

Instructor's Notes

To present this workshop, the Instructor should have a good and current understanding of diabetes and diabetes medications.

Pass out the *Insulin and Diabetes Pills* pamphlet. Have participants look at it and fill it out while they wait.

It is recommended that basic diabetes information be made available. Go to www.dagc.org under the "management" tab on the left side to download the following: *What is diabetes?*; *Testing Your Blood (Sugar)*; *Diabetes and Food*; *Exercise*

Medications and Diabetes

A “survival skills” presentation
developed by the
Diabetes Association
of Greater Cleveland

Knowing about your diabetes medicine is a survival skill. This presentation about diabetes medications is designed to help you better understand your diabetes medicines.

Remind people to fill out the ***Insulin and Diabetes Pills*** pamphlet.

As you can see, there are many types of diabetes pills and insulin. Some of the names are hard to pronounce. Some of the names sound a lot alike. As we go through this presentation, you will see why it is so important to know about the medicine you are taking.

What is diabetes?

- A disease that affects the way your body uses the food you eat for energy
- Diabetes happens when:
 - TYPE 1
 - Your body does not make any insulin
 - Your body does not make enough insulin
 - TYPE 2
 - Your body does not use the insulin it makes the right way

In people with type 1 diabetes, the body no longer makes insulin. Insulin must be taken by injections, or with an insulin pump.

Let's review the 2 main problems that happen in the body with Type 2 DM.

Often, type 2 diabetes starts with the problem of **insulin resistance**. Insulin resistance means that the muscle cells **resist** the insulin that the body makes. Insulin is like a key that opens the doors of the cells so that glucose (sugar) in the blood can get into the cells and be used for energy. Insulin resistance usually develops slowly over time, often without any symptoms present.

When glucose stays in the blood and gets higher and higher, a signal is sent to the brain. The brain tells the pancreas to make more insulin. The pancreas then works extra hard to make more and more insulin. Over time, the pancreas becomes 'worn out' and starts to make less and less insulin. That is the second main problem in Type 2 DM.

There is another problem that often happens in people with Type 2 DM. It involves the liver. When your body breaks down carbohydrates that you have eaten, part is used for energy for muscles. Some is changed and gets stored as fat. There is also a part that is stored for 'emergency' use in the liver. It is called glycogen. In a person without diabetes, glycogen is released in small amounts into the blood stream when the person's blood sugar starts to get slightly lower, often overnight when they have not eaten anything for a long time. By releasing small amounts of glycogen, the body keeps blood glucose levels even.

Diabetes Pills

How many of you
are taking diabetes pills?

Lead in to oral medications. **How many people are taking diabetes pills?**

The pills you take for your diabetes are not insulin in a pill form. These pills help to control or manage blood sugar levels in different ways.

There are several different groups or 'classes' of pills. Each class works on a different problem in the body that is causing high blood sugar. That is why you may need more than one pill for your diabetes.

The next few slides will talk about these different groups of pills.

Things you should know about your pill medicines

- Name (brand name and generic name)
- How fast it works
- When to take
- How to take (food vs empty stomach)

Here are some basic things you should know about the pill medicines that you may be taking.

Name

All medications have a brand or scientific name as well as a common name (generic name).

How fast does the medicine work

Some medications may take a few days to start working; others may take several weeks. Talk to your doctor or pharmacist about this.

When is the medicine supposed to be taken

Diabetes medicines work in different ways so it is important that you take the medicines in the right amount and at the right time each day. Talk to the doctor or pharmacist about when to take your diabetes pills.

How is medicine to be taken

Some medicines should be taken with food; others should be taken on an empty stomach or without food.

Things you should know about your pill medicines

- Expiration or “use by” date
- Side effects
- Does it interact with other meds you take, both prescription and non-prescription
- Should you take it if you are sick or not eating
- Storage

Expiration or “use by” date

Medicines have an expiration or “use by” date. This means that the medicine will not work as well or at all after that date. It is important to use your medication by the expiration or “use by” date.

Side Effects

Sometimes medicines might cause other things to happen when you take them. For example, you might have an upset stomach, headache, dizziness, etc. These are called side effects. They usually stop after your body gets used to the medicine.

Interactions

Some things, like prescription medicines or over-the-counter medicines, foods, and herbal remedies, can affect how well another medicines works. Talk to your doctor or pharmacist about this.

If you are not feeling well or if you did not or cannot eat, should you take your medicine?

Who can you ask about ALL of these things? Your Pharmacist!

Mary's doctor visit

Listen to this story. What do you think are the problems?

Because Mary moved to a different neighborhood, she needed to find a new doctor. At her first visit with the new doctor, the nurse asks her what medicine she was currently taking for her diabetes. Mary tells the nurse she cannot remember. The nurse starts to name some different diabetes pills. "Is it Glyburide; glucatrol; actos"? Mary says "Yes!, that's it, glucatrol".

After her check up, the doctor writes a prescription for glucatrol and gives it to Mary. Mary gets the prescription filled and starts taking the medicine, but her blood sugars are going all over the place. Mary calls the doctor back and tells her about the problems with her blood sugar. Mary says that the name of the medicine her old doctor gave her was glucophage, not glucatrol! The doctor changes her prescription to glucophage.

The moral of this story is:

- As you saw on the handout and will see in the up-coming slides, there are many different pill medicines to help manage diabetes. Many of those medicines have similar sounding names.
- It is important to know the names of the medication you are taking.
- It's a good idea to write down the names of your medicines and keep them in your wallet or purse.

Pills that help you release more insulin (longer acting)

<u>Generic name</u>	<u>Brand name</u>
– Glimepiride	Amaryl
– Glipizide	Glucotrol
– Glipizide Extended Release	Glucotrol XL
– Glyburide	Diabeta
– Glyburide micronized	Glynase

Overview of how these drugs work

This class, called sulfonylureas, has been around the longest, since the 1950's.

These medicines work by helping your pancreas to make more insulin throughout the day.

- Starts working in 15 – 60 minutes
- Lasts up to 24 hours
- Usually taken once or twice per day,
 - Before breakfast (once a day)
 - Before breakfast and dinner (twice a day)
- Side effects
 - Low blood sugar (Hypoglycemia)
 - Sun sensitivity
 - Weight gain

Because this medicine can cause low blood sugar, it is important to eat after you have taken it.

(The weight gain is due to the chemical make up of the drug. It does not stimulate appetite.)

Pills that help you release more insulin (shorter acting)

Generic name

- nateglinide
- repaglinide

Brand name

- Starlix
- Prandin

Overview of how these drugs work

This class, the meglitinides, work very similarly to the sulfonylureas.

They help your pancreas to make more insulin. The difference is they are short-acting. You take them before a meal, they do their job, and are out of the bloodstream fairly quickly. Therefore, there is less chance of low blood sugar in between meals.

- Starts working within 20-30 minutes
- Lasts about 4 hours
- Usually taken before each meal
- Side effects
 - Low blood sugar (Hypoglycemia)

Pills that help your insulin work better

<u>Generic name</u>	<u>Brand name</u>
– rosiglitazone	Avandia
– pioglitazone	Actos

Overview of how these drugs work

This class of pills are called Thiazolidinediones (TZD's).

They are also known as insulin sensitizers. They work on muscle cells to make them more 'friendly' to the insulin your body is already making. In other words, they work on the problem of 'insulin resistance'.

- Starts working in about 30 minutes
- Lasts 12-24 hours
- May take 6-8 weeks to see an improvement on blood sugar levels
- Taken once or twice per day
- Side Effects
 - Edema (retaining water)
 - Weight gain

Pills that reduce the amount of glucose your liver produces

Generic

- metformin
- metformin extended release
- metformin in liquid form

Brand

Glucophage
Glucophage XR
Riomet

Overview of how these drugs work

This class of medication is called the Biguanides.

When you eat carbohydrates, part of the glucose goes into your cells and is used for energy. Part of the glucose is stored as fat, but part of it goes to the liver and is stored there for 'emergency' purposes.

In a person without DM, the brain senses when blood sugar levels start to go even slightly lower and it signals the liver to release a very small amount of stored glucose into the bloodstream to even things out.

However, in a person with Type 2 DM, the liver doesn't necessarily do as it is told, and instead may release large amounts of glucose into the bloodstream when it is not needed – often this occurs during the night.

- Starts working after several days
- Lasts 12 hours (24 hours for XR)
- Usually taken 1-2 times per day
- Side effects:
 - Nausea, bloating, gas, diarrhea
(usually gets better over time)

Pills that slow the digestion of carbohydrates

Generic name

- acarbose
- miglitol

Brand name

- Precose
- Glyset

Overview of how these drugs work

These pills, called alpha-glucosidase inhibitors, work in your digestive tract to slow the breakdown of carbohydrate foods, which slows down the rise in blood glucose after you eat.

- Starts working rapidly
- Usually taken 3 times per day, with first bite of a meal
- Side effects:
 - Stomach pain, gas, diarrhea
(usually gets better over time)

Pills that work on the body's own balancing system

Generic name

- sitagliptin
- Onglyza

Brand name

- Januvia
- Saxagliptin

Overview of how these drugs work

Your body has its own natural balancing system to keep blood sugar levels steady. When you eat, your body sends a message to your pancreas to make more insulin and to the liver to make less sugar.

But there is a substance called DPP-4 that blocks some of these messages. These drugs work by blocking DPP-4, so that more of the messages can get through.

- Starts working in about an hour
- Lasts for 24 hours
- Taken once a day, with or without food
- Side effects:
 - Stuffy or runny nose
 - Sore throat
 - Upper respiratory infection (cold)
 - Headache

Combination Pills

<u>Generic name</u>	<u>Brand name</u>
– actos + metformin	ActoPlus Met
– metformin + glipizide	Metaglip
– avandia + metformin	Avandamet
– januvia + metformin	Janumet
– avandia + amaryl	Avandaryl
– glyburide + metformin	Glucovance

Some medications work well together to help manage or control your blood sugar. These medications have been combined so instead of taking 2 different pills, you only have to take one.

Laura's Story

Laura went to the doctor's office for her usual visit. Laura had been taking metformin to help manage her diabetes.

At the end of her visit, the doctor wrote her a prescription for glucophage. On her way home, Laura got the prescription filled at the drug store. When it was time to take her medicine, Laura was not sure if she should still take the metformin with the glucophage. So she took the glucophage (her new prescription) and the metformin (her old prescription). Laura's blood sugar levels began to run very low, so she called her doctor.

What do you think the problem was?

Moral of this story

- If you have questions, ASK them, don't guess. Call the doctor's office or ask the pharmacist.
- Metformin is the generic name for glucophage! Laura was double dosing on her diabetes medicine!
- It is important to know the generic and the brand names of the medicines you are taking. It's a good idea to write them both down on that list you are keeping in your wallet or purse.

Insulin

How many of you
are taking insulin?

Lead in to information about insulin. **How many people are taking insulin?** If no one is taking insulin, you can move quickly through these next slides.

There are several different types of insulin with different names.

Can be taken with a vial and syringe, with an insulin pen or with an insulin pump.

Words you need to know when taking insulin

- Peak
- Onset
- Duration
- Bolus
- Basal
- Cloudy
- Clear

Peak means when and how long the insulin is working the hardest to lower blood sugar levels.

Onset means how soon the insulin starts to lower blood sugar levels after it is taken.

Duration means how long the insulin works to lower blood sugar levels.

Bolus is an extra amount of insulin taken to cover an expected rise in blood sugar, often before a meal or snack.

Basal is a continuous supply of low levels of longer-acting insulin, as used in insulin pumps.

Cloudy and **Clear** refers to how the insulin looks. It does not have anything to do with the strength of the insulin.

What you should know about insulin

- How it should look
- How it should **NOT** look
- Storage (before and after opening)
- How long it can be used (expiration dates)

How it should look; How it should NOT look

Some insulin is supposed to be cloudy. Others are supposed to be clear. Insulin should never have strings, clumps or crystals.

Storage (before and after opening)

Most insulin should be stored in the refrigerator before it is open. Once it is opened, it does not have to be kept in the refrigerator. It can be left at room temperature (not too hot and not too cold)

Expiration or “use by” date

Medicines have an expiration or “use by” date. This means that the medicine will not work as well or at all after that date. It is important to use your medication by the expiration or “use by” date.

How long is it good once it has been opened?

After being opened, insulin is good for 28-30 days. Write the opening date on the bottle of insulin so you know when the 28-30 days are up.

Short and Rapid Acting Insulin

Generic name

-lispro
-glulisine
-regular

Brand name

Novolog, Humalog
Apidra
Novolin R, Humulin R

These are known as 'bolus' insulins. Remember, **bolus** is an extra amount of insulin taken to cover an expected rise in blood sugar, often before a meal or snack.

They are taken before meals to cover carbohydrates you are eating or to bring down a high blood sugar

Short acting insulins 'R', begin working about 30 minutes after taking
Rapid acting insulins begin working about 10 minutes after taking

They should look clear, not discolored or cloudy, with no 'clumps' or 'strings'

Intermediate and Long Acting Insulin

Generic name

- glargine

- detemir

- NPH

Brand name

Lantus

Levemir

Novolin N, Humulin N

These are known as 'basal' or 'background' insulins. Remember, **Basal** refers to a continuous supply of low levels of longer-acting insulin.

Lantus and Levemir are most often taken once a day at bedtime.

Lantus and Levemir insulins provide a slow, steady stream of insulin for about 20-24 hrs. after taking. They have little to no peak. Remember, a peak means how long the insulin is working the hardest to lower blood sugar levels.

Lantus and Levemir should appear clear, not discolored, with no 'clumps' or 'strings'

Lantus should not be mixed in the same syringe with any other insulin.

NPH is most often taken twice a day – before breakfast, and before dinner.

NPH begins working about 1-1/2 hrs. after taking, peaks anywhere between 4-12 hours later, and may last up to 24 hours.

NPH should look cloudy or milky, and must be rolled or turned (not shaken) to mix before taking.

Combination Insulins

■ Intermediate/Rapid Acting

- Humalog Mix 75/25 NPH + lispro
- Novolog Mix 70/30 NPH + lispro

■ Intermediate/Short Acting

- Humulin 70/30 NPH + regular
- Novolin 70/30 NPH + regular
- Humulin 50/50 NPH + regular

Intermediate/Rapid acting is a combination of NPH and lispro (Humalog or Novolog)

Intermediate/Short acting is a combination of NPH and Regular (Humulin R or Novolin R)

All of these mixes contain NPH insulin, so they will appear cloudy or milky.

John's Story

John takes Lantus and Humalog insulins.

John's bedtime blood sugar was 105. He decided not to take his Lantus because he did not want his blood sugar to go low. In the morning, when he checked his blood sugar, it was 200!

What happened?

Moral of the story

- It is important to know how your medicines work.
- The Lantus does not have a peak, so it would not have lowered John's blood sugar. By not taking it, his blood sugar rose.

Other Injectable Medications

Generic name

exenatide

Brand name

Byetta

Ask the audience if anyone is taking Byetta (exenatide) or Symlin (pramlintide).

If not, proceed to slide #34.

This injectable drug is not insulin. It is called an **Incretin mimetic** and is taken twice a day. (A once-a-week version is in the works).

It is only used for Type 2 DM.

It works in several ways:

- Helps the pancreas to make more insulin after a meal

- Decreases the amount of glucose (glycogen) released from the liver

- Slows down stomach emptying

- Decreases food intake, resulting in weight loss

- Starts working within 30 minutes
- Lasts about 8 hours
- Usually taken twice per day, before breakfast and dinner
- Side effects:
 - Diarrhea, nausea, vomiting
(usually gets better over time)
 - Weight loss

<u>Generic name</u>	<u>Brand name</u>
pramlintide	Symlin

Symlin is a synthetic form of the hormone 'amylin'. Amylin is released, along with insulin, from the pancreas after a meal and helps to control blood sugar levels.

Symlin can be used by people with Type 1 and Type 2 diabetes to control after-meal blood sugar levels.

When starting Symlin, the physician will probably decrease the mealtime insulin dose by about 50%, to decrease the risk of hypoglycemia.

Symlin comes in a vial, like insulin, but it cannot be mixed with insulin in the same syringe.

- Starts to work very rapidly
- Lasts for about 3 hours
- Taken right before meals with pre-meal insulin
- Side effects:
 - Hypoglycemia
 - Nausea

If you cannot afford your medications...

This information is on the back of the pamphlet about insulin and diabetes pills. Have people turn to it and follow along.

- Ask your doctor if samples are available through the doctors office. Do this especially if the doctor is giving you a prescription for a new medicine
- Check to see if your medicine is offered in a generic form. If it is, there is a good chance it will be available on the \$4.00 medication list at many drug stores like Marc's, Giant Eagle, WalMart, Dave's and other similar stores.
- There are patient assistance programs for most drugs on the market. In order to work with these programs, you must have a doctor and a Rx. To find out about the program for your medicine, you or your doctors office can **Google** the name of medication on a computer. If there is a program for your medication, you will get information about the guidelines to qualify for assistance and you will have to either apply on line or print out a form that will need to be filled out by you and your doctor.

If you have questions or need help,
please call 216-591-0800

