



Booster Blitz Lecture Series
Management of Diabetes
in Long-Term Care
Residents

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Disclosures

No financial disclosures

Overview:

- Epidemiology
- Type 2 diabetes mellitus pathophysiology and symptoms
- T2 DM complications
- T2 DM treatment
- Recognising hyper- and hypoglycemia
- Medication-related adverse effects
- Establishing care plan for residents in nursing homes

Epidemiology

Approximately 1 in 5 nursing home residents suffers from diabetes (a much higher rate than national average of 6%).

<https://www.cdc.gov/diabetes/library/socialmedia/infographics/diabetes.html>

Newton CA, Adeel S, Sadeghi-Yarandi S, et al. Prevalence, quality of care, and complications in long term care residents with diabetes: a multicenter observational study. *J Am Med Dir Assoc* 2013;14:842–846

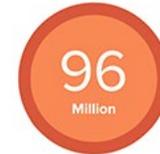
Dybicz SB, Thompson S, Molotsky S, Stuart B. Prevalence of diabetes and the burden of comorbid conditions among elderly nursing home residents. *Am J Geriatr Pharmacother* 2011;9:212–223

Resnick HE, Heineman J, Stone R, Shorr RI. Diabetes in U.S. nursing homes, 2004. *Diabetes Care* 2008;31:287–288



37 million people have diabetes

DIABETES



96 million American adults—more than 1 in 3—have prediabetes

PREDIABETES



COST



\$327 Billion

Total medical costs & lost work & wages for people with diagnosed diabetes



Medical costs for people with diabetes are more than twice as high as for people without diabetes

RISKS

People who have diabetes are at higher risk of serious health complications:



Blindness



Kidney failure



Heart disease



Stroke



Loss of toes, feet, or legs

Clinical Vignette:

74 years young lady

CHRONIC HEALTH PROBLEMS: type 2 diabetes, high blood pressure, anemia of chronic disease, high cholesterol, kidney disease, COPD/asthma, hx of endometrial hyperplasia, elevated WBC, diverticulosis, umbilical hernia, hx TIA, hx UTI, cardiomegaly, hx angina and heart attack.

Had two falls in the past six months.

No hospitalizations in the past six months.

Social History: Literate, level of education unknown, speaks Spanish (born in Bolivia)

Clinical Vignette (contd.):

FUNCTIONAL STATUS:

- Independent with ADLs and receives assistance for laundry, meals and cleaning.
- She is independent with bed mobility with a bed transfer handle, transfers with cane and rollator with difficulty, ambulates with a rollator with increased right knee pain.

LIVING SITUATION: In Long-term care setting

CAREGIVERS INVOLVED: Son involved in her care, lives in Cranston, RI.

MEDICATIONS (current): Bumex, Claritin, Fe, Gabapentin, Lantus 40u AM, 30u PM, lisinopril 5mg, metoprolol, myrbetriq, simvastatin, fenofibrate, ventolin

Clinical Vignette (contd.):

Current Goals:

Overall healthcare goal: would like to continue to manage pain.

Current goals and interventions (based on first assessment):

- **Statement: has type 2 diabetes. Diabetes is managed with insulin. Last A1C was 8.5%.**
- **Outcome: diabetes will be stable as evidenced by A1c below 9.0 over the next 6 months.**
- **Intervention: Adjust insulin as needed to keep A1c below 9.0.**
- **She also has a pain goal, LTC facility providing therapy to address.**

Clinical Vignette (contd.):

- 6 months later: Changed diet and lost weight, exercising on her chair, Lantus dose decreased, waking up at night with hypoglycemic symptoms.
- Now, A1c = 7.7 eGFR 25.
- Current additional goal: avoiding hypoglycemia.

Type 2 Diabetes Mellitus

Pathophysiology and Symptoms

Symptoms of Diabetes



**Increased
thirst.**



**Slow-healing cuts
and sores.**



Fatigue.



**Blurred
vision.**



**Frequent
urination.**

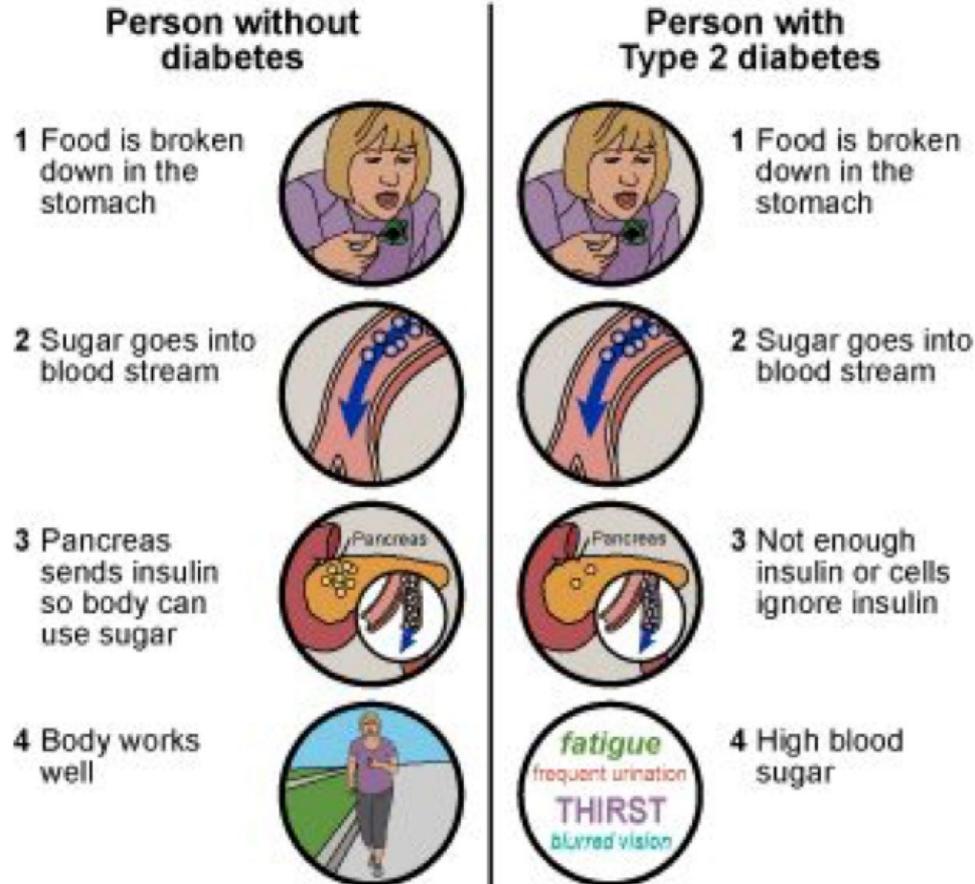


**Unexplained
weight loss.**

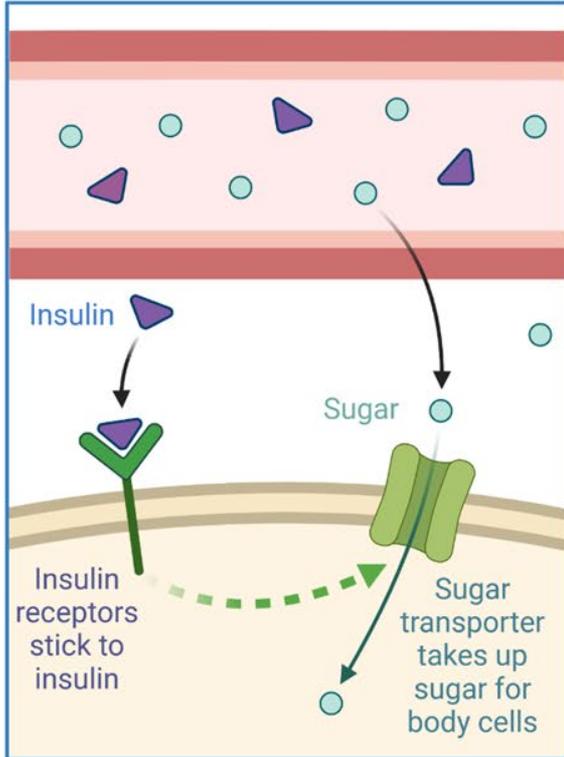
How is T2 DM diagnosed?

Type of test	In-range (mg/dL)	Prediabetes (mg/dL)	Diabetes (mg/L)
Fasting blood glucose test	Less than 100.	100 to 125.	126 or higher.
Random blood glucose test	N/A.	N/A.	200 or higher (with classic symptoms of hyperglycemia or hyperglycemic crisis).
A1c	Less than 5.7%.	5.7% to 6.4%.	6.5% or higher.

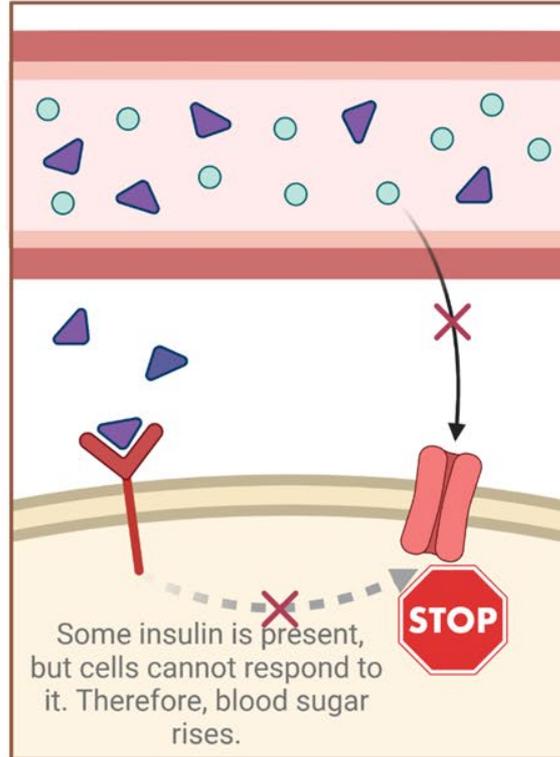
Diabetes - Type 2



Healthy



Type 2 Diabetes



Type 2 Diabetes Treatment

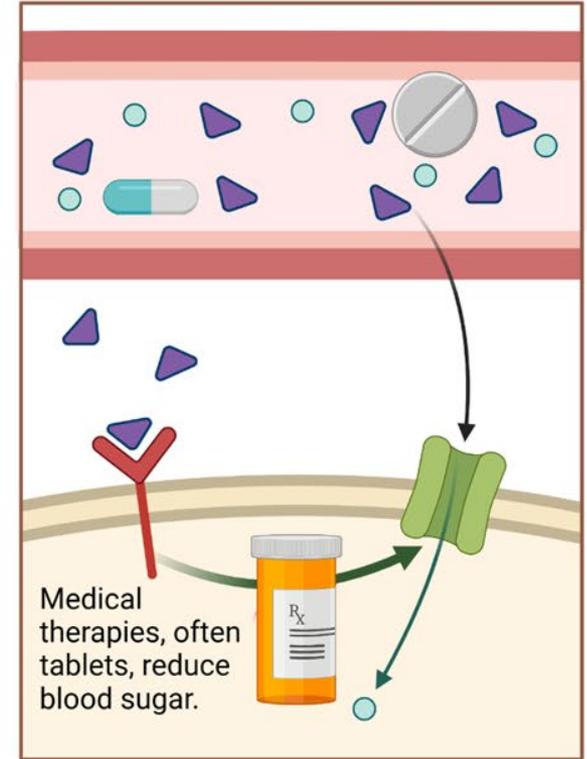
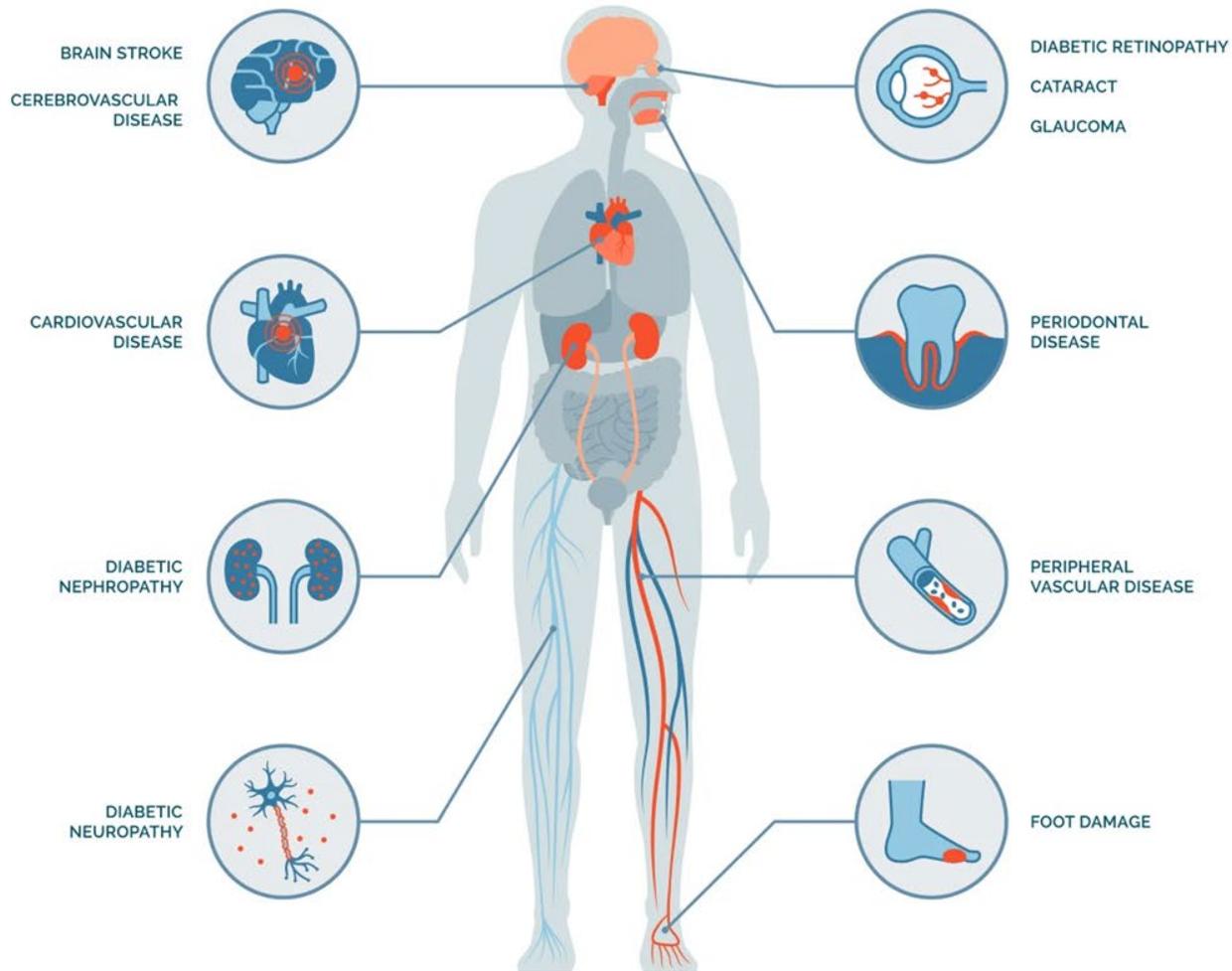


Illustration of difference between normal individuals versus Type 2 diabetes

Created with BioRender.com

T2 DM Complications



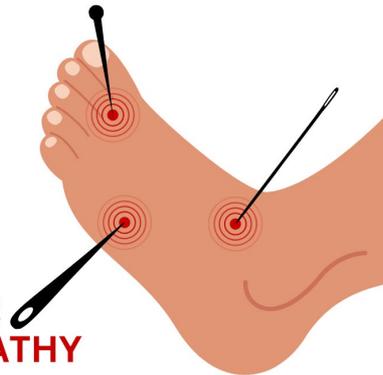
Vascular complications from hyper-glycemia:

Microvascular complications:

- Neuropathy
- Retinopathy
- Nephropathy

Macrovascular complications:

- Stroke
- Wound infection
- Myocardial infarction



**DIABETIC
NEUROPATHY**

Type 2 Diabetes Mellitus Treatment

ABCs of Diabetes

Important steps to take to prevent or delay health complications down the road:

- A: Get a regular A1C test.
- B: Try to keep [blood pressure](#) below 140/90 mm Hg (or the target your doctor sets).
- C: Manage [cholesterol](#) levels.
- s: Stop [smoking](#) or don't start.

PROTECT YOUR VISION FROM DIABETES



Have a dilated eye exam every year, and follow these steps to keep your health on **TRACK**.

T	R	A	C	K
				
Take your medications as prescribed by your doctor.	Reach and maintain a healthy weight.	Add more physical activity to your daily routine.	Control your ABC's—A1C, blood pressure, and cholesterol levels.	Kick the smoking habit.

www.nei.nih.gov/diabetes



National Eye Institute

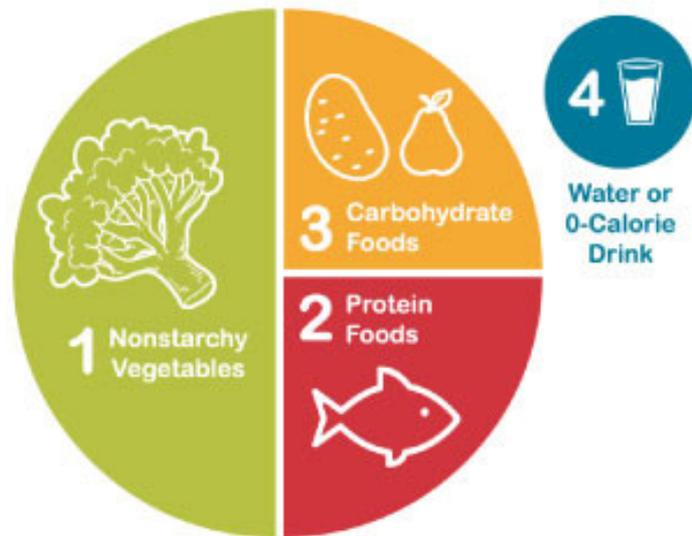


A program of the National Institutes of Health



Answers by The American Diabetes Association

The Diabetes Plate Method is the easiest way to create healthy meals that can help manage blood sugar. Using this method, you can create perfectly portioned meals with a healthy balance of vegetables, protein, and carbohydrates—without any counting, calculating, weighing, or measuring. All you need is a plate!



Medications:

If this is insufficient to achieve good glucose control, a range of tablets are available:

- **Metformin** is the first-line treatment for type 2 diabetes, which makes insulin work better (reduces insulin resistance) and helps reduce the risk of diabetes-related complications.
- **Pioglitazone** improves the function of insulin (reduces insulin resistance).
- **Sulphonylureas** (e.g. gliclazide) stimulate insulin secretion.
- **DPP-4 inhibitors** (e.g. sitagliptin) prevent the breakdown of the naturally occurring hormone GLP-1.
- **Oral GLP-1 receptor agonists** (e.g. semaglutide) stimulate insulin production and reduce appetite.
- **SGLT2 inhibitors** (e.g. dapagliflozin) lower blood sugar levels by causing sugar to leak into the urine and be removed from the body.

Medications:

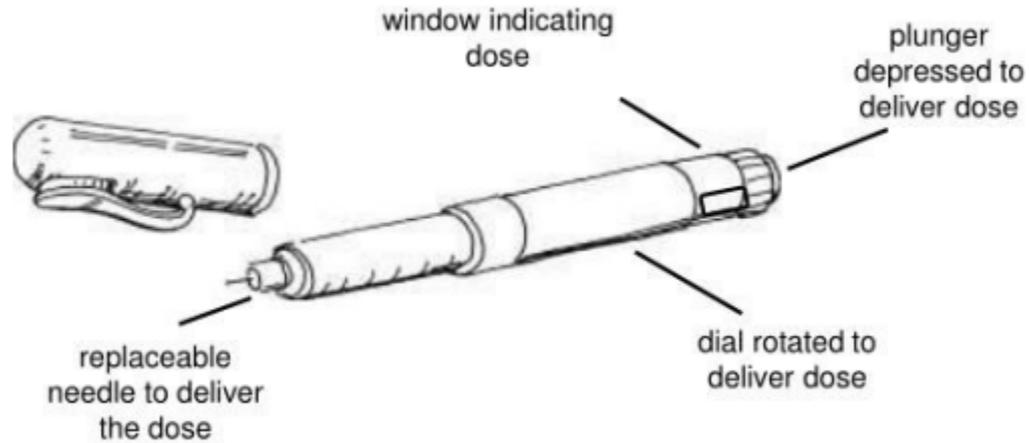
Injectable treatments include:

- **Insulin**- In many patients, particularly after several years of treatment, insulin production falls and is insufficient to meet the patient's needs such that patients with type 2 diabetes may need treatment with insulin injections, either alone or in combination with tablets.
- **GLP-1 receptor agonists** (e.g. semaglutide) stimulate insulin production and reduce appetite so can help with weight loss.

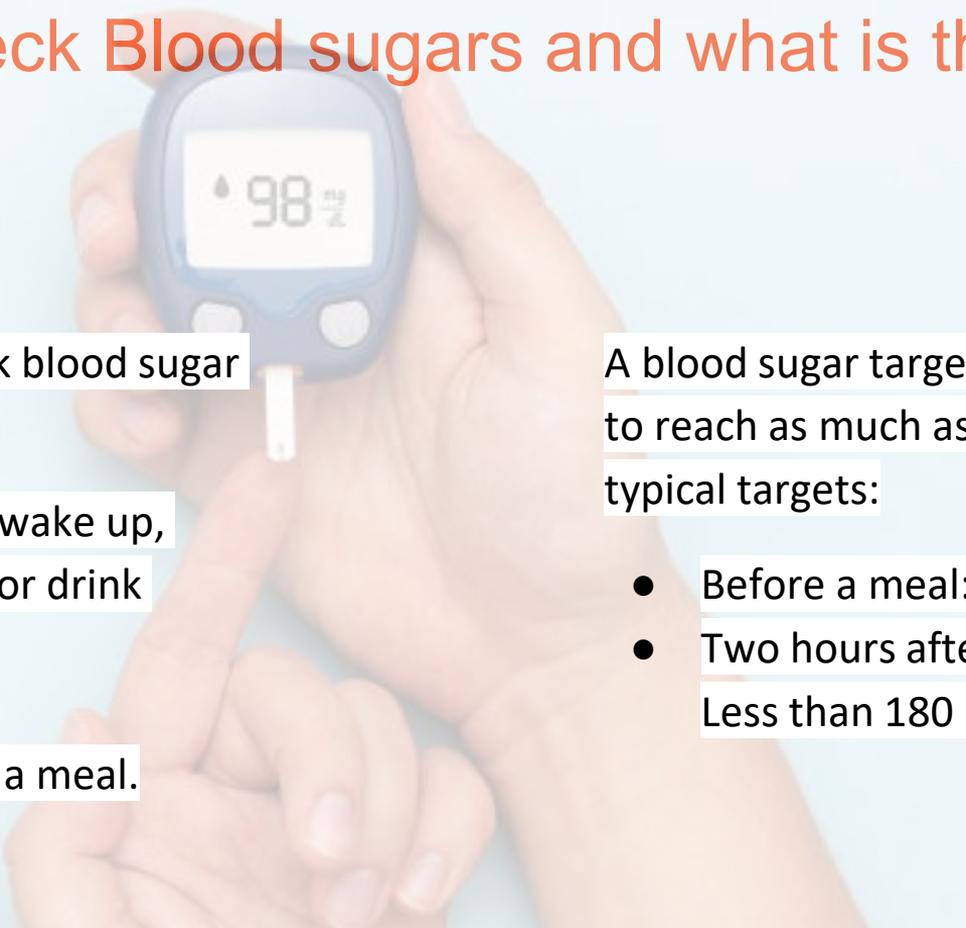
Ways to administer Insulin



Insulin Pen - parts



When to check Blood sugars and what is the target



Typical times to check blood sugar include:

- When they first wake up, before they eat or drink anything.
- Before a meal.
- Two hours after a meal.
- At bedtime.

A blood sugar target is the range we try to reach as much as possible. These are typical targets:

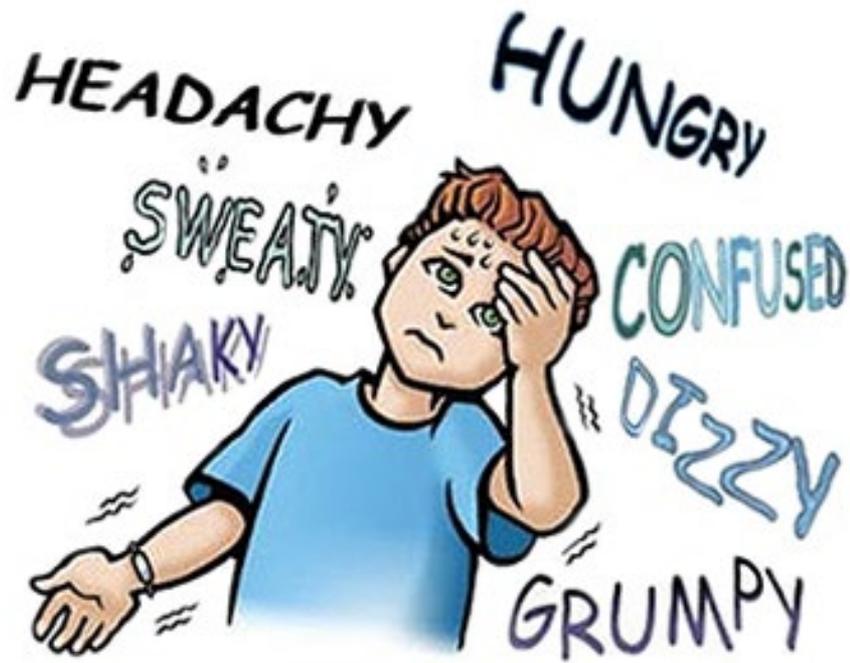
- Before a meal: 80 to 130 mg/dL.
- Two hours after the start of a meal: Less than 180 mg/dL.

What is hypoglycemia?

Signs of low blood sugar are different for everyone.

Common symptoms include:

- Shaking.
- Sweating.
- Nervousness or anxiety.
- Irritability or confusion.
- Dizziness.
- Hunger.



If the blood sugar is lower than 70 mg/dL, do one of the following immediately:

- Give four glucose tablets.
- Provide four ounces of fruit juice.
- Provide four ounces of regular soda, not diet soda.
- Provide four pieces of hard candy.

Frequency

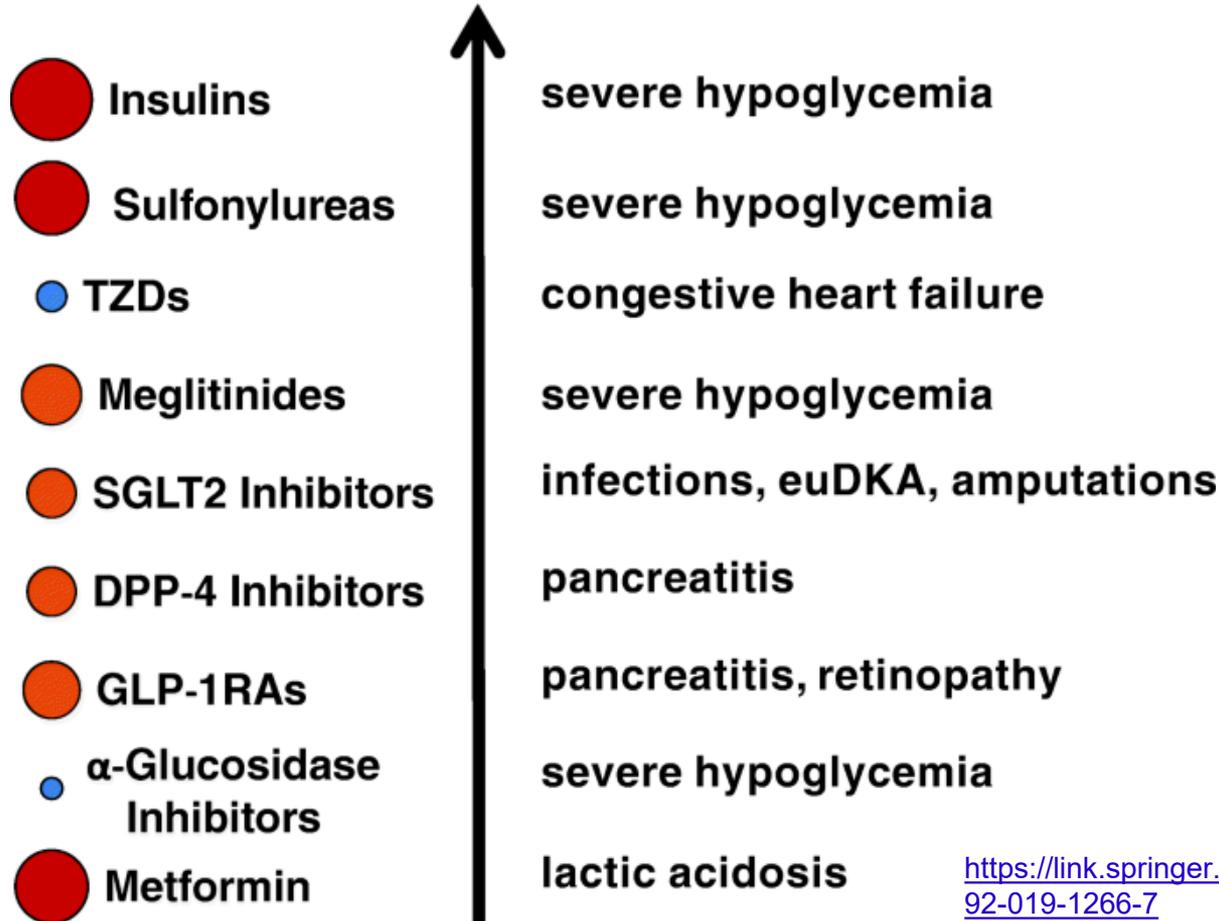


Table 1. Types of insulin and how they work^{1,2}

Insulin Type	How Fast It Starts to Work (onset)	When It Peaks	How Long It Lasts (duration)
rapid-acting/ ultra rapid-acting	15 minutes	1 hour	2 to 4 hours (rapid) 5 to 7 hours (ultra)
rapid-acting, inhaled	10 to 15 minutes	30 minutes	3 hours
regular, also called short-acting	30 minutes	2 to 3 hours	3 to 6 hours
intermediate-acting	2 to 4 hours	4 to 12 hours	12 to 18 hours
long-acting	2 hours	does not peak	24 hours
ultra long-acting	6 hours	does not peak	36 hours or longer

Insulin action

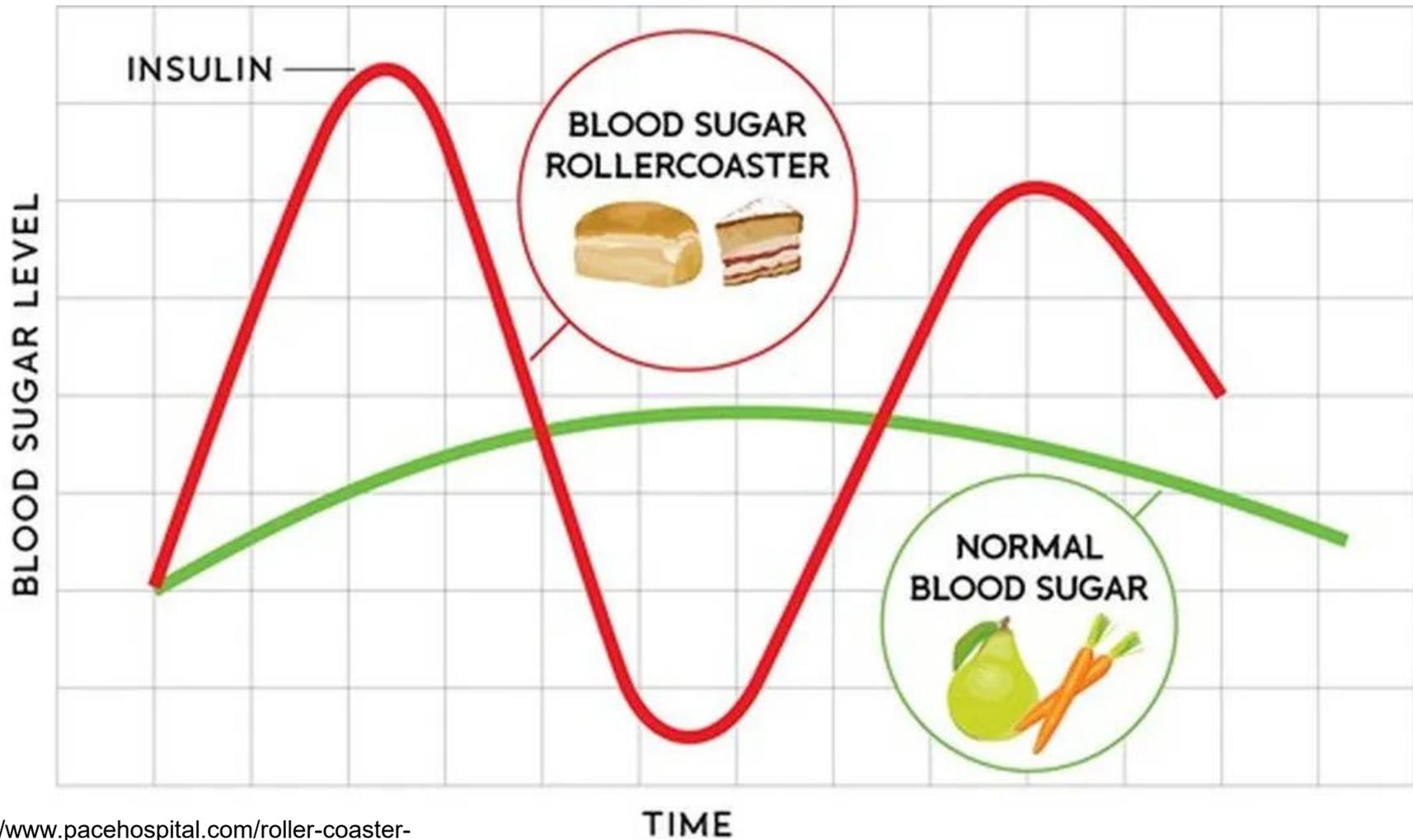
- Helps movement of glucose into the cells
- Stimulates cells to take up glucose from the blood
- Facilitates the storage of glucose, amino acids and fatty acids
- Facilitates glycogen formation and storage in the liver

Insulin in Type 2 Diabetes

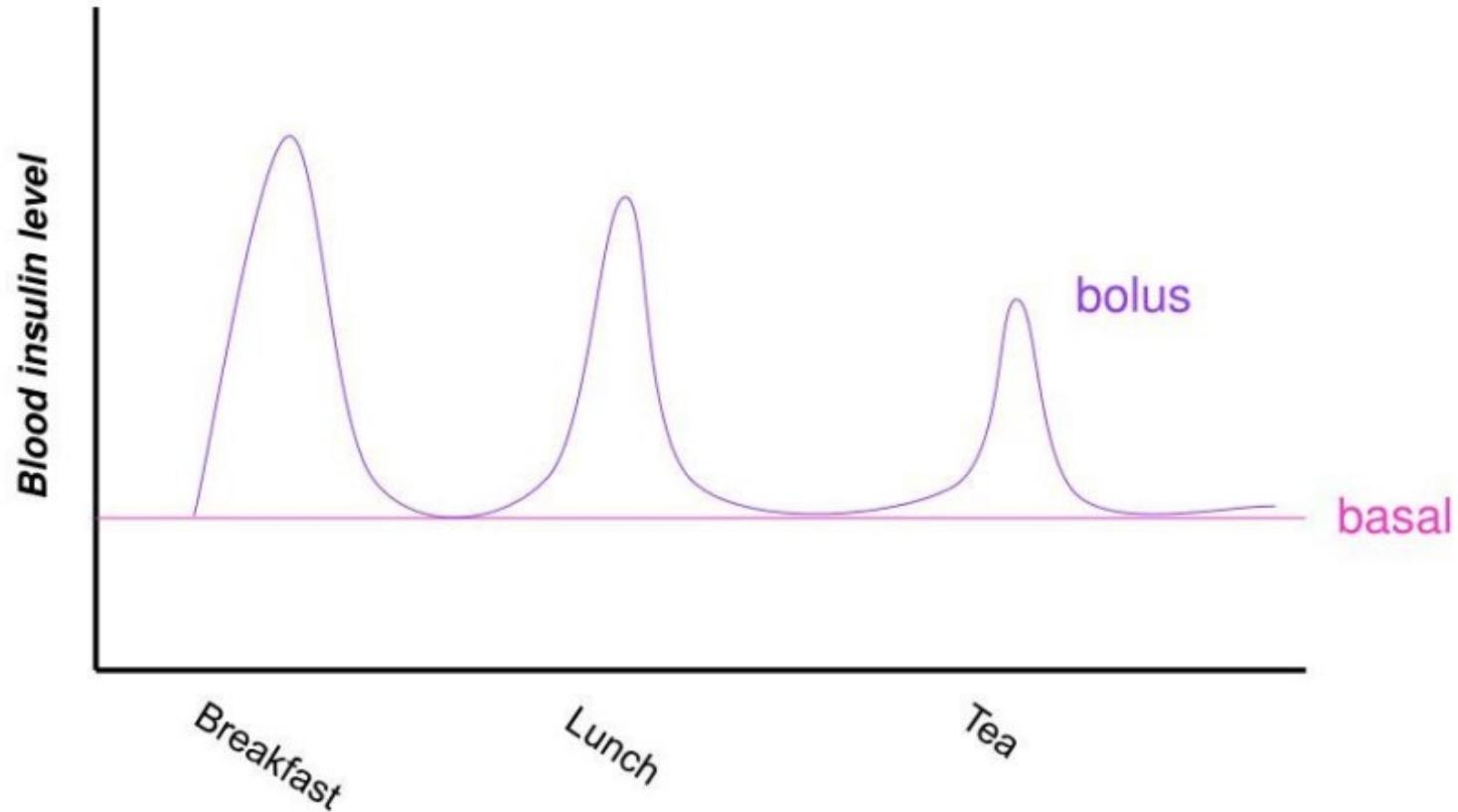
Over time people with T2 DM start to produce less and less insulin and eventually require insulin therapy to reach target blood glucose levels.

It is common for the person to start on one basal injection in combination with oral hypoglycemic agents.

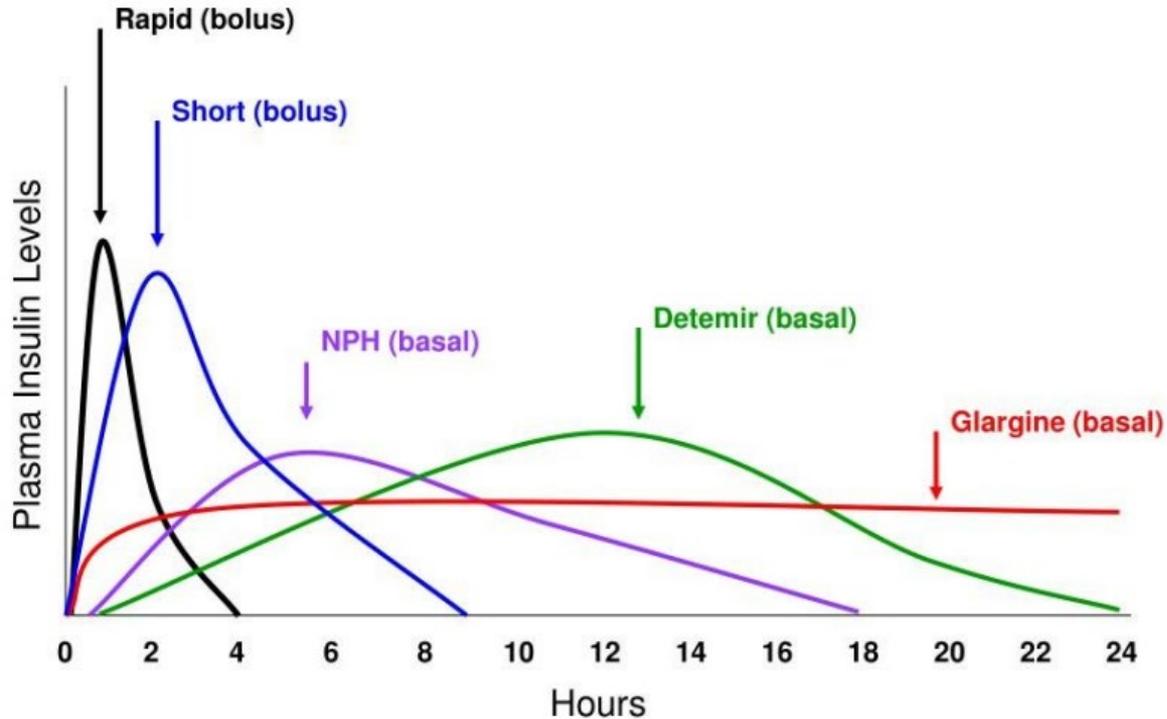
Over time their treatment will intensify as insulin secretion drops further.



Natural Insulin pattern



Types of Insulins available



Timing of Insulin

Bolus (meal time)		Basal (background)	
	Timing		Timing
Rapid	immediately	Glargine	anytime (same time each day)
Short	30mins prior	Detemir	Breakfast Bed time (2130 or ask person)
Pre-mix - Rapid - Short	immediately 30mins prior	NPH	Breakfast Bed time

Syringe disposal

- Store supplies in their original box
- Use a sharps container
- Do not recap needles/ pen needles/ lancets
- Check with your center about policies regarding safe disposal of containers.

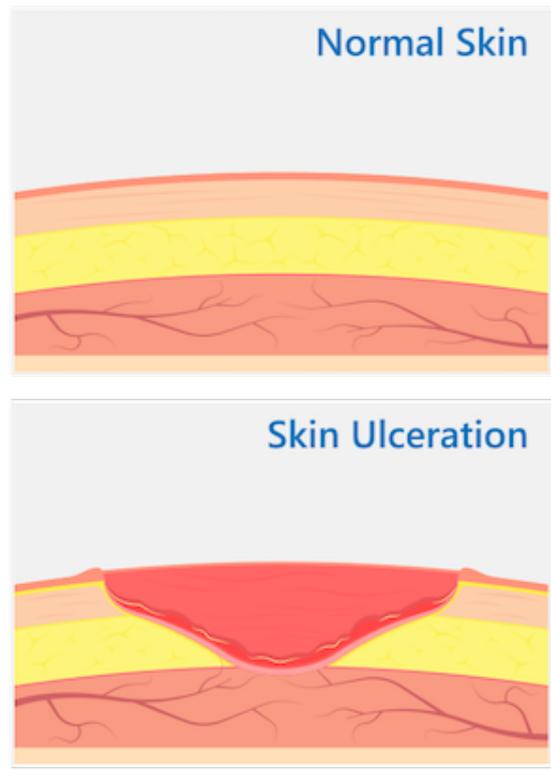
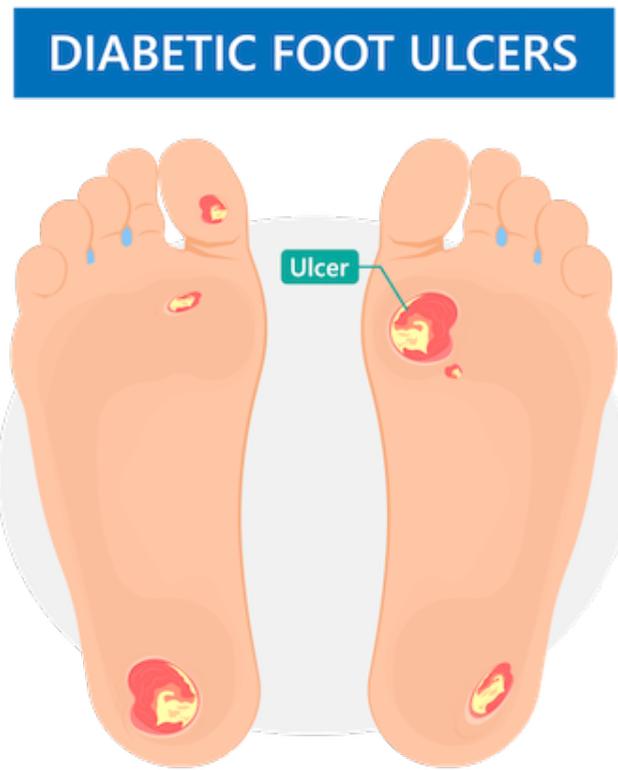
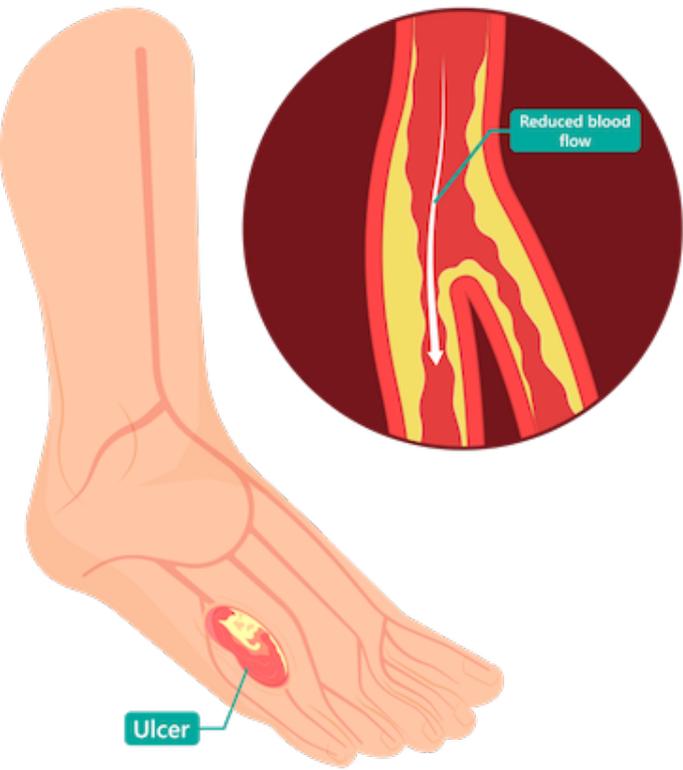


Foot care

Risk factors for the development of foot ulcers and amputation include previous amputation or foot ulcer, peripheral neuropathy, foot deformity, peripheral vascular disease, visual impairment, diabetic nephropathy (especially patients on dialysis), poor glucose control, and **cigarette smoking** (ADA, 2014).

Ask your resident, **“Have you seen a podiatrist or had a comprehensive foot exam in the past year?”** Is there a history of diagnosed peripheral vascular disease or neuropathy?





OPEN SORES OR ULCERS THAT HAVE ANY OF THE FOLLOWING:



Last more than
a week



Are actively
bleeding



Are larger than
a quarter



Exhibit a
bad odor

DISCOLORATION
OF THE SKIN ON
THE LEGS AND
FEET



SWELLING OR
REDNESS IN
THE FEET



ONGOING PAIN
OR
DISCOMFORT
IN THE LOWER
LEGS OR FEET



WARMTH IN
ONE OR MORE
AREAS OF THE
FOOT



How to prevent diabetic foot and leg ulcers:

- Inspect feet daily.
- Wash feet daily.
- Educate resident - Do not pick at or remove calluses, corns, bunions or warts yourself.
- Trim nails carefully.
- Educate resident - Don't go barefoot, even around your room.
- Educate resident - Wear clean, dry socks.
- Educate resident - Buy shoes that fit properly.
- Educate resident - Don't smoke.
- Schedule regular foot check-ups with primary doctor or podiatrist based on care plan.

New goals of care for our lady

- medication titration
- closer monitoring of blood sugars
- meal planning, snacking
- foot care
- monitoring complications
- health literacy and education about diet and activity



NOVEMBER IS
DIABETES
AWARENESS
MONTH

