INDIANA STATE DEPARTMENT OF HEALTH
QUALIFIED MEDICATION AIDE (QMA) - INSULIN ADMINISTRATION
EDUCATION MODULE
INSTRUCTOR MANUAL

INTRODUCTION	INSTRUCTOR NOTES:
This education module is designed to instruct the QMA in the role and responsibilities of insulin administration. This training is optional for any Qualified Medication Aides (QMA). Prior to any insulin administration the individual must: 1. be currently on the QMA registry or have completed the QMA 100 - hour Training Program; **and** 2. successfully completed the Insulin Administration Education Module. The Insulin Administration Education Module must include: 1. at least four (4), and not more than eight (8) hours of classroom training using the QMA - Insulin Administration Education Module; **2.** at least two (2), and not more than four (4) hours of practical training that is 1:1 with a licensed registered nurse; 3. a written examination administered by the Indiana state approved testing entity which the QMA must pass; **and** 4. a practical examination, which the QMA must pass with 100% competency administered by an approved Program Director of an Indiana approved QMA Training Program. **NOTE: TRAINING MUST BE DONE AT AN APPROVED INDIANA STATE DEPARTMENT OF HEALTH QUALIFIED MEDICATION AIDE TRAINING PROGRAM.** Prior to administering insulin at a licensed health facility the QMA **shall**: 1. Be supervised by a RN in administering the insulin; **OR** have the responsibility delegated by the RN for administering the insulin to the QMA based on the RN's assessment of the QMA's competency to administer insulin.	Estimated Time: Additional Handouts / Tools: Instructor Prompts: Notes:

2. Be informed by the health facility where the QMA is employed that the facility:
    a) permits the QMA to administer insulin;
    b) has established a procedure for delegation of insulin administration from the RN to the QMA;
    c) has established a procedure that includes resident-specific clinical parameters based on the RN's assessment of each resident and the QMA's competency to administer the insulin; **and**
    d) has established when the resident-specific parameters require a new or re-assessment by the RN.

It is the responsibility of the QMA with insulin administration approval to understand and review the facility policies or procedure related to the above information at any health facility where employed. If the health facility does not have the above information available, the QMA must **NOT** administer insulin.

ORGANIZATION OF THE QMA- INSULIN ADMINISTRATION EDUCATION MODULE

Throughout the education module there will be Key Terms and Points to Remember that are essential for success. This education module is divided into the following sections:

1. Goals & Objectives
2. The Endocrine System
3. Symptoms & Observations
4. Treatment
5. Insulin Administration Procedure
6. Conditions & Potential Complications
7. Competence & Testing
8. Registry & Renewal Requirements
9. Role and Responsibility – QMA and Facility
10. Glossary & Forms & Resources

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NOTE: Points to Remember are points identified as important and necessary related to safe and accurate insulin administration.	
SECTION 1: Goals & Objectives	**SECTION 1: Goals & Objectives**
Goals: 1. Qualified Medication Aide (QMA) shall safely and accurately administer insulin injection to residents who have been assessed by a registered nurse for insulin administration by a QMA. 2. The QMA will have successfully completed the QMA – Insulin Administration Education Module and be listed on the Indiana Nurse Aide Registry with a QMA- Insulin Administration Certification sub-type. **Objectives:** 1. Define key terms related to diabetes and insulin administration. 2. Describe the structure and function of the endocrine system related to the types of diabetes. 3. Identify signs and symptoms associated with diabetes. 4. Identify treatments necessary to control diabetes. 5. Provide instruction for the safe administration of insulin. 6. Identify complications related to diabetes including signs/symptoms of hyperglycemia and hypoglycemia. 7. Demonstrate competence in the administration of insulin. 8. Recognize the role and responsibility for insulin administration by both the QMA and licensed health facility. 9. Understand both the written and competence testing requirements. 10. Understand the placement on the Indiana Nurse Aide Registry for QMA with approval for insulin administration and renewal requirements.	Estimated Time: Additional Handouts / Tools: Instructor Prompts: Notes:

SECTION 2: The Endocrine System	SECTION 2: The Endocrine System
Pancreas - Function The endocrine system is composed of many different glands that produce hormones which help control bodily functions. The pancreas is one of the endocrine glands that is located in the upper abdomen, behind the stomach. The Islets of Langerhans are clusters of cells throughout the pancreas that secrete insulin and glucagon. **INSERT BODY PICTURE FROM NHCA PG 103** The pancreas serves two important functions: 1. Produces enzymes that break down food in the intestines and 2. Produces hormones that regulate blood sugar levels. Three main types of enzymes are produced by the pancreas: • Lipase (breaks down fats) • Protease (breaks down proteins) • Amylase (breaks down carbohydrates) Two main hormones are produced by the pancreas: • Insulin • Glucagon The Islets of Langerhans are clusters of cells throughout the pancreas that produce insulin and glucagon. The purpose of insulin is to carry glucose from the bloodstream into the cells for use as energy and fuel. Glucagon is released when blood sugar levels are low and the body needs energy to feed cells. Normally, insulin is released by the pancreas within minutes of a rise in the amount of glucose in the blood – for example, after a meal. The glucose level reaches a peak in 30 minutes and returns to baseline within three hours. Between periods of food intake, insulin in the blood remains low. The normal range for fasting or before meals blood glucose level range from 70 – 110.	Estimated Time: Additional Handouts / Tools: Instructor Prompts: Notes:

Insulin is also important in fat metabolism. Insulin prevents fat from being broken down into excessive amounts of substances called ketones. When there are too many ketones circulating in the blood, a condition known as ketoacidosis results. This condition is harmful to the normal function of all cells because it further prevents them from using glucose for energy. Insulin is also important in protein utilization by the body. When there is not enough glucose in the cells to use for energy, the body will break down proteins to use for fuel. If there is no insulin available, the body will not be able to use sufficient amounts of protein for tissue growth and repair. This is generally what causes weight loss and delayed wound healing in many residents with diabetes. Glucagon is released when blood sugar levels are too low and the body needs energy, signaling the liver to release stored sugar in an effort to feed cells the energy they need to operate. Additionally, when glucagon is released it turns proteins in the liver into sugar to be used for energy. Once blood sugar levels have risen, the pancreas stops releasing glucagon. **Diabetes Mellitus - Types** Diabetes mellitus is a disease of hormone production and regulation originating in the pancreas that inhibits needed glucose that is used for energy. In the medical field, it will be abbreviated as “DM”. When working with residents, diabetes mellitus is often referred to as “the sugar disease” or “sugar diabetes”. These are slang terms for diabetes mellitus. Diabetes is also known as “hyperglycemia.” The signs and symptoms of diabetes are related to high levels of glucose in the blood and lack of energy available to the body’s cells. The symptoms usually develop suddenly and include: • Frequent /unusual thirst (polydipsia) • Frequent urination (polyuria) • Frequent/ extreme hunger (polyphagia)	

- Blurred vision
- Unusual weight loss
- Extreme fatigue
- Irritability

There are two types of diabetes:

1. Type I – The most common, chronic childhood disease. All people with Type I require insulin as their pancreas does not produce any of the hormone. Most Type I diabetics are diagnosed in childhood or early adulthood.

2. Type II – This form of diabetes produces insulin, but the body does not use it effectively. This is also known as insulin resistance. Risk factors for Type II diabetes may be related to poor lifestyle choices and excessive body fat. This type is usually diagnosed in adulthood. The growing obesity rate in children has caused a rise in Type II diabetes diagnosis in children.

When Type II (insulin resistant) diabetes is present, the pancreas needs to produce more insulin than usual to keep blood sugar levels within a normal range, similar to an air conditioner that has to work extra hard to keep the house cool on a hot summer day. Over time, the pancreas, like an overworked air conditioner, begins to break down. It starts losing the ability to produce insulin.

Also, as the body ages, the cells become more resistant to the effects of insulin, and as a result the older adult has more difficulty metabolizing glucose (using glucose for fuel and energy). The cells in the pancreas that produce insulin (Islets of Langerhans) become less sensitive with age and do not produce insulin quickly enough to respond to the rise of glucose in the blood.

SECTION 3: Symptoms & Observations	**SECTION 3: Symptoms & Observations**
Diabetes is also known as "hyperglycemia." The signs and symptoms of diabetes are related to high levels of glucose in the blood and lack of energy available to the body's cells. The most common signs and symptoms of hyperglycemia are the three P's; polyuria (frequent urination to get excess sugar out of the body); polydipsia (frequent thirst to make up for the fluid loss from polyuria); and polyphagia (frequent hunger because the body is trying to get that extra sugar for energy). Other common symptoms of hyperglycemia include unusual weight loss, blurred vision, fatigue, and irritability. These symptoms can develop suddenly. **Signs & Symptoms of Hyperglycemia – high levels of glucose** • Frequent /unusual thirst (polydipsia) • Frequent urination (polyuria) • Frequent/ extreme hunger (polyphagia) • Unusual weight loss • Blurred vision • Fruity odor to breath • Extreme fatigue • Irritability Glucagon is released when blood sugar levels are too low and the body needs energy. Low blood sugar levels that do not rise with the release of glucagon and remain low are considered hypoglycemia. It is important to note that hypoglycemia can develop suddenly. In an effort to pull itself out of the hypoglycemic state, the endocrine system will release epinephrine (adrenaline), the "fight-or-flight" hormone. If the blood glucose level continues to drop, the brain does not get enough glucose and stops functioning as it should. If blood glucose stays low for too long, starving the brain of glucose, it may lead to seizures, coma, and death.	Estimated Time: Additional Handouts / Tools: Instructor Prompts: Notes:

Signs & Symptoms of Hypoglycemia – low levels of glucose

- Jittery, anxious, irritable
- Sweating, chills
- Skin pale, cold, clammy
- Confusion
- Tachycardia – fast heart rate
- Dizziness
- Nausea
- Fatigue, weakness
- Blurred vision
- Headache

POINT(S) TO REMEMBER
Know & Recognize the signs / symptoms of: ➢ Hyperglycemia ➢ Hypoglycemia

Recognizing & Responding to Signs/ Symptoms of Hyperglycemia / Hypoglycemia

Recognizing and responding to the signs and symptoms of hyperglycemia and hyp0glycemia can save a resident's life. Failure to recognize and respond can result in a resident's death. The QMA should know the signs and symptoms of hyperglycemia and hypoglycemia. If the resident is observed or verbalizes any of the signs or symptoms of hyperglycemia and hypoglycemia, the QMA should respond in an appropriate and timely manner.

Healthcare facilities should have specific policies and procedures related to insulin administration and emergency response related to hyperglycemia / hypoglycemia

episodes. Also physician's orders related to insulin administration, blood glucose levels and treatment parameters should be available and followed. These policies, procedures or physician's orders should include instruction for blood glucose above or below a specific level, and action for any changes in the resident condition. The QMA must be aware of what action should be taken in an emergency and must understand the nurse on call or on site must be notified immediately and the nurse's instruction followed. **Examples:** If the resident is observed or verbalizes signs/ symptoms of hyperglycemia / hypoglycemia the QMA should: • Immediately take the resident's blood glucose level; • Notify the nurse on call or on site of both signs/ symptoms and blood glucose level; and • Follow the nurse's instructions. If the resident is unable to swallow, combative, or unconscious the QMA should: • Call 911 immediately; • Notify the nurse on call or on site of signs/ symptoms; • Take the resident's blood glucose level; and • Stay with the resident until help arrives. If the resident is alert / awake and blood glucose level is below or above specific levels the QMA should: • Follow the facility policy / procedure related to insulin administration; • Notify the nurse on call or on site of both signs/ symptoms and blood glucose level; and • Follow the nurse's instructions.	

POINT(S) TO REMEMBER
Recognize & Respond: ➢ Know signs/symptoms of hyperglycemia & hypoglycemia ➢ Know facility's policy, procedures & physician orders related to signs/symptoms of hyperglycemia & hypoglycemia ➢ Facility may use forms, such as "Decision Tree" for insulin administration and treatment guidelines ➢ Notify the nurse on call or on site for any concerns ➢ Follow instruction from the nurse

SECTION 4: Treatments

Observations

All diabetic residents must be observed closely for signs and/or symptoms related to diabetes. Hyperglycemia (high blood glucose) and hypoglycemia (low blood sugar) should always be considered when caring for a diabetic resident. Recognizing these conditions are extremely important:

	HYPERGLYCEMIA	HYPOGLYCEMIA
ONSET	Gradual	Rapid
CAUSE	Infection ,Medications, Stress, High food intake	Nausea & Vomiting, Too much insulin, Alcohol intake, Low food intake
SYMPTOMS	Shortness of breath, Fruity odor to breath, Dry mouth, Polyuria, Polyphagia, Polydipsia, Fatigue, Dry/Flushed skin, Confusion, Deep labored breathing, Slow reflexes, Slurred speech	Shakiness, Dizziness, Sweating, Hunger, Pale/Cool/Clammy Skin, Mood swings, Behavior changes, Clumsy/jerky movement, Poor concentration, Tingling sensation around the mouth, Seizure, Nightmare
RESULTS	High Blood Sugar Diabetic Coma	Low Blood Sugar Insulin Reaction
ACTION	Check Blood Sugar Contact Nurse	Check Blood Sugar Contact Nurse

SECTION 4: Treatments

Estimated Time:

Additional Handouts / Tools:

Instructor Prompts:

POINT(S) TO REMEMBER
Diabetic residents need: ➢ to be observed closely ➢ proper action taken when changes occur ➢ the QMA must contact the nurse with any questions or concerns

Notes:

Diet

Diet can play a significant role in diabetic management. A dietitian can develop an individualized diet to meet the resident's needs. The diet should meet nutritional guidelines, control blood glucose levels, and maintain appropriate body weight. The diet should be well-balanced and meals should be consumed on a regular schedule. Skipping or omitting meals can cause changes in blood sugar levels, for that reason meal consumption is important. Food substitutes should be offered. Sugar and sugar containing foods should be monitored.

POINT(S) TO REMEMBER
Diet Management should include: ➢ Diet that is well-balanced & consumed on a regular schedule ➢ Consistent meals and snacks ➢ Monitoring to identify changes in eating frequency or amounts

Activity

Physical activity increases insulin sensitivity, improves glucose tolerance and promotes weight control. Exercise is an important tool in managing diabetes. The level of exertion should match the individual's level of fitness.

Medications – Oral – Pills

Oral hypoglycemic medications are taken in pill form and work in a variety of ways:

- Stimulate insulin secretion in the pancreas; or
- Decreases the amount of glucose released by the liver; or
- Delays the digestion of carbohydrates in the diet.

Some oral hypoglycemic medications improve the body's sensitivity or ability to manage insulin. Understanding that medications work on different areas and have different actions help to understand why residents may be taking different types of medications.

Generic Name	**Trade/Brand Name**
glipizide	Glucotrol
metformin	Glucophage
pioglitazone	Actos
sitagliptin	Januvia
liraglutide	Victoza
glimepiride	Amaryl
dapagliflozin	Farxiga

NOTE: The same medication may have several names. The generic name is the nonproprietary name given to a drug. The trade or brand name is the name given by a specific company. An example would be the generic name "acetaminophen" or the trade / brand name "Tylenol". Generic drugs must have the same active ingredient, dosage and route of administration as the trade / brand name drug.

Medications – Insulin injection

Insulin is the primary hormone involved with diabetes. The purpose of insulin is to carry glucose from the bloodstream into the cells for energy and fuel. Normally, insulin is released by the pancreas within minutes of a rise in the amount of glucose in the blood -- for example, after a meal. The glucose level reaches a peak

(approximately 30 minutes after meal), insulin is released by the pancreas, and then the glucose level returns to baseline (approximately 3 hours later). Between periods of food intake, insulin in the blood remains low.

Medicinal insulin is used as a replacement for the insulin that is normally produced by the pancreas. Insulin acts primarily to lower blood glucose levels by helping glucose get to target tissue. Insulin is administered by injection because it is destroyed in the digestive tract. It is important to understand that the person given scheduled insulin must eat at scheduled times. A delay in meals or snacks may have significant adverse effects.

POINT(S) TO REMEMBER
Residents that are receiving scheduled insulin should: ➢ Receive the insulin injection at the scheduled time ➢ Eat at the scheduled time ➢ Be observed for any changes in activity, behavior or condition ➢ Have any changes reported to the nurse on call or on site

Insulin – Function

Insulin is a naturally occurring hormone secreted by the pancreas; it is required to sustain life. There are many different types of insulin on the market. The differences are comprised of how they are made, how they work in the body, and cost.

The cells in the body need sugar for energy. However, sugar cannot go into most of the cells directly. After eating food and the blood glucose level rises, cells in the pancreas (known as beta cells) are signaled to release insulin into the bloodstream. Insulin then attaches to and signals cells to absorb sugar from the bloodstream. Insulin is often described as a “key” which unlocks the cell to allow sugar to enter the cell and be used for energy.

In the past, bovine (cow) and/or porcine (pig) insulin was extracted and used to develop different classifications of insulin. While bovine and porcine (sometimes combined) insulin is similar to human insulin, the composition is a little different. Because of this, some residents' immune systems produce antibodies making bovine and/or porcine preparations ineffective. This led researchers to investigate human insulin synthesis by developing a chemically identical drug with the help of DNA recombinant (rDNA) technology. Today, almost all insulin prescribed is recombinant DNA human insulin.

There are several types of insulin on the market today. The most common forms of insulin are:

- **Rapid-acting**: It should be taken just before or just after eating. It is mostly gone from the body after a few hours.
- **Regular (short-acting)**: It should be taken 30-45 minutes prior to eating. It is mostly gone from the body after a few hours.
- **Intermediate acting**: It is often used in the morning or at bedtime to help control blood glucose between meals.
- **Long-acting**: It is often used in the morning or at bedtime to help control the blood glucose throughout the day.

POINT(S) TO REMEMBER
➢ Insulin cannot be taken in pill form, as stomach acid will break it down or destroy it, making it ineffective ➢ See chart in Section 5 – Insulin Administration for types of insulin

NOTE: Research is being done to develop an oral form of insulin that would be effective in the treatment of diabetes. Currently there are no oral pills available.

Blood Glucose Testing

Blood glucose testing determines the amount of glucose circulating in the blood at a particular time. Blood glucose testing is a reliable indicator of the level of glucose within the blood that can determine the need for changing or maintaining the current treatment measures. Types of blood testing:

- Random Blood Glucose (BG) – blood glucose levels measure the glucose in the blood at that specific time. This test is done with an individual glucose monitor device using a finger stick drop of blood. This test can be done routinely such as before meals or based on signs, symptoms, or symptoms/complaints verbalized or observed. (Normal 70-110)
- Fasting Blood Glucose (FBG or FBS) – is the blood glucose level following at least 12 hours of fasting (no food or fluids, except water). This can be done in a laboratory from a venipuncture specimen or with a blood glucose monitor device using a finger stick drop of blood. (Normal FBG or FBS 70-110)
- Hemoglobin A (HbA) or HbA1C – determines the average level of serum glucose over the previous 3 months. This test is done in a laboratory from a venipuncture specimen. (Fasting for at least 12 hours is recommended.) This test determines the consistency of blood glucose levels over a period of time. (Normal 3.8-6.4%)

BLOOD GLUCOSE TESTING WITH GLUCOSE MONITOR DEVICE PROCEDURE (adapted from the American Diabetic Association at www.diabetes.org)

1. Prepare the glucose meter. Each monitor is different, read the manufacturer instruction completely and carefully. (Practice is recommended.)
2. Perform hand hygiene
3. Choose finger to be used. Don't test on the same finger every time. Choose a different finger each time. Stick the side of the fingertip, not on top. The side is less painful and less likely to bruise.

4. Insert the lancet in the finger-sticking device. (Each device is different –read instruction prior to use.) 5. Prepare glucose monitor and insert reagent strip. 6. Put on gloves 7. Cleanse fingertip with alcohol wipe and allow to dry 8. Place finger-sticking device with lancet against cleaned dry site and activate. 9. Gently squeeze out a drop of blood. If there is difficulty obtaining a drop of blood, try hanging the hand down or very gently squeezing the fingertip. 10. Pick up the monitor with the inserted reagent strip and place next to the drop of blood. Allow the blood to be absorbed into the reagent strip. (Read manufacturer's instructions carefully as this is an important step necessary to obtain an accurate result.) 11. Wait for the result to appear on the screen. 12. Wipe finger of any remaining blood. 13. Remove gloves 14. Dispose of all supplies following Infection Control practices. 15. Perform hand hygiene 16. Document results per facility guidelines. **NOTE: THE ABOVE PROCEDURE IS A GUIDELINE OR EXAMPLE. ALL HEALTH FACILITIES SHOULD HAVE A POLICIES AND PROCEDURES THAT SHOULD BE FOLLOWED WHEN PERFORMING BLOOD GLUCOSE TESTING WITH A BLOOD GLUCOSE MONITOR, INCLUDING CLEANING AND STORAGE.**	

POINT(S) TO REMEMBER
➢ Residents given scheduled insulin MUST eat at scheduled times ➢ If a resident refuses a meal, an alternate meal or snack must be offered ➢ An accurate Fasting Blood Glucose (FBG or FBS) level requires at least 12 hours of no food or fluids, except water ➢ Blood glucose monitor device testing MUST follow the established policy and procedure established by the facility ➢ Random blood glucose & Fasting blood glucose normal value is 70-110

ADDITIONAL GLUCOSE MONITORING DEVICES:

FreeStyle Libre - Flash Glucose Monitoring System is a continuous glucose monitoring device indicated for the management of diabetes in persons age 18 and older. FreeStyle Libre is designed to replace blood glucose testing for diabetics treatment decisions. The device detects trends and tracks patterns aiding in the decision of related to hyperglycemia and hypoglycemia, facilitating both acute and long-term therapy adjustments. Interpretation of reading should be based on the individual's glucose trends and several sequential readings over time. The monitor is intended for single individual use and should not be shared.

The FreeStyle Libre includes the Sensor that has a small flexible tip that is inserted just under the skin on the back of the upper arm. The Sensor can be worn for up to 14 days. The Reader device is to be held within 1.5 inches of the Sensor to show the glucose readings and glucose trends.

NOTE: The QMA can use the Reader device to obtain glucose readings, following instruction from a licensed nurse in the facility procedure. Any concerns or problems must be reported to the nurse on site or on call. The QMA **cannot** apply, remove or change the Sensor.

SECTION 5: Insulin Administration Procedure	SECTION 5: Insulin Administration Procedure
All medication administration requires careful monitoring to prevent errors. Providing medication safely is the primary role of the qualified medication aide (QMA). This is essential when caring for diabetic residents and insulin administration. **POINT(S) TO REMEMBER** Rights of Medication Administration: ➢ Right Drug ➢ Right Resident ➢ Right Amount /Dose ➢ Right Route ➢ Right Time ➢ Right Documentation – the Sixth Right Insulin, the hormone given to treat diabetes, is typically given by injection. Residents receiving insulin injections must be observed for signs and symptoms of hyperglycemia (high blood sugar) and/or hypoglycemia (low blood sugar). There are several types of insulin. Insulin varies by speed of onset, time of duration, and peak time. Onset can be defined as the amount of time it takes for the medication to begin to work. Peak refers to the time when the medication reaches its greatest effectiveness. Duration is the amount of time during which the medication lasts in the body.	Estimated Time: Additional Handouts / Tools: Instructor Prompts: Notes:

Differences in Types of Insulin

Type	Name	Appearance	Onset	Peak	Duration
Rapid-acting Insulin lispro Insulin aspart	Humalog Novolog	Clear Clear	<15 min	1-2 hours	3-4 hours
Regular Regular Regular	Humulin R Novolin R	Clear Clear	0.5-1 hour	2-4 hours	5-7 hours
Intermediate-acting NPH NPH	Humulin N Novolin N	Cloudy Cloudy	2-4 hours	4-10 hours	10-16 hours
Long-acting Insulin glargine Insulin determir	Lantus Levemir	Clear	2-4 hours	Peakless	0-24 hours

Insulin is measured by the "unit" and requires a special syringe for administration. All insulins come dissolved or suspended in liquids. The standard and most commonly used strength in the United States is U-100, which means it has 100 units of insulin per milliliter (ml) of fluid. Recently a U-500 insulin has been developed for residents who are extremely insulin resistant. U-500 insulin is 5 times more concentrated or powerful than standard U-100 insulin. U-500 insulin or any insulin greater than U-500 in strength or activity **CANNOT** be administered by a Qualified Medication Aide.

POINT(S) TO REMEMBER

- There are several different types of insulin
- Insulin varies by onset, time of duration, and peak time
- U-100 is the standard & most commonly used insulin strength
- U-500 or greater strength insulin **CANNOT** be administered by a QMA

Needles & Syringe & Vials

Needles and syringes are available in multiple sizes and types. Needle sizes are identified by gauge (diameter of the needle) and length. Needle gauges range from 14-30. The larger the gauge number the smaller the diameter of the needle. The length of the needle is determined by the length of needle shaft. The syringe is typically made of plastic and disposable. There are three primary parts of a syringe: 1) the hub that attaches to the needle, 2) the barrel that contains the measurement marks and 3) the plunger that is used to withdraw and inject the medication. When handling a syringe and needle, it is important to touch only the outside of the barrel and plunger. The needle is sterile and must not be touched. The needle may be already attached or separate and needs to be attached to the syringe. **INSERT PICTURE FROM NHCA INSTRUCTOR MANUAL – PAGE 124 SYRINGE**

There are syringes made specifically for insulin administration. Insulin is measured in "unit(s)". The amount of insulin the syringe will hold varies by syringe. There are 3 types of insulin syringes based on the amount of insulin to be injected, 3/10 cc used for administering 30 units or less , ½ cc used for administering 50 units or less or 1cc syringe used for administering more than 50 units of insulin.

Insulin used for injection may be stored in vials. The insulin within the vial is sterile. Vials are glass containers with a rubber stopper on the top of the vial in which a needle is inserted to withdraw the insulin. **INSERT PICTURE FROM NHCA INSTRUCTOR MANUAL – PAGE 124 VIALS**

After use, the syringe and needle must be disposed of properly in a puncture-resistant sharps container labeled properly. Used needles must not be recapped. Most needle stick exposures occur from recapping or improper disposal of needles.

Needles and syringes should **NEVER** be reused or used on more than one resident.

POINT(S) TO REMEMBER
Insulin Syringes: ➢ ONLY "Insulin Syringe" MUST always be used to administer insulin ➢ Insulin dose is always in UNITS ➢ Insulin needles & syringes should NEVER be reused or used on more than one resident

Storage of Insulin

Insulin must be stored properly. Insulin is very sensitive to sunlight and extreme hot or cold temperatures.

Unopened insulin vials:

- Refrigerate 36 -46°F
- Expiration date on vial / box

Opened insulin:

- Vial – Store in the refrigerator or controlled room temperature
  Discard after 28 days
- Pen – Store controlled room temperature
  Discard 7-28 days (Check pen manufacturer instructions)

Important Insulin Storage:

- Do not keep in hot place
- Do not freeze – Discard frozen or thawed insulin
- Do not store in sunlight
- Never use expired insulin
- Discard opened insulin vial after 28 days (write discard date on vial) – can be stored at room temperature

- Inspect Insulin – note any change in color / clarity, white particles or crystals and discard. Insulin that is clear should always be clear and never cloudy.

Rotation of Injection Sites

Insulin injections are given on a regular and sometimes frequent basis. For that reason, the injection site should be consistently rotated. An injection site rotation plan is necessary to prevent irritation and tissue damage to any one injection site. Hard, painful lumps can develop under the skin with repeated injection into the same area. An injection site diagram should be used to document injection sites. Most common injection sites are the abdomen, outer thighs, back of arms and buttock. Do not inject near joints, the groin area, the navel area, the middle of the abdomen or in scar tissue. **INSERT SITE ROTATION DIAGRAM FROM AMERICAN ASSOCIATION OF DIABETES EDUCATION. (2)**

POINT(S) TO REMEMBER
Rotation of Injection Site: ➢ Reduces the risk of irritation, tissue damage, and pain ➢ Rotation site diagram should be used

Insulin Administration Procedure

Insulin injection technique is the same no matter what type or amount of insulin is used. Insulin is administered by subcutaneous (subq or SQ) injections. Subcutaneous injections allow medication to be absorbed more slowly for a sustained period. The insulin is injected with a needle into the subcutaneous layer between the skin and the muscle. **INSERT PICTURE FROM NHCA INSTRUCTOR MANUAL PAGE 126**

WITHDRAWING MEDICATION FROM A VIAL & ADMINISTERING INSULIN BY SUBCUTANEOUS (Subq or SQ) INJECTION 1. Gather the needed equipment and supplies. Supplies include insulin syringe with needle, alcohol wipes, medication, disposable gloves and a sharps container. Needle (25-27 gauge, ¼ to 5/8 inch) Insulin Syringe is marked or calibrated in units. Choose the syringe based on the insulin being given. (If using U 100 insulin, use U 100 syringe) 2. Check Medication Administration Record for the insulin order. (Remember the "Rights of Medication Administration.) (1st check) 3. Wash and dry hands thoroughly or use alcohol based hand rub. 4. Prepare insulin for injection: a. Check date insulin vial opened. (Follow facility policy for dating insulin.) b. Check the insulin carefully. Rapid and short-acting insulin should look clear and long-acting insulin should look cloudy with no clumps or crystals. Insulin that looks different from usual can be too old or spoiled and should never be used. c. If using clear intermediate or long-acting (cloudy) insulin, roll the insulin vial between your hands 3-4 times to mix the insulin evenly. Do not shake the vial. Rapid and short-acting (clear) insulin does not need to be mixed. Be certain you are using an insulin syringe with the unit scale on the syringe that matches the type of insulin you are administering. d. Remove cap of vial, if new. Wipe the top of the insulin vial with alcohol wipe. e. Check how many units of insulin you need to inject. (2nd check) f. Pull back the plunger to draw the amount of air into the syringe that matches the insulin ordered dose. Hold the insulin vial upright. Insert the needle through the rubber stopper of the vial. Push the plunger down to inject the air in the vial. Keep the needle in the vial.	

g. Holding the needle/syringe in the vial, turn the vial upside down. Pull back on the plunger to withdraw slightly more than the amount of insulin ordered. (Approximately 2 units more is sufficient) With the needle still in the vial (and the vial is still upside down), tap the side of the syringe gently. Any air bubbles will rise to the top. Push in the plunger just enough to get rid of the air and the extra insulin. Now there is just the right amount of insulin in the syringe and no air bubbles. h. Complete a check to make sure the correct amount of insulin is present. (3rd check) Take the needle out of vial, recap the needle with one hand. 5. Return medication to storage and secure other medications. Always keep the prepared syringe in your possession. 6. Choose the injection site according to the medication plan for the resident, facility procedure, and rotation plan or physician direction. See "Rotation of Injection Sites" 7. Take the medication and supplies to the resident. 8. Knock, ask permission to enter resident room. Identify resident. Provide privacy. 9. Position the equipment on a clean barrier within reach. 10. Wash and dry hands thoroughly or use alcohol based hand rub. 11. Put on gloves. 12. Clean the injection site with an alcohol wipe in a circular motion, and allow to dry. 13. Remove the needle cover (cap). 14. With one hand gently pinch skin between forefinger and thumb. The pinched skin area will be the injection site. Instruct the resident that they will feel a stick. With your other hand, hold the syringe like a pencil or dart. Gently insert the needle quickly and firmly at a 45 – 90 degree angle. 15. Release the skin. Do not let go of or move the syringe. Press the plunger in a gentle, steady motion until the medication is injected.. Keep the needle in place for a count of five (5).	

16. When the syringe is empty and you have counted to five (5), pull out the needle at the same angle you put it in. Gently press the injection site for a few seconds using an alcohol wipe or cotton ball to prevent the medication from leaking.
17. Do not massage the area. Do not recap the syringe. Pull the protective guard over the needle.
18. Dispose of the syringe in a container designated for used sharps.
19. Dispose of supplies.
    Remove gloves.
    Wash hands
20. Record the insulin administration, including injection site.
21. Report any concerns voiced by the resident or observed by the QMA to the licensed nurse.

PREPARING AN INSULIN PEN AND ADMINISTERING INSULIN BY SUBQ INJECTION

The use of insulin pens has increased in recent years. Insulin pens are made by different companies. Insulin pens should not be shared or used on multiple residents. The following are the general directions for pen use. **Read the specific instructions from the manufacturer for the pen that will be used prior to administration**.

Insulin pens should not be shared. Pens are for individual use only.

1. Gather the needed equipment and supplies. Supplies include the pen with medication, needle, alcohol wipes, disposable gloves and a sharps container.
2. Check Medication Administration Record for the insulin order. (1st check)
3. Wash and dry hands thoroughly or use alcohol based hand rub.
4. Remove the pen cap. Check the reservoir to make sure the insulin is clear and has no particles.

5. Wipe the pen tip with an alcohol wipe. 6. Remove the protective seal from a new needle, screw the needle in place. 7. Remove the outer needle cap and save. 8. Dial a dose of 2 units to prime the pen. 9. Hold the pen with the needle pointing straight up and tap lightly so the bubbles will rise to the top. 10. Press the injection button all the way in and check to see that insulin comes out of the needle. (If no insulin comes out, repeat the test. If insulin still does not come out, get a new needle) 11. Check the order for the correct dose. (2nd check) 12. Make sure the window shows "0" before selecting the dose. 13. Select the correct dose and dial until the number shows in the window. 14. Check the order to confirm the correct dose appears. (3rd check) 15. Take the medication and supplies to the resident. 16. Knock, ask permission to enter resident room. Identify resident. Provide privacy. 17. Position the equipment on a clean barrier within reach. 18. Wash and dry hands thoroughly, or use alcohol based hand rub 19. Put on gloves. 20. Clean the injection site with an alcohol wipe in a circular motion, and allow to dry. 21. Keep the pen straight and insert the needle into the skin. Using your thumb, press the injection button all the way down, when the number in the window returns to 0, slowly count to 10 before removing the needle. 22. Release the button and remove the needle from the skin. 23. Put the outer needle cap back on the needle and unscrew or pull the needle from the pen. 24. Discard the needle in the sharps container. 25. Dispose of supplies. Remove gloves. Wash hands. 26. Record the insulin administration.	

27. Report any concerns voiced by the resident or observed by the QMA to the licensed nurse.

POINT(S) TO REMEMBER
Insulin Injection with Syringe or Pen: ➢ Always check physician order for insulin dose three times ➢ Follow the "Rights of Medication Administration" ➢ Document and report any concerns ➢ Do not administer insulin if concerns or issues are observed or verbalized by the resident ➢ Notify nurse immediately regarding concerns or issues

GUIDELINES FOR ADMINISTRATION OF SLIDING SCALE INSULIN
Sliding-scale insulin therapy bases the amount of insulin a diabetic must have administered at a specific time. For example, prior to meals and at bedtime. The higher the blood glucose level, the more insulin required.

If insulin is ordered to be given according to the resident's blood glucose level, the physician's order will give the time the blood glucose level should be checked, type of insulin and a scale for the amount of insulin to be administered when the resident's blood glucose level is within that specific range. The insulin must be administered in the exact amount ordered as close to the time the blood glucose level was taken as possible.

EXAMPLES: If the order reads to give 4 units of insulin for blood glucose of 201-250, only give the 4 units of insulin if the resident's blood glucose is equal to or between the specific ranges. If the order reads to give 0 units of insulin for blood glucose < (less than) 150, no insulin is given unless the blood sugar is over 150.

Example:
Insulin Sliding Scale Orders

BG 70-150	0 Units (U)
151-200	2 U
201-250	4 U
251-300	6 U
301-350	8 U
351-400	10 U
>400	Call MD

POINT(S) TO REMEMBER

Prior to Insulin Administration:

- Resident should be observed for any changes or complaints, such as signs or symptoms of hyperglycemia or hypoglycemia
- Prepared insulin and amount in syringe/pen should be checked with the physician order at least 3 times for accuracy prior to administration
- Injection site must be rotated
- **ANY CONCERNS SHOULD BE REPORTED TO THE NURSE IMMEDIATELY, PRIOR TO ADMINISTRATION OF THE INSULIN**

SECTION 6: Conditions & Potential Complications

Eye disease:
Retinopathy – Eyesight is damaged from bleeding, detachment of the retina, or the presence of abnormal blood vessels in the retina. Can lead to blindness.

Blindness – Inability to see. The leading cause of blindness in the U.S. are cataracts, glaucoma, and age-related macular degeneration.

Cataracts – Diabetics develop cataracts at an earlier age than the general population and the disorder progresses faster in diabetics. Cataracts are a thickening of the lens

SECTION 6: Conditions & Potential Complications

Estimated Time:

Additional Handouts / Tools:

of the eye. High glucose levels cause damage to the lens due to glucose converting to sorbitol in the eye. Glaucoma - Caused by pressure build-up in the eye. In diabetes, the blood vessels are narrowed; the pressure in the eye vessels constricts the blood getting to the retina, causing damage, leading to blindness. **Kidney Disease (Nephropathy):** Diabetes can damage the blood vessels in the kidneys that are needed to filter waste. The damage can cause the blood vessels to leak proteins into the urine. This as well as the increased pressure in the vessels causes damage to the kidneys. Diabetes can also lead to kidney failure that may require renal dialysis. **Heart Disease:** Hypertension (HTN) – Diabetes affects the blood vessels throughout the body. When the cardiac vessels become damaged from the high levels of blood glucose in the system, the blood flow has to work with more force, causing hypertension. Heart disease – The heart has to work harder (see HTN) in a diabetic, the heart muscle becomes fatigued and weakens causing heart disease. Blood vessel changes - Diabetes increases the residents' risk of heart disease because high blood glucose levels signal the liver to increase availability of fat for energy because it believes that the body is not able to use glucose. Increased levels of cholesterol and fat in the blood lead to fatty deposits in the walls of blood vessels. **Nerve Damage:** Neuropathy – Affects most areas of the body. Neuropathy is one of the most common complication of diabetes. The excess glucose injures and weakens the vessels that carry nutrients to the nerves. Symptoms can include pain, tingling, or numbness.	Instructor Prompts: Notes:

Approximately 70% of diabetics have some form of neuropathy. Four main types of neuropathy include: • Peripheral neuropathy can cause numbness, tingling or pain in the toes, feet, legs, hands, arms, wasting of the muscles of the feet and hands. • Autonomic neuropathy can cause indigestion, nausea, vomiting, gastroparesis, bowel/bladder dysfunction, sexual dysfunction, abnormal response to blood pressure, heart, lung, eye problems. • Proximal neuropathy can cause pain or weakness in the thighs, hips, buttocks, or legs. • Focal neuropathy can cause sudden weakness or pain in any nerve in the body including those that go to the eyes, muscles of the face, ears, pelvis and lower back, chest, abdomen, thighs, legs, and feet. **Neurologic Disease:** Stroke – Occurs when blood flow is restricted to the brain. Blood clots are the most common cause of stroke in diabetics. Another type of stroke is a hemorrhagic stroke. This occurs in diabetics as the blood vessels weaken, leading to a break in the vessel. **Skin Condition:** Infections - Diabetics are more susceptible to bacterial, yeast, and fungal infections because the toxins that cause these infections are not transported out of the system due to decreased blood flow. **Other Common Complications:** Depression – Depression risk increases with diabetes. Living with a chronic disease that requires diligence and lifestyle changes can lead to a great many complications that can be overwhelming. Poor wound healing – blood vessels carry blood and oxygen throughout the human body and all of its organs. The skin is the largest body organ. When blood vessels are	

damaged, blood and oxygen cannot get to the wounded area, thus inhibiting proper wound healing. Foot damage – nerve damage and decreased sensation in the feet or decreased blood flow cause ulcers, necrosis, infections, poor wound healing that ultimately increase a persons' risk for complication including amputation. Gum problems – high glucose levels in saliva help bacteria thrive and can cause an accelerated build-up of decay-causing plaque or tartar. The tartar builds up along the gum line causing chronic inflammation and infections. This also leads to tooth decay and tooth loss. Additionally, thrush is a common diabetic complication. **Care of a diabetic resident when they are ill:** Sick Day Management – Blood glucose levels need to be checked more frequently when sick, since the body will require more energy during an illness. Hormones in the body that fight off infection increase with illnesses and raise blood glucose levels. More insulin may therefore be needed. If vomiting occurs, blood glucose levels drop and hypoglycemia treatment may be needed to bring blood glucose levels up. If the resident is unable to eat, provide sips of fruit juice, Gatorade, or popsicles. If levels drop below 70 (or the range that the physician sets), glucagon administration may be needed with a physician's order. **Glucagon may not be administered by the QMA.**	
SECTION 7: Competency & Testing	**SECTION 7: Competency & Testing**
Competency is an important part of the training of all individuals. Competency testing is a way of ensuring an individual knows and can perform the skill or procedure in a knowledgeable and safe manner. Training and competency records must be kept and updated as required.	Estimated Time: Additional Handouts / Tools:

QMA Insulin Administration training must be done through an approved Indiana State Department of Health Qualified Medication Aide Training Program by an approved Program Director. It is the responsibility of the Program Director to provide the QMA Insulin Administration Education Module according to the module guidelines, such as timeframes, skilled competency evaluations. The training program may develop a written final exam, but this would not replace the state written competence evaluation. The Insulin Administration for QMAs competency is determined by both a skills and written competency evaluation. The skills portion is administered by a QMA- Insulin Administration Education Module - Program Director. The student must perform each skill with 100% accuracy: • WITHDRAWING INSULIN FROM A VIAL & ADMINISTERING INSULIN BY SUBQ INJECTION **and** • PREPARING AN INSULIN PEN & ADMINISTERING INSULIN BY SUBQ INJECTION The completed competency checklist forms for both WITHDRAWING INSULIN FROM A VIAL & ADMINISTERING INSULIN SUBQ **and** PREPARING AN INSULIN PEN & ADMINISTERING INSULIN SUBQ must be available in student file. The student is not competent until each skill is completed with **100%** accuracy. The QMA Program Director should determine when to conduct the skills competency. At no time during the practicum experience should a student be allowed to administer insulin to a resident without direct supervision. Following successful completion of the skills competency evaluation, the individual may apply for the written competency evaluation. The written competency evaluation is a secured test that is administered by a state approved testing entity. The individual must: • Submit an Application to Test for Qualified Medication Aide – Insulin Administration Certification (State Form # 00000) with the testing fee to state testing entity.	Instructor Prompts: Notes:

- Successfully pass the 25 multiple choice question test with an 88% (22 or more correct answers).
- An individual/student who is not successful after 3 attempts – will need to retake the entire QMA Insulin Administration Education Module.
- An individual/student will have 12 months from the Insulin Administration Skills Competency Verification (Section 4) date on the Application to Test (State Form #000000) to successfully complete the written competency evaluation. After 12 months, the individual/student must retake the entire QMA Insulin Administration Education Module.
- The individual/student must be on the Indiana Nurse Aide Registry with a QMA- Insulin Administration sub-type Certification **before** administering insulin in a facility.

POINT(S) TO REMEMBER
QMA must: ➢ Successfully complete both the skills and written competency evaluation for the QMA – Insulin Administration Certification.

SECTION 8: Registry & Renewal Requirements	**SECTION 8: Registry & Renewal Requirements**
The Indiana State Department of Health oversees the Nurse Aide Registry. This registry contains the names and information for all Certified Nurse Aides (CNA), Home Health Aides (HHA) and Qualified Medication Aides (QMA) in Indiana. All aides working in a licensed nursing home must be listed on the Registry. The Nurse Aide Registry is maintained by the Indiana Professional Licensing Agency (PLA) and is available online at https://www.in.gov/pla/license.htm . Following successful completion of both the QMA - Insulin Administration Education Module and the competency (skills and written) evaluation, an Insulin Administration sub-type will be added to the QMA's certification on the Indiana Nurse Aide Registry.	Estimated Time: Additional Handouts / Tools:

The issued date will be the date of successful completion of the written competency evaluation. The expiration date will correspond to the current CNA/ QMA Certification expiration date. **Renewal of QMA-Insulin Administration Certification** An individual must renew all (CNA, QMA, and QMA-Insulin Administration) certifications by the expiration date. The renewal is done through the PLA Online Licensing System at https://www.in.gov/pla/license.htm . When renewing certifications, the CNA certification **MUST** be done first. All renewals will be for a two year period. **Inservice Requirements** In addition to the annual six (6) hours of inservice related to medication(s), medication administration and/or medication treatments, the QMA must also include an additional one (1) hour of inservice related to insulin administration per year. This additional inservice hour can be documented on the Qualified Medication Aide (QMA) Record of Annual Inservice Training (State Form #51654). The Record of Annual Inservice Training does not need to be submitted to the Indiana State Department of Health (ISDH). The ISDH may request the inservice documentation from the QMA. It is the QMA's responsibility to maintain and keep their yearly inservice attendance record(s). **Fees** There is no renewal fee or charge.	Instructor Prompts: Notes:

POINT(S) TO REMEMBER
QMA must: ➢ Be on the Indiana Nurse Aide Registry with the Insulin Administration sub-type before administering insulin in a health care facility ➢ Complete the required inservice hours for renewal of certifications ➢ **REMEMBER: AT THE TIME OF RENEWAL, THE CNA CERTIFICATE MUST BE RENEWED FIRST.**

SECTION 9: Role & Responsibility – QMA & Facility	**SECTION 9: Role & Responsibility – QMA & Facility**
QMA Responsibility QMA – Scope of Practice -Insulin Administration • Withdraw insulin from a vial & administer insulin by subcutaneous (subq or SQ) injection • Prepare an insulin pen & administer insulin by subcutaneous (subq or SQ) injection • Administer sliding scale insulin subcutaneous (subq or SQ) injection per guidelines and specific physician's orders • Perform finger stick blood glucose testing per facility policy and procedure, • Perform FreeStyle Libre blood glucose readings only per facility policy and procedure • NOT ADMINISTER CONCENTRATED INSULIN EQUAL TO OR GREATER IN STRENGTH OR ACTIVITY THAN A U-500 INSULIN • Report and document insulin administration, observations, and concerns	Estimated Time: Additional Handouts / Tools: Instructor Prompts:

POINT(S) TO REMEMBER
Qualified Medication Aide must: ➢ Understand the QMA's requirements related to Insulin Administration ➢ Understand the facility requirements related to Insulin Administration ➢ Perform within the **Scope of Practice – Insulin Administration ONLY**

Health Facility Responsibility

Prior to administering insulin at a licensed health facility, the QMA shall:

- Be supervised by a RN in administering the insulin; **OR** the RN must delegate responsibility for administering the insulin to the QMA based on the RN's assessment of the QMA's competency to administer insulin.

- Be informed by the health facility where the QMA is employed that the facility:
    a. permits the QMA to administer insulin;
    b. established a procedure for delegation of insulin administration from the RN to the QMA;
    c. established a procedure that includes resident-specific clinical parameters based on the RN's assessment of each resident and the QMA's competency to administer the insulin; and
    d. established when the resident-specific parameters require a new or re-assessment by the RN.

Notes:

POINT(S) TO REMEMBER Health Facility must: ➢ Verify on the Indiana Nurse Aide Registry that the QMA has had the appropriate training/testing with the QMA- Insulin Administration Certification sub-type. ➢ Confirm there are no findings of abuse, neglect, misappropriation or QMA out of scope of practice finding(s).	
SECTION 10: Glossary & Forms	**SECTION 10: Glossary & Forms**
Glossary **Amylase** An enzyme found mainly in saliva and pancreatic fluid that converts starch and glycogen into simple sugars. **Autonomic Neuropathy** Damage to the nerves that control involuntary (automatic) bodily functions such as blood pressure, heart rate, sweating, bowel and bladder processes, digestion, respiration. **Beta Cells** A type of cell in the pancreas that produces and releases insulin. **Blood Glucose level** The blood glucose level is how much glucose is in the blood at a given time. This level is very important for people with diabetes, and must be monitored throughout the day.	Estimated Time: Additional Handouts / Tools: Instructor Prompts:

Carbohydrates Carbohydrates are one of the three main energy sources for the body. The body breaks down carbohydrates to get glucose, which then provides energy to the body. Carbohydrates include sugars, starches and fiber. Carbohydrates come mainly from grains (bread, noodles, rice, and cereal), legumes (beans, lentils, and peas), starchy vegetables (potatoes, corn), fruits, cookies, cakes, candy. **Cataracts** A medical condition in which the lens of the eye becomes progressively opaque, resulting in blurred vision. **Diabetes mellitus** Diabetes mellitus is the full name for diabetes, but most people refer to it as just diabetes. Diabetes is a chronic disorder of either no insulin production or improper use of insulin. **Endocrine system** Comprised of glands that produce hormones that control bodily function. Diabetes is an endocrine disorder because insulin is a hormone. **Duration** The amount of time in which the medication lasts in your system. **Fat** Fat is one of the three main energy sources for your body. Fat mainly comes from nuts, oils, olives, avocado, butter, fried foods, fatty meat (bacon, sausage, red meat). **Focal neuropathy** Nerve damage to a single nerve, most commonly in one's hand, head, torso or leg.	Notes:

Gastroparesis Neuropathy that affects the stomach, causing the stomach to empty too slowly after eating. **Glaucoma** A medical condition of increased pressure within the eyeball, causing gradual loss of sight. **Glucagon** A hormone made by the pancreas. It raises the blood glucose level, so it counteracts the effects of the hormone insulin. **Glucose** A sugar that the body uses for energy. In order to use it properly, the body must have enough of the hormone insulin. **Hyperglycemia** Hyperglycemia is too much glucose in the blood. **Hypoglycemia** Hypoglycemia is too little glucose in the blood. **Insulin** A hormone that helps the body use glucose. Insulin allows glucose to enter the cells that need it, especially the muscles. Without insulin, glucose can't get to where it needs to go. **Insulin resistance** When the body doesn't respond as well as it should to insulin. It is an early sign of Type II diabetes.	

Intermediate Acting Insulin - (Also known as NPH Insulin) A type of insulin that starts to act within the first hour of injecting, followed by a period of peak activity lasting up to 7 hours. **Islets of Langerhans** The area in the pancreas that houses the beta cells. **Ketoacidosis** Also known as diabetic ketoacidosis (DKA). Ketoacidosis happens when the body starts breaking down fat too quickly. The liver processes the fat into fuel called ketones, which causes the blood to become acidic. **Ketones** When the body starts to break down fat in order to get energy, ketones are a byproduct. When too many ketones build up in the blood, it makes the blood acidic and can lead to diabetic ketoacidosis. **Lipase** A pancreatic enzyme that initiates the breakdown of fats to fatty acids and glycerol or other alcohols. **Long Acting Insulin** A type of insulin that keeps working to keep blood sugar under control throughout daily routine; usually lasts up to 24 hours. **Macrovascular complications** Over time, poor blood glucose control can lead to serious complication, including damage to major blood vessels – to the macrovascular system. Macrovascular complications cause plaque to build up in the arteries, which can lead to a heart attack or stroke.	

Microvascular complications Over time, poor blood glucose control can lead to serious complications, including damage to tiny blood vessels – to the microvascular system. These microvascular complications of diabetes can lead to problems with the eyes, kidneys and nerves. **Nephropathy** Nephropathy is damage to the kidneys. It is a possible long-term complication of diabetes. Numbness, tingling, weakness, and pain from nerve damage; usually in the hands and feet. **Neuropathy** Neuropathy is damage to the nerves. It is a possible long-term complication of diabetes. **Onset** Onset can be defined as the amount of time it takes for the medication to begin to work. **Pancreas** An organ of the endocrine system. A specific area of the pancreas, the Islets of Langerhans, produces the hormone insulin **Peak** The time when the medication reaches its maximum effectiveness. **Polydipsia** Constant, excessive drinking as a result of increased thirst. **Polyphagia** Excessive hunger or increased appetite.	

Polyuria Excessive urination. **Protease** A group of enzymes that breaks down proteins to convert to amino acids. **Protein** A source of energy. Protein is found mainly in meat, fish, poultry, dairy, beans. **Proximal neuropathy** Nerve damage and subsequent pain on one side of body. Most commonly affects the thighs, hips, or buttocks. Commonly called diabetic amyotrophy. **Rapid Acting Insulin** A type of insulin that is usually administered just before or with a meal. It acts very quickly to minimize the rise in blood sugar that follows eating. **Regular Insulin** A type of insulin that is short acting, usually reaching the bloodstream within 30 minutes. **Retinopathy** Retinopathy is damage to the retina. The retina is the part of the eye that senses light. It is a possible long-term complication diabetes. **Type I Diabetes** Also known as juvenile diabetes or insulin-dependent diabetes. A chronic condition in which the pancreas does not produce insulin.	

Type II Diabetes Also known as insulin-resistant diabetes. A condition in which the body does not use insulin properly. In early stages, the pancreas makes extra insulin to make up for the deficiency. Over time, it is not able to keep up and can't make enough insulin to keep blood glucose at normal levels. **Forms** Qualified Medication Aide (QMA) Record of Annual Inservice Training Qualified Medication Aide (QMA) Insulin Administration Decision Tree - OPTIONAL Application to Test for Qualified Medication Aide – Insulin Administration Certification Insulin Administration for Qualified Medication Aide (QMA) Competency Checklist • Preparing an Insulin Pen & Administering Insulin Subq • Withdrawing Insulin form a Vial & Administering Insulin Subq	
Resources	**Resources**
Indiana Professional Licensing Agency - www.in.gov/pla/index.htm Ivy Tech Community College – Test Center - https://www.in.gov/isdh/28366.htm Indiana State Department of Health - https://www.in.gov/isdh/20507.htm Nebraska Health Care Association – Medication Aide Training American Association of Diabetic Educators (AADE) www.diabeteseducator.org American Diabetes Association (ADA) www.diabeteseducator.org/docs/default-source/... Centers for Disease Control and Prevention (CDC) www.cdc.gov Handbook of Geriatric Nursing Care Manual of Nursing Practice - Lippincott	