Leveraging Health Literacy and Patient Preferences to Reduce Hypoglycemic Events in Patients with Type 2 Diabetes

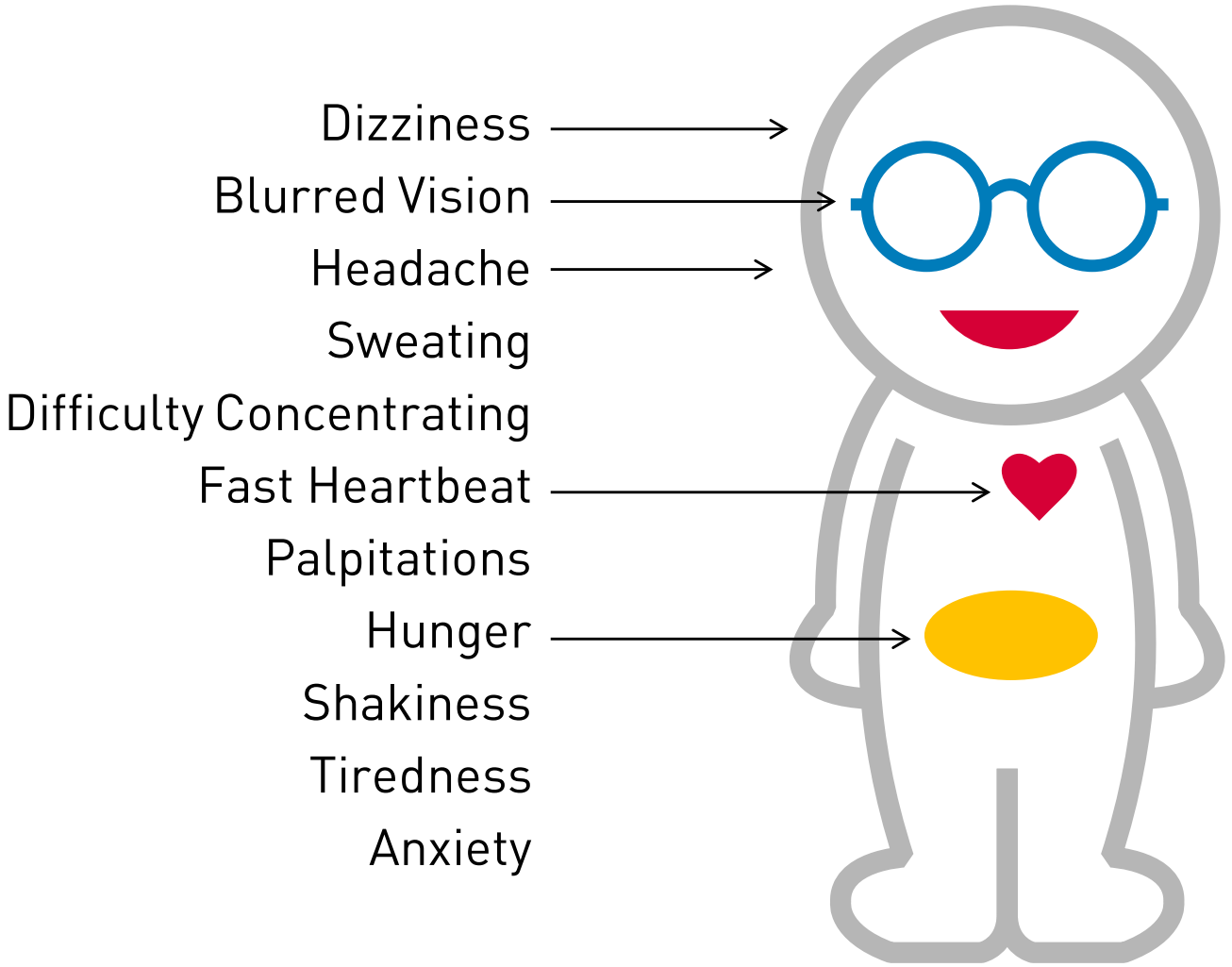
Learning Objectives

- Describe the prevalence of hypoglycemic events among patients with type 2 diabetes mellitus and risk factors leading to an event
- Introduce methods of assessing health literacy and numeracy of patients and caregivers
- Review effective ways to incorporate patient preferences into care plans and differentiate A1C target values for individuals
- List the action steps to reduce the likelihood of a hypoglycemic event for a high risk patient

What Is Hypoglycemia?

- Hypoglycemia, or low blood sugar, occurs when the level of glucose in the blood drops below normal
  - For many people with diabetes, that means a level of 70 milligrams per deciliter (mg / dL) or less
- Can be a side effect of both insulin and some other hypoglycemic prone anti-hyperglycemic medications

Symptoms of Hypoglycemia



Risk Factors for Hypoglycemia

- Intensive glucose control / A1C targets too low
- Advanced age and cognitive decline
- Low health literacy and numeracy
- Social determinants including food insecurity
- Insulin and / or sulfonylurea medication therapy
- Low economic status
- Prior hypoglycemic episode
- Hypoglycemia unawareness
- Liver / kidney disease

Prevalence of Hypoglycemia

- In 2015, a population-based meta-analysis estimated that, among patients with type 2 diabetes taking insulin,[2]
  - Prevalence of mild / moderate hypoglycemia was 52%
  - Prevalence of severe hypoglycemia was 21%
  - Incidence of mild / moderate hypoglycemia was 23 events per person-year
  - Incidence of severe hypoglycemia was 1 event per person-year
- In 2011, about 282,000 ED visits for adults ≥18 yrs. had hypoglycemia as the first-listed diagnosis and diabetes as another diagnosis[1]

1. Centers for Disease Control and Prevention. National Diabetes Statistics Report: Estimates of Diabetes and Its Burden in the United States, 2014. Atlanta, GA: U.S. Department of Health and Human Services; 2014.
2. Edridge CL, Dunkley AJ, Bodicoat DH, Rose TC, Gray LJ, et al. (2015) Prevalence and Incidence of Hypoglycaemia in 532,542 People with Type 2 Diabetes on Oral Therapies and Insulin: A Systematic Review and Meta-Analysis of Population Based Studies. PLOS ONE 10(6): e0126427. doi: 10.1371/journal.pone.0126427.

Prevalence of Hypoglycemia

- The National Electronic Injury Surveillance System-Cooperative Adverse Drug Event Surveillance (NEISS-CADES) analyzed the frequency and rates of hospitalization after ED visits in older adults:

  - **94%** of hospitalizations from endocrine agents were for **hypoglycemia**[1]
  - About 2/3 of these hospitalizations involved neurologic symptoms (loss of consciousness, seizures, changes in mental status) [1]

1. Daniel S. Budnitz, M.D., M.P.H., Maribeth C. Lovegrove, M.P.H., Nadine Shehab, Pharm.D., M.P.H., and Chesley L. Richards, M.D., M.P.H. , Emergency Hospitalizations for Adverse Drug Events in Older Americans, N Engl J Med 2011; 365:2002-2012November 24, 2011.

Risk of Hypoglycemia in Older Veterans with Dementia and Cognitive Impairment

With Permission: Feil, D.G.; Rajan, M.; Soroka, O.; Tseng, C.L.; Miller, D.R.; Pogach, L.M.

Risk Factor	Frequency of Hypoglycemia	Patients on Insulin
Dementia	14.1%	30%
Cognitive Impairment	10.4%	30%
Neither	6.3%	24%

Feil DG, Rajan M, Soroka O, Tseng CL, Miller DR , Pogach LM. (2011). Risk of Hypoglycemia in Older Veterans with Dementia and Cognitive Impairment: Implications for Practice and Policy. J Am Geriatr Soc, 59: 2263–2272.

Knowledge Check

Symptoms of hypoglycemia include:

a) Headache, blurred vision
b) Seizures
c) Confusion
d) All of the above
e) None of the above

Knowledge Check

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d) All of the above
e) None of the above

Heart Disease Rates in Diabetes Patients

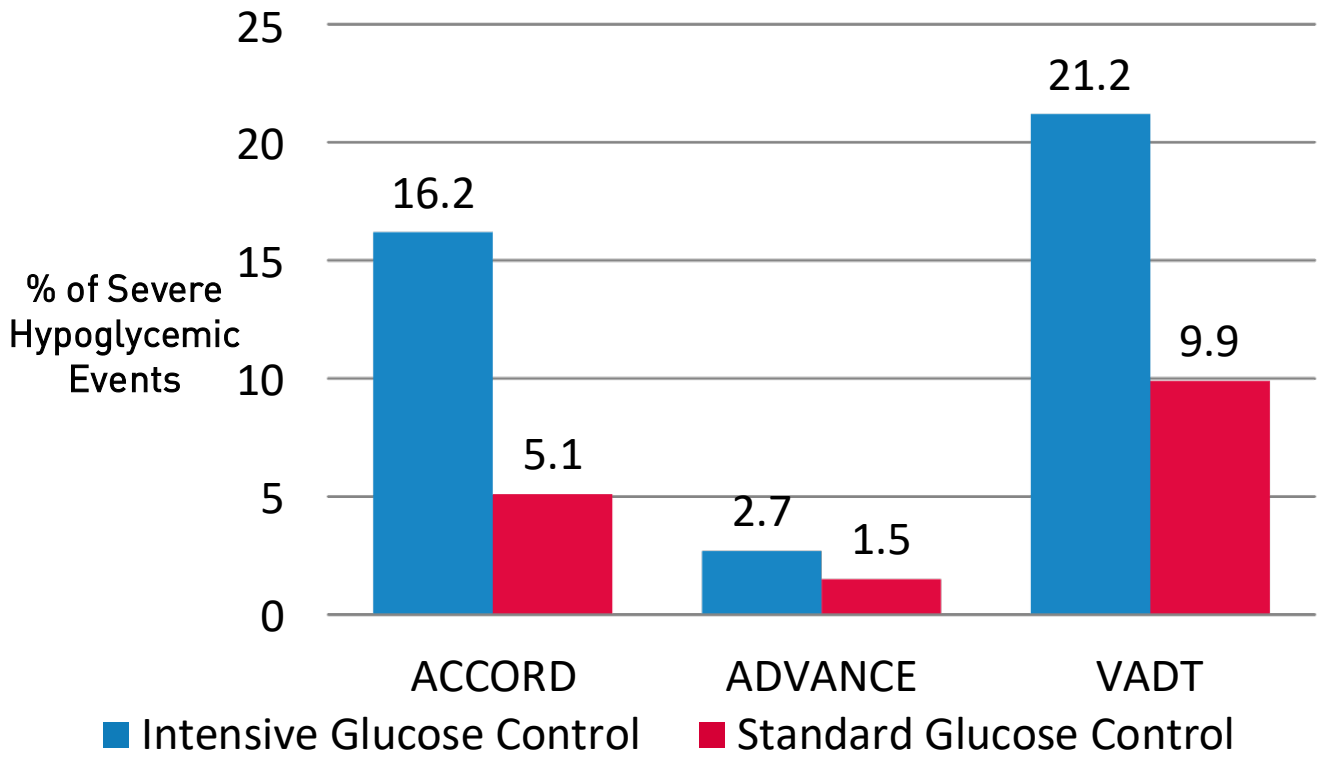
- Three landmark trials compared the rates of heart disease in patients receiving:
  - Intensive diabetes treatment
  - Conventional diabetes treatment
- The trials demonstrated that intensive blood glucose lowering to near normal levels resulted in more hypoglycemia requiring medical assistance

ACCORD, ADVANCE, and VADT

- Action to Control Cardiovascular Risk in Diabetes (ACCORD) study
- Action in Diabetes and Vascular Disease (ADVANCE) trial
- Veterans Affairs Diabetes Trial (VADT)

Outpatient Intensive Glucose Control

With Permission: Frier, B.M.; Schemthaner, G.; Heller, S.R.



Frier BM, Schernthaner G, Heller SR. Hypoglycemia and cardiovascular risks. Diabetes Care 2011;34 (suppl 2):S132–S137.

Benefits of Intensive Glucose Control

ACCORD ADVANCE VADT

NO clear benefit of intensive blood glucose control on heart disease risk

https://diatribe.org/issues/10/learning-curve

A1C Variabilities

- The A1C test reflects average blood glucose levels over the past 2-3 months
- Results can vary by as much as 2-6% depending on the lab where the test was performed
  - **This means an A1C measured as 7.0% could indicate a true A1C anywhere in the range from ~6.6-7.4%**

National Glycohemoglobin Standardization Program. Meeting of the NGSP Clinical Advisory Committee Minutes. Boston, MA. (2015 June 7). Retrieved from http://www.ngsp.org/docs/CAC2015.pdf

ACCORD Trial – Root Cause of Hypoglycemic Events

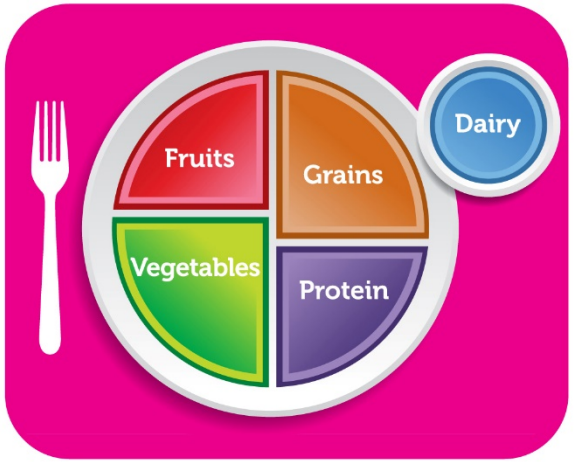
1) use of diabetes medications
2) inadequate Caloric intake and food insecurity
3) exercise
4) errors with use of medications
5) current illnesses

Bonds et al. BMC Endocrine Disorders 2012, 12:5 Page 2 of 9 http://www.biomedcentral.com/1472-6823/12/5

Food Insecurity

- Screening question:
  - **"In the past month, was there any day when you or anyone in your family went hungry because you did not have enough money for food?"**

- 1 in 7 U.S. households do not have adequate access to food

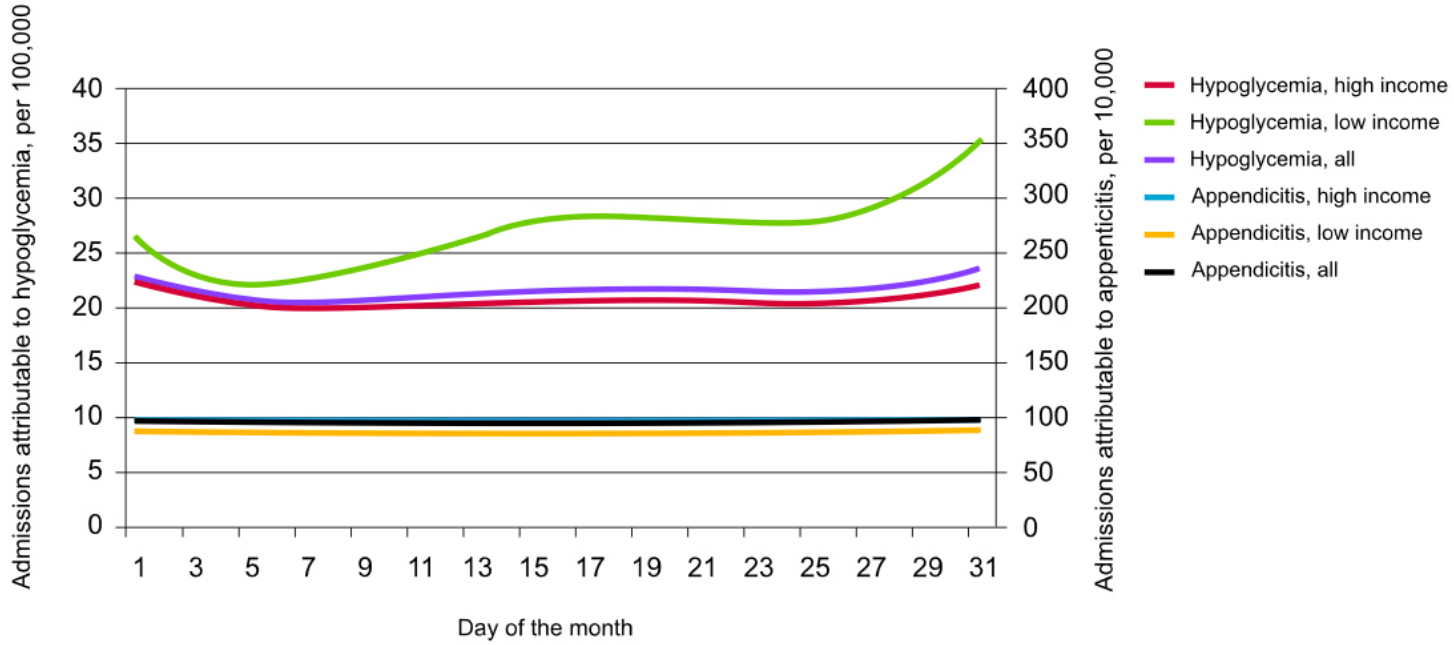


Seligman HK, Bolger AF, Guzman D, Lopez A, Bibbins-Domingo K. Exhaustion of food budgets at month's end and hospital admissions for hypoglycemia. Health Affairs. 2014; 33(1): 116–123.

Food Insecurity

With Permission: Seligman, H.K.; Bolger, A.F.; Guzman, D.; Lopez, A.; Bibbins-Domingo, K.

Risk for hypoglycemia admission ↑ 27% in the last week of the month vs. first week in low-income population



Seligman HK, Bolger AF, Guzman D, Lopez A, Bibbins-Domingo K. Exhaustion of food budgets at month's end and hospital admissions for hypoglycemia. Health Affairs. 2014; 33(1): 116–123.

Factors Increasing Hypoglycemic Events—Patient Controlled

- Insufficient carbohydrate intake
- Skipping or delaying meals
- Increasing physical activity
- Drinking too much alcohol without enough food
- Taking medications incorrectly
- Inadequate nutrition during illness

Factors Increasing Hypoglycemic Events—Provider Controlled

- Lack of shared decision making and individualized A1C target setting
- Aggressive hyperglycemic medication prescribing
- Not addressing patient knowledge gaps
- Failure to address food insecurity

Knowledge Check

On average, A1C test results can differ by as much as:

a) 10%
b) 8% to 12%
c) 2% to 6%
d) 0.5% to 1%
e) None of the above

Knowledge Check

On average, A1C test results can differ by as much as:

a) 10%
b) 8% to 12%
c) 2% to 6%
d) 0.5% to 1%
e) None of the above

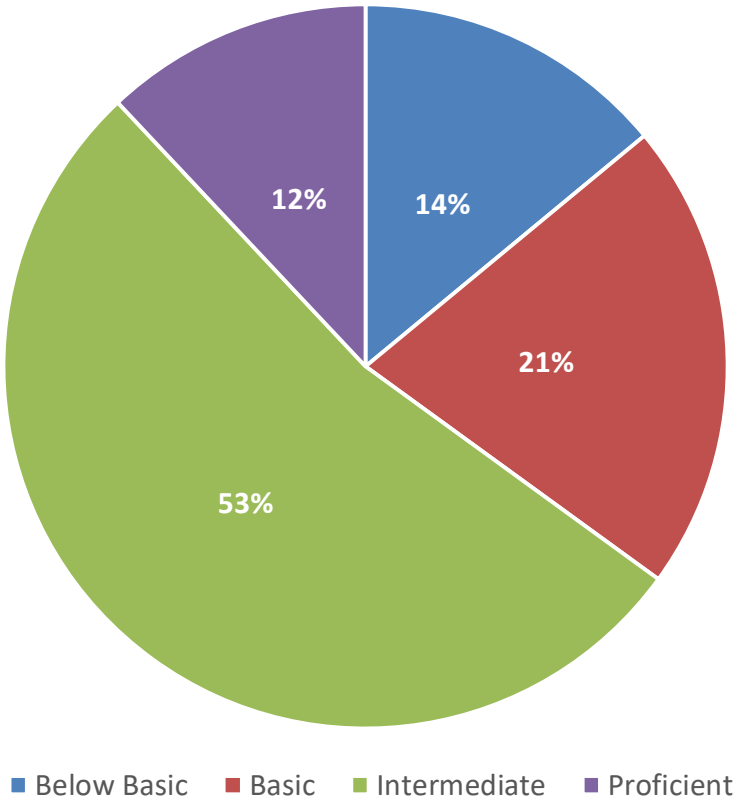
What Is Health Literacy?

- "The degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions."[1]
- Deficits are not always obvious, so if these skills are not specifically assessed, they may go unrecognized. [2]

1. Wallace A. Low Health Literacy: Overview, Assessment, and Steps Toward Providing High-Quality Diabetes Care. Diabetes Spectrum Oct 2010, 23 (4) 220-227
2. White RO, Wolff K, Cavanaugh KL, Rothman R. Addressing Health Literacy and Numeracy to Improve Diabetes Education and Care. Diabetes Spectrum Oct 2010, 23 (4) 238-243.

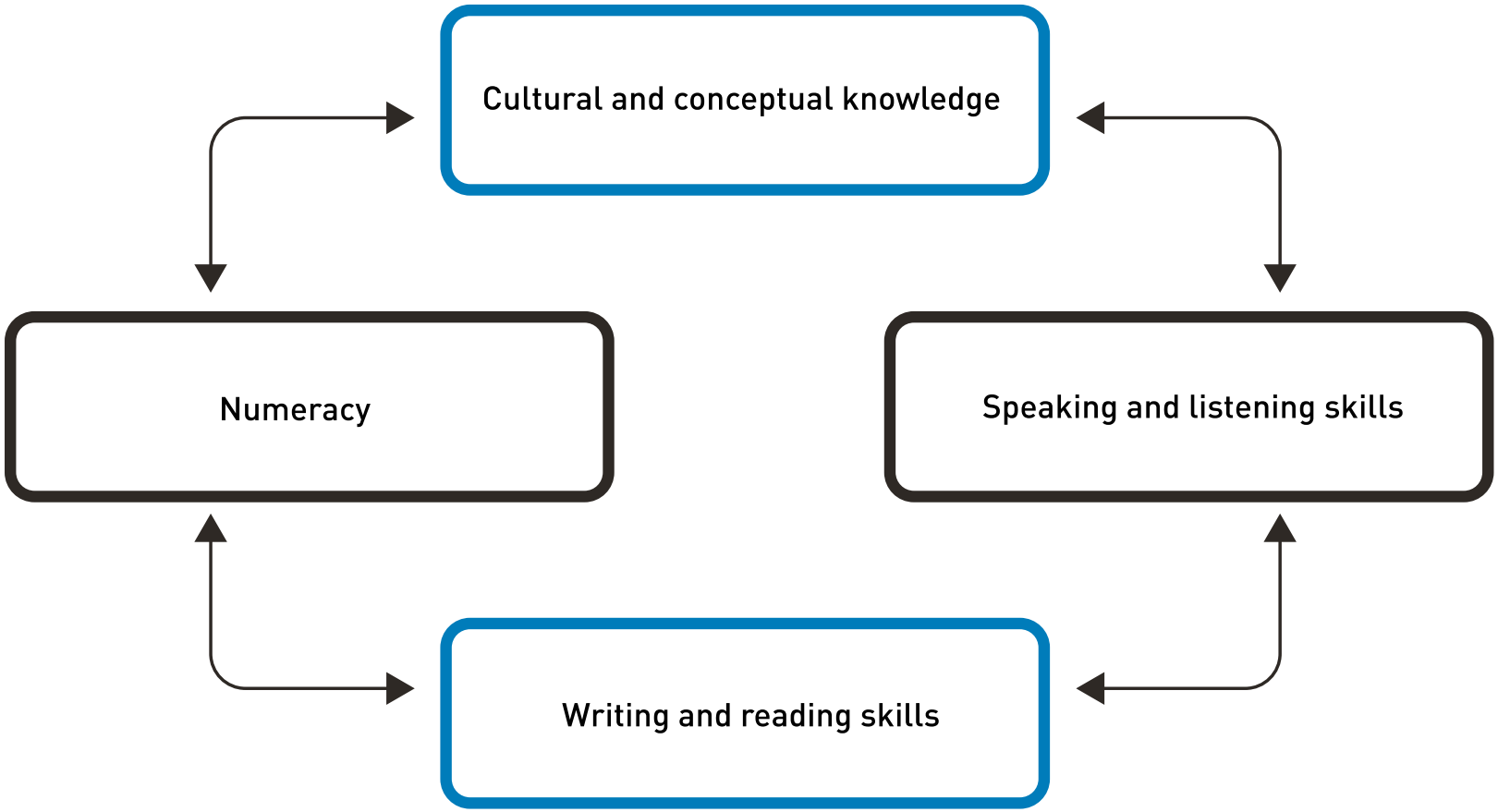
Health Literacy Issues

- **77 million** U.S. adults have basic or below basic health literacy. [1]
- Only 12% of U.S. adults had proficient health literacy. [1]
- Evidence supports an association between limited health literacy and numeracy and poor diabetes outcomes. [2]



1. America's Health Literacy: Why We Need Accessible Health Information. An Issue Brief From the U.S. Department of Health and Human Services. 2008.
2. White RO, Wolff K, Cavanaugh KL, Rothman R. Addressing Health Literacy and Numeracy to Improve Diabetes Education and Care. Diabetes Spectrum Oct 2010, 23 (4) 238-243.

Health Literacy Domains



Wallace A. Low Health Literacy: Overview, Assessment, and Steps Toward Providing High-Quality Diabetes Care. Diabetes Spectrum Oct 2010, 23 (4) 220-227

Diabetes-Specific Numeracy

- Numeracy is the ability to understand and work with numbers
- Interpreting dietary information requires high numeracy skills
- Examples include A1C target, blood glucose readings, and carbohydrate calculations

https://en.oxforddictionaries.com/definition/numeracy

Methods of Assessing Health Literacy / Health Numeracy

- Spoken Knowledge in Low Literacy in Diabetes (SKILLD) Scale
- Diabetes Knowledge Test (DKT2)
- Diabetes Numeracy Test (DNT15)
- Single-Item Literacy Screener (SILS)

Spoken Knowledge in Low Literacy in Diabetes (SKILLD) Scale

- Developed to screen patients with diabetes and low literacy for deficits in self-care knowledge.
- 10-item, open-answer test
- Questions about behaviors patients should have to best manage their diabetes

Russell L. Rothman, Robb Malone, Betsy Bryant, Catherine Wolfe, Penelope Padgett, Darren A. DeWalt, Morris Weinberger and Michael Pignone. The Spoken Knowledge in Low Literacy in Diabetes Scale: A Diabetes Knowledge Scale for Vulnerable Patients. The Diabetes Educator 2005; 31; 215. DOI: 10.1177/0145721705275002.

Spoken Knowledge in Low Literacy in Diabetes (SKILLD) Scale Sample Questions

With Permission: Rothman, R.; Malone, R.; Bryant, B.; Wolfe, C.; Padgett, P.; DeWalt, D; Weinberger, M.; Pignone, M.

Item no.	SKILLD items in English	Escala De Conocimiento Oral En Pacientes Diabéticos Con Bajo Nivel de Lectoescritura	Correct responses *(Revisions)*
1	What are the signs and symptoms of high blood sugar? (Name at least 2)	*¿Cuáles son los signos y sintomas del azúcar alto en la sangre? (al menos dos)*	Answer must contain 2 of any of the following: extreme thirst, frequent urination, drinking or eating, blurred vision, drowsiness, fatigue.
	Probe: How do you feel when your blood sugar is high or when you are diagnosed?	*Exploración: ¿Cómo se siente cuando tiene alto su nivel de azúcar o cuando le diagnosticaron que lo tiene alto?*	
2	What are the signs and symptoms of low blood sugar? (Name at least 2)	*¿Cuáles son los signos o sintomas del azúcar bajo en la sangre? (al menos dos)*	Answer must contain 2 of any of the following: hunger, nervousness, jitteriness, mood swings, irritability, confusion, sweatiness, fast heart rate, *dizziness, lightheadedness, weakness.*
	Probe: How do you feel when your blood sugar is too low?	*Exploración: ¿Cómo se siente cuando tiene muy bajo su nivel de azúcar?*	
3	How do you treat low blood sugar?	*¿Cómo trata el nivel bajo de azúcar?*	Answer must be clear about action: drink juice, eat candy, drink milk, *eat sugar or sweets, drink sugared soft drink,* or at least 15 grams of carbohydrates.
	Probe: What should you do if your sugar is too low? How can you bring your blood sugar up if it's too low?	*Exploración: ¿Qué deberia hacer si tiene bajo su nivel de azúcar? ¿Cómo puede usted subir su nivel de azúcar si está muy bajo?*	

Russell L. Rothman, Robb Malone, Betsy Bryant, Catherine Wolfe, Penelope Padgett, Darren A. DeWalt, Morris Weinberger and Michael Pignone. The Spoken Knowledge in Low Literacy in Diabetes Scale: A Diabetes Knowledge Scale for Vulnerable Patients. The Diabetes Educator 2005; 31; 215. DOI: 10.1177/0145721705275002.

Diabetes Knowledge Test (DKT2)

- Quick and low-cost method of assessing a patient's or a population's general knowledge of diabetes and diabetes self-care
- 2 components: 14-item general test and 9-item insulin use subscale
- Translated into several languages

Fitzgerald JT, Funnell MM, Anderson RM, Nwankwo R, Stansfield RB, Piatt GA. Validation of the Revised Brief Diabetes Knowledge Test (DKT2). The Diabetes Educator. 2016;42(2):178-187. doi:10.1177/0145721715624968

Diabetes Knowledge Test (DKT2) Sample Questions

1. **Which of the following is highest in carbohydrate?**
a. Baked chicken
b. Swiss cheese
c. Baked potato
d. Peanut butter

2. **For a person in good control, what effect does exercise have on blood glucose?**
a. Lowers it
b. Raises it
c. Has no effect

3. **What effect will an infection likely have on blood glucose?**
a. Lowers it
b. Raises it
c. Has no effect

4. **If you have taken rapid-acting insulin, you are most likely to have a low blood glucose reaction in:**
a. Less than 2 hours
b. 3 -5 hours
c. 6 -12 hours
d. More than 13 hours

Fitzgerald JT, Funnell MM, Anderson RM, Nwankwo R, Stansfield RB, Piatt GA. Validation of the Revised Brief Diabetes Knowledge Test (DKT2). The Diabetes Educator. 2016;42(2):178-187. doi:10.1177/0145721715624968

Diabetes Numeracy Test (DNT)

- A valid and reliable assessment of diabetes-specific numeracy [1]
- DNT15 is a shortened version that can be used by clinicians or diabetes educators to help target education or guide therapy [2]
- Touches on 5 diabetes self-care areas [2]
  - 3 items on nutrition
  - 1 item on exercise
  - 3 items on blood glucose monitoring
  - 1 on oral medications
  - 7 on insulin administration

1. Cavanaugh KL. Health literacy in diabetes care: explanation, evidence and equipment. *Diabetes management (London, England)*. 2011;1(2):191-199. doi:10.2217/dmt.11.5.
2. Huizinga MM, Elasy TA, Wallston KA, et al. Development and validation of the Diabetes Numeracy Test (DNT). *BMC Health Services Research*. 2008;8:96. doi:10.1186/1472-6963-8-96.

Diabetes Numeracy Test (DNT) Sample Questions

With Permission: Cavanaugh, K.L.

A You ate one and a half cups from the food labeled below.
How many grams of carbohydrate did you eat?

Nutrition facts Serving size: ¾ cup Servings per container: 10
Amount per serving
Calories: 150
Total fat: 7 g
Total carbohydrates: 18 g Dietary fiber: 3 g Sugars: 3 g
Total protein: 3 g

Answer: 36 g

B You test your blood sugar three times a day. You purchase a prescription of 50 strips on 5 March. Of the dates below, by when will you need to buy new strips?

21 March
21 April
21 May
21 June

Answer: 21 March

C You are given the following instructions: "take one unit of insulin for every 7 g of carbohydrate you eat." How much insulin do you take:

— when you eat 98 g at supper?

Answer: 14 units

Cavanaugh KL. Health literacy in diabetes care: explanation, evidence and equipment. *Diabetes management (London, England)*. 2011;1(2):191-199. doi:10.2217/dmt.11.5

Single-Item Literacy Screener (SILS)

- One question: "How often do you need to have someone help you when you read instructions, pamphlets, or other written material from your doctor or pharmacy?"
- Responses range from 1 (never) to 5 (always)
- A response of 2 is the identifying cut-off point as to who may be in need of assistance

Seligman HK, Wallace AS, Dewalt DA, Schillinger D, Arnold CL, Shilliday BB, Delgadillo A, Bengal N, Davis TC. Facilitating behavior change with low-literacy patient education materials. 2007. Am J Health Behav 31(Suppl. 1):S69-S78.

Adult Carb Quiz

- Validated method of assessing patients' knowledge of carbohydrate counting
- 43 item quiz that takes ~15 minutes to complete
- 6 domains:
  - Carbohydrate food recognition
  - Carbohydrate food content
  - Nutrition label reading
  - Glycemic targets
  - Hypoglycemia prevention and treatment
  - Calculating carbohydrate composition in a mixed meal

Watts SA, Anselmo JM, Kern E. Validating the AdultCarbQuiz: A Test of Carbohydrate-Counting Knowledge for Adults With Diabetes. Diabetes Spectrum Aug 2011, 24 (3) 154-160

Adult Carb Quiz Sample Questions

1. A good blood sugar reading just before a meal would be...

2. You are going to mow the grass, which takes about 30 minutes of solid work. By how many points do you expect your blood sugar to go down?

Knowledge Check

A U.S. Department of Health and Human Services brief said that 77 million Americans were identified as having basic or below basic health literacy.

True

False

Knowledge Check

A U.S. Department of Health and Human Services brief said that 77 million Americans were identified as having basic or below basic health literacy.

True

False

Knowledge Check

Evidence supports an association between limited health literacy and poor diabetes outcomes.

True

False

Knowledge Check

Evidence supports an association between limited health literacy and poor diabetes outcomes.

True

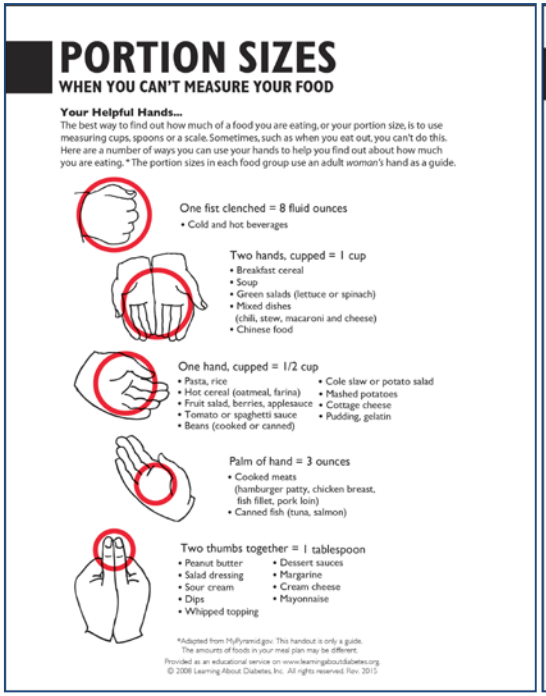
False

Translation into Practice

- Appropriately tailor interventions and provide health education
- Communicate using simple language
  - Use the "Two syllable rule" when creating written and spoken educational materials
  - Limit information to no more than three topics

Seligman HK, Wallace AS, Dewalt DA, Schillinger D, Arnold CL, Shilliday BB, Delgadillo A, Bengal N, Davis TC. Facilitating behavior change with low-literacy patient education materials. 2007. Am J Health Behav 31(Suppl. 1):S69-S78.

Visual Aids



PORTION SIZES
WHEN YOU CAN'T MEASURE YOUR FOOD

Your Helpful Hands...

The best way to find out how much of a food you are eating, or your portion size, is to use measuring cups, spoons or a scale. Sometimes, such as when you eat out, you can't do this. Here are a number of ways you can use your hands to help you find out about how much you are eating. * The portion sizes in each food group use an adult *woman's* hand as a guide.

One fist clenched = 8 fluid ounces
- Cold and hot beverages

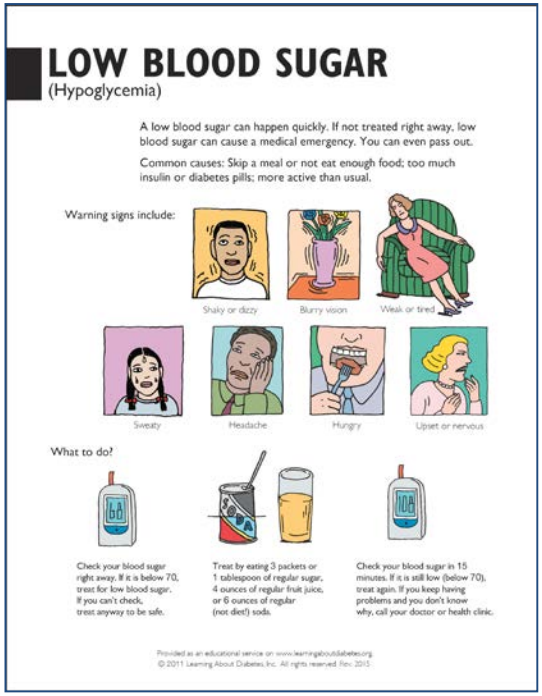
Two hands, cupped = 1 cup
- Breakfast cereal
- Soup
- Green salads (lettuce or spinach)
- Mixed dishes (chili, stew, macaroni and cheese)
- Chinese food

One hand, cupped = 1/2 cup
- Pasta, rice
- Hot cereal (oatmeal, farina)
- Fruit salad, berries, applesauce
- Tomato or spaghetti sauce
- Beans (cooked or canned)
- Cole slaw or potato salad
- Mashed potatoes
- Cottage cheese
- Pudding, gelatin

Palm of hand = 3 ounces
- Cooked meats (hamburger patty, chicken breast, fish fillet, pork loin)
- Canned fish (tuna, salmon)

Two thumbs together = 1 tablespoon
- Peanut butter
- Salad dressing
- Sour cream
- Dips
- Whipped topping
- Dessert sauces
- Margarine
- Cream cheese
- Mayonnaise

*Adapted from MyPyramid.gov. This handout is only a guide. The amounts of foods in your meal plan may be different.



LOW BLOOD SUGAR
(Hypoglycemia)

A low blood sugar can happen quickly. If not treated right away, low blood sugar can cause a medical emergency. You can even pass out.

Common causes: Skip a meal or not eat enough food; too much insulin or diabetes pills; more active than usual.

Warning signs include:

Shaky or dizzy | Blurry vision | Weak or tired

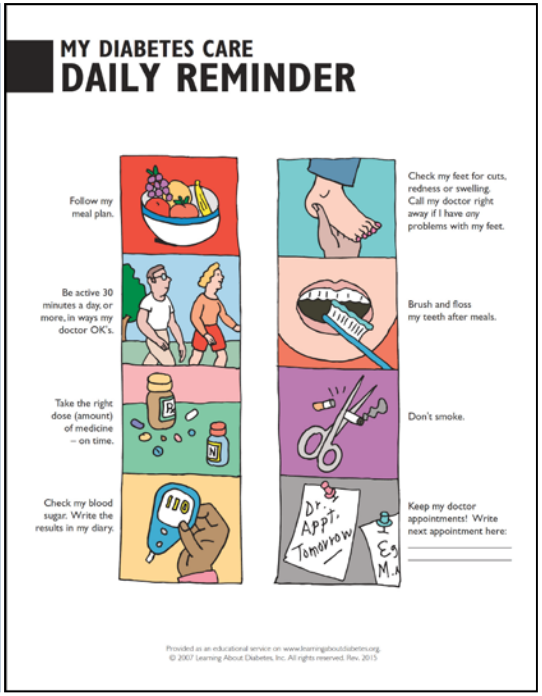
Sweaty | Headache | Hungry | Upset or nervous

What to do?

Check your blood sugar right away. If it is below 70, treat for low blood sugar. If you can't check, treat anyway to be safe.

Treat by eating 3 packets or 1 tablespoon of regular sugar, 4 ounces of regular fruit juice, or 6 ounces of regular (not diet!) soda.

Check your blood sugar in 15 minutes. If it is still low (below 70), treat again. If you keep having problems and you don't know why, call your doctor or health clinic.



MY DIABETES CARE
DAILY REMINDER

Follow my meal plan.

Be active 30 minutes a day, or more, in ways my doctor OK's.

Take the right dose (amount) of medicine – on time.

Check my blood sugar. Write the results in my diary.

Check my feet for cuts, redness or swelling. Call my doctor right away if I have *any* problems with my feet.

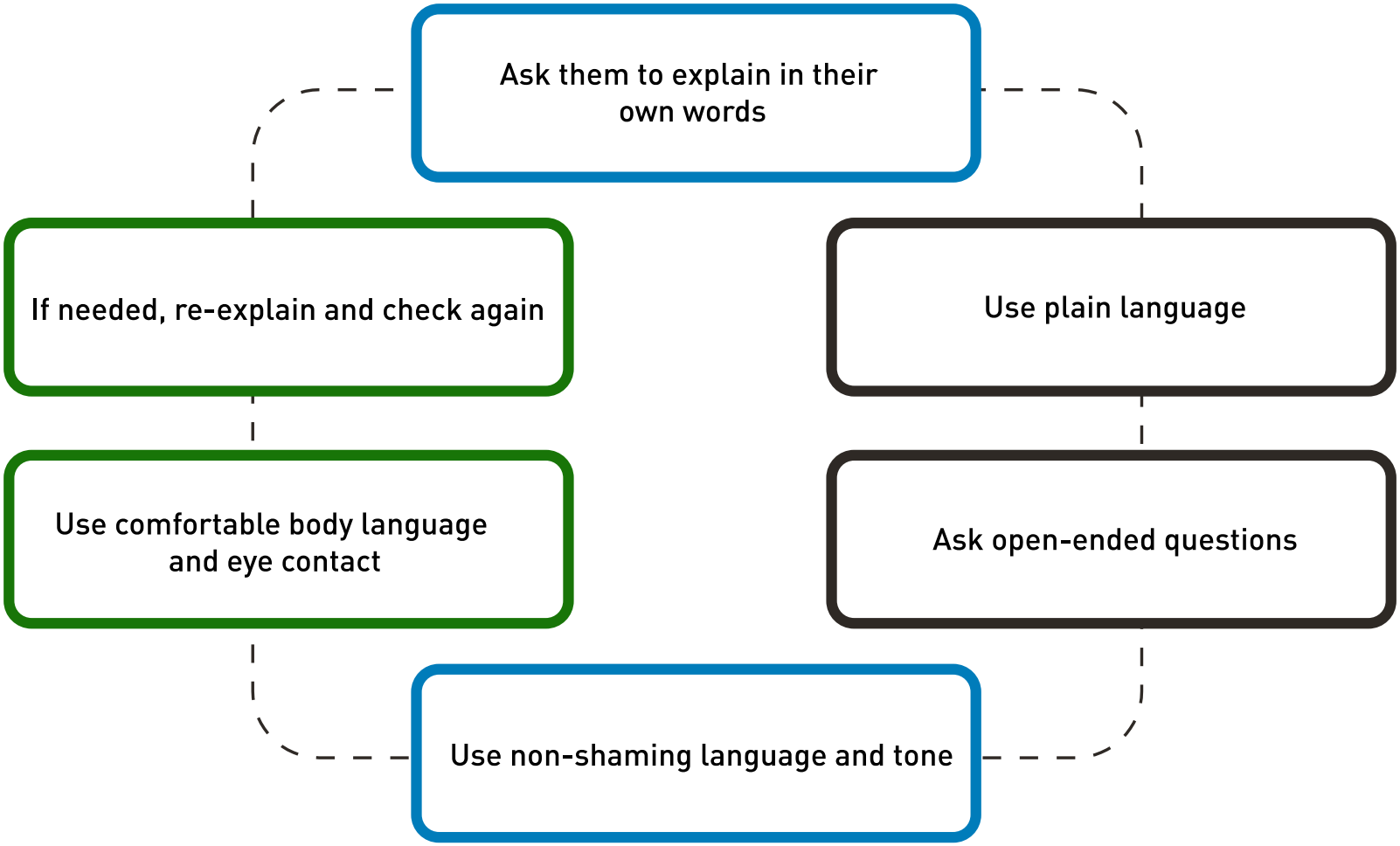
Brush and floss my teeth after meals.

Don't smoke.

Keep my doctor appointments! Write next appointment here:

Portion Sizes. Learning About Diabetes. Retrieved from http://www.learningaboutdiabetes.org/wp-content/uploads/pdfs-healthy_eating/PortionSizesEN.pdf. Accessed January 6, 2017.
Low Blood Sugar. Learning About Diabetes. Retrieved from http://www.learningaboutdiabetes.org/wp-content/uploads/pdfs-blood-sugar/LowBloodSugarEN.pdf. Accessed January 6, 2017.
Daily Reminder. Learning About Diabetes. Retrieved from http://www.learningaboutdiabetes.org/wp-content/uploads/pdfs-caring-for-diabetes/DailyReminderEN.pdf. Accessed January 9, 2017.

“Teach Back” or “Show Me” Method



Apply the Ask Me 3

1. What is my main problem?
2. What do I need to do?
3. Why is it important to do this?

Knowledge Check

Which of the following tests or methods have been identified as effective health literacy tools? (Choose all that apply)

a) SKILLD
b) DKT2
c) SILS
d) TNT
e) All of the above

Knowledge Check

Which of the following tests or methods have been identified as effective health literacy tools? (Choose all that apply)

a) SKILLD
b) DKT2
c) SILS
d) TNT
e) All of the above

Knowledge Check

The easiest way to ensure your message complies with universal literacy comprehension is to limit your patient discussion to words that are two syllables or less whenever possible.

True

False

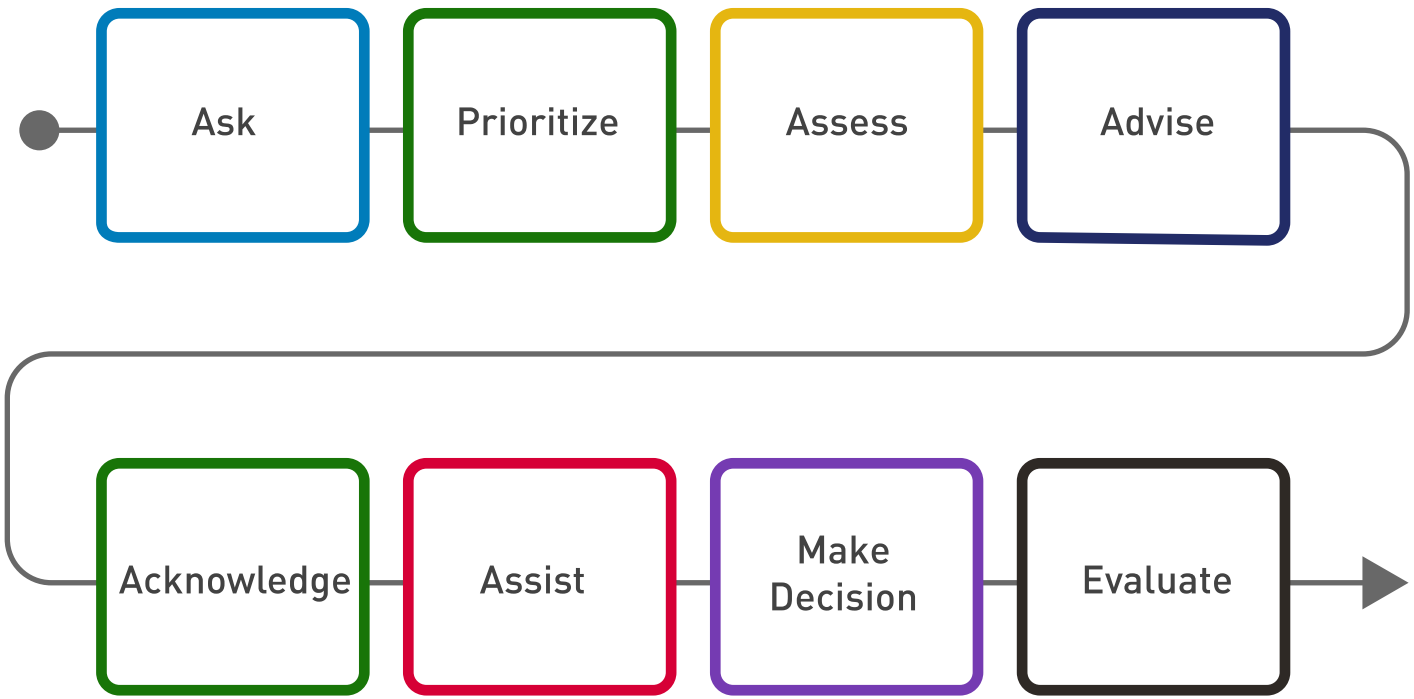
Knowledge Check

The easiest way to ensure your message complies with universal literacy comprehension is to limit your patient discussion to words that are two syllables or less whenever possible.

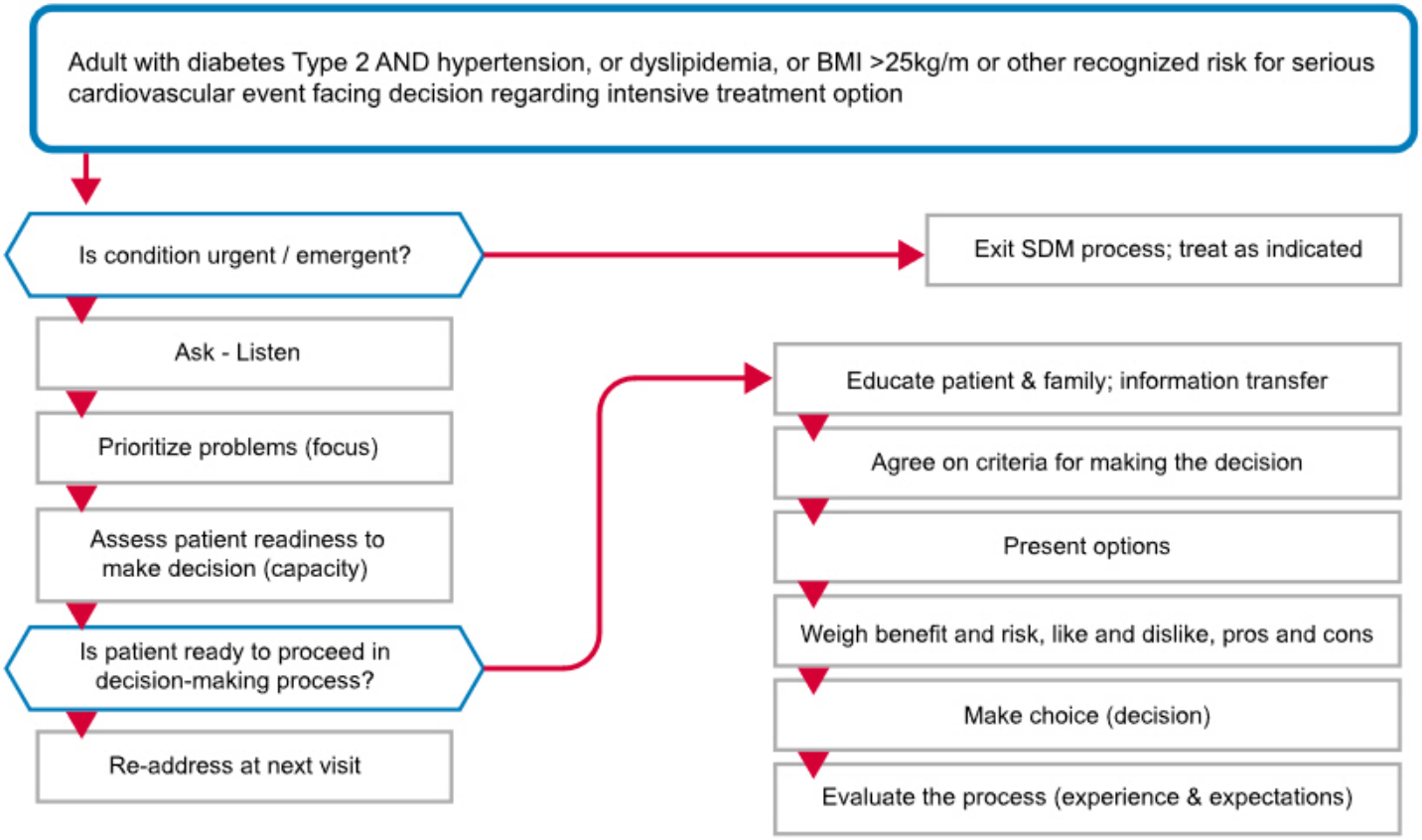
True

False

Key Elements of Shared Decision Making (SDM)



Shared Decision-Making Algorithm



U.S. Department of Veterans Affairs. 2010. VA/DoD CPG Shared Decision-Making with the Patient with Diabetes Mellitus. Retrieved from http://www.healthquality.va.gov/guidelines/CD/diabetes/cpgSDMDMPOCKETFinalPRESS022513.pdf

Step 1: Assess Health Literacy Status and Assume Some Level of Health Literacy Deficit

- Utilize one or more health literacy assessment tools
- Apply universal precautions by assuming some level of health literacy deficit
- Adjust communication style based on level of health literacy

Step 2: Identify Critical Factors

Major Comorbidity

Significant cardiovascular disease

Severe CKD

Severe COPD

Severe chronic liver disease

Life threatening cancer

Recent stroke

Physiologic Age with Life Expectancy

>10 years

5-10 years

<5 years

Microvascular Disease

Absent or Mild

- Early retinopathy
- Microalbuminuria (<30mg / dL)
- Mild nephropathy

Moderate

- Pre-proliferative retinopathy
- Sensory loss
- Macroalbuminuria (fixed proteinuria (>300 mg / dL))

Advanced

- Retinopathy with hemorrhage
- Proliferative retinopathy
- Creatinine >2.0
- Insensate extremities
- Autonomic neuropathy

Management of Diabetes Mellitus Update Working Group. (2010). *VA/DoD Clinical Practice Guideline for the Management of Diabetes Mellitus. Version 4.0.* Washington, DC: Veterans Health Administration and Department of Defense.

Step 3: Recommend Target Based on "7-8-9" A1C Goal Ranges

Major Comorbidity or Physiologic Age	Absent or Mild Microvascular Complications	Moderate Microvascular Complications	Advanced Microvascular Complications
Absent >10 years of life expectancy	<7%	<8%	8-9%
Present 5-10 years of life expectancy	<8%	<8%	8-9%
Marked <5 years of life expectancy	8-9%	8-9%	8-9%

Management of Diabetes Mellitus Update Working Group. (2010). *VA/DoD Clinical Practice Guideline for the Management of Diabetes Mellitus. Version 4.0.* Washington, DC: Veterans Health Administration and Department of Defense.

Step 4: Discuss Recommended A1C Target and Ask Patient About Factors Specific to Them

Patient Factors to Consider

Motivation

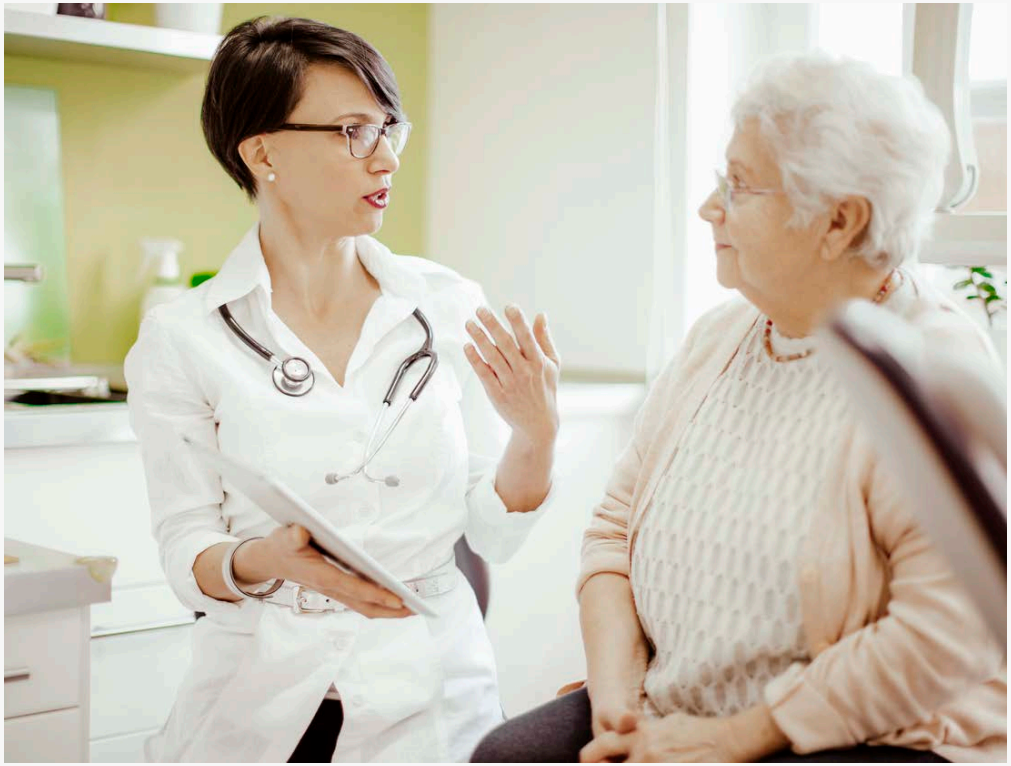
Adherence

Ability to care for themselves

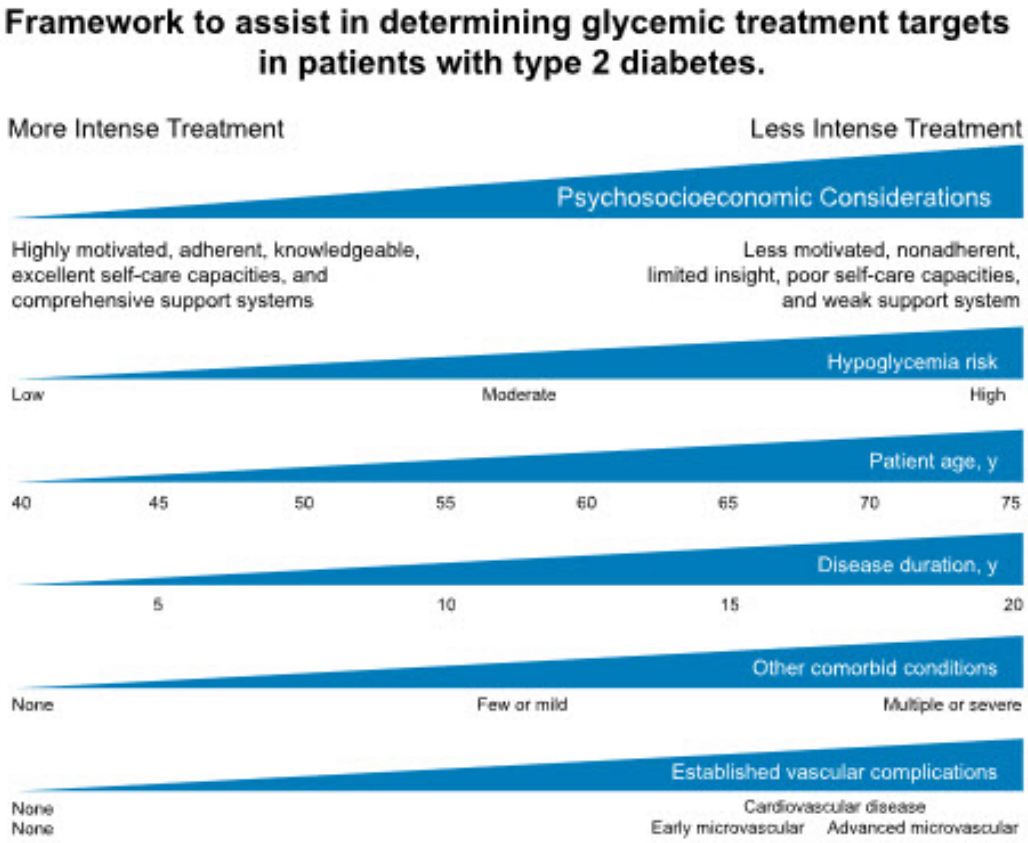
Support system

Risk / fear of hypoglycemia

Economic factors



Step 5: Use Framework and Patient Preferences to Collaborate with Patient / Family for Best Management Option

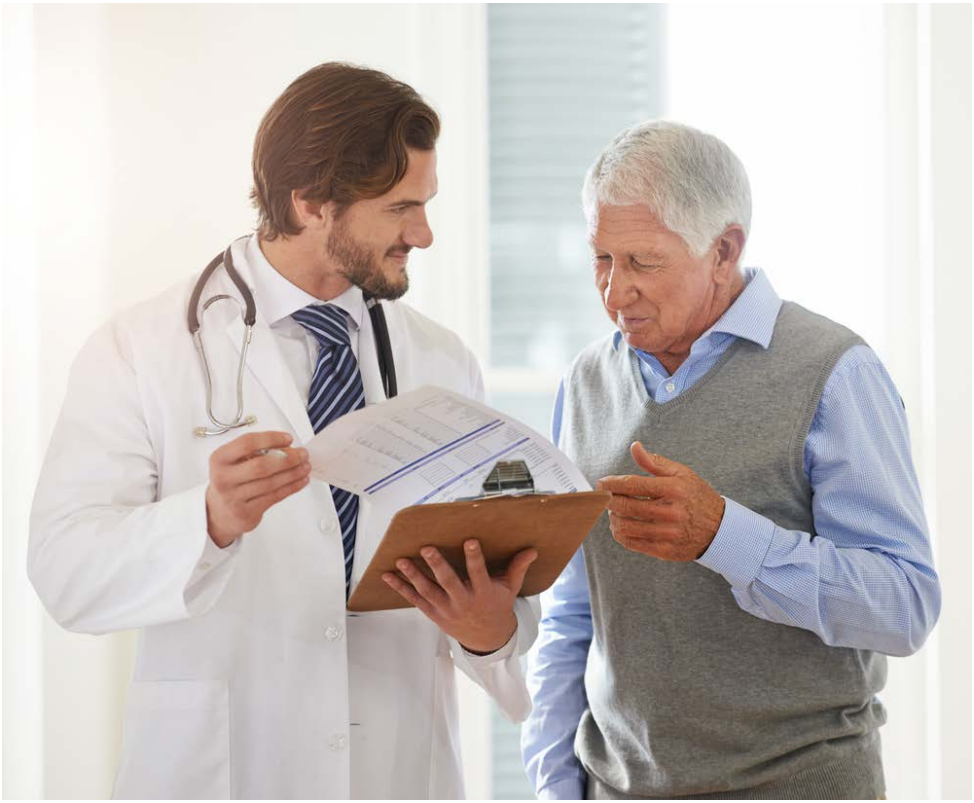


Ismail-Beigi F, Moghissi E, Tiktin M, Hirsch IB, Inzucchi SE, Genuth S. Individualizing Glycemic Targets in Type 2 Diabetes Mellitus: Implications of Recent Clinical Trials. Ann Intern Med. 2011;154:554-559

Step 6: Agree on Action Plan and Set Goals

- Patients and caregivers may accept your recommendations OR choose a less / more intensive strategy

- The objective of SDM is to partner with the patient for safe and effective care, always allowing them to change their goals



Medication Selection

High Hypoglycemic Risk	Moderate Hypoglycemic Risk	Low Hypoglycemic Risk
Insulin ***Sulfonylureas*** (glyburide, glipizide, glimepiride, tolazamide, tolbutamide, chlorpropamide)	***Meglitinides*** (nateglinide, repaglinide)	***Biguanides*** (metformin) ***DPP-4 Inhibitors*** (sitagliptin, saxagliptin, linagliptin, alogliptin) ***GLP-1 analogs*** (exenatide, albiglutide, dulaglutide, liraglutide) ***SGLT-2 inhibitors*** (canagliflozin, empagliflozin, dapagliflozin) ***Thiazolidinediones*** (rosiglitazone, pioglitazone) ***Alpha-glucosidase inhibitors*** (miglitol, acarbose)

Medication Management

Advise patients to avoid skipping meals to reduce need for medication adjustment and risk of hypoglycemic events

Inform patients that exercising during the peak effect of a rapid-acting insulin dose increases the risk of severe hypoglycemia

Always carry glucose tablets / gels or hard candy if at risk for hypoglycemia

Teach patients to take medications correctly, e.g., insulin and sulfonylurea timing with meals

Knowledge Check

Which drug class has the LOWEST risk of hypoglycemia?

A. FalseInsulin (long-acting)
B. Sulfonylureas (glyburide)
C. Meglitinides (repaglinide)
D. Biguanides (metformin)

Knowledge Check

Which drug class has the LOWEST risk of hypoglycemia?

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Knowledge Check

Each step of the shared decision-making process should be used for every patient.

True

False

Knowledge Check

Each step of the shared decision-making process should be used for every patient.

True

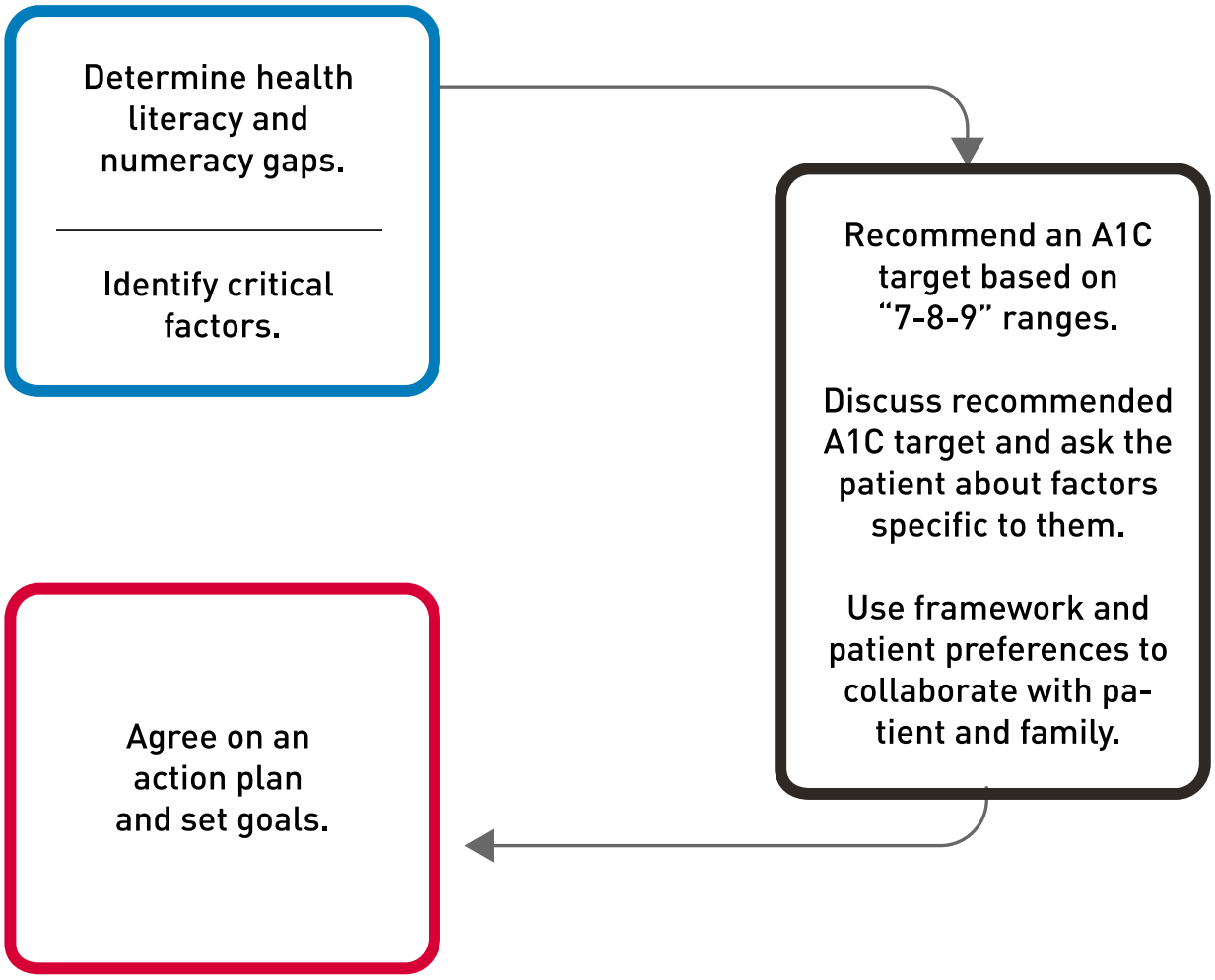
False

Case Study

GT is a 72 year old man with an A1C of 7.2% and history of cardiovascular disease, including a myocardial infarction (MI) two years ago. For his diabetes, he is currently taking metformin 500mg BID, glipizide 5mg BID, and Lantus 20 units at bedtime. GT has a fixed income with limited access to food, and his wife recently passed away.

List action steps that you would take to minimize the risk of a hypoglycemic event for this patient.

Action Steps to Minimize Risk for Hypoglycemic Event



Action Steps in Action

1. **Determine any health literacy and numeracy gaps.** It was observed that the patient incorrectly measured units of insulin.
2. **Identify critical factors.** The patient had a myocardial infarction two years ago, and has cardiovascular disease.
3. **Recommend an A1C target based on "7-8-9" ranges.** Due to the patient's age, co-morbid disease states, and the fact that he lives alone and has limited access to food, an A1C target range of 8-9% was set.
4. **Discuss recommended A1C target and ask the patient about factors specific to them.** This patient lived alone, is on a fixed income, and has limited access to food. This increases his risk for hypoglycemia and puts him at risk for severe consequences.
5. **Use framework and patient preferences to collaborate with patient / family.** Partnership with the patient occurred throughout the whole process.
6. **Agree on an action plan and set goals.** The patient's bedtime Lantus dose was decreased. Patient was given contact information of a local resource to access food, and shown the correct technique to measure insulin. The patient was scheduled to return for a follow-up appointment, and was also referred to a registered dietitian nutritionist for assistance with food insufficiency.

Summary

Hypoglycemia is considerably prevalent among people with type 2 diabetes, particularly those on insulin.

- Assume some level of health literacy and numeracy deficit in patients
- Communicate using simple language
- Personalize each A1C target depending on patient risk factors, using shared decision making to enhance safe and effective care
- Create safe and effective care plans using patient specific social determinants of health to reduce the risk of a hypoglycemic event

Conclusion

You should now be able to:

- Describe the prevalence of hypoglycemic events among patients with type 2 diabetes mellitus and identify risk factors leading to an event.
- Introduce methods of assessing health literacy and numeracy of patients and caregivers.
- Review effective ways to incorporate patient preferences into care plans and differentiate A1C target values for individuals.
- List the action steps to reduce the likelihood of a hypoglycemic event for a high-risk patient.