Counseling Diabetics On Survival Skills

Elaena Quattrocchi, BS, Pharm.D.,FASHP
Associate Professor, Pharmacy Practice
Arnold and Marie Schwartz College of Pharmacy
Why Diabetes?

- 26 million diabetics in the US
- Estimated that 1/3 are unaware of diagnosis
- Third leading cause of death in the US
- Leading cause of blindness
- *Patient education is the cornerstone of diabetes treatment and management*
- Complications can be prevented or delayed through treatment
Living With Diabetes

- Frightening
- Confusing
- Overwhelming with all the tasks involved with daily diabetes management
- Feelings of anger, sadness, guilt
- Life will never be the same again
Diabetes is a Balancing Act

Patients need to balance:

- Food and medications
- Physical activity
- Stress and emotions

*Pharmacists are part of the health care team that need to help diabetics learn the basic skills necessary to safely care for their diabetes*
Basic Diabetes Survival Skills

- What is diabetes mellitus
- Types of diabetes
- What happens when you have diabetes
- Signs and symptoms of diabetes
- Causes of a high blood sugar
Basic Diabetes Survival Skills

Treatment of Diabetes

- Self-management
  1. Exercise
  2. Diet
  3. Blood glucose monitoring

*Target blood glucose values
*Hypoglycemia: signs and symptoms, causes, complications of a low blood sugar, treatment of a low blood sugar and tips to prevent low blood sugars
Basic Diabetes Survival Skills

- Diabetic medications
  1. Oral anti-diabetic medications
  2. Injectable medications

INSULIN
*Types, availability, storage, side effects, sites of injection, how to draw up insulin into a syringe, mixing insulin’s in one syringe, giving the injection, how to use an insulin pen, and how to dispose of sharps

INCRETIN MIMETICS
AMYLIN HORMONE ANALOGE
Basic Diabetic Survival Skills

- Sick day management
- Traveling with diabetes
- Disaster planning
Knowledge and skills of diabetes are taught by different health-care providers

Comprehensive diabetes education is often not possible at the time of diagnosis

Diabetics need continued support to reach self-management and lifestyle goals as they strive for optimal diabetes control

Pharmacists see people with diabetes on an average up to seven times more often than other health-care providers

Pharmacists play a unique role as educators by providing numerous diabetes care products and instructing them on their proper use.

Educating diabetics about their disease empowers them
Empowerment

Being able to offer education to people with diabetes a pharmacist can become a very useful tool in empowering people to take charge of their disease.
Video

Newly Diagnosed Type 1 Diabetic
What Went Wrong

- The physician had confidence that the pharmacist would help reinforce the basic survival skills that a patient newly diagnosed with diabetes would need.
- The patient’s mother was overwhelmed and afraid that she would not remember everything she needed to do.
- Both times the mother came into the pharmacy the pharmacist did not have any compassion for the mother nor offered her counseling.
What Went Wrong

- The pharmacist ordered the wrong syringes for the baby
  3/10 cc INSTEAD of 3/10 HALF UNIT
  MEDICATION ERROR
- Consequence: DKA
Strengths/Syringes/Needle Size

- U-100, U-500 strengths of insulin
- 300 unit vial, 1000 unit vial, 300 unit pen and cartridge
- Gauge: 28-31
- Length: 5/16” 8mm, 15/64” 6mm
- Syringe size: 3/10 cc, ½ cc, 1cc
  - ½ unit markings are available on certain syringes.
  - <30 units use 3/10 cc syringe
  - Up to 50 units use ½ cc syringe
  - 50-100 units use 1 cc syringe
Pen Needles

- 29, 30, 31, 32 gauge
- 5/32 inch (nano) 32 gauge 4mm
- 3/16 inch (mini) 31 gauge 5mm
- 5/16 inch (short) 31 gauge 8mm
- ½ inch (original) 29 gauge 12.7mm
How Should Pharmacists Counsel Newly Diagnosed Type 1 Diabetics

- Reassure the patient and family that they may feel overwhelmed by all the tasks involved in daily management, but they will soon become second nature to them.
- Ask them if they have any questions about diabetes
- Counsel them on all prescriptions you are dispensing
Insulin

- Since your pancreas is no longer making insulin or is not making enough, you must take insulin.
- People with type 1 diabetes will always need to take insulin several times a day.
- Insulin is classified into different categories which is based on:
  * the onset (how long it takes to work)
  * the peak (when it is most effective)
  * the duration (how long it lasts)
Types of Insulin Used in Type 1 DM

- Generally we use two types of insulin
- Rapid acting insulin to cover meals and should be taken when you eat or right after the meals. Novolog®, Humalog®, Apidra®
  * Do NOT skip meals
  * Monitoring carbohydrates is easier by carbohydrate counting
  * Meals and snacks must have carbohydrates and proteins
- Long acting insulin to control your blood sugar when you are not eating. It last about 24 hours and it should be taken the same time each day (usually at bedtime). Lantus®, Levemir®
Storage of Insulin

- Unopened insulin vials or pens store in the refrigerator and the expiration date is noted on the package.

- Insulin currently in use can be kept at room temperature (less than 86 degrees F) but the stability changes once open and so does the expiration date.
Expiration of Insulin

Expiration dates once open:
* All rapid acting vials and pens 28 days
* Short acting: Humulin® R (31 days), Novolin® R (42 days)
* Intermediate acting: Humulin® N (31 days vial, 14 days pen), Novolin® N (42 days vial)
* Long acting: Lantus® (28 days vial and pen), Levemir® (42 days vial and pen)
* Pre-mixed insulins: Novolog® 70/30 (28 days vial, 14 days pen), Novolin 70/30 (42 days vial); Humalog 75/25 and 50/50 (28 days vial, 10 days pen), Humulin 70/30 (31 days vial, 10 days pen)

WRITE EXPIRATION DATE ON INSULIN ONCE OPEN
Injection Sites
How to Inject Insulin With a Syringe

1. Wash your hands and swab top of bottle with alcohol

2. If the insulin is a suspension gently roll the bottle between your hands. Don’t SHAKE it. Mix it thoroughly but avoid bubbles or foam.

3. If injecting clear insulin, inspect it to ensure it is clear and there are no particles.

4. Leave the bottle upright and inject the amount of air equal to the amount of insulin you will be withdrawing. Leave the needle in the vial and turn the whole bottle upside down.

5. While holding the bottle upside down, withdraw the insulin.

6. Air bubbles will make your dose of insulin wrong. If you see a bubble, push the insulin back into the bottle and pull it out again.
Mixing Insulin’s in One Syringe

1. Start with the CLOUDY insulin first. Leaving the bottle upright inject air equal to the amount of NPH to be used into the bottle. Remove the needle from the bottle.

2. Inject air equal to amount of clear insulin into the CLEAR insulin bottle. Turn the clear bottle upside down before withdrawing the ordered dose of clear insulin. Pull slowly to avoid getting air bubbles in the syringe. Pull the needle out of the clear insulin bottle.
Mixing Insulin’s in One Syringe

3. Now take the cloudy insulin bottle and roll the bottle between your hands, insert the needle, being careful not to push in the plunger, and turn the bottle upside down. Slowly withdraw the cloudy insulin until the total of clear and cloudy insulin doses is reached.

4. If an error occurs start over.
Giving the Injection

1. Choose the site of injection: upper outer arm, outer thigh, abdomen 2 inches from naval area, or buttocks (rotate sites)
2. Clean the area of injection with alcohol and let it air dry
3. Pinch the skin or fold the skin between your thumb and fingers
4. Insert the needle at a 90 degree angle, straight down and all the way in. Thin patients or children may need to insert at a 45 degree angle to avoid an IM injection
5. Push the plunger gently all the way down to inject the insulin, wait 3-5 seconds
6. Release the skin
7. Pull the needle straight out and avoid rubbing the area
8. Dispose of syringe in a sharps container
Sharps Disposal

- Guidelines for disposal vary for different states

- NY guidelines: Make sure you have either a red sharps container or durable plastic container with a tight lid like a detergent bottle.

- Filled bottles can be brought to hospitals, nursing homes, clinics, or other sharps collection sites.

- If the sharps is being disposed of at home, “Home Sharps” should be written on the plastic bottle and be disposed of in the regular garbage.

- Needles should not be bent or clipped, flushed down the toilet, put in recyclables, or any other container that cannot close or can be punctured.
How to Use an Insulin Pen

1. If using two different types of insulin, check the label and make sure you use the correct insulin pen
2. Wash your hands
3. Take off the cap
4. Disinfect the rubber membrane with an alcohol swab prior to use
5. Take a pen needle and screw the needle onto the insulin pen
6. Remove the big outer needle cap and the inner cap. Do not discard the outer needle cap
How to Use an Insulin Pen

7. It is important to prime the pen prior to every injection. This removes air bubbles and ensures that the pen and needle are working properly.

8. Dial 2 units, hold the pen with the needle pointing upward, tap the reservoir gently so any air bubbles rise to the needle. Press the injection button all the way in. Check if insulin comes out of the needle. If insulin does not come out, check for air bubbles and repeat the test 2 more times to remove them. If no insulin comes out a third time try a new needle.
How to Use an Insulin Pen

9. Be sure the dose window shows “0” following the safety test dose. Select your dose. If the dose is larger than the maximum dose on your pen, use two or more injections.

10. Using the insulin technique taught to you insert the needle into your skin and press the injection button all the way down. Hold the button in that position, slowly count to 10 and withdraw the needle.

11. Put the outer needle cap back on the needle and use it to unscrew the needle from the pen. Always remove the needle after each injection. Leaving the needle on the pen will cause inaccurate doses and contamination. Changes in temperature can cause an overdose or under dose of insulin.
How to Use an Insulin Pen

12. Replace the pen cap.
13. Dispose of your needles in a “sharps” container or a hard plastic detergent container mark it “sharps”
14. Insulin pens in use can be kept at room temperature. All other pens not in use keep in the refrigerator.
15. You may want to keep your long acting insulin in the bedroom since you take it at bedtime or when you wake up in the morning. Keep your rapid acting insulin in the kitchen since you take this insulin with meals.
16. Make sure you write down the date you started using that pen. Insulin once open is stable for a specific number of days. If not opened, it is stable under refrigeration until the expiration date on the package.
Sick Day Rules

- When do sick day rules apply?
  A sick day is a cold, the flu, infections, dental problems, surgery, burns, stress (physical/emotional), and any underlying illness

* Have your doctor supply you with sick day management instructions
Sick Day Rules

- What happens to blood sugars when you are sick?
  * The stress of an illness makes the blood sugar go up and increase the need for insulin
  * Your body makes ketones when your blood sugar goes high. Ketones are a sign of danger!
  * A blood sugar can go low if a person does not eat.
Sick Day Rules

What should I check for when I am sick?

* Test your blood sugar every 4 hours if you take insulin. If you don’t take insulin check your blood sugar 2-4 times a day or as often as your health care provider tells you to.

* Test your urine for ketones every 4 hours or every time you urinate (if positive test glucose every 2 hours and use supplemental insulin as directed).
Sick Day Rules

- Should I take my diabetes medication when I am sick
  * Never stop your insulin. If unsure of how much insulin to take call MD. Write down everything: blood sugar values, ketone values, how much food and liquid you take in and insulin doses.
  * Take your usual dose of insulin unless blood sugar is below 80 mg/dl or above 240 mg/dl or raising blood sugar on an insulin pump.
  * If taking other medications for your diabetes check with your doctor. Some medications are okay to take when you are sick and others are not.
  * Do not exercise!
Sick Day Rules

- What should I eat or drink?
  * Try to eat. If you can’t eat try: crackers, toast, chicken soup, bouillon or chicken broth
  * When you are sick a high blood sugar, fever, diarrhea, and vomiting can cause you to lose too much fluid from your body. You must try to drink plenty of fluids every ½ hour to an hour. If your stomach is upset or you are vomiting take small sips of liquids every 15 minutes.
  * Fluids: water, sugar free/caffeine free drinks, sugar free ice pops and sugar free gelatin. If your sugar is low regular soda, regular gelatin or regular ice pops.
Sick Day Rules

- When should I call my doctor?
  * If I have an underlying illness
  * If your urine shows moderate to large ketones
  * If your blood sugar is below 70 mg/dl or above 250 mg/dl or a rising blood sugar on an insulin pump
  * If weight loss is noted
  * Fruity smell on breath
  * Vomiting (never assume vomiting is normal or a stomach virus)
  * Diarrhea
  * Pain in the stomach, chest pain, or difficulty breathing
  * High fever
Sick Day Rules

- Sick Day Box
  * Drinks, gelatin (sugar free, sugar)
  * Broth or bouillon
  * Saltines, crackers, bread
  * Ketone strips
  * Blood glucose meter, strips, BG log
  * Glucagon emergency kit
  * Insulin, syringes/pen needles
  * Acetaminophen, ibuprofen
  * Thermometer
Video

Counseling Patients on Blood Glucose Monitoring, Hypoglycemia, and Treatment
Preventing Medication Errors
Medication Errors with Insulin Therapy

- Not storing insulin at the proper temperature
- Using Expired insulin
- Using the wrong insulin pen device on the wrong patient
- Using a mixed insulin in an insulin pump instead of a rapid acting insulin
- Dispensing an insulin cartridge to fill the reservoir of an insulin pump instead of a vial. The cartridge does not fit into a pump
Medication Errors With Insulin Therapy

- Not rotating sites of insulin injections and pump insertion can cause erratic insulin absorption and high blood sugars
- Dispensing the wrong type of syringe to a patient: 3/10 ml instead of 3/10 half unit
- Not using the correct length of a needle on a syringe or pen needle to give a SQ injection
- Not using the correct technique to inject insulin
- Reusing needles can bend, become dull and cause infections
- Leaving pen needles on the pen can cause differences in concentration
Medication Errors With Insulin Therapy

- Injecting the wrong type of insulin
  * Injecting the dose of the long acting insulin when injecting a rapid acting insulin
- Dispensing the wrong insulin since names sound the same:
  NovoLog, NovoLog Mix 75/25, Novolin 70/30
- Dispensing U-500 regular insulin instead of U-100 insulin
Insulin Medication Error
U-500 Regular Insulin

- Prescribing of U-500 Regular insulin is on the rise due to the obesity epidemic, insulin resistance and tighter control protocols.
- Potential for adverse drug events exists due to unfamiliarity with U-500 Regular insulin and its higher potency.
U-500 Checklist to Prevent Errors

- Call patient’s physician to confirm that patient’s basal-bolus insulin has been D/C and the patient is using a Tb syringe NOT U-100 syringe.
- Confirm that patient has been receiving greater than 200 units per day of basal-bolus insulin
- Double check calculations
Time Action Profile of U-500R

- U-500R and U-100R human insulin are not bioequivalent
- U-100R has measurable activity up to 18 hours and U-500R insulin has activity up to 20-22 hours (duration of action is about 24 hours)
- U-500R insulin takes longer to reach maximal effect (6.4 hours) vs U-100R insulin (5.3 hours)
- U-500R insulin has both basal/prandial action
- U-500R and U-100R need to be taken 30 minutes before meals
Algorithm for U-500R Insulin Dosing

- When switching to U-500R insulin, the TDD may be reduced by 10-20% for initial A1C less than or equal to 8%
- TDD may be increased by 10-20% for initial A1C greater than or equal to 10%
Algorithm 150-300 units/day

- Twice daily (before breakfast and supper)
- Three times daily (before meals)

- Divide TDD 60/40 or 50/50
- Divide TDD 40/30/30 or 33.3/33.3/33.3
Algorithm 300-600 units/day

- Three times per day (before meals)
- Four times per day (before meals and bedtime)
- Divide TDD 40/30/30 or 33.3/33.3/33.3
- Divide TDD 30/30/30/10
Algorithm >600 units/day

- Four times/day (before meals and bedtime)
- Divide TDD 30/30/30/10
U-100 syringe vs Tuberculin syringe

- U-100 syringe use 31 gauge, 6 mm length needles
- Tuberculin syringe use the smallest gauge (27) 12.7 mm in length
- The U-100 syringe is lower cost, smaller needle size, greater availability
- Tuberculin syringe is a longer needle and a smaller gauge (larger needle). Patients need to pinch up and inject at a 90 degree angle to reduce risk of an IM injection.
- U-100 syringe is expressed in units and Tb syringe expressed in volume (mls)
Conversion Information For U-500R Using a U-100 Syringe or Tb Syringe

- Formulas:

Dose (actual U-500 units) × 0.2 = Unit markings in a U-100 syringe

Dose (actual U-500 units) × 0.002 = Volume (ml) in a Tb syringe

Or

Divide prescribed dose (actual U-500 units) by 5 = Unit markings in a U-100 syringe

Divide prescribed dose (actual U-500 units) by 500 = Volume (ml) in a Tb syringe
U-500 Insulin Label

- Label Prescription to express dose in units using a U-100 syringe and actual U-500 units

Example: 150 actual units of U-500 Regular insulin
Inject 30 unit markings on a U-100 syringe SQ 3 times a day 30 minutes before meal
“Concentrated insulin. Do not Adjust Dose”
U-500 Insulin Label

- Label Prescription to express dose in volume (mls) and actual U-500 units

Example: 150 actual units of U-500 Regular insulin
Inject 0.3 ml on tuberculin syringe
SQ 3 times a day
30 minutes before meal
“Concentrated insulin. Do not Adjust Dose”
U-500R vial vs U-100R vial

- U-500R vial is 20 ml (10,000 units)
- U-100R vial is 10 ml (1000 units)
- Diagonal brown stripes mark the vial label and box making U-500R packaging distinctive in appearance from U-100R packaging (white/blue/yellow)
- U-500 (Concentrated) is highlighted in red on the label and the vial has a different shape than the U-100 vial
U-500 Checklist to Prevent Errors

- Provide clear patient instructions
  * U-500 insulin is five times stronger than the standard U-100 insulin you have been taking
  * The unit markings on the U-500 insulin does not equal the unit marking of a U-100 syringe
  * Your doctor wants you to use a different syringe to draw up your insulin. The syringe is a tuberculin syringe and instead of drawing up units you will draw up mls.
U-500 Checklist to Prevent Errors

*Make sure you take the correct amount of insulin. Too much insulin can cause a SEVERE low blood sugar that is not easily reversed. If your blood sugar goes under 70 mg/dl make sure doctor knows.

*Your doctor should be the only person to change your dose.

*You must stop all your other insulin’s you have been taking

*Take this insulin 30 minutes before eating

*The insulin vial is good for 31 days once open
U-500 Checklist to Prevent Errors

- Demonstrate drawing up insulin with a tuberculin syringe and have the patient demonstrate back to you
- Dispense tuberculin syringes and needles
- U-100 syringes can be used but greater chance of an error
- Make sure U-500 insulin is placed away from standard insulin to prevent dispensing error
- Distinguish in patient’s profile that patient is on U-500 Regular CONCENTRATED INSULIN so covering pharmacist will not make a dispensing error
Video

Traveling With Diabetes
Traveling With Diabetes

Important Points From Video
- Give yourself enough time to clear security
- Pack medications in a clear sealable bag
- Never pack your supplies in checked luggage
- Unlimited number of syringes allowed on plane accompanied with insulin
- Unlimited number of used syringes allowed on plane accompanied with sharps container
- All medical liquids in containers greater than 3.4 ounces are allowed through security but must be searched and declared
- Make sure all medications are labeled and the prescription name matches the one on the ticket.
Traveling With Diabetes

- Have a doctor’s note explaining all the medications you are on and supplies you require.
- Have extra prescriptions written for all your diabetes supplies in case of an emergency.
- Make sure you take double of all the diabetes supplies since prescription laws differ from state to state.
- If traveling out of the country medications may differ and laws.
- You have the option of asking for a visual inspection of your diabetes supplies instead of putting them through the X-ray.
- Notify security officer if you are uncomfortable to go through scanner or metal detector. May affect insulin pumps.
Traveling With Diabetes

- Walk around the plane
- Keep well hydrated
- Meters are accurate on planes
- When using a syringe in flight no need to inject air into the vial
- Pressure may have to be equalized by removing the plunger and inserting the syringe into the vial. Then replace plunger and withdraw insulin as usual.
Time Zones

- If traveling fewer than five time zones adjustments to insulin are unnecessary
- If traveling north or south, no adjustment in the 24 hour schedule is needed
- Traveling east to west across time zones abbreviates or extends the day
- Traveling east shortens the day and doses will be closer than normal causing hypoglycemia
- Traveling west makes the day longer and so insulin doses may need to be increased
- Give rapid acting insulin with meals and long acting insulin at equivalent time normally taken at home.
Traveling With Diabetes

- Plan in advance! Your trip may require meal planning, time zone changes and more exercise.
- Make sure immunizations are up to date.
- Make sure you know where the nearest hospital is to where you are staying.
Traveling With Diabetes

- If traveling to a foreign country find an English-speaking foreign doctor and know how to reach the American Consulate.
- Learn how to say “I need sugar. I am a diabetic and my blood sugar is low” in the language of the country.
- Always wear a medical ID in case of an emergency.
- Avoid tap water in other countries including ice cubes.
Traveling With Diabetes

- Pack all your supplies in a carry-on bag so your supplies are with you at all times.
  - *Insulin (insulated bag)*
  - *Syringes/pen needles*
  - *Pump supplies*
  - *Oral medications*
  - *Glucagon emergency kit*
  - *Glucose tablets/gel*
  - *Blood glucose meter*
  - *Blood glucose strips*
  - *Lancets*
  - *Urine ketone Strips*
  - *Batteries*
Traveling With Diabetes

- Pack snacks when site seeing or any other form of exercise (ie swimming, hiking) and work meals and insulin into the day.
- Carry your glucagon emergency kit, glucose tablets/gel
- Apply sun screen at the beach and drink plenty of water.
- Never walk barefoot, inspect feet everyday for blisters, cuts, or redness and contact a doctor if your foot looks infected.
- Pack topical antibiotic ointment, bandages, anti-diarrhea and anti-nausea medications.
Traveling By Car

- Make sure you make frequent stops to walk around
- Make sure you do not skip meals and take your medications as directed
- Bring snacks and fluids with you when traveling by car
- If you are driving, check your blood sugar before going into the car and throughout your trip
- If you feel your sugar is going low, pull over to side of the road immediately and check your sugar
- Have quick acting glucose available to treat a low blood sugar.
- Never leave your diabetes supplies in your car.
Disaster Planning for Diabetics

- Make sure immunizations are up to date especially tetanus.
- If a storm is coming refill prescriptions.
- Medications and supplies may be in short supply.
- Have an emergency supply of 2 weeks.
- Carefully store: diabetes supplies, batteries, flashlight, and First-Aid kit in a plastic box that is in a dry area.
- Remember to have an insulated bag for insulin and ice packs ready always.
- Keep a copy of insurance card, emergency contacts, list of all medical conditions, medications/doses/insulin regimen and most recent lab
- Check every 2-3 months to make sure nothing has expired and replace as needed.
Food Supplies for Emergency Planning

- Water supply of 1 gallon per person per day for 3 days.
- Glucose tablets/sugar packets/glucagon emergency kit
- 4 oz juice boxes or regular soda
- Sugar free drinks
- Box of unopened crackers, unsweetened cereal
- Cans of tuna/chicken/salmon, nuts, peanut butter
- Manual can opener
Points to Remember During a Disaster

- Never skip meals
- Check your blood sugar
- Never walk barefoot
- Wear your Medical ID at all times
- If you are not feeling well and cannot reach your doctor, go to the nearest hospital or emergency medical center