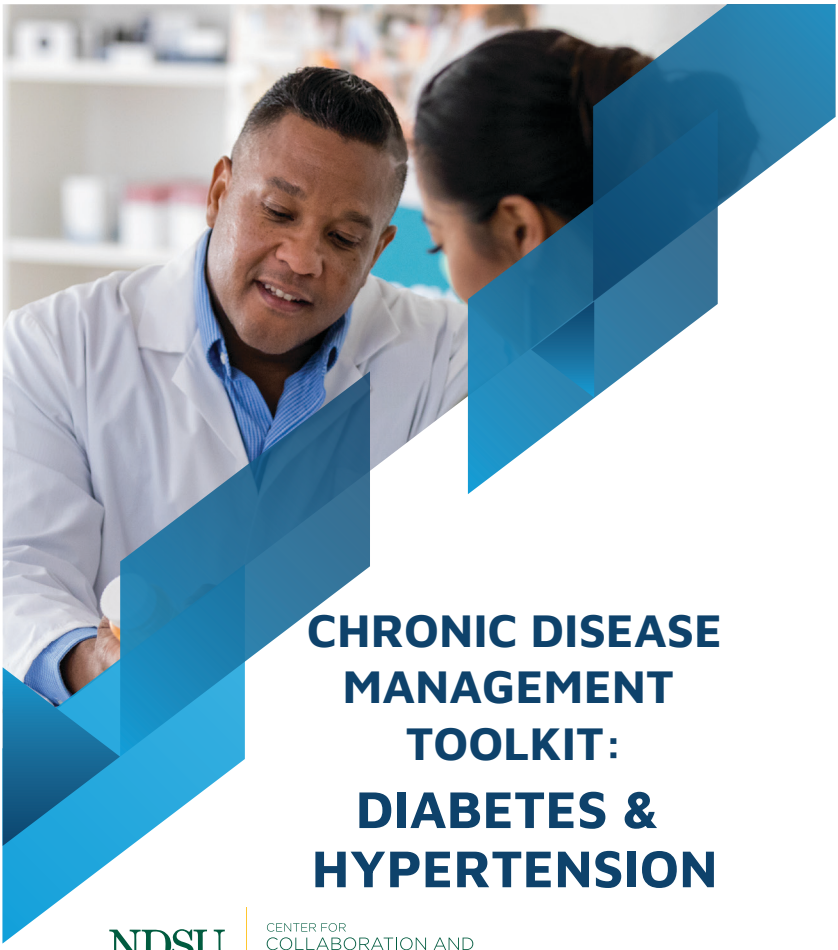


CHRONIC DISEASE MANAGEMENT TOOLKIT:

DIABETES & HYPERTENSION

NDSU

CENTER FOR
COLLABORATION AND
ADVANCEMENT IN PHARMACY

GOALS FOR DIABETES

A1C goal: A1C goals must be patient-centered and may be increased or decreased based on patients frequency of hyper-hypoglycemia

- ADA: <7%
- AACE: </=6.5%

Pre-prandial capillary plasma glucose

- ADA: 80-130 mg/dL
- AACE: <110 mg/dL

Post-prandial capillary plasma glucose

- ADA: <180 mg/dL
- AACE: <140 mg/dL

DIABETES DIAGNOSTIC CRITERIA

Fasting plasma glucose

- Prediabetes: 100-125 mg/dL
- Diabetes: ≥126 mg/dL

A1C

- Prediabetes: 5.7-6.4%
- Diabetes: ≥6.5%

2-hour plasma glucose test (OGTT)

- Prediabetes: 140-199 mg/dL
- Diabetes: ≥200 mg/dL

Random plasma glucose

- Prediabetes: Not recommended
- Diabetes: ≥200 mg/dL

TREATMENT

CLASS	MEDICATION EXAMPLES	ROUTE	EFFICACY	HYPOGLYCEMIC RISK	WEIGHT CHANGE
Biguanides	Metformin	Oral	High	None	Neutral
SGLT-2 inhibitors*	Canaglifozin, dapagliflozin, empagliflozin	Oral	Intermediate to high	None	Loss
GLP-1 receptor agonist	Liraglutide and semaglutide	Oral and subcutaneous	High to very high	None	Loss
GLP-1 and GIP receptor agonists	Mounjaro	Subcutaneous	High to very high	None	Loss
Thiazolidinediones (TZD)	Pioglitazone	Oral	High	None	Gain
Sulfonylureas (SUO)	Glipizide, glyburide, & glimepiride	Oral	High	Yes	Gain
Insulin	See table on next page	Subcutaneous	High to very high	Yes	Gain

*Recommended for established or high risk ASCVD, heart failure, and chronic kidney disease.

Insulin Medication Examples

TYPE	MEDICATION EXAMPLES	ONSET (HOURS)	DURATION (HOURS)
Ultra rapid action	Aspart (fiasp)	0.25 to 4	5 to 7
Rapid acting	Aspart (Novolog)	0.25 to 0.4	3 to 7
Rapid acting	Lispro (humalog)	0.5 to 0.75	5.7 to 6.6
Short acting	Regular (Humulin R, Novolin)	0.5	8
Intermediate acting	NPH (Humulin-N, Novolin-N)	1 to 2	14 to 24
Long acting	Degludec (Tresiba)	1	N/A

Insulin Medication Examples Cont.

TYPE	MEDICATION EXAMPLES	ONSET (HOURS)	DURATION (HOURS)
Long acting	Glargine (Lantus)	3 to 4	10.8 to >24
Long acting	Glargine (Basaglar)	3 to 4	>24
Long acting	Glargine (Toujeo)	6	>24
Combination	NPH+Regular (Humulin 70/30, Novolin 70/30)	0.5	18 to 24
Combination	Lispro protamine+Lispro (Humulog Mix 50/50, Humalog Mix 75/25)	0.25 to 0.5	14 to 24
Combination	Aspart protamine + Aspart (Novolog Mix 70/30)	0.17 to 0.33	18 to 24

APPROACHES TO TREATMENT

Initial A1C <7.5%: Monotherapy with metformin

Initial A1C ≥7.5-9%*: Dual therapy

- Metformin + SU/TZD/DPP-4/SGLT-2i/GLP-1/insulin
- Triple therapy
  - Metformin + SU+ DPP-4/SGLT-2i/GLP-1/insulin

Comorbid conditions

- Established or high risk ASCVD
  - GLP-1 or SGLT-2i
- Preservd or reduced EF
  - SGLT-2i
  - Avoid TZDs and sitagliptin
- Chronic kidney disease
  - SGLT-2i or GLP-1

*=Reserve insulin treatment for patients with high A1C (>10%) or A1C>9% with symptoms

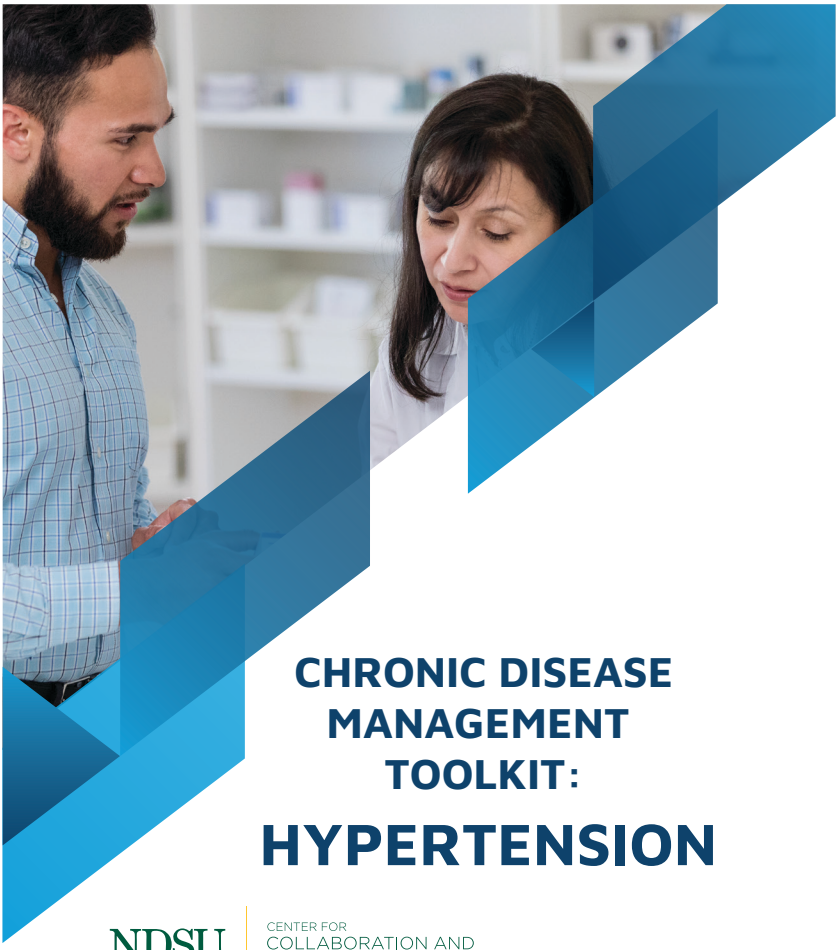
FOLLOW-UP

Patient at goal	Assess glycemic status at least two times per year
Patient not at goal/recently changed therapy	Assess glycemic status at least four times per year

PRE-DIABETES INTERVENTIONS

- Counsel on lifestyle modifications for weight management and sleep health
- Refer to the National Diabetes Prevention Program at **www.ndc3.org**
- Counsel on smoking cessation if appropriate

NOTES



CHRONIC DISEASE MANAGEMENT TOOLKIT:

HYPERTENSION

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HYPERTENSION DIAGNOSTIC CRITERIA

Blood Pressures

1. Normal: <120 AND <80 mmHg
2. Elevated: 120-129 AND <80 mmHg
3. Hypertension Stage 1: 130-139 OR 80-89 mmHg
4. Hypertension Stage 2: ≥140 OR ≥90 mmHg
5. Hypertensive crisis: >180 AND/OR >120 mmHg

Cuff Size

Confirm you are using the correct sized cuff (using the wrong cuff can lead to discrepancies as great as 10 mmHg SBP or 8 mmHg DBP).

Readings

Take an average of 2 readings on two different occasions to estimate the patients blood pressure

GOALS FOR THERAPY

Patients <65 years

Goal for patients <65 years with hypertension, regardless of chronic comorbidities, is **<130/80 mmHg** (if tolerated by patient)

Patients ≥65 years

Goal for patients ≥65 years with hypertension is **<130 mmHg** (SBP)

1. Adjust goal based on patient factors including comorbidity burden, life expectancy, clinical judgment and patient preference

Patients with comorbidities

Goal for patients with comorbidities (listed below) is **<130/80 mmHg**

1. Diabetes mellitus
2. Chronic kidney disease
3. After renal transplant
4. Heart failure
5. Stable ischemic heart disease
6. Peripheral artery disease

TREATMENT ALGORITHM

Treat hypertension if blood pressure is:

1. ≥130/80 mmHg AND patient has ASCVD of >10% OR has clinical ASCVD
2. ≥140/90 mmHg AND patient has ASCVD of <10%

TREATMENT OPTIONS - FIRST LINE

Thiazide/thiazide-type diuretic	• Monitor sodium, potassium, calcium, and uric acid • Ex: Chlorthoalidone and hydrochlorothiazide
Angiotensin converting enzyme (ACE) inhibitor	• Monitor potassium • Do not use in junction with ARBs • Ex: Benazepril, enalapril, and lisinopril
Angiotensin receptor blocker (ARB)	• Monitor potassium • Do not use in junction with ACE inhibitors • Ex: Candesartan, losartan, and valsartan
Calcium-channel blocker (CCB)	• Dihydropyridines ex: Amlodipine and nicardipine • Avoid use with HFrEF, if required use amlodipine or felodipine • Non-dihydropyridines ex: Diltiazem and verapamil • Do not use in HFrEF

TREATMENT OPTIONS - SECOND LINE

Other diuretics	• Loop ex: Bumetanide and furosemide
	  ◦ Preferred if symptomatic heat failure and preferred over thiazide if GFR<30mL/min
	• Potassium-sparing ex: Amiloride and triamterene
	  ◦ Monitor potassium and renal function
	  ◦ Minimally effective and avoid if GRF<45mL/min
	• Aldosterone antagonists ex: Eplernone and spironolactone
	  ◦ Monitor potassium and renal function
	  ◦ Avoid use with potassium supplements, potassium-sparing diuretic, or significant renal dysfunction

Beta-blockers	• Cardio selective ex: Atenolol, metoprolol, succinate, and metoprolol tartrate • Non-cardio selective ex: Nadolol and propranolol ◦ Avoid in reactive airway disease • Intrinsic sympathomimetic ex: Acebutolol and pindolol • Alpha and beta-receptor blocker ex: carvedilol and labetalol

Direct renin inhibitor	• Ex: Aliskiren
	  ◦ Monitor potassium and renal function
	  ◦ Do not use with ACE inhibitors or ARBs

Alpha-1 blockers	• Ex: Doxazosin and Prazosin
Central alpha 2 agonist	• Ex: Clonidine, guanfacine, and methyldopa ◦ Taper clonidine due to rebound hypertension
Direct vasodilators	• Ex: Hydralazine and minoxidil ◦ Associated with sodium/water retention and tachycardia: use with diuretic and beta blocker

TREATMENT OPTIONS - AFRICAN-AMERICAN ADULTS

- Initial treatment should include thiazide-type diuretic or a calcium channel blocker

TREATMENT OPTIONS - PREGNANCY

- DO NOT USE ACE inhibitors, ARBs or direct renin inhibitors
- Treatment should be transited to methyldopa, nifedipine or labetalol

FOLLOW-UP

Normal	1 year
Elevated	3-6 months
Stage 1 hypertension	Monthly until goal is met then 3-6 months thereafter
Stage 2 hypertention	Monthly until goal is met then 3-6 months thereafter

NOTES