

# DIABETES MEDICATIONS SUPPLEMENT

## WORKING TOGETHER TO MANAGE DIABETES



This medication supplement guide is to provide health care professional with at-a-glance information on medications commonly used for people with diabetes. For complete prescribing information, please consult the medications package insert or the Physicians' Desk Reference.



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# SECTION A

## Diabetes Medications

**Table 1. Oral Agents to Treat Type 2 Diabetes**

Agent	Class	Primary Action	Typical Dosage
Tolbutamide (Ornase™) Tolazamide (Tolinase™) Chlorpropamide (Diabenese™)	Sulfonylureas (1st generation)	Increases insulin production in the pancreas.	Tolbutamide: 0.25–2.0 g/day in divided doses; maximum, 3 g/day Tolazamide: 100–1,000 mg/day in divided doses; maximum, 1 g/day Chlorpropamide: 100–500 mg/day twice a day; maximum, 750 mg/day
Glyburide (Micronase™, Diabeta™, Glynase™) Glipizide (Glucotrol, Glucotrol XL™) Glimepiride (Amaryl™)	Sulfonylureas (2nd generation)	Increases insulin production in the pancreas.	Glyburide: 1.25–5 mg/once or twice a day; maximum, 20 mg/day Glynase: 0.75–12.0 mg/day; maximum 12 mg/day Glipizide: 2.5–20.0 mg/once or twice a day; maximum, 40 mg/day; or XL* 2.5–10.0 mg/once or twice a day; maximum, 20 mg/day Glimepiride: 1–8 mg/day; maximum, 8 mg/day
Repaglinide (Prandin™)	Meglitinide	Increases insulin release from pancreas.	New diagnosis or A1C < 8%, 0.5 mg; A1C > 8%, 1–2 mg, 15–30 min before each meal; increase weekly until results are obtained; maximum, 16 mg/day
Nateglinide (Starlix™)	Phenylalanine derivative	Increases insulin release from pancreas.	60–120 mg before each meal
Metformin (Fortamet™, Glumetza™, Glucophage™)	Biguanide	Primarily decreases hepatic glucose production. Minor increase in muscle glucose uptake which may improve insulin resistance.	500 mg/day twice a day with meals, increase by 500 mg every 1–3 wk, twice or three times a day; usually most effective at 2,000 mg/day; maximum, 2,550 mg/day  Long acting form Glucophage XR™: 500mg once/day, max dose 2000mg once/day
Rosiglitazone (Avandia™)	Thiazolidinedione	Decreases insulin resistance, increasing glucose uptake, fat redistribution; minor decrease in hepatic glucose output; preserves β-cell function; decreases vascular inflammation.	Initially 4 mg/day in single or divided doses. Increase to 8 mg/day in 12 wk, if needed; maximum, 8 mg/day with or without food
Pioglitazone (Actos™)	Thiazolidinedione	Decreases insulin resistance, increasing glucose uptake, fat redistribution; minor decrease in hepatic glucose output; preserves β-cell function; decreases vascular inflammation.	Initially 15 or 30 mg/day; maximum with or without food 45 mg for monotherapy, 30 mg for combination therapy
Acarbose (Precose™) Miglitol (Glyset™)	Alpha-glucosidase inhibitor	Slows absorption of complex carbohydrate from GI tract.	25 mg/day; increase by 25 mg/day every 4–6 wk; maximum, split dose before meals (with first bite of food) 300 mg/day (150 mg/day for weight < 60 kg)
<b>Combinations</b>			
Glucovance™ (Glyburide and Metformin)	Sulfonylureas and Biguanide	Decreases hepatic glucose production and increases insulin secretion.	Ratios of glyburide and metformin (in mg): 1.25/250, 2.5/500, 5/500. Initial: 1.25/250 once or twice a day, increased every 2 weeks. 2nd line: 2.5–5/500 twice a day, increased every 1–2 weeks. Average dose 7.5/1,500. Maximum dose should not exceed 20 mg glyburide/2,000 mg metformin daily.
Metaglip™ (Glipizide and Metformin)	Sulfonylureas and Biguanide	Decreases hepatic glucose production and increases insulin secretion.	Ratios of glipizide and metformin (in mg): 2.5/250, 2.5/500, 5/500. Initial: 2.5/250 once or twice a day, increased every 2 weeks. 2nd line: 2.5–5/500 twice a day, increased every 1–2 weeks. Maximum doses should not exceed 20 mg glipizide/2,000 mg metformin daily.
Avandamet™ (Rosiglitazone and Metformin)	Thiazolidinedione and Biguanide	Decreases hepatic glucose production, increases glucose uptake, decreases insulin resistance, and preserves β-cell function.	Ratios of rosiglitazone and metformin: 1 mg/500 mg, 2 mg/500 mg, 4 mg/500 mg, 2 mg/1,000 mg, 4 mg/1,000 mg twice a day; dosage individualized based on current therapy. Maximum, 8 mg/2,000 mg per day.
Actoplus Met™ (Pioglitazone and Metformin)	Thiazolidinedione and Biguanide	Decreases hepatic glucose production, increases glucose uptake, decreases insulin.	Ratios of pioglitazone and metformin: 15 mg/500 mg, 15 mg/850 mg
Avandaryl™ (Rosiglitazone and Glimepiride)	Thiazolidinedione and Sulfonylurea	Decreases insulin resistance and increases insulin secretion.	Ratios of rosiglitazone and glimepiride: 4 mg/1 mg, 4 mg/1 mg

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A1C = glycated hemoglobin ALT = alanine aminotransferase CHF = congestive heart failure

FPG = fasting plasma glucose GI = gastrointestinal XL = TZD = thiazolidinedione, CYP 450 = cytochrome P 450

	Side Effects	Precautions	Critical Tests	Comments
	Hypoglycemia, weight gain, hyperinsulinemia Disulfiram reaction with alcohol	Chlorpropamide remains active for up to 60 hours. Use extreme caution with elderly patients or patients with hepatic or renal dysfunction.	All are metabolized in liver. Periodic evaluation of liver function is suggested.	Use of these agents is not recommended unless the patient has a well-established history of taking them. Second-generation sulfonylureas provide more predictable results with fewer side effects and more convenient dosing.
	Hypoglycemia, weight gain, hyperinsulinemia	Clearance may be diminished in patients with hepatic or renal impairment.		Glipizide is preferred with renal impairment. Doses > 15 mg should be divided. Glimepiride indicated for use with insulin. Shown to have some insulin-sensitizing effect.
	Hypoglycemia, weight gain, hyperinsulinemia	Use with caution on patient with hepatic or renal impairment.		Patients should be instructed to take medication no more than 30 minutes prior to a meal. If meals are skipped or added, the medication should be skipped or added as well. Approved for use as monotherapy or in combination with TZD or metformin.
	Minimal risk of hypoglycemia	Currently no contraindications available. Use with caution with moderate to severe hepatic disease.	Periodic evaluation of liver function tests.	Approved as monotherapy or in combination with metformin or TZD. Has only a 2-hour duration of action. If meals are skipped or added, the medication should be skipped or added as well.
	Nausea, diarrhea, metallic taste, possible lactic acidosis	Due to increased risk of lactic acidosis, should not use if suspect frequent alcohol use, liver or kidney disease, or CHF.	Contraindicated if serum creatinine is: > 1.5 mg/dL in men or > 1.4 mg/dL women. Do not use if creatinine clearance is abnormal. Monitor hematological and renal function annually.	Especially beneficial in obese patients due to potential for weight loss, improved lipid profile, and lack of potential for hypoglycemia requiring supplemental carbohydrate intake. Discontinue for 48 hr after contrast dye procedures.
	Minor weight increase of 3–6 lbs., edema	Should not be used in patients with CHF or hepatic disease. Can cause mild-to-moderate edema.	Avoid initiation if ALT > 2.5X upper limit of normal. Measure ALT periodically. Discontinue if ALT > 3X upper limit of normal.	Approved for use as monotherapy and in combination with metformin, sulfonylureas, or insulin. Less interactions associated with CYP-450.
	Minor weight increase of 3–6 lbs., edema	Should not be used in patients with CHF or hepatic disease. Can cause mild-to-moderate edema.	Avoid initiation if ALT > 2.5X upper limit of normal. Measure ALT periodically. Discontinue if ALT > 3X upper limit of normal.	Avoid initiation if ALT > 2.5X upper limit of normal. Measure ALT periodically. Discontinue if ALT > 3X upper limit of normal.
	Gas and bloating, sometimes diarrhea for both drugs	Should not be used if GI disorders are concurrent.	Avoid if serum creatinine is > 2.0 mg/dL. Monitor serum transaminase every 3 months for 1st year of therapy.	Approved for use as monotherapy and in combination with metformin, sulfonylureas, or insulin. If used with hypoglycemic agents, such as sulfonylureas or insulin, must treat hypoglycemia with glucose not sucrose.
	Hypoglycemia, weight gain, lactic acidosis	Should not be used if suspect frequent alcohol use, liver or kidney disease, or CHF.	Same caveats as individual components.	Patients may frequently use 2 different dose tablets to attain desired daily dosage and results. Discontinue for 48 hr after procedure using contrast dye.
	Hypoglycemia, weight gain, lactic acidosis	Should not be used if suspect frequent alcohol use, liver or kidney disease, or CHF.	Same caveats as individual components.	Patients may frequently use 2 different dose tablets to attain desired daily dosage and results. Discontinue for 48 hr after procedure using contrast dye.
	Edema, possible lactic acidosis	Should not be used if suspect frequent alcohol use, liver or kidney disease, or CHF.	Same caveats as individual components.	Less expensive than using agents separately. Reported decrease in GI upset associated with metformin and weight increase associated with rosiglitazone. Discontinue for 48 hr after procedure using contrast dye.
	Same caveats as individual components.	Same caveats as individual components.	Same caveats as individual components.	Same caveats as individual components.
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\* Agents in a class of medicines share mechanisms of action, require similar precautions, and generally have similar side effects. For proper usage, please read label. Agents should not be used in patients with type 1 diabetes.

# Diabetes Medications

**Table 2. Glucose-Lowering Activity—Oral Diabetes Agent**

Medication	Blood Glucose Most Affected	Greatest Risk for Hypoglycemia
Sulfonylureas	Fasting and postprandial	Nocturnal, fasting, 4–6 hr after meals
Meglitinide or phenylalanine derivative	Postprandial	2–3 hr after meals
Biguanide	Fasting and postprandial	After exercise if prolonged and strenuous
Alpha-glucosidase inhibitor	Postprandial	None
Thiazolidinedione	Fasting and postprandial	None
Glucovance™	Fasting and postprandial	Nocturnal, fasting, 4–6 hr after meals
Metaglip™	Fasting	Nocturnal, fasting 4–6 hr after meals
Avandamet™	Fasting and postprandial	After exercise if prolonged and strenuous
Actoplus Met™	Fasting and postprandial	After exercise if prolonged and strenuous
Avandryl™	Fasting and postprandial	Nocturnal, fasting, 4–6 hr after meals

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Testing frequency and times may vary based on individual assessment.

**Table 3. Important Insulin Information\***

Insulin	Onset	Peak	Effective Duration	Maximal Duration	Comments
<b>Human insulins</b>					
<b>Rapid Acting</b>					
Lispro (Humalog™)	< 15 min	1–2 hr	2–4 hr	3–5 hr	Should be taken just prior to or just after eating.
Aspart (Novolog™)	< 15 min	1–3 hr	3–5 hr	4–6 hr	Should be taken just prior to or just after eating.
Glulisine (Apidra™)	< 15 min	0.5–1 hr	3 hr	3 hr	Should be taken just prior to or just after eating.
<b>Short Acting</b>					
Regular (Novolin R™, Humulin R™)	0.5–1 hr	2–4 hr	3–5 hr	8 hr	Best if taken 30 min before a meal.
<b>Intermediate Acting</b>					
Lente (Novolin™, Humulin L™)	3–4 hr	4–12 hr	12–18 hr	16–20 hr	Limited supplies.
NPH (Novolin N™, Humulin N™)	2–4 hr	4–10 hr	10–16 hr	14–18 hr	Bedtime dosing minimizes nocturnal hypoglycemia.
<b>Long Acting</b>					
Characterized by a “flat” or “peakless” concentration profile.					
Insulin glargine (Lantus™) analog	4–6 hr	None	24 hr	24 hr	Cannot be mixed with any other insulin. Stress site rotation and not to use same syringe used with other insulins. Not recommended for pre-filling syringes.
Detemir (Levemir™)	3–4 hr	50% in 3–4 hr, lasting up to 14 hr	5.7–23.2 hr	Dose dependent- 5.7–23.2 hr	Cannot be mixed in same syringe with other insulins. Duration of action is dose dependent: 6 hrs (0.1U/kg), 12hrs (0.2U/kg), 20 hrs (0.4U/kg), 23 hrs (0.8U/kg and 1.6U/kg).
Ultralente	6–10 hr	Minimal	18–20 hr	20–30 hr	Limited supplies.
<b>Pre-mixed Human</b>					
Humalog™ 75/25 Novolog Mix™ 70/30	<15 min	1–2 hr	10–16 hr	14–18 hr	75% NPL, 25% Lispro 70% NPH, 30% Aspart Should be taken just prior to or just after eating because of rapid onset. Caution because of name confusion with Humalog and Novolog.
Humulin™ 70/30 Novolin™ 70/30	0.5–1 hr	2–10 hr	10–16 hr	14–18 hr	Humalin and Novolin are 70% NPH and 30% regular insulin.
<b>Animal Source</b>					
Regular	0.5–2 hr	3–4 hr	4–6 hr	6–8 hr	Conversion to human insulin recommended. Dose changes required (usually a 10% reduction in dose when switching to human).
NPH	4–6 hr	8–14 hr	16–20 hr	20–24 hr	
Lente	4–6 hr	8–14 hr	16–20 hr	20–24 hr	
<b>Inhaled Insulin</b>					
Exubera™	10–20 min	30–90 min	2–6 hr	6 hr	Dosed in MG of powder, Available in 1 mg and 3 mg blisters. 1mg approx=3 IU insulin, 3mg approx=8 IU (Inhalation of 1 mg +1 mg +1 mg does not equal 3mg)

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\*Site rotation for injections is necessary for all types of insulin.

**Table 4. Recommended Insulin Storage**

Insulin Type	Refrigerated (36° F–46° F)		Room Temperature (59° F– 86° F)	
	Opened	Unopened	Opened	Unopened
Vial				
Humalog™, Novolog™, Humulin™, Novolin™, Apidra™	28 days	Until expiration date	28 days	28 days
Lantus™ (10 mL)	28 days	Until expiration date	28 days	28 days
Detemir (Levemir™)	42 days	Until expiration date	42 days	42 days
Pens/Cartridges	Not in use		In use	
Humalog™	Until expiration date		28 days	
Humulin R™ (available in cartridge only)	Until expiration date		28 days	
Humulin N™	Until expiration date		14 days	
Humulin 70/30™	Until expiration date		10 days	
Humalog Mix 75/25™	Until expiration date		10 days	
Novolog™	Until expiration date		28 days	
Novolog Mix 70/30™	Until expiration date		14 days	
Novolin R™ (prefilled and 1.5-mL cartridge)	Until expiration date		30 days	
Novolin R™ (3-mL cartridge)	Until expiration date		28 days	
Novolin N™ (prefilled and 1.5-mL cartridge)	Until expiration date		7 days	
Novolin N™ (3-mL cartridge)	Until expiration date		14 days	
Novolin 70/30™ (prefilled and 1.5-mL cartridge)	Until expiration date		7 days	
Novolin 70/30™ (3-mL cartridge)	Until expiration date		10 days	
Detemir (Levemir™)	Until expiration date		42 days	
Apidra™	Until expiration date		28 days	
Lantus™	Until expiration date		28 days	
Self-filled syringes (Note: not recommended for glargine)	14 days*		7 days	
Inhaled Insulin	Not in use (unopened overwrap)		In use (unopened overwrap)	
Exubera™ (insulin blisters)	Room Temperature (59° F– 86° F) Until expiration date		Room Temperature (59° F– 86° F) 90days	
Release Unit	Do not refrigerate		Replace every 14 days	
Inhaler & Chamber	Replace Yearly (Wash Weekly)			

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**Table 5. Incretins and Amylins**

Agent	Primary Action	How Supplied/Storage	Typical Dosage	Duration Action	Side Effects	Precautions	Comments
Exenatide (Byetta™)	Decreases post-meal glucagon production. Delays gastric emptying. Increases satiety, leading to decreased caloric intake. Degree of response depends on plasma glucose levels.	250 mcg/mL: - 5 mcg/dose prefilled pen - 10 mcg/dose prefilled pen If not in use: refrigerate until expiration date. If in use: stable at room temperature Discard after 30 days.	5 mcg BID subcutaneous for first 1 month, then 10 mcg BID, injected within 60 minutes before morning and evening meal	Peak effects in approx 2 hours with maximal duration of 10 hours.	Nausea and hypoglycemia most common; occasional vomiting, diarrhea, jitters, dizziness, headache.	Not for use in patients with Type 1 diabetes, severe renal disease or ESRD*, or severe GI disease.	Consider lowering dose of sulfonylurea to avoid hypoglycemia when starting. May reduce the rate of absorption of oral medication. Medications requiring threshold concentrations should be taken 1 hour prior to injection. Approved for use with sulfonylureas and/or metformin or in combination with a TZD* alone or with metformin.
Pramlintide (Symlin™)	Decreases post-meal glucagon production. Delays gastric emptying. Increases satiety, leading to decreased caloric intake. Degree of response depends on plasma glucose levels.	5 mL vials containing 0.6 mg/mL. Requires U-100 insulin syringe for injection If not in use: refrigerate until expiration date. If in use: room temperature. Discard after 28 days.	Type 1 diabetes: 15–60 mcg starting with 15 mcg subcutaneously before meals of 30gm or more carbohydrate. Type 2 diabetes: 60–120 mcg starting with 60 mcg subcutaneous before meals. Titrate as directed by prescriber.	Maximum effect in 20 minutes with rapid elimination. Maximum duration of 4 hours	Nausea and hypoglycemia most common. Doses are adjusted based on presentation of these side effects. Occasional vomiting, stomach pain, dizziness, indigestion.	Indicated for insulin treated type 2 diabetes or for type 1 diabetes. Contraindicated in patients with hypoglycemia unawareness, gastroparesis. Or poor adherence. Should never be mixed with insulin and should be injected separately. Reduce insulin dose by 50% when starting.	Requires patient testing of blood sugars before and after meals, frequent physician follow up, and thorough understanding of how to adjust doses of insulin and pramlintide. May reduce the rate of absorption of orally administered medication. Medications requiring threshold concentrations should be taken 1 hour prior to injection.
Sitagliptin (Januvia™)	DPP-4 inhibitor* Inhibits the DPP-4 enzyme that degrades GLP-1 and GIP resulting in 2-3 fold increased levels of these incretins. Increases insulin secretion in presence of elevated plasma glucose. Reduces post-meal glucagon secretion.	25mg, 50mg, 100mg tablets	100 mg po qd Moderate renal insufficiency (CrCl > 30 to < 50 mL/min): 50mg/day Severe renal insufficiency (CrCl < 30 mL/min): 25mg/day	Approximately 24 hours	Low incidence of side effects including hypoglycemia or gastrointestinal symptoms Headache, upper respiratory tract infection, nasopharyngitis	Not for use in type 1 diabetes. Assessment of renal function is recommended prior to initiation and periodically thereafter.	May be used as monotherapy or in combination with metformin or TZDs. Not associated with weight loss

Adapted from © 2006 The Diabetes Center, Old Saybrook, CT. Used with permission. \*DPP-4-dipeptidyl peptidase -4 GIP- glucose dependent insulinotropic polypeptide GLP-glucose like polypeptide  
ESRD-End Stage Renal Disease TZD-Thiazolidinedione

**Table 6. Hypoglycemia Treatment**

Agent	Primary Action	How Supplied/Storage	Typical Dosage	Duration Action	Side Effects	Precautions	Comments
Glucagon	Converts liver glycogen to glucose	1 mg vial with diluent; emergency kit, 1 mg vial with prefilled syringe of diluent. Before reconstitution, room temperature until expiration date. After reconstitution, may be stored for up to 48 hours under refrigeration.	0.5–2 mg subcutaneous	15 min, should be followed by carbohydrate snack.	Occasional nausea and vomiting	Must be reconstituted prior to injection. Should be followed by carbohydrate snack and blood glucose testing every 15 minutes until glucose level returns to acceptable levels.	Patient should be instructed to teach colleagues, family, etc. how to give injection. Only use if patient is unconscious or unable to eat or drink. All people taking insulin should receive a prescription for glucagon kit for emergency use.

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**Table 7. Recommended Control Measures**

Biochemical Index	Preprandial	Peak postprandial	A1C (ADA)*	Blood pressure	LDL	TG	HDL
Goal	90–130 mg/dL	<180 mg/dL	<7%	<130/80	<100	<150	>40

Adapted from © 2006 The Diabetes Center, Old Saybrook, CT. Used with permission. LDL=low density lipoprotein TG=triglycerides HDL=high density lipoprotein \*ADA—American Diabetes Association

# SECTION B

## Medications to Lower High Blood Pressure\*

Category	Generic Name	Brand Name™	Minimum Daily Dose	Maximum Daily Dose	Special Considerations for class of drugs
Angiotensin-converting enzyme (ACE) inhibitors	benazepril	Lotensin™	10 mg QD	40 mg QD or divided	May cause cough.  May increase potassium concentrations.  Do not use potassium or salt substitutes without consulting physician.  Do not use if pregnant or if trying to conceive.  Caution if creatinine > 1.5.
	captopril	Capoten™	25 mg divided dose	100 mg divided dose	
	enalapril	Vasotec™	5 mg QD	40 mg QD or divided	
	fosinopril	Monopril™	10 mg QD	40 mg QD or divided	
	lisinopril	Prinivil, Zestril™	10 mg QD	40 mg QD	
	moexipril	Univasc™	7.5 mg QD	30 mg QD or divided	
	perindopril	Aceon™	4 mg QD	8 mg QD	
	quinapril	Accupril™	10 mg QD	80 mg QD or divided	
ramipril	Altace™	2.5 mg QD	20 mg QD or divided		
Angiotensin II receptor blockers	trandolapril	Mavik™	1 mg QD	4 mg QD	May cause dizziness and upset stomach.  Do not use potassium or salt substitutes without consulting physician.  Do not use if pregnant or if trying to conceive.  Caution if creatinine > 1.5.
	candesartan	Atacand™	8 mg QD	32 mg QD or divided	
	eprosartan	Teveten™	400 mg QD	800 mg QD or divided	
	irbesartan	Avapro™	150 mg QD	300 mg QD	
	losartan	Cozaar™	25 mg QD	100 mg QD or divided	
	olmesartan	Benicar™	20 mg QD	40 mg QD	
	telmisartan	Micardis™	20 mg QD	80 mg QD	
valsartan	Diovan™	80 mg QD	320 mg QD		
Calcium channel blockers	amlodipine	Norvasc™	2.5 mg QD	10 mg QD	May cause constipation, dizziness, upset stomach, and flushing.  Call physician for shortness of breath, unusual heartbeat, or swelling of feet or hands.
	diltiazem	Cardizem LA™	120 mg QD	540 mg QD	
	diltiazem	Cardizem CD™	180 mg QD	420 mg QD	
	diltiazem	Dilacor XR™ *	180 mg QD	420 mg QD	
	diltiazem	Tiazac™	180 mg QD	420 mg QD	
	felodipine	Plendil™ *	2.5 mg QD	20 mg QD	
	isradipine	DynaCirc™ *	2.5 mg QD	10 mg QD	
	nicardipine	Cardene SR™ *	60mg in divided dose	120 mg divided dose	
	nifedipine	Adalat CC™ *	30 mg QD	60 mg QD	
	nifedipine	Procardia XL™ *	30 mg QD	60 mg QD	
	nisoldipine	Sular™ *	10 mg QD	40 mg QD	
	verapamil	Calan™	80 mg QD in divided dose	320 mg divided dose	
	verapamil	Calan SR™	120 mg QD	480 mg divided dose	
	verapamil	Covera HS™ *	120 mg QD	360 mg QD	
	verapamil	Isopstin™	80 mg QD in divided dose	320 mg divided dose	
	verapamil	Isopstin SR™ *	120 mg QD	480 mg QD or divided	
verapamil	Verelan™	80 mg QD in divided dose	320 mg divided dose		
verapamil	Verelan PM™	120 mg QD	360 mg QD		
Thiazides and related diuretics	bedroflumethiazide	Naturetin™	2.5 mg QD	20 mg QD	May increase blood glucose concentrations.  Take in morning to minimize diuretic effect at night.  May cause low potassium, need to monitor level.
	chlorothiazide	Diuril™	125 mg QD	500 mg QD or divided	
	chlorthalidone	Hygroton™	12.5 mg QD	25 mg QD	
	hydrochlorothiazide	HydroDIURIL™	12.5 mg QD	50 mg QD or divided	
	hydrochlorothiazide	Microzide™	12.5 mg QD	50 mg QD or divided	
	indapamide	Lozol™	1.25 mg QD	2.5 mg QD	
	methylothiazide	Enduron™	2.5 mg QD	5 mg QD	
	metolazone	Mykrox™	0.5 mg QD	1.0 mg QD	
metolazone	Zaroxolyn™	2.5 mg QD	5 mg QD		

\* Agents in a class of medicines share mechanisms of action, require similar precautions and generally have similar side effects.

CC= extended release XL=extended release SR=sustained release CR=controlled release CD=extended release XR=extended release PM=extended release, controlled onset HS=extended release, controlled onset Dosages based on JNC7 usual dose range.

## Medications to Lower High Blood Pressure\* (continued)

Category	Generic Name	Brand Name™	Minimum Daily Dose	Maximum Daily Dose	Special Considerations for class of drugs
Loop diuretics	bumetanide	Bumex™	0.5 mg QD	2 mg QD or divided	May cause low potassium. Need blood test to monitor level. (Parenteral drug available) May cause photosensitivity: sunscreen recommended.
	ethacrynic acid	Edecrin™	25 mg QD	200 mg divided dose	
	furosemide	Lasix™	20 mg QD	80 mg QD or divided	
	torseamide	Demadex™	2.5 mg QD	10 mg QD	
Potassium-sparing diuretics	amiloride	Midamor™	5 mg QD	10 mg QD	Do not use potassium or salt substitutes without consulting physician. Need to monitor potassium level.
	triamterene	Dyrenium™	50 mg QD or divided	100 mg divided dose	
Aldosterone receptor blockers	eplerenone	Inspra™	50 mg QD	100 mg divided dose	
	spironolactone	Aldactone™	25 mg QD	50 mg divided dose	
β-blockers	acebutolol	Sectral™	200 mg QD	800 mg divided dose	Intrinsic sympathomimetic activity. May alter blood glucose, may mask signs of low blood. Call physician for slow heart rate (< 60), confusion, or swelling of feet or legs. Can cause claudication. Do not discontinue abruptly.
	atenolol	Tenormin™	25 mg QD	100 mg QD	
	betaxolol	Kerlone™	5 mg QD	20 mg QD	
	bisoprolol	Zebeta™	2.5 mg QD	10 mg QD	
	carteolol	Cartol™	2.5 mg QD	10 mg QD	
	metoprolol	Lopressor™	50 mg QD	100 mg QD or divided	
	metoprolol	Toprol XL™*	50 mg QD	100 mg QD	
	nadolol	Corgard™	40 mg QD	120 mg QD	
	penbutolol	Levitol™	10 mg QD	40 mg QD	
	pindolol	Visken™	10 mg in divided dose	40 mg divided dose	
	propranolol	Inderal™	40 mg divided dose	160 mg divided dose	
	propranolol	Inderal LA™*	60 mg QD	180 mg QD	
α-blockers	timolol	Blocadren™	20 mg divided dose	40 mg divided dose	To prevent dizziness, avoid standing up suddenly, especially with the first few doses.
	doxazosin	Cardura™	1 mg QD	16 mg QD	
	prazosin	Minipress™	2 mg in divided dose	20 mg divided dose	
Combined α- and β-blockers	terazosin	Hytrin™	1 mg QD	20 mg QD	May mask signs of low blood glucose levels. Take with food to avoid stomach upset.
	carvedilol	Coreg™	12.5 mg divided dose	50 mg divided dose	
	labetalol	Normodyne™	200 mg divided dose	800 mg divided dose	
Direct vasodilators	labetalol	Trandate™	200 mg divided dose	800 mg divided dose	May cause headaches, fluid retention, or fast heart rate.
	hydralazine	Apresoline™	25 mg QD	100 mg divided dose	
Central α-agonists	midoxidil	Loniten™	2.5 mg QD	80 mg divided dose	Do not discontinue drug suddenly without consulting physician.
	clonidine	Catapres™	0.1 mg QD	0.8 mg divided dose	
	clonidine	Catapres TTS™* (patch)	0.1 mg Q week	0.3 mg Q week	
	methyl dopa	Aldomet™	250 mg divided dose	1,000 mg divided dose	
Peripheral Anti-adrenergics	guanfacine	Tenex™	0.5 mg QD	2 mg QD	May cause dizziness, nasal congestion, and depression.
	guanadrel	Hylorel™	10 mg in divided dose	75 mg divided dose	
	guanethidine	Ismelin™	10 mg QD	50 mg QD	
	reserpine		0.1 mg divided dose	0.25 mg divided dose	

\* Agents in a class of medicines share mechanisms of action, require similar precautions and generally have similar side effects.  
XL = extended release LA = long acting

Note: There are many combination medications for the control of blood pressure. The indications and caveats are the same for each individual component.

### For all anti-hypertensives:

- Ask pharmacist before using OTC products.
- Monitor blood pressure regularly.
- To prevent dizziness, advise patient to stand up slowly. If dizziness persists, refer to health care provider.

### Information about high blood pressure can be found at the following Web sites:

Health care professionals: <http://www.nhlbi.nih.gov/health/prof/heart/index.htm>

Information for people with diabetes: <http://www.nhlbi.nih.gov/hbp>

Drugs used to treat high blood pressure: <http://www.nhlbi.nih.gov/guidelines/hypertension/express.pdf>

# SECTION C

## Medications for the Treatment of Dyslipidemia

Category	Generic Name	Brand Name	Minimum Daily Dose	Maximum Daily Dose	Special Considerations for class of drugs
HMG-CoA reductase inhibitors (statins)	atorvastatin	Lipitor™	10 mg QD	80 mg in divided doses	<p>Main action: Lowers LDL ("bad") cholesterol. Also lowers TG and modestly raises HDL.</p> <p>Have blood tests for liver enzyme concentrations.</p> <p>Notify physician if muscle aches or weakness develops.</p> <p>Use caution if combined with fibric acid derivatives due to the increased risk of rhabdomyolysis.</p>
	fluvastatin	Lescol™	20 mg QD	80 mg in divided doses	
	fluvastatin	Lescol XL™	80 mg QD	80 mg in divided doses	
	lovastatin	Mevacor™	10 mg QD	80 mg in divided doses	
	lovastatin (extended-release)	Altocor™	20 mg QD	60 mg QD	
	pravastatin	Pravachol™	10 mg QD	80 mg QD	
	rosuvastatin	Crestor™	5 mg QD	40 mg QD	
	simvastatin	Zocor™	5 mg QD	80 mg in divided doses	
Cholesterol absorption inhibitors	ezetimibe	Zetia™	10 mg QD	10 mg QD	<p>Main action: Lowers LDL cholesterol; inhibits absorption of cholesterol.</p> <p>If used with a statin, take together.</p> <p>If used with bile acid sequestrant, ezetimibe should be taken 2 hr before or 4 hr after bile acid sequestrant.</p>
Nicotinic acid (niacin)	nicotinic acid (extended release)	Niaspan™	50–100 mg QD	2,000 mg QD	<p>Main action: Lowers LDL cholesterol increases HDL ("good") cholesterol, lowers triglycerides.</p> <p>Take with food.</p> <p>May cause flushing.</p> <p>May increase blood glucose levels.</p> <p>Have blood tests for liver enzyme concentrations.</p> <p>Long-acting forms may be more likely to cause liver malfunction.</p>
	nicotinic acid		250 mg/day QD	<p>Titrated up to 1500mg therapeutic dose in 3 divided doses.</p> <p>Maximum dose= 3000mg</p>	
Lipid combinations	lovastatin-niacin	Advicor™	20 mg/500 mg QD	40 mg/2,000 mg QD	Main Action: Reduces LDL, TC, and TG and increases HDL due to the individual actions of niacin and lovastatin.
	simvastatin-ezetimibe	Vytorin™	10 mg/10 mg QD	80 mg/10 mg QD	Main Action: Reduces LDL cholesterol.
	Amlodipine + atorvastatin	Caduet™	2.5mg/10mg QD	10 mg/80 mg QD	Blood Pressure medication (Calcium channel blocker (see Blood pressure med chart) + lipid (statin) medication. Same comments as individual
Fibric acid derivatives	fenofibrate	Tricor™	48 mg QD	145 mg QD	<p>Main action: Lowers triglycerides, increases HDL cholesterol.</p> <p>Perform blood tests for liver enzyme concentrations.</p> <p>Adjust dose based on age and renal impairment.</p> <p>Notify physician if muscle aches or weakness develops.</p>
	fenofibrate	Lofibra™	67 mg QD	200 mg QD	
	fenofibrate	Triglide™	50 mg QD	160 mg QD	
	fenofibrate	Antara™	43 mg QD	130 mg QD	
	gemfibrozil	Lopid™	1,200 mg BID	1,200 mg BID	
Bile acid sequestrants	cholestyramine	LoCHOLEST™	4 g QD	24 g in divided doses	<p>Main action: Lowers LDL cholesterol.</p> <p>May cause constipation and stomach upset.</p> <p>May need to be taken at a different time than other medications to avoid drug interactions.</p> <p>May increase triglycerides blood concentrations.</p> <p>Can be combined with other agents such as statins.</p>
	cholestyramine light	LoCHOLEST light™	4 g QD	24 g in divided doses	
	cholestyramine	Questran™	4 g QD	24 g in divided doses	
	cholestyramine light	Questran light™	4 g QD	24 g in divided doses	
	cholestyramine	Prevalite™	4 g QD	24 g in divided doses	
	cholestipol	Colestid™	2g QD or BID	6g QD or BID	
	colesevelam	Welchol™	1,875 mg (3 tablets) QD	4,375 mg (7 tabs) QD or BID	

HMG-Coa = 3-hydroxy-3-methylglutaryl coenzyme A    LDL = low-density lipoprotein    HDL = high-density lipoprotein    TC = total cholesterol  
 TG = plasma triglycerides    generic = generic drug manufacturers



The U. S. Department of Health and Human Services' National Diabetes Education Program (NDEP) is jointly sponsored by the National Institutes of Health and the Centers for Disease Control and Prevention with the support of more than 200 partner organizations.

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