

Diabetes Medication Reference for Clinicians

This table provides clinicians a brief overview of examples of medications used to treat diabetes. This is not a complete list and **is not** intended to be used as a sole reference.

Nursing responsibilities with ALL diabetes medications: Emphasize importance of self-monitoring of blood glucose (SMBG); teach to be aware of signs/symptoms of allergic reactions; teach to be aware of possible side effects and contraindications; and monitor A1C levels.

Oral Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities
Biguanide <ul style="list-style-type: none"> metformin (Glucophage, Glucophage XR, Glumetza, Fortamet, Riomet) Multiple combinations with other classes First line therapy for type 2 diabetes; current recommendation is to start upon diagnosis 	<ul style="list-style-type: none"> Lowers glucose levels by decreasing the amount of glucose produced by the liver Increases glucose uptake in muscle cells Improves hyperglycemia & hypertriglyceridemia in obese patients with diabetes; may promote weight loss 	<ul style="list-style-type: none"> Anorexia, nausea, vomiting, diarrhea - usually occurs during initiation of the drug Vitamin B-12 deficiency Lactic acidosis (severe but rare) Should not cause hypoglycemia as monotherapy 	<ul style="list-style-type: none"> Renal disease Liver failure or alcohol abuse (can result in lactic acidosis) Temporarily held on day of procedures with dye and withheld 48 hours after the procedure; restart after confirmation of renal function 	Patient education: <ul style="list-style-type: none"> Take with food Keep appointments for regular kidney function lab tests Avoid alcohol Report abnormal glucose levels Report s/s lactic acidosis (weakness, drowsiness, malaise)

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Oral Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities
<p>Sulfonylureas 2nd generation</p> <ul style="list-style-type: none"> glyburide (DiaBeta, Glynase, Micronase) glipizide (Glucotrol, Glucotrol XL) glimepiride (Amaryl) 	<ul style="list-style-type: none"> Stimulates pancreatic beta cells to release insulin 	<ul style="list-style-type: none"> Hypoglycemia (especially with elderly and patients with cardiovascular disease) Weight gain of 2-3 kg “Antabuse”-like response if consumed with alcohol 	<ul style="list-style-type: none"> Sulfa allergy Severe liver or kidney impairment 	<ul style="list-style-type: none"> Assess for sulfa allergy <p>Patient education:</p> <ul style="list-style-type: none"> Take at same time daily 30 minutes before meal except XL Take with food Avoid alcohol
<p>Alpha-glucosidase inhibitors (AGIs)</p> <ul style="list-style-type: none"> acarbose (Precose, Glucobay) miglitol (Glyset) 	<ul style="list-style-type: none"> Lowers postprandial rise in blood sugar by delaying absorption of carbohydrates from intestines 	<ul style="list-style-type: none"> Flatulence Diarrhea Abdominal distention 	<ul style="list-style-type: none"> End-stage kidney disease GI disorders 	<p>Patient education:</p> <ul style="list-style-type: none"> Take with first bite of main meal Be aware GI side effects usually decrease with continued therapy If used with other hypoglycemic agents, inform patient to treat hypoglycemia with faster acting glucose (glucose tabs or Lifesavers) instead of sucrose (white table sugar)

Oral Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities
Dipeptidyl Peptidase-4 (DPP-4) Inhibitors <ul style="list-style-type: none"> saxagliptin (Onglyza) sitagliptin (Januvia) linagliptin (Tradjenta) alogliptin (Nesina) Multiple combinations with other classes 	<ul style="list-style-type: none"> Reduces postprandial rise in blood glucose by preventing the breakdown of GLP-1 (GLP-1 reduces glucose), which in turn stimulates insulin synthesis and decreases glucagon secretion Minimal to no weight gain 	<ul style="list-style-type: none"> Upper respiratory tract infection Sore throat Headache Sitagliptin has been associated with pancreatitis Increased risk of hypoglycemia when used in combination with other diabetes drugs 	<ul style="list-style-type: none"> Use with caution in patients with heart failure 	Patient education: <ul style="list-style-type: none"> Be aware of and report s/s of pancreatitis (abdominal pain, nausea/vomiting) Inform that severe and disabling joint pain may occur
Meglitinides <ul style="list-style-type: none"> repaglinide (Prandin) nateglinide (Starlix) 	<ul style="list-style-type: none"> Increases insulin release in response to food ingestion 	<ul style="list-style-type: none"> Hypoglycemia Weight gain 	<ul style="list-style-type: none"> Caution with hepatic or renal impairment 	Patient education: <ul style="list-style-type: none"> Take within 15-30 minutes of a meal and skip/add dose if meal is skipped/added Keep appointments for regular kidney function lab tests
Sodium-glucose co-transporter 2 (SGLT2) inhibitors <ul style="list-style-type: none"> canagliflozin (Invokana) dapagliflozin (Farxiga) empagliflozin (Jardiance) 	<ul style="list-style-type: none"> Blocks reabsorption of glucose by the kidney, increases glucose excretion 	<ul style="list-style-type: none"> Hypotension, especially with older people, those with impaired renal function, and those receiving diuretics Urinary tract infection (UTI) Vaginal candidiasis 	<ul style="list-style-type: none"> Kidney disease Ketoacidosis Moderate or severe renal impairment Active bladder cancer 	Patient education: <ul style="list-style-type: none"> Be aware of and report s/s UTI Keep appointments for regular kidney function lab tests Encourage self-monitoring of BP if at risk for hypotension

Oral Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities
Thiazolidinediones (TZDs) <ul style="list-style-type: none"> rosiglitazone (Avandia) pioglitazone (Actos) 	<ul style="list-style-type: none"> Decreases insulin resistance and improves uptake in muscle and fat cells Decreases glucose production in the liver Pioglitazone increases HDL levels and lowers triglycerides 	<ul style="list-style-type: none"> Weight gain and edema Abnormal liver function tests Actos may increase risk of bladder cancer (FDA Black Box warning) 	<ul style="list-style-type: none"> May cause or worsen heart failure (FDA Black Box warning) Active liver disease 	Patient education: <ul style="list-style-type: none"> Monitor weight regularly Be aware of and report s/s heart failure Keep appointments for regular kidney function lab tests

Injectable Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities
Amylin mimetics <ul style="list-style-type: none"> pramlintide (Symlin) 	<ul style="list-style-type: none"> Used with insulin Slows food digestion Reduces glucose production from liver May suppress hunger 	<ul style="list-style-type: none"> Hypoglycemia; Nausea Headache Irritation at injection site Weight loss Severe hypoglycemic risk 3 hours after injection (FDA Black Box warning) 	<ul style="list-style-type: none"> Pregnancy History of frequent hypoglycemia Confirmed diagnosis of gastroparesis 	Patient education: <ul style="list-style-type: none"> Monitor blood glucose 3 hours after injection Know that nausea/vomiting may occur when first starting this medicine

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Injectable Medication	Action	Possible Side-effects	Contraindications	Nursing Responsibilities		
GLP-1 Agonist (Incretin mimetics) <ul style="list-style-type: none"> • exenatide (Byetta) • exenatide extended release (Bydureon) - once weekly dosing • liraglutide (Victoza) • dulaglutide (Trulicity) - once weekly dosing • albiglutide (Tanzeum) - once weekly dosing 	<ul style="list-style-type: none"> • Stimulates release of insulin • Reduces glucose production from liver • Slows food digestion • Used with metformin and sulfonylureas • May suppress hunger 	<ul style="list-style-type: none"> • Nausea or vomiting • Headache • Dizziness • Hypoglycemia, especially if used with sulfonylureas • Weight loss 	<ul style="list-style-type: none"> • Kidney disease • Type 1 diabetes • Pregnancy • Stomach or digestive problems • Victoza and Bydureon have increased risk of thyroid C-cell tumor (FDA Black Box warning) 	Patient education: <ul style="list-style-type: none"> • Know that nausea is usually worse during first few weeks of treatment and gets better over time • Keep appointments for regular kidney function lab tests • Explain extended release may form small lumps at injection site which absorb as the medicine is released 		
Insulin Type	Onset*	Peak*	Duration*	Action	Side Effects	Nursing Responsibilities
Rapid-Acting <ul style="list-style-type: none"> • lispro (Humalog) • aspart (NovoLog) • glulisine (Apidra) 	<15 minutes	lispro (Humalog) =30-60 min aspart (NovoLog) =1-3 hrs glulisine (Apidra) =1-2 hrs	3-6 hours	<ul style="list-style-type: none"> • Bolus insulin • Used with meals • Often used with basal rate • Less chance of hypoglycemia after meals due to shorter duration 	Primary side effect of all insulin <ul style="list-style-type: none"> • Hypoglycemia, particularly during peak effect times 	Patient Education for all insulin: <ul style="list-style-type: none"> • Know type of insulin being used, including onset, peak and duration of action • Teach/observe injection technique, site rotation • Emphasize importance of SMBG • Teach proper storage of insulin • Have sick-day plan • Teach treatment
Short-Acting <ul style="list-style-type: none"> • Regular <ul style="list-style-type: none"> ○ Novolin R ○ Humulin R 	30 minutes	2-3 hours	4-10 hours	<ul style="list-style-type: none"> • Coverage for meals eaten within 30-60 minutes 		

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Injectable Medication	Action			Possible Side-effects	Contraindications	Nursing Responsibilities
Intermediate-Acting <ul style="list-style-type: none"> NPH <ul style="list-style-type: none"> Novolin N Humulin N 	2-4 hours	4-8 hours	10-18 hours	<ul style="list-style-type: none"> Coverage for later-half the day or overnight Often used with short-acting insulin 		<ul style="list-style-type: none"> Teach to inspect injection sites for lipodystrophy (loss of fatty tissue at sites)
Long-Acting <ul style="list-style-type: none"> Insulin glargine (Lantus) 	3-4 hours	Steady delivery (no peak)	20-24 hours	<ul style="list-style-type: none"> Basal insulin Used for 24-hour coverage 		
<ul style="list-style-type: none"> Insulin detemir (Levemir) 	3-4 hours	3-14 hours	6-24 hours			
<ul style="list-style-type: none"> Insulin degludec (Tresiba) available in U100 and U200 	30-90 minutes	Steady delivery (no peak)	Up to 42 hours			
<ul style="list-style-type: none"> U300 insulin glargine (Toujeo) 	2-4 hours	6-8 hours	≤ 24 hours	<ul style="list-style-type: none"> Basal insulin (<u>more concentrated</u> than Lantus) Taken once a day 		
Pre-Mixed <ul style="list-style-type: none"> Humulin 70/30 Novolin 70/30 Humalog 50/50; 75/25 NovoLog 70/30 	5-15 minutes	Varies	10-16 hours	<ul style="list-style-type: none"> Convenient combination but no flexibility with individual insulin doses Taken 2-3 times a day prior to meals 		

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<ul style="list-style-type: none"> Insulin degludec/insulin aspart 70/30 (Ryzodeg) 	5-15 minutes	Varies	10-16 hours	<ul style="list-style-type: none"> Helps lower A1c Decreases hypoglycemia episodes Taken once or twice daily depending on need of meal time insulin 		

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Inhaled Insulin	Onset*	Peak*	Duration*	Action	Side Effects	Nursing Responsibilities
Afrezza (regular human insulin)	15 minutes	1 hour	3 hours	<ul style="list-style-type: none"> • Bolus-rapid acting insulin used before meals 	<ul style="list-style-type: none"> • Hypoglycemia • Cough • Throat irritation • Risk of acute bronchospasm in patients with chronic lung disease 	<ul style="list-style-type: none"> • Emphasize importance of keeping regularly scheduled exams to assess for chronic lung diseases such as asthma or COPD • Teach how to use inhaler correctly

**Onset, Peak and Duration may vary with individuals. Patient self-monitoring blood glucose logs will help determine individual responses.*

References:

[AHRQ \(2015\)](#); [ADA: Oral Medications \(2015\)](#); [ADA: Insulin Basics \(2015\)](#); [ADA Standards of Medical Care in Diabetes -2016, \(2016\)](#); [Mayo Clinic: Type 2 Diabetes \(2014\)](#); [NDIC: Amylin Mimetic \(NIDDK\) \(2013\)](#); [NDIC: Incretin Mimetic \(NIDDK\) \(2013\)](#); [Papadakis & McPhee \(2013\)](#); [U.S. FDA \(2013\)](#)