

Diabetes 101: Medications & ADEs In Nursing Homes



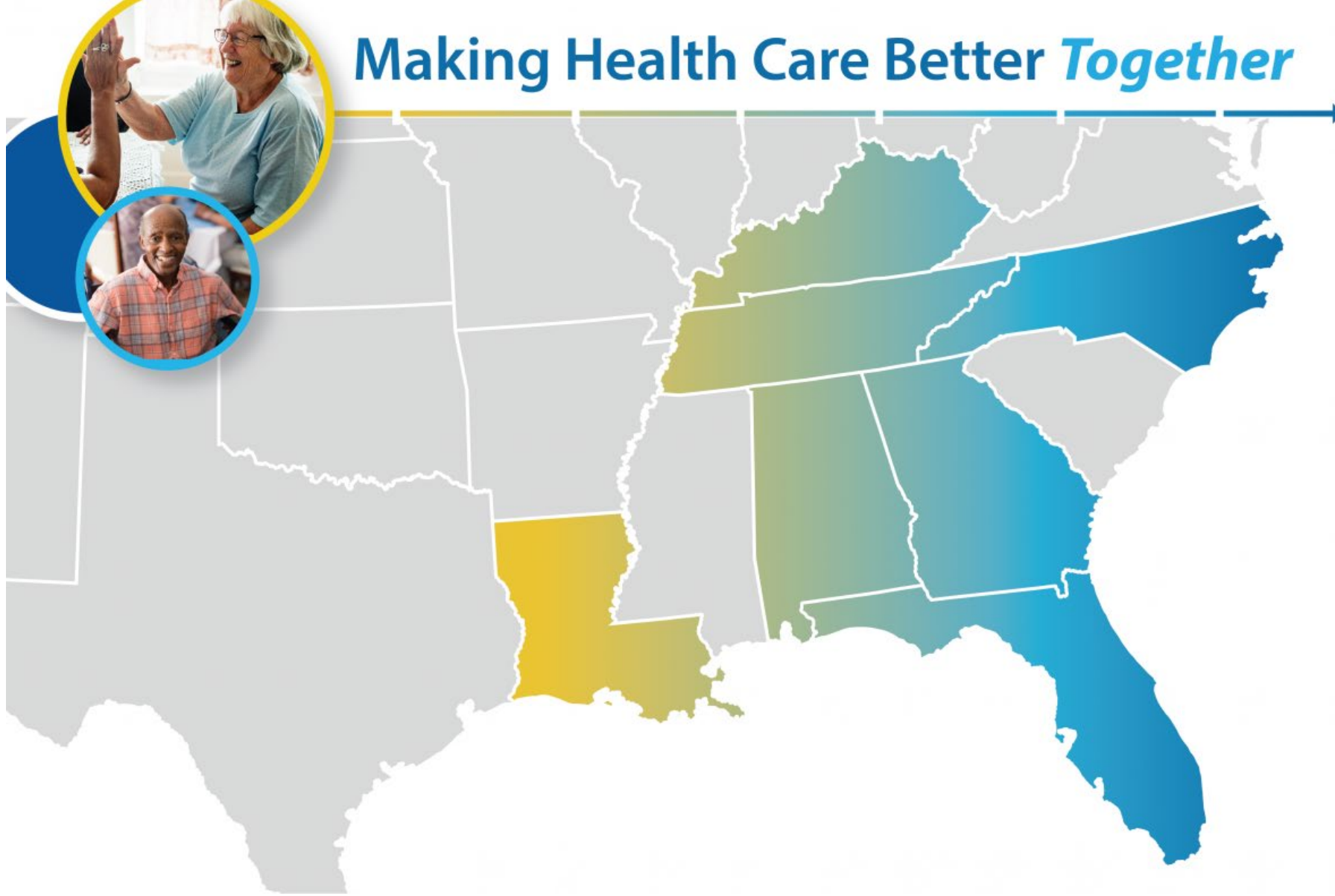
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Making Health Care Better *Together*



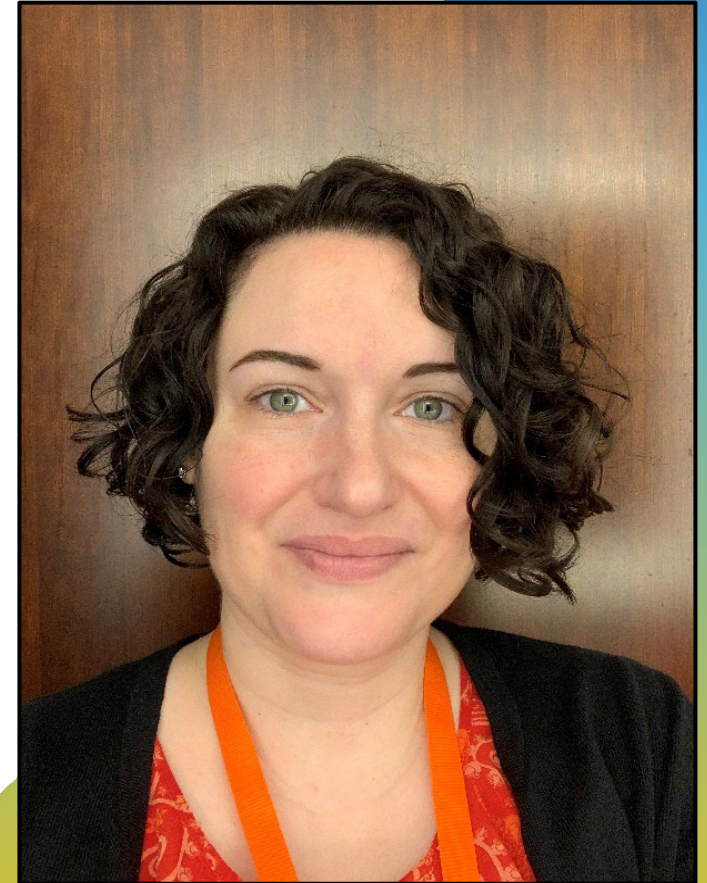
About Alliant Health Solutions

Tanya Vadala, Pharm.D.

MEDICATION SAFETY PHARMACIST

Tanya is an IPRO pharmacist with 20 years of clinical pharmacy, community pharmacy, academia, quality improvement and medication safety experience. Before joining IPRO, she worked at various community pharmacies and taught at Albany College of Pharmacy and Health Sciences in Albany, N.Y. She specializes in Medication Therapy Management (MTM), medication reconciliation, opioids, immunizations, and patient self-care. Her formal teaching experience includes courses in pharmacy practice and clinical experiential teaching.

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Objectives

- Recognize common diabetes medications
- Distinguish between the different types of diabetes medications
- Discuss signs and symptoms of low and high blood glucose
- Summarize issues that can occur with diabetes medication use in LTC

Diabetes- Introduction

- **Insulin:** A hormone produced in the pancreas that regulates the amount of glucose in the blood by helping glucose enter cells
- **Diabetes:** The body is unable to make enough insulin, or the body can't use insulin as well as it could, which leads to high blood glucose levels
- **Types of Diabetes:**
 - Pre-diabetes:
 - Reversible with lifestyle modification
 - Type 1 diabetes(T1DM):
 - Caused due to an autoimmune reaction- pancreas doesn't produce insulin
 - Rapid development and requires insulin therapy
 - Type 2 diabetes (T2DM):
 - Body is unable to produce adequate insulin to maintain a normal blood sugar level
 - Slow development and can be reversible or delayed with lifestyle modification

Common Oral Diabetes Agents in LTC

Meglitinides 'glinides'	Sulfonylureas	Biguanides	TZDs
repaglinide (Prandin®)	glyburide (Glynase®)	metformin (Glucophage®)	pioglitazone (Actos®)
nateglinide (Starlix®)	glipizide (Glucotrol®/Glucotrol XL®)		rosiglitazone (Avandia®)
	glimepiride (Amaryl®)		
	chlorpropamide (Diabinese®)		

Less Common Diabetes Agents

Alpha-1 glucosidase inhibitors	Dipeptidyl peptidase-4 (DPP-4) Inhibitors	Glucagon-like peptide 1 receptor agonists (GLP1-RAs)	Sodium-glucose cotransport 2 inhibitors (SGLT-2)
acarbose (Precose®)	sitagliptin (Januvia®)	exenatide (Byetta®)	dapagliflozin (Farxiga®)
miglitol (Glyset®)	saxagliptin (Onglyza®)	exenatide extended release (Bydureon BCise®)	canagliflozin (Invokana®)
	linagliptin (Tradjenta®)	dulaglutide (Trulicity®)	empagliflozin (Jardiance®)
	alogliptin (Nesina®)	liraglutide (Victosa®, Saxenda®)	
		Semaglutide (Ozempic®, Rybelsus®, Wegovy®)	

Types of Insulin

Insulin Type	Onset	Peak Time	Duration	Method
Rapid acting	15 minutes	1 hour	2 to 4 hours	Usually taken right before a meal. Often used with longer-acting insulin.
Rapid-acting inhaled	10 to 15 minutes	30 minutes	3 hours	Usually taken right before a meal. Often used with injectable long-acting insulin.
Regular/short acting	30 minutes	2 to 3 hours	3 to 6 hours	Usually taken 30 to 60 minutes before a meal.
Intermediate acting	2 to 4 hours	4 to 12 hours	12 to 18 hours	Covers insulin needs for half a day or overnight. Often used with rapid- or short-acting insulin.
Long acting	2 hours	Does not peak	Up to 24 hours	Covers insulin needs for about a full day. Often used, when needed, with rapid- or short-acting insulin.
Ultra-long acting	6 hours	Does not peak	36 hours or longer	Provides steady insulin for long periods.
Premixed	5 to 60 minutes	Peaks vary	10 to 16 hours	Combines intermediate- and short-acting insulin. Usually taken 10 to 30 minutes before breakfast and dinner.

Rapid-Acting Insulins

Brand Name	Other names	Type
Admelog	insulin lispro injection	Rapid-Acting
Afrezza (inhalation powder)	regular human insulin	Rapid-Acting
Apidra Apidra Solostar	insulin glargine	Rapid-Acting
Fiasp Fiasp Flextouch	insulin aspart	Rapid-Acting
Humalog Humalog Pen Humalog Kwikpen	insulin lispro	Rapid-Acting
Novolog	insulin aspart	Rapid-Acting

Short, Intermediate and Long-Acting Insulins

Brand Name	Other names	Type
Humulin R Humulin R Pen	regular human insulin	Short-Acting
Novolin R	regular human insulin	Short-Acting
Humulin N	NPH(human insulin isophane suspension)	Intermediate-Acting
Novolin N	NPH (human insulin isophane suspension)	Intermediate-Acting
Basaglar KwikPen	insulin glargine	Long-Acting
Lantus Lantus Solostar	insulin glargine	Long-Acting
Levemir	insulin detemir	Long-Acting
Toujeo Toujeo Max	insulin glargine	Long-Acting
Tresiba FlexTouch	insulin degludec	Long-Acting

Premixed Insulins

Brand Name	Other names	Type
Humalog Mix 75/25 Humalog Mix 75/25 KwikPen	75% insulin lispro protamine suspension 25% insulin lispro injection	Intermediate- and Rapid-Acting
Humalog 70/30	70% human insulin isophane suspension 30% human insulin injection	Intermediate- and Rapid-Acting
Humalog Mix 50/50 Humalog Mix 50/50 KwikPen	50% insulin lispro protamine suspension 50% insulin lispro injection	Intermediate- and Rapid-Acting
NovoLog Mix 70/30 NovoLog Mix 70/30 FlexPen	70% insulin aspart protamine suspension 30% insulin aspart injection	Intermediate- and Rapid-Acting
Ryzodeg 70/30 FlexTouch	70% insulin degludec 30% insulin aspart	Long- and Rapid-Acting
Humulin 70/30 Humulin 70/30 KwikPen	70% NPH human insulin 30% regular human insulin injection	Intermediate- and Short-Acting
Novolin 70/30	70% NPH Human Insulin 30% Regular Human Insulin Injection	Intermediate- and Short-Acting

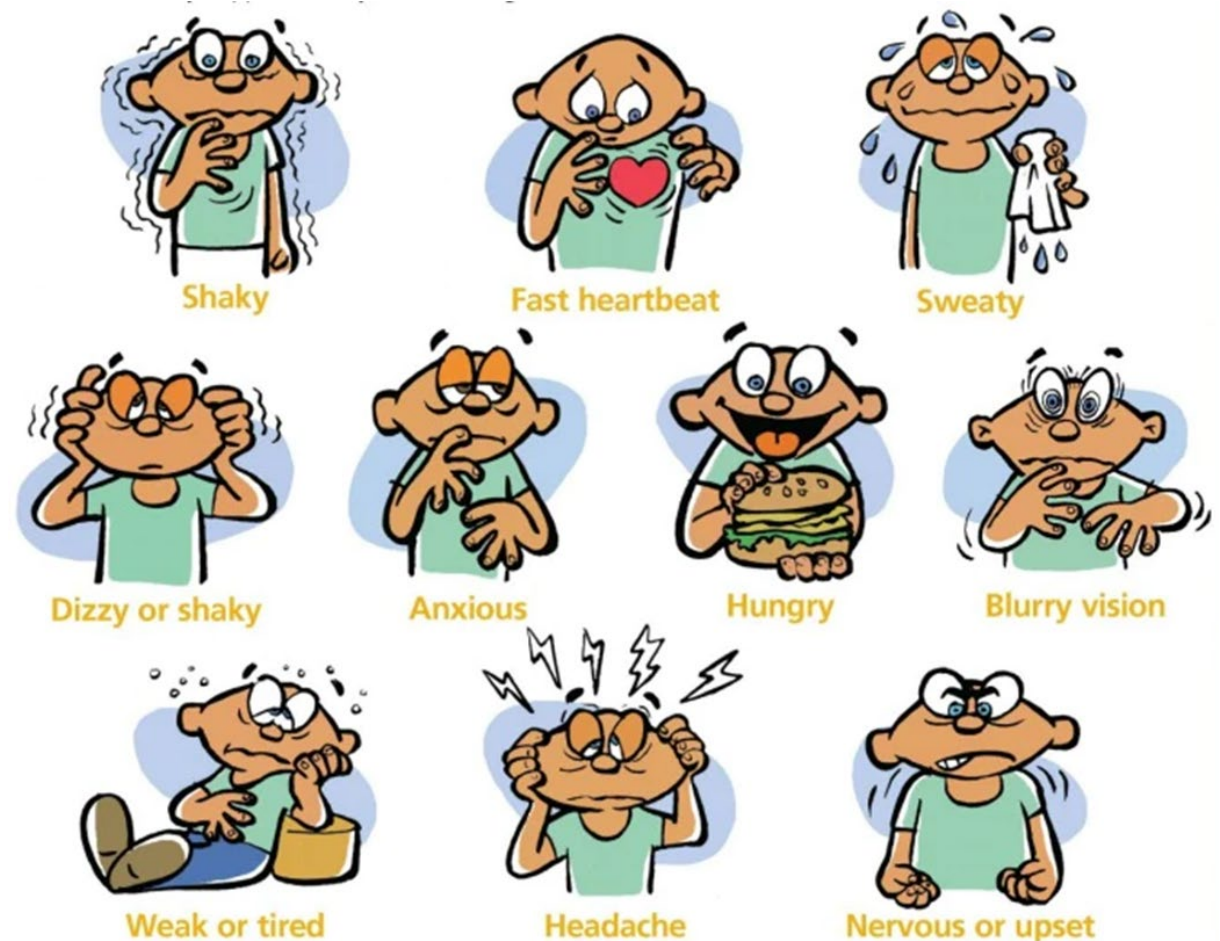
Non-Insulin Injectables

Glucagon-like peptide 1 receptor agonists (GLP1-RAs)	Dual glucagon-like peptide 1 receptor agonist (GLP1-RAs) and glucose-dependent insulintropic polypeptide (GIP) agonist	Amylin Mimetic
exenatide (Byetta®)	tirzepatide (Mounjaro®)	pramlintide (SymlinPen®)
exenatide extended release (Bydureon BCise®)		
dulaglutide (Trulicity®)		
liraglutide (Victoza®, Saxenda®)		
semaglutide (Ozempic®, Wegovy®)		
Lixisenatide (Adlyxin®)		

Signs/Symptoms of Hypoglycemia (low blood sugar)

Other Symptoms:

- Irritability or impatience
- Confusion, including delirium
- Nausea
- Tingling or numbness in lips/tongue
- Lack of coordination
- Seizures
- Unconsciousness



<https://ihealthlabs.com/blogs/education/what-is-hypoglycemia>

Treatment of Hypoglycemia (low blood sugar)

The 15-15 Rule

For low blood sugar between 55-69 mg/dL, raise it by following the 15-15 rule: have 15 grams of carbs and check your blood sugar after 15 minutes. If it's still below your target range, have another serving. Repeat these steps until it's in your target range. Once in range, eat a nutritious meal or snack to ensure it doesn't get too low again.

These items have about 15 grams of carbs:

- 4 ounces ($\frac{1}{2}$ cup) of juice or regular soda.
- 1 tablespoon of sugar, honey, or syrup.
- Hard candies, jellybeans, or gumdrops (see food label for how much to eat).
- 3-4 glucose tablets (follow instructions).
- 1 dose of glucose gel (usually 1 tube; follow instructions).

Always follow the policy/procedure approved by your facility

Treatment of Severe Hypoglycemia (low blood sugar)

Blood sugar below 55mg/dL is considered severely low.

Injectable glucagon is the best way to treat severely low blood sugar.

- Available by prescription
- Family and those close to you should be trained on the use of glucagon

Glucagon administration:

- Inject glucagon per the directions on the kit.
- Patients will usually wake within 15 mins of the injection.
- If they do not wake within 15 mins after the first injection, one more injection should be given.
- Once the person is awake and able to swallow, give the person a fast-acting glucose source (soft drink or juice), then have them eat a long-acting source of sugar (crackers and cheese or a sandwich with meat).

Contact a doctor for emergency medical treatment immediately after receiving a glucagon injection.

Signs/Symptoms of Severe Hyperglycemia (High Blood Sugar)

- Hyperglycemia is defined as glucose >125mg/dL while fasting or >180mg/dL 2 hours after a meal
- Symptoms of severe hyperglycemia include:
 - Increased urination
 - Increased thirst
 - Increased hunger
 - Sleepiness
 - Blurry vision
 - Infections or injuries taking longer than usual to heal
 - Loss of balance
 - Altered mental status

Complications of Hypoglycemia and Hyperglycemia

Hypoglycemia

- Can lead to a decline in quality of life, including:
 - Increase in falls and fractures
 - Confusion
 - Delirium
 - Fatigue
 - Dizziness

Hyperglycemia

- Kidney disease, including kidney failure
- Loss of vision
- Heart disease
- Stroke
- Peripheral vascular disease (narrowed blood vessels)
- Peripheral neuropathy (nerve damage)
 - May lead to amputation

Tips to Avoid Errors When Administering Diabetes Medications

- Verify that you have the correct medication for the resident.
- Be sure to administer the correct dose.
- Confirm the medication is not expired.
 - Check the expiration date.
 - Check the date the pen/vial was started and ensure it is okay to use.
 - Has the pen/vial been stored correctly (refrigerator/room temp) for the correct amount of time?
- Make sure the resident's blood glucose isn't too low before administering.
 - Identify if there is a hold order for certain glucose readings.
- If mealtime insulin, ensure the resident has eaten, or the food is with them.
- Avoid using sliding scale insulin use as much as possible.

Challenges Facing Diabetes Management at Long-Term Care Facilities From American Diabetes Association Guidelines

Patient related	Facility related	Diabetes management related
Irregular eating habits	Staff turnover	Sole use of sliding scale insulin
Altered cognition, anxiety and depression	Lack of nutritional individualization	Mismatch insulin administration timing in relation to feeding time
Impaired mobility	Lack of or insufficient glucose monitoring	Inappropriate hypoglycemia management
Polypharmacy and medication reconciliation errors	Limited staff diabetes-specific knowledge and training	Limited knowledge of advanced technologies (continuous glucose monitoring)
Variable levels of social support	Lack of pharmacist and dietitian support	Lack of comprehensive transitional diabetes management protocol
Variable nutritional needs	Lack of comprehensive notification system	Lack of diabetes management protocols
Persistent pain		
Oral health, skin and vision problems		

[National Library of Medicine | Update on the Management of Diabetes in long-term care facilities](#)

Low Blood Glucose (Hypoglycemia)



Hypoglycemia, also known as low blood glucose (blood sugar), is when your blood glucose levels have fallen low enough that you need to take action to bring them back to your target range. This is usually when your blood glucose is less than 70 mg/dL. However, talk to your doctor about your own blood glucose targets, and what level is too low for you.

When can it happen?

Low blood glucose can happen if you've skipped a meal or snack, eaten less than usual, or been more physically active than usual. If you don't take steps to bring glucose levels back to normal, you could even pass out.

What are the symptoms?

Each person's reaction to low blood glucose is different. It's important that you learn your own signs and symptoms when your blood glucose is low.

Signs and symptoms of low blood glucose include:

- Feeling shaky
- Being nervous or anxious
- Sweating, chills, clamminess
- Mood swings, irritability, impatience
- Confusion
- Fast heartbeat
- Feeling light-headed or dizzy



- Hunger, nausea
- Color draining from skin (pallor)
- Feeling sleepy
- Feeling weak, having no energy
- Blurred/impaired vision
- Tingling or numbness in lips, tongue, cheeks
- Headaches
- Coordination problems, clumsiness
- Nightmares or crying out in sleep
- Seizures

What should you do?

The 15-15 rule—have 15 grams of carbohydrate to raise your blood glucose and check it after 15 minutes. If it's still below 70 mg/dL, have another serving.

Repeat these steps until your blood glucose is at least 70 mg/dL. Once your blood glucose is back to normal, eat a meal or snack to make sure it doesn't lower again.

This may be:

- Glucose tablets (see instructions)
- Gel tube (see instructions)
- 4 ounces (1/2 cups) of juice or regular soda (not diet)
- 1 tablespoon of sugar, honey, or corn syrup
- 8 ounces of nonfat or 1% milk
- Hard candies, jellybeans, or gumdrops—see food label for how many to consume

Continued »



Visit diabetes.org or call 800-DIABETES (800-342-2383) for more resources from the American Diabetes Association.

ZONE TOOL | Diabetes



Diabetes means that you have too much sugar (glucose) in your blood. High blood sugar levels can lead to serious health problems. Keeping your blood sugar under control is very important. Use this document to help understand what to do when your levels rise too high or low, as directed by your doctor.

GREEN Zone: All Clear!

- A1c under 7%
- Fasting blood sugar 90-130
- Blood sugar less than 180 (1-2 hours after eating)
- Blood pressure less than 130/80
- LDL cholesterol target less than 100mg/dl if no cardiovascular disease
- LDL less than 70mg/dl for those with a history of cardiovascular disease (e.g., ischemia, angina, stroke, heart attack)

GREEN Zone Means:

- Your blood sugars are under control
- Continue taking your medications as ordered
- Continue routine blood glucose monitoring
- Follow healthy eating habits
- Keep all physician appointments



YELLOW Zone: Caution

Call Your Physician!

- A1c between 7% and 8%
- Average blood sugar 150-210
- Most fasting blood sugars under 200
- Blood pressure greater than 140/90

Work closely with your health care team if you are going into the YELLOW zone.

YELLOW Zone Means:

- Your blood sugar may indicate that you need an adjustment of your medications
- Improve your eating habits
- Increase your activity level

Call your doctor, nurse, or diabetes educator if changes in your activity level or eating habits don't decrease your fasting blood sugar levels.



RED Zone: Medical Alert!

- A1c greater than 9%
- Average blood sugars are over 210
- Most fasting blood sugars are well over 200

RED Zone Means:

- You need to be evaluated by a doctor
- If you have a blood glucose over:



Call your doctor and call 9-1-1

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Resources

- [Communication Checklist: Signs and Symptoms of Hyper or Hypoglycemia with Diabetes \(allianthealth.org\)](#)
- [Diabetes Adverse Drug Events \(ADEs\) \(allianthealth.org\)](#)
- [Diabetes Zone Tool - NQIIC \(allianthealth.org\)](#)
- [American Diabetes Association | Research, Education, Advocacy](#)
- [Diabetes Basics | CDC](#)
- [Diabetes | FDA](#)

Questions?



Nursing Home and Partnership for Community Health: CMS 12th SOW GOALS



OPIOID UTILIZATION AND MISUSE

- Promote opioid best practices
-
- Reduce opioid adverse drug events in all settings



PATIENT SAFETY

- Reduce hospitalizations due to c. diff
-
- Reduce adverse drug events
-
- Reduce facility acquired infections



CHRONIC DISEASE SELF- MANAGEMENT

- Increase instances of adequately diagnosed and controlled hypertension
-
- Increase use of cardiac rehabilitation programs
-
- Reduce instances of uncontrolled diabetes
-
- Identify patients at high-risk for kidney disease and improve outcomes



CARE COORDINATION

- Convene community coalitions
-
- Reduce avoidable readmissions, admissions to hospitals and preventable emergency department visits
-
- Identify and promote optimal care for super utilizers



COVID-19

- Support nursing homes by establishing a safe visitor policy and cohort plan
-
- Provide virtual events to support infection control and prevention
-
- Support nursing homes and community coalitions with emergency preparedness plans



IMMUNIZATION

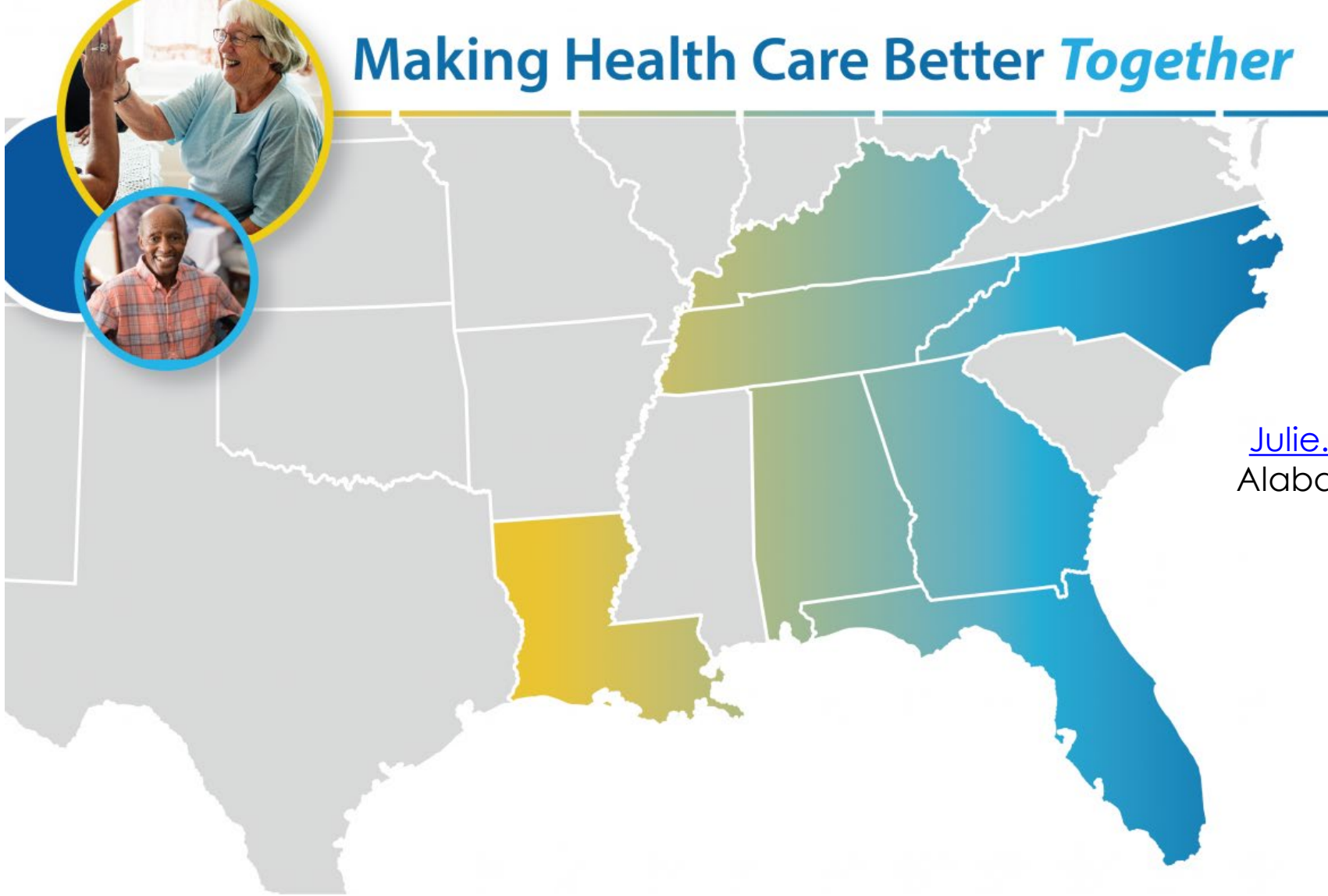
- Increase influenza, pneumococcal, and COVID-19 vaccination rates



TRAINING

- Encourage completion of infection control and prevention trainings by front line clinical and management staff

Making Health Care Better *Together*



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