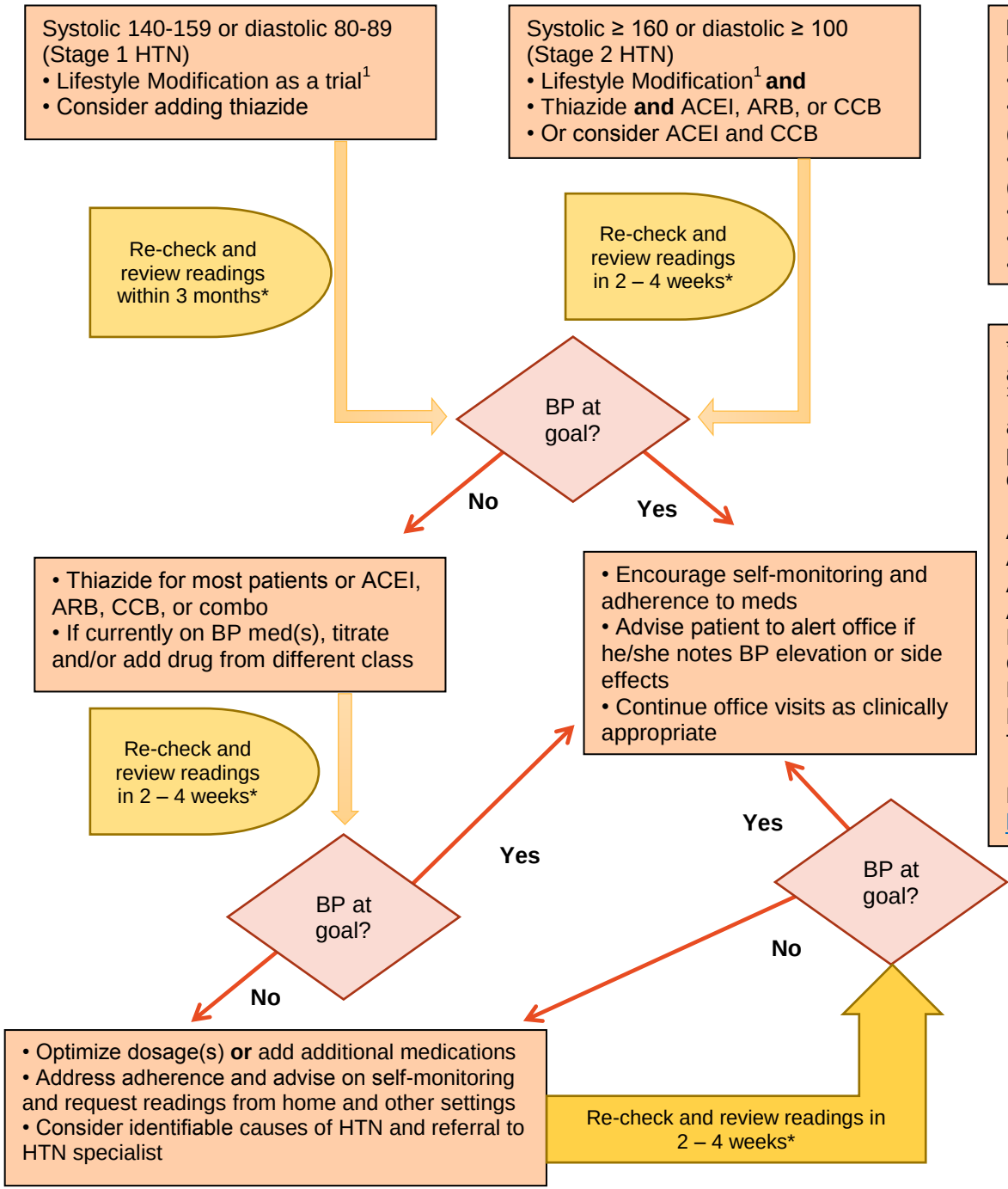
Screening	Diagnosis of Hypertension*		
	Hypertension Stages	**Systolic (BP mmHg)**	**Diastolic (BP mmHg)**
Screen for high blood pressure in routine health assessment or at least once a year.	Prehypertension	120 – 139	80 - 89
	Stage 1 Hypertension	140 – 159	90 - 99
	Stage 2 Hypertension	≥ 160	≥ 100
	**Each hypertension stage is diagnosed if the person has either systolic or diastolic blood pressure levels within the indicated ranges.*		

Adapted from Kenning I, Kerandi H, Luehr D, Margolis K, O'Connor P, Pereira C, Schlichte A, Woolley T. Institute for Clinical Systems Improvement. Hypertension Diagnosis and Treatment. Updated November 2014.

Suggested primary care pathway for controlling hypertension

The blood pressure (BP) goal is set by a combination of factors including scientific evidence, clinical judgment, and patient tolerance. For most people, the goal is <140 mmHg and <90 mmHg; however some individuals may be better served by other goals. Lifestyle modifications (LM)* should be initiated in all patients with hypertension (HTN) and patients should be assessed for target organ damage and existing cardiovascular disease. Self-monitoring is encouraged for most patients throughout their care and requesting and reviewing readings from home and community settings can help in achieving and maintaining good control. For patients with HTN and certain medical conditions, specific medications should be considered, as listed in the following chart.

Adapted from Centers for Disease Control and Prevention's Protocol for Controlling Hypertension in Adults. Atlanta, Georgia. 2013. For more information visit http://millionhearts.hhs.gov/Docs/Hypertension-Protocol.pdf



Medications to consider for patients with hypertension and certain medical conditions

- Coronary artery disease/Post MI: BB, ACEI
- Heart failure with reduced EF: ACEI or ARB, BB (approved for this use), ALDO, diuretic
- Heart failure with preserved EF: ACEI or ARB, BB (approved for this use), diuretic
- Diabetes: ACEI or ARB, BB, CCB, diuretic
- Kidney disease: ACEI or ARB
- Stroke or TIA: ACEI, diuretic

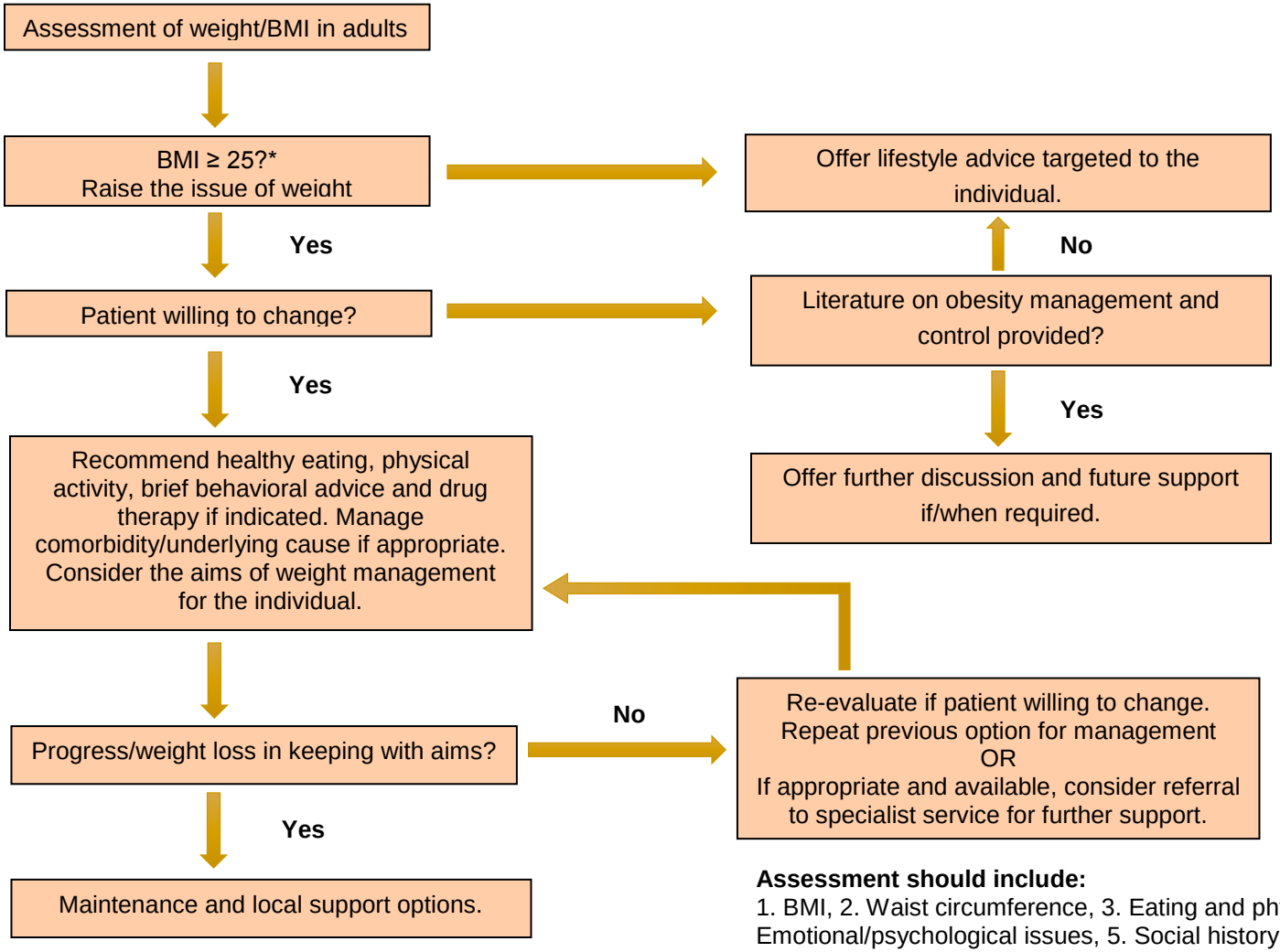
*Re-check interval should be based on patient's risk of adverse outcomes

[1] Lifestyle modifications should include weight reduction, adoption of a DASH eating plan, reduction on dietary sodium, physical activity, smoking cessation, and moderate alcohol consumption.

Abbreviations:
ACEI – Angiotensin-Converting Enzyme Inhibitor
ALDO – Aldosterone Antagonist
ARB – Angiotensin II Receptor Blocker
BB – Beta Blocker
CCB – Calcium Channel Blocker
EF – Ejection Fraction
MI – Myocardial Infarction
TIA – Transient Ischemic Attack

For more information visit
http://millionhearts.hhs.gov/resources/protocols.html

Suggested primary care pathway for adults with overweight and obesity



Adapted from the Scottish Intercollegiate Guidelines Network's Management of Obesity: Quick Reference Guide (2010).

Assessment should include:
1. BMI, 2. Waist circumference, 3. Eating and physical activity, 4. Emotional/psychological issues, 5. Social history (including alcohol and smoking), 6. Family history (eg diabetes, CHD), 7. Medication causes (eg drugs associated with diabetes or mental health)

Consider the following during assessment:
Associated comorbidity (eg diabetes, hypertension, CHD, sleep apnea, respiratory problems, non-alcoholic fatty-liver disease) and underlying causes (eg hypothyroidism)

Metabolic Syndrome Diagnosis and Control

For a person to be defined as having the metabolic syndrome they must have: • **Central obesity**, defined as waist circumference of 40" in men and 35" in women. If Body Mass Index (BMI) is ≥ 30, central obesity can be assumed and waist circumference does not need to be measured. • Plus **any two** of the following four factors	
Raised triglycerides	≥ 150 mg/dL **or** specific treatment for this lipid abnormality
Reduced HDL cholesterol	< 40 mg/dL in males < 50 mg/dL in females **or** specific treatment for this lipid abnormality
Raised blood pressure (BP)	Systolic BP ≥ 130 or diastolic BP ≥ 85 mm Hg **or** treatment of previously diagnosed hypertension
Raised fasting plasma glucose (FPG)	(FPG) ≥ 100 mg/dL, **or** previously diagnosed type 2 diabetes If above 100 mg/dL, OGTT is strongly recommended but is not necessary to define presence of the syndrome.
Primary intervention – primary management for the metabolic syndrome is a healthy lifestyle. This includes: moderate calorie restriction (to achieve a 5% – 10% loss of body weight in the first year), moderate increase in physical activity, smoking cessation, change in dietary composition, and moderate alcohol consumption. *Secondary intervention* - In people for whom lifestyle change is not enough and who are considered to be at high risk for CVD, drug therapy may be required to treat the metabolic syndrome.	

Adapted from International Diabetes Federation. The IDF consensus worldwide definition of the metabolic syndrome. (2006).

https://www.idf.org/webdata/docs/IDF_Meta_def_final.pdf