

Diabetes Medicine Update – January 2012

The information in this handout replaces the pages on “Diabetes Medicines” and “Insulin and Other Injectable Medicines” in the booklet, Learning to Live Well with Diabetes, 2009. It is not intended to replace the advice of your medical providers.

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WHAT YOU SHOULD KNOW ABOUT YOUR DIABETES MEDICINE

Diabetes medicines lower your blood sugar. The different types are:

- Sulfonylureas (sul-fah-nil-yoo-ree'-ahs) help your body make more insulin.
- Meglitinides (Meh-gli'-ti-nides) also help the body make more insulin. They are shorter acting than sulfonylureas and are especially active after meals.
- Biguanides (by-gwan'-ides) make sure that your liver does not make too much sugar and helps your body use insulin better.
- Thiazolidinediones (thy-ah-zo'-li-deen-dye'-owns) (*TZDs* or *glitazones*) help your muscles make better use of your insulin while also decreasing the sugar made in the liver.
- Dipeptidyl dipeptidase-4 (DPP-IV) inhibitors help to improve the levels of insulin after a meal and decrease the amount of sugar that the body makes.
- Dopamine agonists lower blood sugar without raising insulin levels. The cause of this effect is unknown.
- Sodium-Dependent Glucose Transporters-2 (SGLT-2) inhibitors increase the amount of glucose (sugar) in urine causing more glucose to be excreted. *Note: At least one drug in this class may be approved by the FDA in 2012.*
- Bile Acid Sequestrants lower blood sugar and cholesterol. The cause of the blood sugar lowering is unknown.

WHAT TO DO

Most medicines should be taken at about the same time each day. Medicines should be taken as directed. Talk with your medical provider, diabetes educator, or pharmacist:

- About what the medicine is supposed to do in your body
- About when to take your medication
- About what you should do if you miss a dose
- About possible side effects of the medicines
- Before stopping any of your medications
- Before you start any herbal medicines or dietary supplements

TIPS to Help Your Medicines Help You

The medicines you take help you stay healthy and keep your blood sugar in good control. Work in partnership with your medical provider to make sure you get the best results. Here are some tips:

- Take your medications on time and in the correct amounts.
- If you want to stop taking a medicine or cut down the amount for any reason, discuss it with your medical provider first.
- Tell your medical provider about all the medicines you use, even over the counter products, vitamins, and supplements.
- Keep an up-to-date list of your medicines to take with you to all medical appointments. Keep the list posted in a place that's easy to notice, inside a kitchen cabinet or on the back of your door as well as in your wallet or purse.
- Keep all of your medicines in labeled containers.
- Keep your medications stored away from heat or humidity.
- If you forget to take your medicine, do not double up on your next dose.
- Do not share medications with friends or family.
- Try to obtain all of your medications from one pharmacy.

HELP FOR AFFORDING MEDICATIONS

Do you struggle with the cost of your diabetes drugs? They can be hard to pay for. Sometimes people skip taking their medicine because of the cost. Be sure to let your medical provider know if this is a problem for you. You may be eligible for financial assistance with your medication.

Refer to the list below for some resources:

Healthy Vermonters Prescription Drug Program

This program is for those who have no insurance for prescription medicines or those who do not have enough income to pay for medicines. Call 1-800-250-8427.

Medicare Part D

Medicare provides a prescription drug plan regardless of income, health status, or prescription drug usage. Go to www.medicare.gov or call 1-800-633-4227. Contact your

local State Health Insurance and Assistance Program regional coordinator at your Area Agency on Aging to guide you through the plan selection process.

Veteran's Administration

Call 1-866-687-8387.

Partnership for Prescription Assistance (PPARx)

PPARx is a one-stop site for applying for free or low cost medications from drug manufacturers. It is a national program. They will determine if you are eligible for programs from the drug manufacturers or from other plans. More info is available at 1-888-477-2669 or visit www.pparx.org.

Oral Diabetes Medicines

DIABETES DRUGS	GENERIC NAME	BRAND NAME	SIDE EFFECTS	COMMENTS
Sulfonylureas	Glimepiride* Glyburide*	Amaryl Glynase Micronase Diabeta	Low blood sugar, weight gain	Take with meal. Should not be taken if you have an allergy to sulfa antibiotics. May cause low blood sugar if taken with sulfa antibiotics. Glipizide should be taken on an empty stomach before meals.
	Glipizide* Glipizide XL*	Glucotrol Glucotrol XL		
Meglitinides	Repaglinide Nateglinide*	Prandin Starlix	Low blood sugar, weight gain	Should be taken within 30 minutes before a meal. You must eat if you have taken a dose.
Biguanides	Metformin*	Glucophage Glucophage XR Fortimet Glumetza Riomet Solution	Diarrhea, nausea	Take with food; does not cause weight gain. Occasional kidney function test needed; caution if patient is over 80 years or has heart failure. May cause vitamin B12 deficiency.
Thiazolidinediones (TZD or glitazone)	Pioglitazone** Rosiglitazone*	Actos Avandia	Weight gain, fluid buildup, may stop birth control pills from working	Take at same time every day. Does not need to be taken with meals. Occasional liver function test required. May increase risk of bone fracture. Avandia should not be used with insulin or nitrates and may increase risk of heart attack. Avandia is not available in community pharmacies and its use is restricted. Neither should be used if patients have specific types of congestive heart failure. Actos has been associated with increased risk of bladder cancer.
Alpha Glucosidase Inhibitors	Acarbose Miglitol	Precose Glyset	Bloating, gas	"Starch blocker". Take with first bite of meal up to 4 times daily.
DPP-IV Inhibitors	Sitagliptin Saxagliptin Linagliptin Alogliptin***	Januvia Onglyza Tradjenta Nesina	Common cold, swelling nasal passages	None are approved to be used with insulin or other injectable drugs for diabetes.
Dopamine agonists	Bromocriptine	Cycloset	Nausea, fatigue	Not approved for use with insulin. Starting doses are slowly increased over several weeks. Should not be used by nursing mothers.
Sodium-Dependent Glucose Transport Inhibitors-2 (SGLT-2)	Dapagliflozin	To be announced		It is anticipated that the first of several SGLT-2 medications will be available in 2012. They should be available to patients with type 1 & type 2 diabetes.

Oral Diabetes Medicine Continued

DIABETES DRUGS	GENERIC NAME	BRAND NAME	SIDE EFFECTS	COMMENTS
Other Combination Drugs	Metformin/glipizide	Metaglip	Same side effects as the individual drugs	Should be taken 30 minutes before meals
	Sitagliptin/simvastatin	Juvisync		Should be taken after evening meal
	Metformin/glyburide*	Glucovance		All below should be taken at mealtime
	Metformin/rosiglitazone*	Avandamet		
	Metformin/pioglitazone**	Actoplus Met		
	Metformin/pioglitazone extended release**	Actoplus Met XR		
	Metformin/sitagliptin	Janumet		Take with the first meal of the day
	Metformin/saxagliptin	Kombiglyze XR		
Rosiglitazone/glimepiride*	Avandaryl			
Pioglitazone/glimepiride**	Duetact	To be announced		
Alogliptin/pioglitazone***	To be announced			
Bile acid sequestrant	Colesevelam	Welchol	Constipation, nausea	Reduces blood sugar & cholesterol; do not use if you have extremely high triglycerides or patients with previous bowel obstructions.

* generic version available currently
availability 2012

**anticipated generic availability August, 2012

***expected approval and

WHAT YOU SHOULD KNOW ABOUT INSULIN

Insulin helps lower blood sugar by moving sugar from the blood into the cells of your body. Once inside the cells, sugar provides energy. If your body doesn't make enough insulin, you will need to use insulin by injections (shot) or infusion (insulin pump machine). Insulin may cause weight gain in some people. Risk of low blood sugar (hypoglycemia) may increase with insulin use.

There are different types of insulin. Some work very quickly while some are longer acting. Often people use two different types of insulin to manage their blood sugars around the clock and at mealtime. All insulins help to lower blood sugar. How fast insulin works depends on:

- Your body's response to insulin
- The type of insulin you use
- Your level of physical activity

Insulin's strength is measured in units. The majority of insulins in the United States are U-100 strength. Outside of the United States, some countries have U-40 (a weaker concentration) as well. Veterinarians in the United States use U-40 made to treat dogs and cats. Be sure to compare the name and strength of the vial or pen you purchase with the vial or pen you have been using.

Insulin syringes come in different sizes based on the number of doses (also called units) that they can hold. Common syringe sizes are 25 units, 30 units, 50 units, and 100 units. Syringes are used with vials of insulin. Most insulins are also available in dial-up pens. These pens have a dosing knob that is turned to get the correct dose of units in 1-unit increments. Some pens measure in half-unit increments for patients using very small doses of insulin. Pens are convenient and offer privacy. Some patients use insulin pumps to provide insulin usage all day plus extra insulin at mealtime.

U-500 INSULIN

U-500 Regular insulin is a concentrated version of Regular U-100 insulin. It is 5 times stronger than most insulins and is used with patients that need very high doses of insulin. Patients using U-500 Regular insulin will still have to use U-100 syringes. It is important to realize that insulin drawn up to 5 units on the syringe equals 25 units of U-500. Always double check the concentration of the Regular insulin you receive from the pharmacy (U-

500 versus U-100) as the two insulins are not interchangeable. If you have other insulins at home, separate the insulins so the U-100 insulin will not be used accidentally. A pharmacist, diabetes educator, or your medical provider can work with you to make the dosing easier.

WHAT TO DO

Developing an insulin plan that fits your lifestyle is an important part of managing your diabetes. Your plan should control blood sugar to the goals set by your medical providers. Work with them to find the right match for you.

Your diabetes educator is key to learning:

- How to draw up insulin
- How to give insulin shots
- What special precautions to take when you are exercising or traveling

It is important to take the exact amount of insulin that you need.

Insulin may be prescribed in addition to diabetes pills or may be used alone. Insulins may be started with just 1 shot daily but many people take 3 or more shots per day to get the best results. Sometimes people use 2 different kinds of insulin to help achieve better results. The dose is based on daily blood sugar results.

Check the expiration date on your insulin. Once opened, insulin vials generally have a shelf life of 28-42 days at room temperature, but insulin pens, once started, can be safe to use from 10 to 42 days. Ask your pharmacists or diabetes educator if you are not sure. When you open a new vial of insulin or start a new pen, mark that date on the container and then throw the insulin away when you reach the end of the shelf life, regardless of whether there is any insulin left.

Using old insulin may not give you the glucose lowering effect you expect. If you get several vials of insulin or boxes of insulin pens at once, keep the unopened vials or pens in the refrigerator. Do NOT freeze.

Keep insulin away from temperature extremes of heat and cold. If it is very hot, you should keep your insulin cool by storing it in an insulated container.

TIPS for Using Insulin

Insulin lowers your blood sugar whether you eat or not. The insulin you take and the food you eat must be balanced. Do not skip meals otherwise you can develop low blood sugar. Low blood sugar needs to be treated right away (see *High and Low Blood Sugar* in the booklet, *Learning to Live Well with Diabetes*).

Usually insulin given in the belly is absorbed the fastest. If you will be doing exercise using the arm(s) or leg(s), it is better to give insulin in an area not being directly exercised. Otherwise, the insulin will be used faster. For example, if you are playing tennis, don't inject the arm with which you swing the racquet. It is better to not take the insulin just before a warm bath or shower since the heat will cause the insulin to be absorbed faster.

If you have been taking multiple daily shots of insulin, counting your carbs, and checking your blood sugar often, you might want to consider an insulin pump. An insulin pump is a small device that delivers a steady amount of background (basal) insulin over a 24 hour period with additional (bolus) insulin given to cover meals and snacks. The pump delivers insulin through a thin tube directly into the skin. Many people like the flexibility that an insulin pump provides. If you think this is something you might like, talk to your diabetes educator or medical provider.

HOW MUCH INSULIN?

Insulin comes in a variety of vials of different sizes, cartridges, and pens. One ml (milliliter) of U100 insulin = 100 units. A typical 10ml vial of insulin contains 1000 units. If you are using much less insulin than 1000 units per month you might consider choosing an insulin that is available in 3ml (300 unit) vials such as Humalog, Humulin N, or Humulin R U-100. Insulin pens are also prefilled as 300 units each and come as part of a box of 5 pens (total 1500 units). Insulin cartridges that are used in non-disposable pens also come as 300 units each in a box of 5 cartridges (total 1500 units).

Insulins

GENERIC NAME	BRAND NAME	BEGINS WORKING	WORKS HARDEST (peaks)	STOPS WORKING	COMMENTS
Lispro- very short acting	Humalog	10-15 minutes	30-90 minutes	4-5 hours	Should be taken just before eating or at the end of a meal; looks clear in vial; approved for insulin pumps.
Aspart- very short acting	Novolog	10-20 minutes	40-50 minutes	3-5 hours	Should be taken just before (5-10minutes) eating meal; looks clear in vial; approved for use in insulin pumps.
Glulisine- very short acting	Apidra	10-15 minutes	60-120 minutes	3-4 hours	Should be taken just before eating or within 20 minutes after finishing eating; looks clear in vial; approved for use in insulin pumps
Regular- short acting	Humulin R Novolin R	30-60 minutes	2-4 hours	6-9 hours	Given near mealtime (30 minutes before eating); looks clear in vial, when combining Regular with NPH, draw the Regular insulin first then NPH.
NPH- moderate acting	Humulin N Novolin N	2- 4 hours	4-8 hours	12-16 hours	Usually taken in morning and/or before bed. Looks cloudy in bottle but there should be no clumps.
Glargine- long acting	Lantus	2-4 hours	All day	Up to 24 hours	Do not mix with other insulins; may sting after injection; some patients require two shots daily. Looks clear; discard after 28 days.
Detemir- long acting	Levemir	2-4 hours	All day	Up to 24 hours	Do not mix with other insulins; looks clear in vial; discard after 42 days; may require two shots daily
Degludec- ultra long acting*	Degludec	To be announced	To be announced	Up to 42 hours	Should be injected daily
Pre-mixed: a mixture of long and very short acting insulins	Humalog Mix 75/25	5-15 minutes	4-8/1-2 hours	Up to 24 hours	Should be injected just before eating a meal; usually dosed once or twice daily.
	Humalog Mix 50/50	5- 15 minutes	4-8/1-2 hours		
	Novolog 70/30	10- 20 minutes	1-4 hours		
Pre-mixed: A mixture of long and short acting insulins	Humulin 70/30	30-45 minutes	4-8/ 2-3 hours	Up to 18 hrs	Should be injected 30 minutes before the start of a meal; usually dosed once or twice daily.
	Humulin 50/50	30-60 minutes	2-8 hours	Up to 18 hrs	
	Novolin 70/30	30 minutes	2-12 hours	Up to 24 hrs	
Pre-mixed: Aspart-rapid acting and Degludec ultra long acting*	DegludecPlus 70/30	To be announced	To be announced	Up to 42 hrs	
Regular U-500	Humulin R U-500	30 minutes		24 hours or longer	***High Concentration Insulin that is 5 times stronger than U-100 Regular insulin. Should not be used with other insulins; clear in large 20ml vial; patient or caregiver should be trained by pharmacist, diabetes educator, or medical provider to draw up dose.

*Expected approval and availability 2012

Other Injectable Medicines

MEDICINE	BRAND NAME	SIDES EFFECTS	COMMENTS
Pramlintide	Symlin	Slight nausea hypoglycemia	Decreases appetite. Slows stomach emptying. May use with insulin; not approved to be used with other diabetes medicines; may need less insulin; available in prefilled pens only.
Exenatide Liraglutide	Byetta Victoza	Nausea, hypoglycemia	Promotes weight loss; helps lower blood sugars especially after meals; other diabetes medicine doses may need to be decreased; exenatide can be used with insulin glargine (Lantus); exenatide should not be used for patients with a history of pancreatitis; both come as prefilled pens.
Exenatide Extended Release	Bydureon*	Nausea Hypoglycemia	Injected once weekly; see Exenatide above for other comments.
Glucagon	Glucagon Glucagen		Used as a "rescue" medicine by caregiver or medical professional as treatment for severe low blood sugars (hypoglycemia).

*Expected approval and availability in 2012