

# Diabetes Management in the Elderly



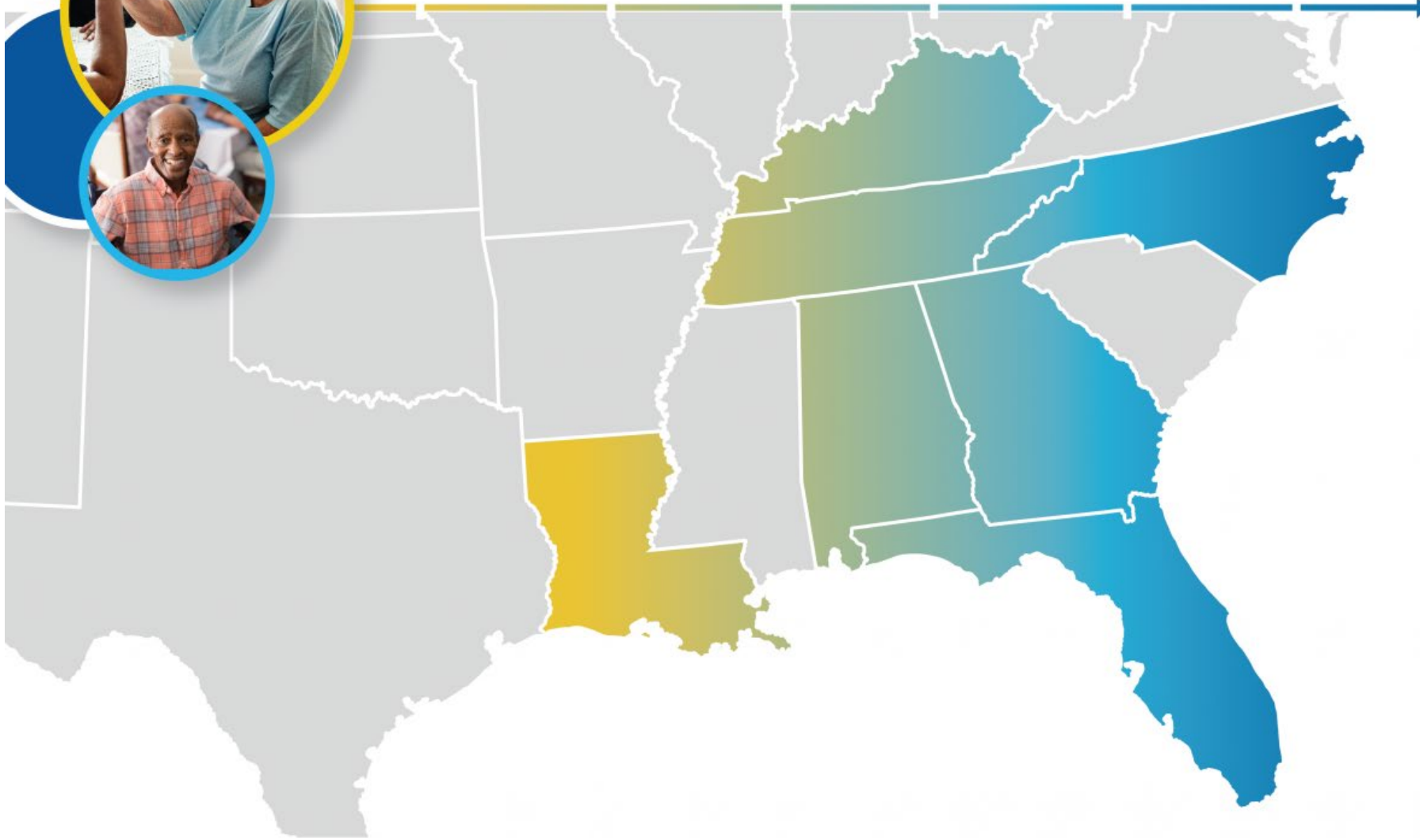
Presented by:  
Katharine Abbot, Pharm.D.

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# Making Health Care Better *Together*



About Alliant Health Solutions

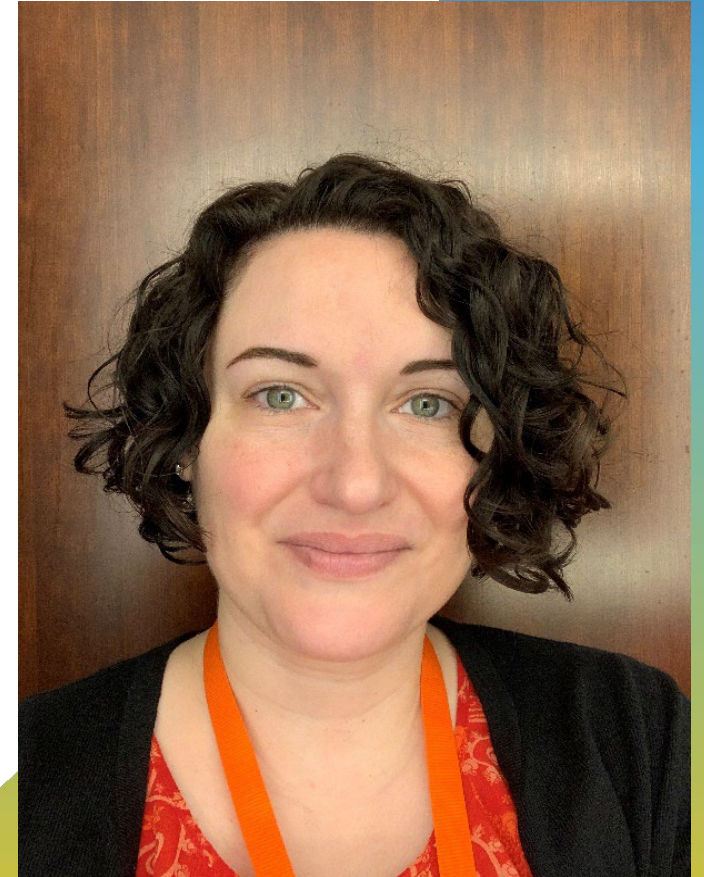


# Tanya Vadala, Pharm.D.

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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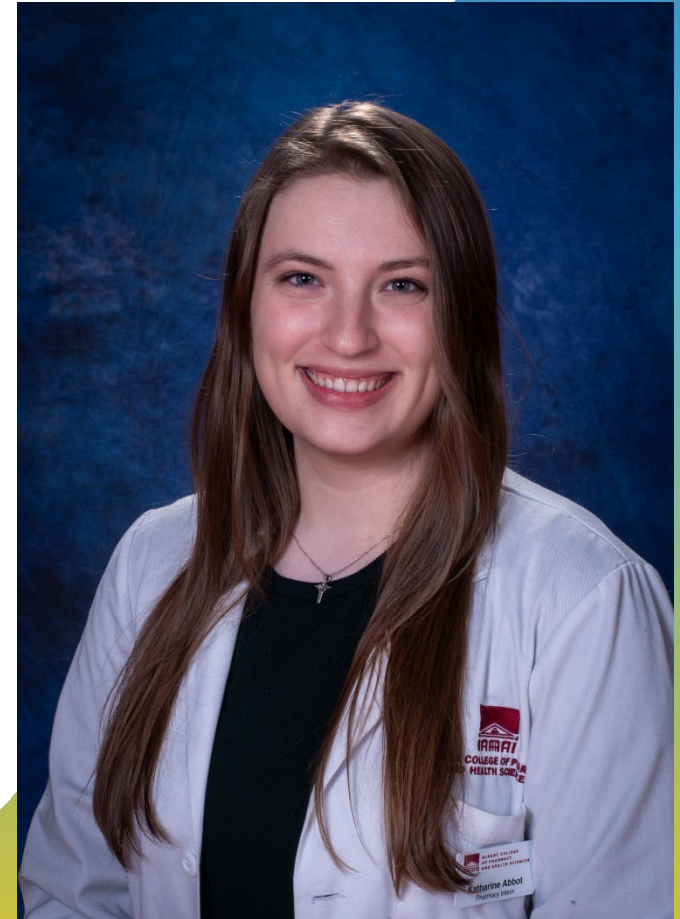
# Katharine Abbot, Pharm.D.

## PGY-2 ENDOCRINOLOGY PHARMACY RESIDENT

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# Objectives

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Recognize signs and symptoms of hyperglycemia and hypoglycemia

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Identify common adverse drug reactions for diabetes medications

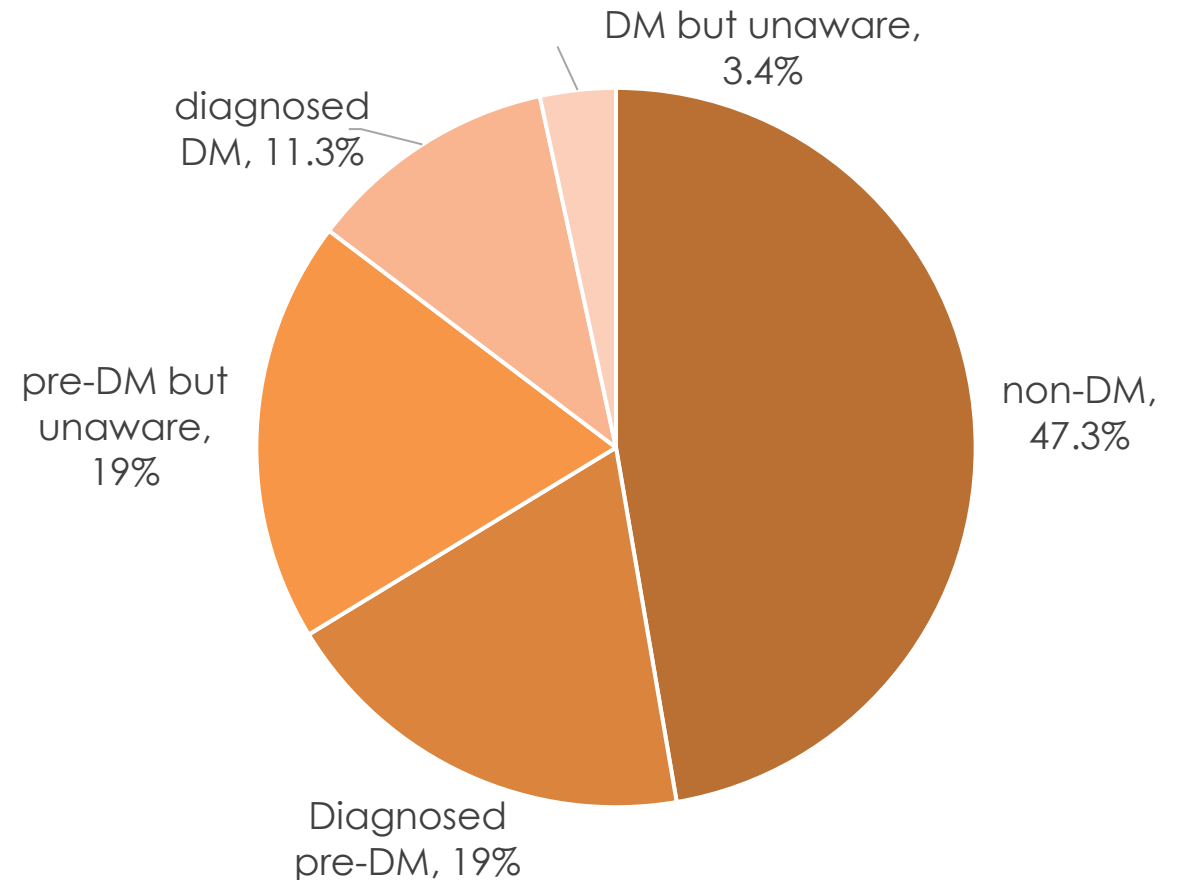
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Discuss measures to prevent medication related adverse reactions

# Prevalence

- CDC 2022 Report
  - About 37.1 million (14.7%) American adults have DM with 23% of them unaware
  - 38% of US adults have pre-DM with 81% of them unaware
- Frequency of adults with DM increases with age
- Most common in American Indians/Alaskan Natives (14.5%) and non-Hispanic African Americans (12.1%)

DM and pre-DM Prevalence in US Adults, 2017-2020



# Diabetes and the Elderly



Over 25% of people over the age of 65 years have diabetes

One-half of older adults have prediabetes

Older adults with diabetes have higher rates of premature death, functional disability, accelerated muscle loss, and coexisting illnesses, such as hypertension, coronary heart disease, and stroke, compared to those without diabetes

Older adults with diabetes are at greater risk than other older adults for several common geriatric syndromes, such as polypharmacy, cognitive impairment, depression, urinary incontinence, injurious falls, persistent pain, and frailty

# Older Adults ADA Recommendations

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Episodes of hypoglycemia should be ascertained and addressed at routine visits

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For older adults with type 1 diabetes, continuous glucose monitoring is recommended to reduce hypoglycemia

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For older adults with type 2 diabetes on multiple daily doses of insulin, continuous glucose monitoring should be considered

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For older adults with type 1 diabetes, consider the use of automated insulin delivery systems and other advanced insulin delivery devices such as connected pens

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Glycemic goals for some older adults might reasonably be relaxed as part of individualized care, but hyperglycemia leading to symptoms or risk of acute hyperglycemia complications should be avoided in all people with diabetes

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Screening for diabetes complications should be individualized in older adults



# Outpatient Glycemic Goals

- **Before meals:** 80-130 mg/dL
- **After meals:** <180 mg/dL at 1-2 hours after start of meal

Individualization  
is key

- Tighter targets (6.0%-6.5%)
  - Younger, healthier
- Looser targets (7.5%-8.0%)
  - Older, comorbidities, hypoglycemia risk

Individualize  
goals based on:

- Diabetes duration, age, life expectancy, comorbidities
- CVD or advanced micro-vascular complications
- Hypoglycemia risk or unawareness

# Glycemic Goals: Avoiding Overtreatment

- Very complex/poor health
  - **Who:** LTC, end-stage chronic illness, moderate to severe cognitive impairment, or 2+ ADL dependencies
  - **Why:** limited life expectancy vs time to benefit
  - **Goals:** avoid hypoglycemia and symptomatic hyperglycemia
    - No A1C goal
    - Premeal glucose: 100-180 mg/dL
    - Bedtime glucose: 110-200 mg/dL
- Simplify, simplify, simplify
- Decrease pill burden
- Choose medications with low risk of hypoglycemia, low glucose monitoring burden, and low pill burden

# ADA Recommendations

Patient Characteristics	Rationale	Reasonable A1C Goal	Fasting/Preprandial Glucose	Bedtime Glucose
Healthy (few coexisting chronic illnesses, intact cognitive function and functional status)	Longer life expectancy	<7.0% to 7.5%	80-130 mg/dL	80-180 mg/dL
Complex/intermediate (multiple coexisting chronic illnesses or 2+ instrumental ADL impairments or mild to moderate cognitive impairment)	Intermediate life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0%	90-150 mg/dL	100-180 mg/dL
Very complex/poor health (LTC or end-stage chronic illness or moderate to severe cognitive impairment or 2+ ADL impairments)	Limited life expectancy	Avoid reliance on A1C; avoid hypoglycemia and symptomatic hyperglycemia	100-180 mg/dL	110-200 mg/dL

# Medication Summary

	MET	GLP-1 RA	DUAL GIP/ GLP-1 RA	SGLT2i	TZD	INSULIN (basal & basal bolus)	DPP-4i	SU	GLN	AGi	COLSVL	BRC	PRAML	
WEIGHT	Slight loss	Loss	Loss	Loss	Gain <sup>4</sup>	Gain	Neutral	Gain	Neutral	Neutral	Neutral	Neutral	Loss	
<b>HYPOGLYCEMIA RISK<sup>14</sup></b>	Neutral	Neutral	Neutral	Neutral	Neutral	Moderate to Severe	Neutral	Moderate to Severe	Mild	Neutral	Neutral	Neutral	Neutral	
CKD	CKD3a/3b <sup>6</sup>	Benefit <sup>7</sup>	Insufficient Evidence	Benefit	Neutral	Increased hypoglycemia risk with impaired renal function	Neutral	Increased hypoglycemia risk with impaired renal function	Not recommended SCR >2 mg/dL or CrCl <25	Neutral	Neutral	Neutral	Neutral	
RENAL ADJUSTMENT	Not with CKD4 eGFR <30 <sup>6</sup>	Exenatide not recommended eGFR <45		Check medication-specific eGFR thresholds <sup>8</sup>			Adjust Dose <sup>9</sup>							
ASCVD	MACE	Benefit <sup>1,3</sup>	Safe	Benefit <sup>2</sup>	Neutral <sup>3</sup>	Neutral	Neutral	Possible Increased Risk	Neutral	Insufficient Evidence	Neutral <sup>3</sup>	Safe	Insufficient Evidence	
	CHF	Neutral		Unclear	Reduced Risk	Moderate to Severe <sup>4</sup>	Moderate							Moderate <sup>4</sup>
	STROKE			Benefit <sup>5</sup>	Possible Benefit <sup>2</sup>	Benefit	Neutral							Neutral
GI ADVERSE SYMPTOMS	Mild to Moderate	Moderate <sup>10</sup>	Moderate <sup>10</sup>	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral	Moderate	Mild	Moderate	Moderate	
OTHER CONSIDERATIONS		Medullary Thyroid Carcinoma/ MEN2	Medullary Thyroid Carcinoma/ MEN2	GU infections DKA <sup>11</sup> Fracture Risk <sup>12</sup>	Fracture Risk		Rare Arthralgias/ Myalgias							

■ Possible benefits   
 ■ Use with caution   
 ■ Likelihood of adverse events   
 ■ Neutral, not studied, insufficient evidence



# Common Adverse Drug Reactions

Metformin	<ul style="list-style-type: none"><li>• GI discomfort: nausea, vomiting, diarrhea, abdominal pain</li><li>• Vitamin B12 deficiency</li><li>• Lactic acidosis</li></ul>
GLP-1 RA and Dual GIP/GLP-1 RA	<ul style="list-style-type: none"><li>• GI: nausea, vomiting, diarrhea, abdominal pain, constipation</li></ul>
SGLT2i	<ul style="list-style-type: none"><li>• Genitourinary tract infection<ul style="list-style-type: none"><li>• Genital mycotic infections</li><li>• Urinary tract infections</li></ul></li><li>• Frequent urination → risk of hypotension and hypovolemia</li><li>• Euglycemic ketoacidosis (primarily in T1DM)</li></ul>
TZDs	<ul style="list-style-type: none"><li>• Fluid retention/edema → CHF worsening</li><li>• Weight gain</li><li>• Fracture risk</li></ul>
Insulin	<ul style="list-style-type: none"><li>• Hypoglycemia</li><li>• Weight gain</li></ul>
SU	<ul style="list-style-type: none"><li>• Hypoglycemia</li><li>• Weight gain</li></ul>

# Common Adverse Drug Reactions

DPP4i

- Skin reactions (rare), arthralgia

Meglitinides

- Hypoglycemia
- Weight gain

Alpha-glucosidase inhibitors

- GI discomfort: flatulence, bloating, diarrhea, abdominal pain

Bromocriptine

- GI: nausea, constipation
- Headache, dizziness

Colesevelam

- GI: constipation, bloating, dyspepsia

Amylin analogue

- Hypoglycemia in combination
- Nausea, vomiting
- Headache

# Hypoglycemic Medications

## High Risk

- Insulin
- Sulfonylureas
- Meglitinides

## Low Risk

- Metformin
- GLP-1 agonists
- SGLT2 inhibitors
- DPP-4 inhibitors
- Thiazolidinediones

# Hypoglycemia Signs and Symptoms

## Symptoms of Hypoglycemia



**Shaking or trembling.**



**Faster heart rate.**



**Extreme hunger.**



**Sweating.**



**Confusion/difficulty concentrating.**



**Dizziness.**

Level	Glycemic criteria	Description
Hypoglycemia alert value (level 1)	Glucose $\leq 70$ mg/dl (3.9 mmol/L) and glucose $\geq 54$ mg/dl (3.0 mmol/L)	Sufficiently low for treatment with fast-acting carbohydrate and dose adjustment of glucose-lowering therapy
Clinically significant hypoglycemia (level 2)	Glucose $< 54$ mg/dl (3.0 mmol/L)	Sufficiently low to indicate serious, clinically important hypoglycemia
Severe hypoglycemia (level 3)	No specific glucose threshold	Sufficiently low associated with severe cognitive impairment and/or physical status requiring external assistance for recovery with possible progression to loss of consciousness, seizure, coma, or death



# Hypoglycemia Treatment

## For **unconscious** patient

- Glucagon Kit - 1 mg IM, SQ, or IV
- Gvoke (ready to use glucagon injection) – 1 mg SQ
- Baqsimi (glucagon nasal powder) - 3 mg intranasal
- Zegalogue (dasiglucagon) – 0.6 mg SQ auto injector
- May repeat any of above after 15 minutes

## For **conscious** patient

- 15 grams of CHO
- Glucose preferred (avoid fat)
- Recheck BG in 15 min
  - Still low: Additional 15 grams of CHO
- Once normal, consider meal/snack to prevent recurrence
- Treatment options
  - 3 glucose tabs
  - 4 oz. (1/2 cup) OJ
  - 4-6 oz. regular soda

- When in doubt, treat for hypoglycemia
- Medic Alert bracelet
- Prevent future occurrences

# Hypoglycemia Treatment

	Intranasal glucagon (Baqsimi)	Liquid stable glucagon (Gvoke prefilled syringe and autoinjector)	Dasiglucagon (Zegalogue prefilled syringe and autoinjector)	Lyophilized glucagon powder injection (glucagon emergency kit)	Lyophilized glucagon powder injection (GlucaGen)
Available doses	3 mg	0.5 mg, 1 mg	0.6 mg	0.5 mg, 1 mg	0.5 mg, 1 mg
Route of administration	Nasal	SC	SC	SC, IM, IV	SC, IM, IV
Location of administration	Nose	Lower abdomen, outer thigh, or outer upper arm	Lower abdomen, outer thigh, buttocks, or outer upper arm	Upper arms, thighs, or buttocks	Upper arms, thighs, or buttocks
Dosage	3 mg	1 mg	0.6 mg	1 mg	1 mg
Requires reconstitution prior to use?	No	No	No	<b>Yes</b>	<b>Yes</b>
Shelf-life stability	24 months	24 months	36 months (refrigeration) 12 months (room temperature)	24 months If reconstituted, must use immediately	24 months If reconstituted, must use immediately

# Hyperglycemia Signs and Symptoms

## Symptoms of Hyperglycemia



**Increased thirst.**



**Frequent urination.**



**Extreme hunger.**



**Blurred vision.**



**Slow-healing cuts and sores.**

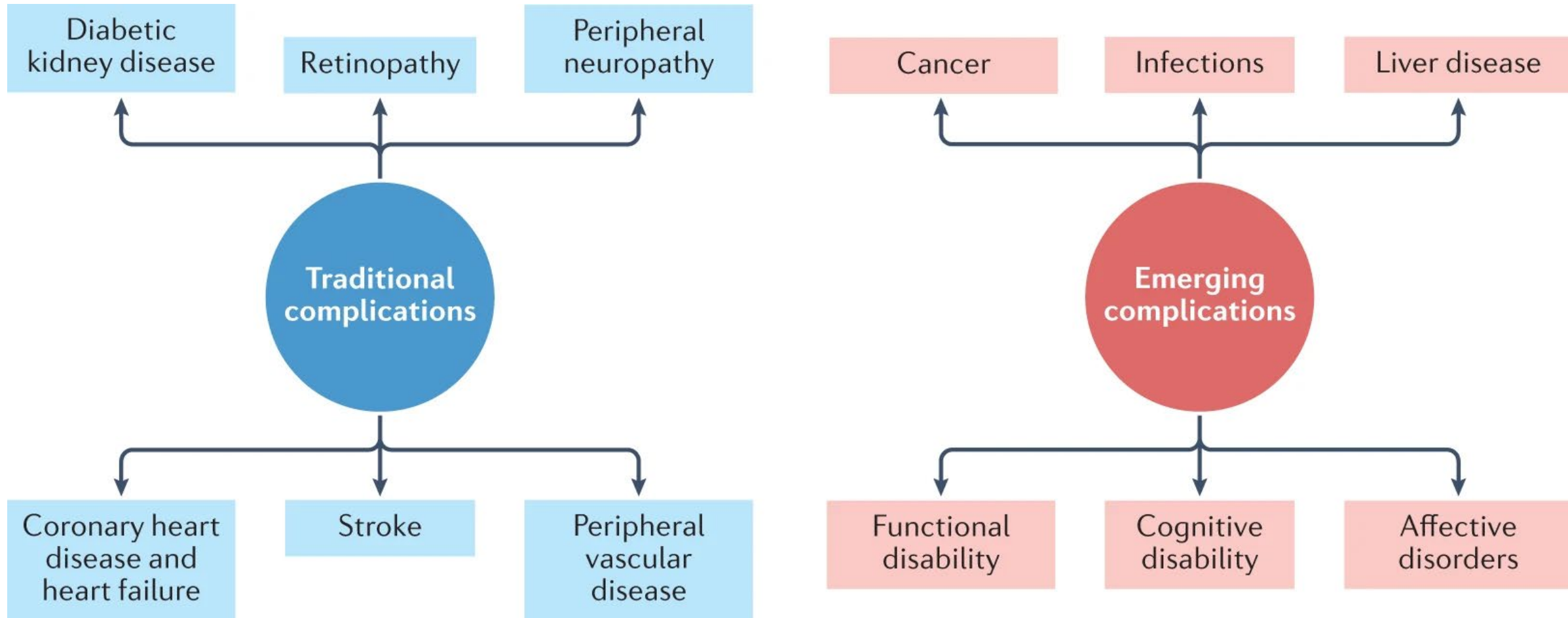


**Fatigue.**

- Hyperglycemia is defined as glucose >125mg/dL while fasting or >180mg/dL 2 hours after a meal
- Ketoacidosis symptoms
  - Nausea and vomiting
  - Dehydration
  - Abdominal pain
  - Fruity-smelling breath
  - Deep labored breathing or hyperventilation (Kussmaul breathing)
  - Rapid heartbeat
  - Confusion and disorientation
  - Loss of consciousness

Cleveland Clinic. Hyperglycemia Signs, Treatment & Prevention | Cleveland Clinic. Cleveland Clinic. Published February 11, 2020. <https://my.clevelandclinic.org/health/diseases/9815-hyperglycemia-high-blood-sugar>

# Uncontrolled Diabetes Complications





# Diabetes Management Challenges

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		

# Strategies to Replace Sliding Scale Insulin

## Suggested steps

SSI is the sole mode of insulin treatment	<ul style="list-style-type: none"><li>• Review average daily insulin requirement over prior 5–7 days</li><li>• Give 50–75% of the average daily insulin requirement as basal insulin</li><li>• Stop SSI, use noninsulin agents or fixed-dose mealtime insulin</li><li>• Consider giving basal insulin in the morning to impact postprandial hyperglycemia and reduce risk of early-morning hypoglycemia</li></ul>
SSI is being used in addition to scheduled basal insulin	<ul style="list-style-type: none"><li>• Add 50–75% of the average insulin requirement used as SSI to the existing dose of basal insulin</li><li>• Use noninsulin agents or fixed-dose mealtime insulin for postprandial hyperglycemia</li></ul>
SSI is being used in addition to basal and scheduled mealtime insulin	<ul style="list-style-type: none"><li>• If correction dose is required frequently, add the average correction dose before a meal to the scheduled mealtime insulin dose at the <b>preceding</b> meal.</li></ul>
SSI is used in short term due to irregular dietary intake or acute illness	<ul style="list-style-type: none"><li>• Short-term use may be needed for acute illness and irregular dietary intake</li><li>• As health and glucose levels stabilize, stop SSI and return to previous regimen as tolerated</li></ul>
Wide fluctuations in glucose levels with cognitive decline and/or irregular dietary intake	<ul style="list-style-type: none"><li>• Use scheduled basal and mealtime insulin based on individual needs with the goal of avoiding hypoglycemia</li><li>• Keep patients hydrated, especially when glucose levels are high</li></ul>

# Specific Situations Needing Attention

## Recommendations for LTC staff for diabetes management

BG reading <70 mg/dL and unresponsive

- Treat hypoglycemia per protocol without any delay

Consecutive glucose meter readings <70 mg/dL

- Call practitioner
- Confirm low glucose value by laboratory test
- Evaluate nutritional intake
- Consider an increase in frequency of glucose monitoring for 24 h
- Adjust diabetes regimen as needed

BG readings >250 mg/dL two or more times within 24-h period accompanied by a new or change in medical or functional status

- Call practitioner
- Increase frequency of glucose monitoring

BG readings >300 mg/dL during all or part of 2 consecutive days

- Confirm high glucose value by laboratory test
- Evaluate nutritional intake

Any glucose reading too high to measure by glucose meter

- Adjust diabetes regimen as needed
- If glucose levels are persistently high after changes to the diabetes regimen, consider medical evaluation for other causes (i.e., infection)

Patient not eating, vomiting, or unable to take oral glucose-lowering medications

- Call practitioner **as soon as possible**
- Consider insulin therapy and adjust dose accordingly based on nutritional status

# Tips to Prevent Adverse Events

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Try to minimize the use of sliding scale insulins

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Use CGMs whenever possible

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Consider administering insulin after meals to ensure the dose is appropriate for the amount of carbohydrates consumed

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Confirm medication expiration date prior to administration

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Measure blood glucose prior to administering an agent with a risk of hypoglycemia



# References

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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



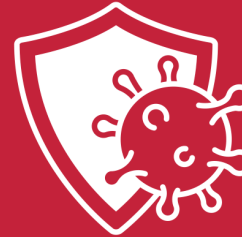
## CHRONIC DISEASE SELF- MANAGEMENT

- 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

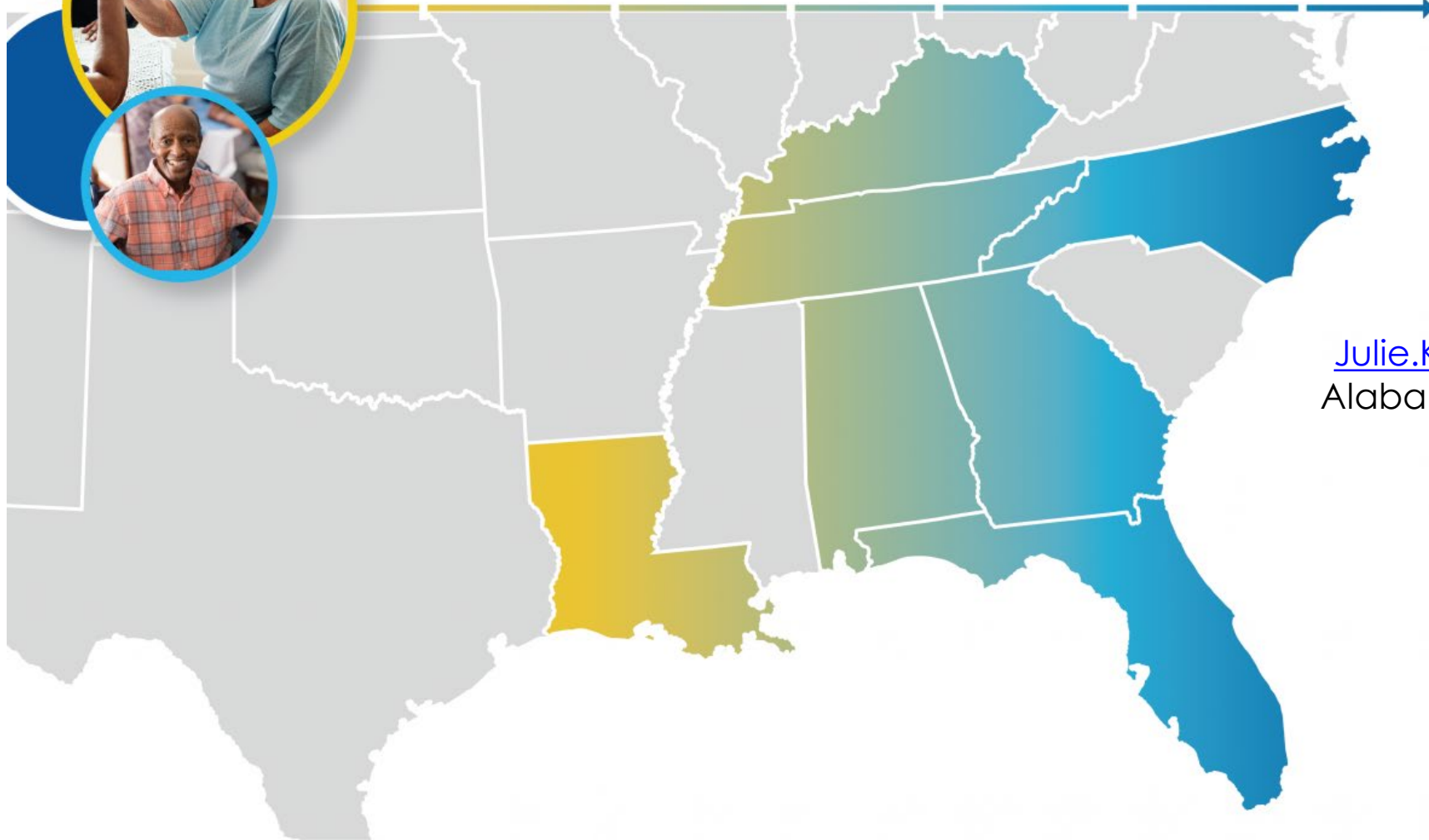
- Increase influenza, pneumococcal, and COVID-19 vaccination rates



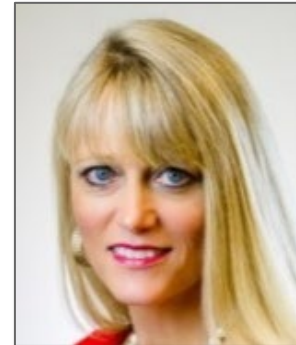
## TRAINING

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

# Making Health Care Better *Together*



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