

Diabetes Management in Long-term Care Facilities: A Practical Guide 6th Edition



A collaborative effort of the
Minnesota State Diabetes Educators

Diabetes Management in Long-term Care Facilities: A Practical Guide

6th Edition

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Purpose

The purpose of this document is to provide guidance for the care and management of people with diabetes in the long-term care and assisted living settings. It is intended for use by direct care clinicians, nurses, dietitians, pharmacists, therapists and for training of nursing assistants who care for residents with diabetes.

Uncontrolled diabetes can be very costly. In 2004 Medicare spent \$17.4 billion on unplanned rehospitalizations, \$4.3 billion of which were from nursing facilities. Hospital rates for short stays increased 29 percent from 2000-2006. Long-stay residents increased from 18.9% in 2000 to 20.9% in 2004. One-fifth of Medicare beneficiaries are readmitted within 30 days of discharge, and 34 percent are rehospitalized within 90 days.

Studies indicate that nearly one third of nursing facility residents have diabetes mellitus. Many of the issues concerning long-term care providers can be impacted by the successful control of diabetes. Uncontrolled diabetes increases the severity of any infection (e.g. urinary tract infections, wound, respiratory), can lead to dehydration, wasting, or altered cognition, which in turn increases the risk of falls. Secondary circulatory and neurological disease predispose the diabetes patient to skin breakdown, decubitus ulcers and non-healing wounds. **Sometimes the underlying cause of acute problems is missed diabetes diagnosis.**

Some diabetes control guidelines, such as American Diabetes Association (ADA) and American Medical Directors Association (AMDA), emphasize near normal blood sugar control to prevent long-term complications. But for elderly long-term care residents, the burdens of near normal control may outweigh the benefits. For residents who are younger, or those who are in sub-acute or transitional care, near normal blood sugar control may be an appropriate goal. Control should be sufficient to avoid short-term complications such as infection, dehydration, or functional impairment and to eliminate symptoms from extremes in blood sugar levels. Blood sugar goals could differ with every resident and may need occasional adjustments as their health status changes.

Facility priorities should be:

- Setting goals for care
- Weighing the burdens and benefits of the treatment plan
- Respecting the resident's preferences

How to use this guide

Long-term care facilities can institute consistent systematic practices that enhance diabetes management. Careful meal composition, activity opportunities and ongoing observation are potential improvements over community living where such support may be unavailable. Staff are able to provide rapid response to acute developments. Use of order sets, standardized policies and procedures can reinforce consistent use of care guidelines. All have the potential of improving quality of life for residents with diabetes.

The Guide incorporates information from recent research and diabetes care guidelines. We have kept the content brief for quick and easy use. The text has been kept simple to aid those with limited English reading skills. Consult the Tool Kit Glossary (section D) for word definitions.

More detailed information can be found in the companion Tool Kit including

- Staff training materials
- Educational handouts for families and residents
- A list of references and resources for further information

NOTE: This publication is intended for informational purposes only and cannot serve as a substitute for the care provided by a licensed clinician or health care professional. Users are advised to seek medical guidance before making changes in healthcare regimens.

About diabetes

1. What is diabetes?

Diabetes is a progressive disease in which the body does not make or use insulin correctly, resulting in high blood sugar (hyperglycemia).

Insulin is a hormone that converts sugars, starches and other food into energy needed for daily life.

Having high blood sugar can lead to damage to the eyes, kidneys, heart, blood vessels and nerves. There is no cure for diabetes, but it can be treated to prevent or delay complications.

Hyperglycemia = High blood sugar [typically above 200 mg/dL]

Type 2 Diabetes was previously known as “non-insulin-dependent diabetes (NIDDM)” or “adult onset diabetes.” People with type 2 diabetes produce less insulin than their body needs. They are often overweight. Type 2 diabetes may not have many symptoms. It typically develops 5 to 10 years before it is diagnosed, so at diagnosis people may already have complications such as heart disease or kidney, nerve, or eye changes. That is why at the time of diagnosis it is important to screen for complications.

Type 2 diabetes is the most common type of diabetes for residents of long-term facilities. Data indicates that **one in three residents in long-term care facilities have diabetes**. Most need to take pills and/or insulin to control the disease.

95% of all people with diabetes have type 2 diabetes

Type 1 Diabetes was previously known as “insulin-dependent diabetes (IDDM)” or “juvenile diabetes.” Type 1 diabetes is a life-long condition in which the pancreas stops making insulin and usually develops in younger people. Without insulin, the body is not able to use the sugar glucose for energy. A person with type 1 diabetes who does not get enough insulin will suffer blood sugars high enough to cause life-threatening crises called ketoacidosis.

Ketoacidosis is an emergency condition that can lead to coma or death. It occurs when there are dangerously high levels of acids (ketones).

To treat type 1 diabetes, a person must take insulin injections each day.

Type 1 Diabetes = always treated with insulin.

2. Who has an increased risk for diabetes (prediabetes)?

Prediabetes is a condition where a person has high blood sugar before meals or after, or a high average blood sugar (A1c) but not yet high enough to be diagnosed as diabetes.

35% of adults have prediabetes
50% of those older than 65 years have prediabetes

Up to half of the people with prediabetes are at very high risk for type 2 diabetes, so it is important to diagnose and treat this condition before it develops into type 2 diabetes. People with prediabetes usually have no symptoms. The treatment can include diet, exercise, and sometimes pills.

Diagnosis of prediabetes*:
Fasting blood sugar (before meal) is 100-125 mg/dl OR
2 hours after 75g glucose is 140-199 mg/dl OR
A1c 5.7-6.4 %

* American Diabetes Association

3. Symptoms of diabetes and prediabetes

People may not notice that they have symptoms of high blood sugars or diabetes. This is especially true for elderly people. Some of the many signs and symptoms are:

- Having to urinate often
- Being thirsty or hungry all the time
- Being easily tired, drowsy
- Losing weight for no reason
- Blurred vision
- Changes in behavior or ability to think

4. How diabetes is diagnosed

Nearly one third of people with diabetes do not know it. Untreated high blood sugars cause many health problems. It is important that all care givers watch for high blood sugar symptoms or test results among all residents:

There are now 4 different ways to diagnose type 2 diabetes:

1. A1c of **6.5% or higher**

OR

2. Fasting plasma glucose (FPG) level of **126 mg/dL or higher**.
 - a. Fasting means having no caloric intake for at least 8 hours before the test.
 - b. Repeat the test on another day to confirm.

OR

3. A two-hour plasma glucose (blood sugar) level of **200 mg/dL or higher**.
 - a. Using a 75-gram oral glucose tolerance test (OGTT).
 - b. Repeat the test on another day to confirm.

OR

4. Symptoms of diabetes are present and a random plasma glucose (blood sugar) is **200 mg/dL or higher**.
Random means any time of day regardless of when the resident last ate.

Watch for signs or symptoms in any of your residents. Many are not yet diagnosed.

Admitting the resident with diabetes

1. What to look for at admission

It is important to assess the resident's special diabetes needs when he or she is being admitted to the long-term care facility in order to make a care plan.

Since diabetes can lead to serious complications such as heart disease, stroke, nerve damage, kidney disease, circulation problems, dental disease and eye disease, it is important to establish whether these complications are present and to what extent they require treatment. Residents with diabetes are at an increased risk for urine infections, skin infections, foot ulcers and oral problems. They are also more likely to die if they get pneumonia or the flu, so vaccination history is needed.

Use a checklist, such as the *Diabetes Assessment Work Sheet* (see the Tool Kit C1) to make your assessment. Some of the key areas to assess are:

- The resident's diabetes treatment plan and medication list
- His/her blood sugar testing experience and blood sugar levels for the past week
- Recent A1c to show level of blood sugar control
- His/her nutrition needs and any dietary problems
- His/her blood pressure while lying down and standing
- Any complications (such as cardiovascular, eye, kidney, nerve or dental disease)
- Any mental health problems, history of depression or anxiety
- Resident's or families awareness of the signs and symptoms of low blood sugars
- A complete skin and foot assessment, looking for existing or potential problems

2. Admission from the hospital

When a person with diabetes is discharged from a hospital directly to a long-term care facility, it is important to keep several things in mind:

- Insulin may have been used even if not used ordinarily because many factors make glucose control more challenging. It is important to adjust the insulin regiment for the new circumstances.

In the hospital, people are under stress and may need MORE insulin. As they recover in the long-term care facility, they may need LESS insulin, or are ready to transition to oral agents.

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- Hospitalized patients generally do not eat as much or the same foods as people who are not hospitalized. Once in the long-term care facility, an increase in appetite will require that medications be adjusted to maintain glucose control.
- More frequent checking of their blood sugar levels makes it easier to make adjustments in medications.
- It is also important to evaluate all of the medications usually taken are continued as well as any new ones started in the hospital.

Managing diabetes for the resident

1. What are goals for treatment?

Treatment goals vary depending on the overall health of the resident. Blood sugar goals should assure that residents are free of symptoms or short-term complications are prevented. Cardiovascular risk factors (such as high blood pressure or cholesterol) should be assessed and treated with consideration of the time frame of benefit to the individual. Treatment methods must take into account the physical changes of aging if they increase the risk of side effects. It seems reasonable to use goals for non-institutionalized adults and to document decisions to alter these goals for select individuals.

Goals for non-institutionalized adults (ADA, AMDA):

- A1c < 7.0% but not below normal
- Before meal glucoses 70-130 mg/dl
- After meal (2 hrs) glucoses < 180mg/dl
- Blood pressure < 130/80 mmHg
- LDL cholesterol < 100 mg/dl

Facilities can use guidelines to systematically manage and improve the care of their residents. Benefits include:

- Better individualization of care
- Enhanced quality of life
- Earlier detection of diabetes and complications
- Better documentation of residents' goals and decisions
- A decline in low blood sugars or extreme high blood sugars
- A decline in infection, electrolyte imbalance, dehydration
- A decline in diabetes related emergency room or hospital visits
- Improved resource use
- Improved staff education and skill (AMDA)

Exceptions to usual goals include those who:

- Are dependent for feeding, have poor prognosis
- Have anorexia, gangrene, cancer, or severe dementia
- Have hypoglycemia unawareness
- Have frequent unexplainable low blood sugars
- Have a life expectancy of less than 5 years (AMDA)

Managing diabetes

2. When to check blood sugars

Blood sugar testing is necessary to:

- Find high and low readings outside of the goal range
- Evaluate the treatment plan
- Detect a changing condition (illness, new medicines, etc.)

How often to test blood sugar

Encourage standing orders for blood sugar testing or a protocol based on treatment for every resident with diabetes.

1. First week of admission:
 - Residents treated with insulin — Test 4 times daily, before meals and at bedtime
 - Residents treated with oral medicines — Test 2 times daily (vary times before meals and at bedtime)
2. Ongoing testing once stabilized, as ordered by the clinician.
 - Residents treated with insulin — Test 2 times daily (vary times before meals and at bedtime)
 - Residents treated with oral medicines — Test 2 times weekly (vary times before meals and at bedtime)
3. Increase how often testing is done during illness, surgery, stress or when the staff detect a sudden change in condition. Some individuals have low blood sugar with no symptoms, which is more difficult to diagnose unless blood sugar testing is done regularly.
4. For the resident's comfort, vary testing sites on all fingers.

Using the test results

1. When a blood sugar test is less than 70 mg/dL or the resident has low blood sugar symptoms, treat immediately. Low blood sugar increases the risk of falls and injuries.

Mild Symptoms of low blood sugar include hunger, nervousness, shakiness, perspiration, dizziness and lightheadedness.

Some will have no symptoms but caregivers may notice a change.

2. Notify the clinician when blood sugar levels are repeatedly high or low (according to the resident's treatment goals), or if patterns indicate that the treatment is no longer working as desired.

3. Ask the registered dietitian to develop a diet plan that will help the resident get better blood sugar control if needed.
4. Ask the consulting pharmacist to assess possible causes of glucose changes.

What is a hemoglobin A1c?

Hemoglobin A1c is a laboratory test of average blood sugar control over time and is recommended to be tested every 3 to 6 months depending on the individual's control.

Hemoglobin A1c is a test that measures a person's average blood sugar level over the past 2 to 3 months.

Each resident with diabetes may have a different A1c goal. An A1c value less than 7% will help prevent diabetic eye disease, heart disease, nerve damage, kidney disease, and stroke. Laboratories have slightly different ranges for normal. A higher A1c value result may be acceptable depending on the resident's age and medical condition. A low result indicates that blood sugars are too low or anemia is present.

| A1c (%) | Average glucose (mg) |
|---------|----------------------|
| 6 | 126 |
| 7 | 154 |
| 8 | 183 |
| 9 | 212 |
| 10 | 240 |
| 11 | 269 |
| 12 | 298 |

American Diabetes Association

Managing diabetes

3. High blood sugar (hyperglycemia)

High blood sugar means that the resident's diabetes treatment is not working. This can happen for many reasons, such as having an infection, a change in health status or starting a new medicine. The clinician should be made aware if the resident's blood sugar is often above the goal.

High blood sugar may cause dehydration, increased urination, incontinence, more frequent infections, blurry vision or increased pain. High blood sugar impairs thinking and increases dementia. Treating this early can help avoid the dangers of very high blood sugar, including severe infections (septicemia), hyperosmolar hyperglycemic nonketotic syndrome and diabetic ketoacidosis, in addition to long-term complications of diabetes.

- **Septicemia** is a life threatening infection of the blood system.
- **Hyperosmolar hyperglycemic nonketotic syndrome** is an emergency condition in which one's blood glucose level is very high. If not treated, it can lead to coma or death.
- **Long-term complications** of diabetes include eye disease, heart and circulation problems, kidney disease and nerve disease.

How to assess high blood sugar

A. **Signs or symptoms** usually come on slowly over hours or days. Watch residents with cognitive impairment closely. A change in mental status or behavior may be related to high blood sugar.

Symptoms may include:

| | |
|--|-----------------------------|
| Blurred vision | Lethargy (sluggish, drowsy) |
| Flushed dry skin | Signs of dehydration |
| Frequent urination | Vomiting |
| Incontinence | Weakness |
| Increased thirst | Weight loss |
| Change in behavior or ability to think | |

A person with **cognitive impairment** is less able to remember, organize their thoughts or make decisions.

B. **Possible causes** of high blood sugar:

1. Physical stress
 - Illness
 - Vomiting or diarrhea
 - Infection
 - Surgery
 - Fever
2. Emotional stress
3. Too much food or overeating
4. Other medicines

Medicines that can increase hyperglycemia: Steroids (prednisone), thiazides, antipsychotics (Zyprexa), estrogen, thyroid hormones, phenytoin (Dilantin), calcium channel blockers (Norvasc), opiates (morphine), nicotinic acid (Niaspan), protease inhibitors (AIDS medicines), herbs such as Echinacea.

How to prevent high blood sugar

- A. Check blood sugars. **Test blood sugars regularly to find any patterns and possible causes** and update the clinician.
 1. Test blood sugar before meals, at bedtime and as needed. Continue to check blood sugar before meals and at bedtime for at least 48 hours.
 2. Test urine for ketones, if ordered.
 3. Check vital signs (temperature, pulse and respiration, blood pressure).
 4. Check food intake and output.
- B. Encourage the resident to drink sugar-free fluids or water whenever possible -approximately 6 to 8 ounces per hour.
- C. If the resident is unable to eat, follow recommendations under “Managing diabetes: Minor illnesses,” section 12 of this guide.
- D. If resident has a change in condition, becomes sick or is suddenly unable to eat or drink, test their blood sugar and update the clinician.
- E. If the resident has a high A1c, test two hours after meals to assess between-meal blood sugars.

Managing diabetes

4. Nutrition

Good nutrition is an important aspect of treating diabetes. The goals of nutrition therapy are to keep the resident well nourished, at a healthy weight and control blood sugar levels. Dietary restrictions should be minimized since undernutrition is common in the population. An increase in physical activity may be the best method to help obese individuals lose weight.

During the initial assessment staff should determine and record:

- The resident's dental condition
- Whether he/she can chew and swallow
- If the resident has pain or discomfort, especially in the mouth, stomach or other parts of the gastrointestinal tract
- If the resident is depressed
- If the resident is able to feed him or herself
- What he/she likes to eat, the preferred food consistency and eating habits

Offer an individualized meal plan

The registered dietitian will design a well-balanced meal plan within the first 21 days of admission. The current recommendation (ADA and AMDA) is to use the regular resident menu with the same amount of carbohydrate at each meal. This can be done several ways:

Adjust the portion size to keep the carbohydrate amount the same with each meal or snack.

Create a menu of carbohydrate choices available at the meal and let the resident pick carbohydrate items.

- If the resident does not eat their meal, offer food or drink with similar carbohydrate content.
- Educate the resident and their family about new perspectives on diet restrictions and on the benefits of following the meal plan
- The resident has the right to refuse dietary treatment.
- Document if the resident refuses to eat the recommended diet.

Diabetes does not mean that sugar must be removed from the diet. Desserts can be part of the carbohydrate-controlled meal.

Snacks can be put into the meal plan if it is part of the resident's lifestyle but are not necessary if the blood sugar is controlled.

Extra calories can cause weight gain.

If a resident goes to bed right after dinner, consider adding an extra carbohydrate choice at dinner in place of bedtime snack.

If the resident has heart disease, high blood pressure or history of stroke, a reduced sodium (salt) diet may be appropriate.

Ongoing assessment of food intake and nutrition

- Monitor food intake daily. Report inadequate intake or change in the usual intake to the nurse and dietitian.
- Check intake and output more closely whenever blood sugars fluctuate or if medicines are modified.
- Add a carbohydrate replacement to the diet if resident is not eating as usual.
- Look for weight changes monthly or more frequently if there are major changes in the resident's condition. Weight changes are especially important for residents with diabetes and can indicate problems in blood sugar control.
- Report evidence of unintended weight loss.
- The dietitian will use weight information to determine if there is more than a 5% change in weight within 30 days, a 7.5% change within 90 days, or a 10% change within 180 days.
- Consider swallowing problems if symptoms are observed with eating or drinking and if intake continues to be poor.
- Poor nutrition can lead to dehydration, poor healing and other deterioration in condition.

Flexible meal programs

“Room service” plans, or five meals a day plans pose challenges for those taking medications for diabetes. Some medication necessitate that carbohydrate foods be taken at certain times to avoid low blood sugars.

Flexible meal plans may not be appropriate for residents with diabetes.

Swallowing problems (dysphagia)

Symptoms of swallowing problems include:

- Pocketing food in the cheeks
- Taking a long time to swallow or eat meals
- Coughing or clearing the throat when eating or drinking

Report any of these symptoms to the dietitian and primary care clinician. The resident's clinician may consider further evaluation with imaging studies or speech therapy.

If a modified (dysphagia) diet is ordered, the dietitian must be aware that it may contain more carbohydrate than usual. Diabetes medicines may need to be changed as well.

- Pre-thickened juices and liquids have more carbohydrates than the same beverages without thickening.
- Powder and thickening agents vary in their carbohydrate content.

Tube feedings

Tube feeding in residents with diabetes presents challenges for blood sugar control. Care must be taken to match their medications amount and action time to the resident's carbohydrate nutritional intake.

Tube feeding may be provided over a full 24-hour period (around the clock) or may be given over a shorter period of time, such as 8, 12 or even 18 hours. Tube feeding may also be given as a large amount at specific times periodically throughout the day.

Insulin is the most flexible medication to use. Blood sugar testing and insulin doses will be individual.

For 24 hour tube feeding:

If long acting insulin is used and the tube feeding is stopped, other means of nutrition must be given to the resident to avoid low blood sugar.

Managing diabetes

5. Oral health

Individuals with diabetes are predisposed to oral infections and periodontal disease. Good oral hygiene and blood sugar control can reduce these risks.

The mouth is the gateway to the rest of the body and reflects what is happening inside the body. Oral health problems are more prevalent in older adults and can greatly lower the resident's quality of life.

Oral infections increase the risk of heart disease, heart attacks and stroke. Since nursing assistants provide daily mouth care, they should watch for evidence of oral problems, such as:

- Fungal infections such as thrush seen as white or red patches that can turn into sores or ulcers
- Oral Infections marked by pain, swelling, redness and sensitivity to hot, cold or sweets
- Dry mouth that may be caused by high blood pressure or certain medicines
- Gum disease (gingivitis), which can be painless or painful, and seen as red, swollen, pussy or bleeding gums or bad breath

Routine dental services should be assured. Antibiotics will be needed in advance of dental procedures to prevent the possible spread of infection.

Dietitians can assist when oral problems endanger the resident's nutrition (AMDA).

Managing diabetes

6. Medicines for diabetes

Most residents with diabetes will have type 2 diabetes. They can benefit from oral or injected drugs that are made to improve the release of insulin or how well it works to control blood glucoses. They work in different ways and more than one may be used. Each has different side effects and work at different times of day. Staff serve an important role in watching for possible side effects and reporting them. Those with renal or liver disease require careful drug selection. A complete review of drugs in use by the consulting pharmacist can assure that they are compatible and safe.

Most commonly used diabetes medicines

These come in pill form. Each medicine may have several different strengths.

| generic name | brand name [®] | how it works | notes |
|---------------|---|---|---|
| acarbose | Precose [®] | Blocks carbohydrate absorption | Avoid when stomach or bowel diseases Monitor liver function |
| glimepiride | Amaryl [®] | Stimulates pancreas to make more insulin | Possible prolonged hypoglycemia Avoid if liver disease |
| glipizide | Glucotrol [®] Glucotrol XL [®] | Stimulates pancreas to make more insulin | Possible prolonged hypoglycemia Avoid if liver disease |
| glyburide | Micronase [®] DiaBeta [®] | Stimulates pancreas to make more insulin | Possible prolonged hypoglycemia Avoid if liver disease Monitor kidney function |
| metformin | Glucophage [®] Glucophage XR [®] | Decreases insulin resistance and liver glucose production, improves muscle glucose uptake | Can cause anorexia and weight loss Monitor kidney function Liquid form available |
| miglitol | Glyset [®] | Blocks carbohydrate absorption | Avoid when stomach or bowel diseases Monitor liver function |
| nateglinide | Starlix [®] | Stimulates pancreas to make more insulin (short acting) | Given 15 min before meals Hypoglycemia possible Monitor kidney function |
| pioglitazone | Actos [®] | Decreases insulin resistance and liver glucose production, improves muscle glucose uptake | Monitor liver function Monitor weight, edema |
| repaglinide | Prandin [®] | Stimulates pancreas to make more insulin (short acting) | Given 15 min before meals Hypoglycemia possible Monitor kidney function |
| rosiglitazone | Avandia [®] | Decreases insulin resistance and liver glucose production, improves muscle glucose uptake | CAUTION – Avoid in patients with heart failure May cause acute heart attack (MI) Can cause anemia, fractures |

Combination Pills

Some pills have 2 medicines in them that work differently to control blood sugars.

| generic name | brand name [®] | brand name/generic combination | notes |
|-----------------------------|----------------------------|--|---|
| metformin / glipizide | Metaglip [®] | Glucophage [®] and glipizide | Possible hypoglycemia |
| metformin / glyburide | Glucovance [®] | Glucophage [®] and glyburide | Possible hypoglycemia |
| pioglitazone / metformin | Actoplus met [®] | Actos [®] and metformin | See individual drug cautions |
| pioglitazone / amaryl | Duetact [®] | Actos [®] and Amaryl [®] | Possible hypoglycemia |
| repaglinide / metformin | Prandimet [®] | Prandin [®] and metformin | Possible hypoglycemia |
| rosiglitazone / glimepiride | Avandaryl [®] | Avandia [®] and Amaryl [®] | See Avandia cautions Possible hypoglycemia |
| rosiglitazone / metformin | Avandamet [®] | Avandia [®] and metformin | See Avandia cautions |
| saxagliptin / metformin | Kombiglyze XR [®] | Onglyza [®] and metformin | See individual drug cautions |
| sitagliptin / metformin | Janumet [®] | Januvia [®] and metformin | See individual drug cautions |

Insulins

Insulin is a hormone that converts the sugars found in starches and other food into the energy needed for daily life. All injected insulins are now man-made. They differ in how long they work in the body. Their chief side effect is low blood sugar (hypoglycemia).

| generic name | brand name [®] | type of insulin |
|--------------|--|---|
| aspart | Novolog [®] | Rapid acting mealtime insulin, starts working in 10 minutes |
| detemir | Levemir [®] | Long acting, given daily or twice daily |
| glargine | Lantus [®] | Long acting, given daily or twice daily |
| glulisine | Apidra [®] | Rapid acting mealtime insulin, starts working in 10 minutes |
| lispro | Humalog [®] | Rapid acting mealtime insulin, starts working in 10 minutes |
| NPH | Novolin N [®] Humulin N [®] | Intermediate acting, usually taken twice daily |
| regular | Novolin R [®] Humulin R [®] | Short acting mealtime insulin, starts working in 30 minutes |

Combination Insulins

Some products have 2 types of insulin that have been pre-mixed for easier administration.

| generic name | brand name [®] | how it works |
|---------------|---|---|
| aspart / NPL | Novolog Mix 70/30 [®] | 30% Novolog [®] and 70% intermediate acting insulin, usually given twice daily |
| lispro / NPH | Humalog 75/25 [®] | 25% Humalog [®] and 75% NPH, usually given twice daily |
| lispro / NPH | Humalog 50/50 [®] | 50% Humalog and 50% NPH |
| regular / NPH | Novolin 70/30 [®] Humulin 70/30 | 30% regular and 70% NPH, usually given twice daily |

New Drugs

These medicines act like (mimic) natural hormones in the body that lower blood sugar. Symlin acts like the normal amylin hormone secreted by the pancreas. The others act like incretin hormones, which are secreted normally by the intestine. Some products are injected and some are pills.

| generic name | brand name [®] | how it works | notes |
|--------------|-------------------------|---|---|
| exenatide | Byetta [®] | Twice daily injectable gut hormone mimic, stimulates insulin secretion, suppresses liver glucose | Nausea, diarrhea Avoid if gastroparesis |
| liriglutide | Victoza [®] | Injected once daily gut hormone mimic | Risk of thyroid tumors |
| pramlintide | Symlin [®] | Three times daily injectable pancreas hormone mimic, suppresses liver glucose, slows food passage | Possible hypoglycemia Nausea, anorexia |
| saxagliptin | Onglyza [®] | Daily tablet, preserves action of glucagon-like peptide 1 (GLP-1) | Urinary tract and upper respiratory infections |
| sitagliptin | Januvia [®] | Daily tablet, gut hormone mimic, preserves the action of glucagon-like peptide 1 (GLP-1) | Avoid if renal disease upper respiratory infection, head pain, gastro-intestinal symptoms, higher risk of pancreatitis |

Managing diabetes

7. Low blood sugar (hypoglycemia)

When blood sugar (glucose) drops to less than 70 mg/dL, the body may not have enough energy to sustain normal activities.

What causes low blood sugar?

Low blood sugar will only occur in those people with diabetes being treated with insulin or certain oral medicines. Taking too much of insulin or oral medicine can cause blood sugars to drop too low especially if they are also:

- Skipping a meal, delaying meals, or not eating enough at meals
- Increasing physical activity
- Drinking alcohol without eating
- Taking rapid acting insulin too long before a meal
- Experiencing an adverse drug interaction
- Vomiting or having acute diarrhea

Common Diabetes Medications that can cause low blood sugars:

- Insulins
- DiaBeta, Micronase, Glynase Prestab (glyburides)
- Glucotrol, Glucotrol XL (glipizides)
- Amaryl (glymepiride)
- Prandin (repaglinide)
- Starlix (netaglinide)

How to assess for low blood sugar

The best way to identify low blood sugar is to test the resident's blood sugar level. If you regularly test blood sugars, you may be able to identify patterns when the resident's blood sugars tend to run high or low. Signs and symptoms alone are a poor indicator of low blood sugar and will vary from person to person. When in doubt, always test the blood sugar level.

People who lack early warning signs and symptoms may have "hypoglycemia unawareness" and are even less likely to know when their blood sugar is too low. These residents may need to have their goals and treatment plans modified. It is especially important to regularly test their blood sugar and to look for patterns when blood sugars tend to get low.

Elderly residents may require changes to their blood sugar goals and testing protocols due to safety concerns to prevent low blood sugars.

Low blood sugar may be a cause of falls or injury in elderly people taking certain diabetes medications.

Nighttime low blood sugar can be a concern, especially for residents with dementia, a recent infection or a change in their oral medicine or insulin.

If not promptly treated, low blood sugar can result in long-term disability, causing seizures, coma cognitive impairment, or death. Frequent, severe or nighttime lows are the most dangerous and require treatment change.

Look for any of the following symptoms of low blood sugar, but be aware that the resident may not show any symptoms. The frail elderly may feel only confusion or lethargy, making their symptoms harder to recognize.

- Confusion or lethargy
- Poor concentration and coordination
- Hallucinations
- Generalized weakness
- Aggression or irritability
- Blurred vision
- Nausea
- Falling
- Hunger
- Seizures or coma
- Shakiness/tremors
- Sweating
- Tachycardia (racing heart)
- Tingling in extremities
- Numbness around lips
- Slurred speech
- Dizziness

How to prevent low blood sugar

1. Test blood sugars regularly to find any patterns and possible causes.
2. Review the treatment plan when two to three episodes occur in a week.
3. Provide a consistent time for meals and the amount of carbohydrates.
4. Provide a bedtime snack for those with nighttime problems.
5. Provide some carbohydrates when the resident isn't able to eat as usual.
6. Educate the resident and family members about symptoms of low blood sugar and how to recognize/treat/report them.

How to treat low blood sugar

NOTE: Treatment protocols and standing orders can be useful. See examples in the Tool Kit C2.

Mild reactions

For a **mild reaction** when the resident is awake but signs or symptoms of low blood sugar **or** has a blood sugar level less than 70 mg/dL:

Rule of 15

- Give a 15 gram dose of glucose gel (read labels) or glucose tablets. Brands vary.
- Wait 15 minutes and recheck the blood sugar. If the resident continues to have low blood sugar symptoms or has a blood sugar level below 70 mg/dL, repeat the treatment.
- Recheck the blood sugar in 15 minutes and prepare to treat for a serious reaction if the resident does not recover.

* Glucose gel is a prepackaged concentrated treatment that provides a premeasured good source of glucose. Glucose tablets must be chewed and may be harder to swallow for elderly individuals. There are different amount of glucose in different brands. Check the one in use in your facility

Moderate reactions

For a **moderate reaction** where the resident's blood sugar is less than 45 mg/dL, but if they are awake, give 30 gm of carbohydrate orally by using two of the items listed above and continue the "Rule of 15." Prepare glucagon if the individual does not recover immediately.

Severe reactions

For a **severe reaction** where the resident cannot drink or swallow, is unconscious, or is having seizures:

- Administer **1 mg of glucagon** intramuscularly. Position the resident on their side in case of vomiting. The resident should awaken within minutes. If not, administer an additional dose of 1 mg glucagon intramuscularly and call for emergency assistance. Some facilities can provide intravenous dextrose 50% which should provide recovery.
- Once fully awake and not vomiting, the resident should eat.

Managing diabetes

8. Nothing by mouth (NPO) for procedures

When a resident has been ordered NPO for a test or procedure, diabetes medicines need to be adjusted. Typically, oral medicines are not given and insulin may be delayed or given at a lower dose. Each situation is different and should be discussed in advance with the clinician.

Managing diabetes

9. Cardiovascular health

More than three out of four people with diabetes have some form of cardiovascular disease. Heart attacks and strokes are two to four times more common among people with diabetes and more likely to be deadly. That is why it is important to attempt control of cardiovascular risk factors, such as high blood sugar, high blood pressure and cholesterol, when appropriate for the individual. Nursing assistants, residents and their families should be aware of the signs and symptoms of heart attack and stroke (outlined in the Tool Kit, section C2).

High blood pressure

People with diabetes often have high blood pressure (hypertension). Treatment should attempt to maintain blood pressure as close to goals as possible taking into account the individuals tolerance of medications.

Controlled blood pressure can reduce the progression of kidney disease and eye disease. Blood pressure should be checked at least monthly and more often if it is not controlled. Blood pressure that drops upon standing should also be checked since this contributes to falls (AMDA).

National guidelines recommend blood pressure goals be 130/80 mg Hg for most people with diabetes.

Residents with high blood pressure should be encouraged to reduce the use of salt (sodium) in their foods.

Guidelines recommend sodium intake for people with diabetes be limited to 1500 mg per day. The average diet has 2300-4700 mg sodium/day.

High cholesterol (blood fats/lipids)

Although people with diabetes are more likely to have high blood cholesterol, lowering cholesterol in nursing facility residents has less clear benefit. If the resident's prognosis is fair or good, lowering LDL cholesterol may be reasonable.

Plant sterols/stanols (2 grams/day) can be safely added to the diet (many salad dressings, milk, yogurt, snack bars, and juices are fortified with sterols/stanols). Drugs therapy may also be indicated.

National guidelines (AMDA) recommend LDL cholesterol goal be less than 100 mg/dL

Managing diabetes

10. Eye care

Retinopathy is one of the most common eye problems for people with diabetes and is the leading cause of blindness in the United States.

Diabetes also increases the risk for glaucoma and cataracts.

- **Retinopathy** is a condition where the retina of the eye is damaged and can lead to vision loss or blindness.
- **Glaucoma** is increased fluid pressure in the eye.
- **Cataracts** are cloudy lenses in the eye.

Early good blood sugar control and blood pressure management can reduce these complications. Timely laser therapy can also stop a rapidly deteriorating condition.

- 1) Regular dilated eye exams by an eye care specialist experienced in diabetic retinopathy are recommended once a year for most residents. This is important because people with diabetes **may have no symptoms** until it is too late to treat the problem.
- 2) Report any eye symptoms the resident reports since it may be an emergency:
 - Blurry vision (also caused by high blood sugars)
 - Symptoms of retina detachment (like a curtain going up or down)
 - Reduced field of vision
 - Dark spots
 - Flashing lights
 - Sensitivity to light
 - Pain or pressure in eyes
- 3) Consider referring residents with vision loss to occupational therapy, which can help them take care of themselves and be more independent. An occupational therapist will give the resident exercises based on his/her vision problems and needs.

Managing diabetes

11. Foot and skin care

High blood sugar from diabetes can cause nerve damage (neuropathy) and poor blood flow (peripheral vascular disease - PVD) that can harm feet. Common foot problems such as calluses, blisters, dry cracked skin or athlete's foot can lead to infections, especially if blood sugars are high. Untreated infections can lead to gangrene and amputation. Immobility compounds these risks. Decubitus ulcers and skin breakdown are common among residents with diabetes. Protective footwear and devices may be needed at admission or when bedridden. This is why residents should have their feet and skin checked often and problems treated immediately.

Nerve damage (neuropathy)

Nerve damage causes two problems:

- **Pain.** Pain from nerve disease (neuropathy) is often described as burning, stinging, tingling, or like pins and needles.
- **Loss of feeling, especially in the feet.** This lack of feeling makes the person more likely to have injury. Nerve damage may also result in deformities in the structure of the foot.



A **bunion, or prominent metatarsal head**, is a protruding bone on the side of the foot caused by the big toe slanting toward the smaller toes.



Claw toe and **hammer-toe** are similar conditions that they cause the toe to bend and the joint buckle upwards.

Charcot's foot is a serious condition in which the joints and soft tissue in the foot are destroyed due to nerve damage.

Flat foot is a condition that occurs when the arch or instep collapses and the bottom of the foot becomes flat.

Poor blood flow (peripheral vascular disease)

Peripheral vascular disease (PVD) is caused by clogged arteries that reduce the blood flow to the foot, arms or legs. PVD can result in foot ulcers and poor wound healing. Older individuals without diabetes can also develop PVD with similar symptoms and risk injury to their arms, legs and feet. People with neuropathy may be unable to feel the usual pains of poor circulation.

Peripheral vascular disease (PVD) is a disease of the blood vessels of the arms, legs, and feet. The signs of PVD are aching pains and slow-healing sores.

Assessing the feet

An assessment of the legs and feet are important at admission. The presence of nerve damage can be found with a Monofilament exam and circulation assessed by foot pulses. Cognitive problems may make it difficult for residents to participate in reporting their perceptions of touch. All staff can observe for developing problems if the skin is assessed regularly. Exams should be more frequent for people with diabetes:

- Document pressure areas shown by redness or calluses
- Document skin problems
- Describe any problems caused by foot deformities
- Document the status of the toenails

It is recommended that nursing assistants' training include special assessment and recording of the condition of the skin of residents with diabetes. Daily foot checks include:

- Redness, calluses or bleeding under calluses
- Skin problems such as open areas or injuries
- Moist, peeling skin, especially between the toes
- Dry, cracked skin

Because residents with diabetes are at such high risk for foot problems, routine foot care is important and includes:

- Wearing protective well fitting footwear
- Maintaining healthy skin with moisturizing when dry and drying when too moist (between toes)
- Toenail trimming, unless the nails are too thick and more specialized care is needed from a podiatrist or foot care nurse
- Gentle removal of calluses using a pumice stone or file

Consider referral to a foot specialist for monitoring or special footwear fitting if one or more of the following are present:

- History of a previous foot ulcer
- History of a partial foot amputation due to a foot ulcer
- Calluses that are large enough to cause a foot ulcer, especially any that are painful or reddened
- A foot deformity, such as hammer toes, claw toes, bunions, prominent metatarsal heads or Chacot's foot
- Loss of sensation
- Signs of poor circulation

Managing diabetes

12. Minor illnesses (sick days)

Minor illnesses can cause blood sugar levels can fluctuate quickly, even with a mild infection. Watch more closely for severe high blood sugar by testing before meals and at bedtime.

Continue insulin and oral medicines, even when the resident is sick. More medication may be needed rather than less.

If a resident is sick and unable to eat and drink, test the blood sugar and report it to the resident's clinician for advice on how to monitor the condition and if the medicines should be changed.

Maintain fluid intake

Residents who continue to eat meals should drink about 8 ounces (or 240 ml) of calorie-free liquids each hour to prevent dehydration. Some of these liquids should contain sodium and electrolytes.

Examples of calorie free liquids include water, sugar-free Kool-aid, diet pop or broth.

Use beverages that are 10 calories or less per 8-ounce serving. It is best to use a mixture of these fluids, not just water alone.

Residents who are not eating

If a resident is unable or unwilling to eat their regular meals, carbohydrate containing liquids should be substituted. Give 45-60 grams of carbohydrate over a 3-4 hours period (about 15 grams every hour).

Check vital signs often

Check vital signs every shift, including temperature and blood pressure. Report any cognition or behavior changes.

Examples of foods with 15 grams carbohydrates

Breakfast

1/2 cup juice

1/2 cup cooked cereal with milk or yogurt

Mid-morning Snack

1/2 cup juice and/or 1 slice toast

Lunch

1 cup cream soup

1/2 cup fruit sauce

Mid-afternoon Snack

1/2 cup regular soda pop or juice

6 crackers

Supper

1 cup cream soup or 1 cup noodles or rice in broth

1 cup milk

Bedtime Snack (as late as possible)

1/2 cup pudding, ice cream, sherbet, or juice

Managing diabetes

13. Immunizations (vaccines)

People with diabetes get sicker and are more likely to die when they have influenza (flu) or pneumonia.

Flu vaccination is recommended yearly. Since some residents may have poor immunity, guidelines(CDC) recommend that care givers, nursing facility staff and family members of residents also get an annual flu vaccine.

Pneumonia vaccine can be taken once if provided when under 65 years of age. Revaccination may be needed if the first dose was taken after the age of 65 (ADA, CDC).

Managing diabetes

14. Mental health

Extremes in blood sugar can alter thinking and function as can longstanding diabetes. Long term effects of diabetes vary greatly between individuals but primarily affect memory. Diabetes is a risk factor for both vascular dementia and Alzheimer's disease.

Depression is the most frequent mental illness in older adults and is highest among institutionalized individuals. Depression is also twice as common in people with diabetes. National guidelines recommend regular screening for depression. Geriatric depression scales are generally used for this purpose.

Anxiety is more common in older adults and is frequently overlooked. Like depression, anxiety can result in physical complaints. Staff should suspect mental health issues when physical functioning changes. (Topics in Geriatric Rehabilitation).

Tips for assisted living facilities

1. Living arrangements

Older adults who need assistance with activities of daily living are seeking short and long term alternatives to living in their own homes. Socialization and assistance can improve overall functional health which in turn allows even more independence.

Assisted living facilities can provide a variety of services, but unlike skilled nursing facilities, they do not offer 24 hour nursing care, oversight of medications by pharmacists, or meal planning by a dietitian. Home health nursing is available to assisted living tenants for medication assistance, blood sugar testing, skin/wound care, or nutrition assessment. Home health can arrange for physical therapy, dietitian assessment and other specialty services. The home health nurse can serve as liaison with the local medical provider and diabetes educators.

2. Meals

Dining services provide nutritious balanced meals and snacks that the tenant selects. Over time, chefs and wait staff can become very familiar with the tenants who have medical nutritional needs and assist them with their choices. They observe when intake is insufficient or excessive and when meals are missed.

Tenants appreciate when carbohydrate choices are listed on menus. Dining services can also introduce new healthy foods such as vegetables, grains, fruits and salt substitutes that the tenant has not experienced. Tenants are also free to leave the facilities and have meals elsewhere providing variety and socialization.

3. Physical activity

Assisting living facilities may host regular physical activity events such as walks, site seeing, shopping, dancing, etc. Tenants participate as they are able or interested. Muscle strengthening through gentle exercise can improve mobility and may reduce falls.

Coupled with a sound diet, increased physical activity is one strategy for weight management.

4. Learning about diabetes self care

It is not uncommon for older adults to have no formal diabetes self-management education. Caregivers sometimes assume that older adults would not participate fully or that their cognitive abilities are too limited. On-site support groups led by a health care professional have successfully been held in the assisted living setting. Family members may be especially interested in joining. Often medical questions emerge in such groups and individuals can be encouraged to seek answers from their providers or to get a referral to a diabetes educator.

Peer support is emerging as a very strong method for increasing coping skills for people with diabetes. Support groups are especially helpful for discussing the patient's side of diabetes such as depression, confusion, fears, etc. Local health professionals could be invited to lend expertise and answer questions. Tenants may also benefit from attending chronic disease self-management or diabetes prevention classes if offered locally.

Staff education and skill development

In some states annual continuing education is required for unlicensed staff. Such staff may be interested in learning more about diabetes since so many of their residents have diabetes. This is an opportunity to promote prevention, early detection and quality management of diabetes. Application of these skills can lead to staff wellness efforts.

The Diabetes Management in Long-term Care Facilities: A Practical Guide and companion Tool Kit (at <http://ltcdiabetesguide.org>) can provide the basis for staff education content. Local educators may be an excellent resource for training. Members of the American Association of Diabetes Educators (AADE) are listed at www.diabeteseducator.org.

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