DRIVING CHANGE
& INNOVATION
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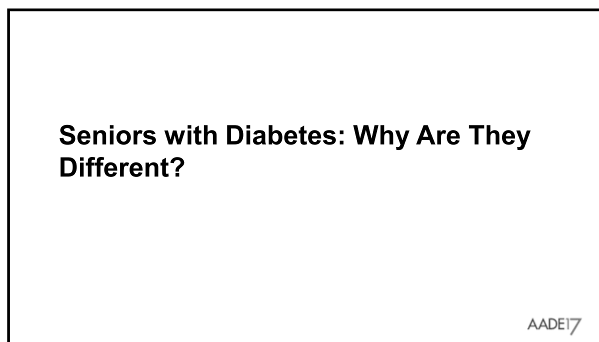
Seniors with Diabetes: Why Are They Different?
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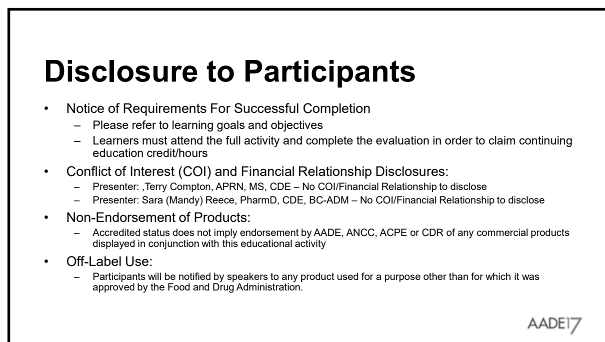
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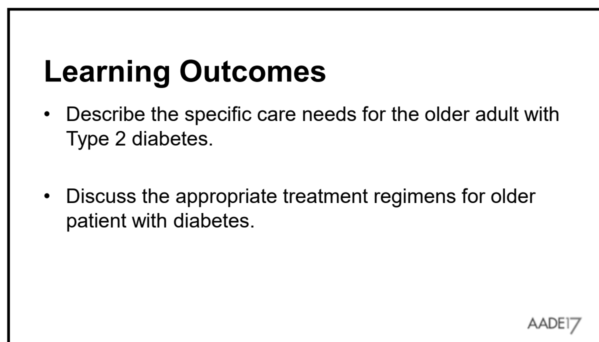
Learning Outcomes
• Describe the specific care needs for the older adult with Type 2 diabetes.
• Discuss the appropriate treatment regimens for older patient with diabetes.
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Outline

- I. Specific care needs for the older adult with Type 2 diabetes
- II. Appropriate treatment regimens for older adults with diabetes

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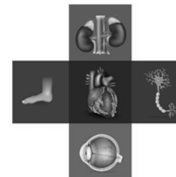
ETIOLOGY OF DIABETES

- Complex, chronic disease
- Estimate 29 million individuals living in the US have diabetes
- Approximately 26% people ≥ 65 years have diabetes



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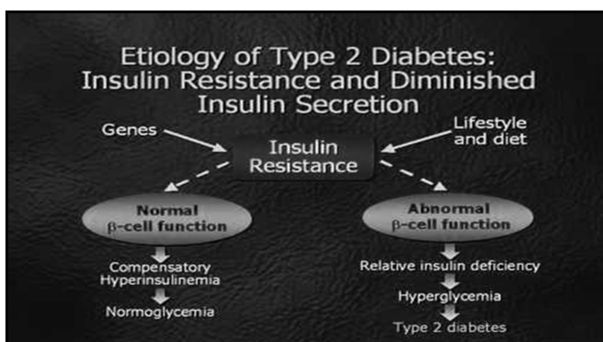

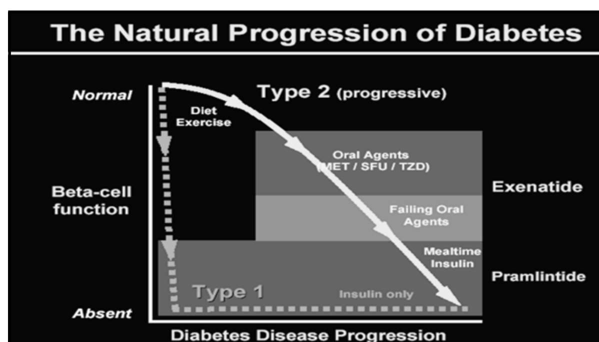

EPIDEMIOLOGY OF DIABETES IN OLDER ADULTS

- Long latency period between development of Type 2 diabetes and diagnosis
- Prolonged duration of diabetes
  - On average 10 years in patients aged 65 to 79
- At risk for diabetes associated microvascular and macrovascular complications

Therapy for Diabetes Mellitus & Related Disorders, 6th ed., 2014, ch. 16, Type 2 Diabetes: Pathogenesis & Natural History, 212-238

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DELAYED DIAGNOSIS IN OLDER ADULTS

- Symptoms mimic common age-related changes
- Classic symptoms often are unrecognized
  - Increased thirst and urination
- Diagnosis may follow presentation of a diabetes related complication

Therapy for Diabetes Mellitus & Related Disorders, 6th ed., 2014, ch. 16, Type 2 Diabetes: Pathogenesis & Natural History, 212-238

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AGING AND WEIGHT CHANGE IN OLDER ADULTS

- Lean body mass decreases
- Body fat and visceral fat increases
- Weight gain, obesity, and visceral fat associated with
  - Reduced insulin sensitivity
  - Decreased glucose uptake in muscle

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COMORBIDITIES

- Fatty liver disease
  - Higher BMI, waist circumference, triglyceride levels and lower HDL cholesterol levels
- Obstructive sleep apnea
  - Significantly higher (Central Obesity)
- Increased risk for cancers
  - Liver, pancreas, endometrium, colon/rectum/breast and bladder
- Arthritis
  - Limited functional ability

ADA Standards of Medical Care in Diabetes, Older Adults, Diabetes Care 2017; 40 (Suppl1): S25-S32

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COMORBIDITIES

- Fractures
  - Higher risk for hip fractures
- Low testosterone in men
  - Especially with obesity
- Periodontal disease
  - Adversely affects diabetes outcomes
- Hearing impairment
  - More common in people with diabetes
    - Neuropathy and/or vascular disease

ADA Standards of Medical Care in Diabetes, Older Adults, Diabetes Care 2017; 40 (Suppl 1): S25-S32

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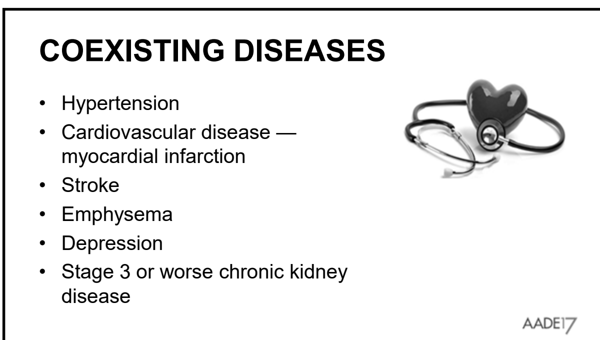

COGNITIVE IMPAIRMENT

- Diabetes associated with an increased risk for cognitive decline and dementia
- Presentation may range
  - Subtle executive dysfunction to memory loss to overt dementia
- May affect a patient's ability to perform complex self-care
  - Glucose monitoring, insulin administration, preparing food, and taking medication as prescribed

Therapy for Diabetes Mellitus & Related Disorders, 6th ed., 2014, ch. 33, Diabetes in the Elderly, 544-558

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OTHER IMPORTANT AREAS FOR ASSESSMENT

- Attitudes toward diabetes self care
  - Meal plan, exercise, medications
- Current self-care knowledge
  - Does patient understand self-care practices and how to perform them
- Family and social support
  - Widowed, divorced, social isolation, inability to drive
- Literacy
  - Ability to read, write, language

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GERIATRIC SYNDROMES

- Polypharmacy
- Urinary incontinence
  - UTI's, urine retention, fecal impaction, and some medications
- Injurious falls
  - Hazardous conditions in the home
  - Psychotropic medications
- Persistent pain
  - Neuropathic pain, arthritis

Therapy for Diabetes Mellitus & Related Disorders, 6th ed., 2014, ch. 33, Diabetes in the Elderly, 544-558

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Patient Case

- PW, 72 year old AA female, presents to clinic for 3 month follow up visit.
  - PMH: dyslipidemia, osteoarthritis, hypertension, Type 2 DM, depression, mild dementia
  - Current meds: metformin 1000 mg BID, glyburide 5 mg BID, lisinopril 10 mg QD, Norvasc 5 mg QD, acetaminophen 500 mg BID PRN
  - BG averages: fasting 200 mg/dL and bedtime 250 mg/dL
  - A1c: 9%
  - BP 145/85
  - eGFR 50 mL/min

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Patient Case

- What are PW's fasting blood glucose and A1c goals?
  - A1c
    - < 7.5%
    - < 8%
    - < 7%
  - Fasting blood glucose
    - 90 – 130 mg/dL
    - 90 – 150 mg/dL
    - 100 – 180 mg/dL

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Appropriate Treatment Regimens

- Glycemic Target
  - ADA glycemic targets
  - Customization of goal values
  - Prevention of hypoglycemia
  - Prevention of hyperosmolar hyperglycemic state (HHS)

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ADA Glycemic Goals

- A1C <7%
- Preprandial capillary plasma glucose
  80-130mg/dL
- Peak postprandial capillary plasma glucose
  <180 mg/dL

Consider life expectancy, disease duration, important comorbidities, established vascular complications, patient resources, and motivation for self-care capacities

ADA Standards of Medical Care in Diabetes, Older Adults, Diabetes Care 2017; 40 (Suppl 1): S99-S104

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GLYCEMIC GOALS IN OLDER ADULTS WITH DIABETES

Healthy

- Few coexisting chronic illnesses
- Intact cognitive and functional status

- A1C goal
  - < 7.5%
- Fasting or preprandial glucose
  - 90-130 mg/dL
- Bedtime glucose
  - 90-150 mg/dL

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GLYCEMIC GOALS: OLDER ADULTS WITH DIABETES

Complex/Intermediate

- A1C goal <8.0%
- Fasting or preprandial glucose 90-150 mg/dL
- Bedtime glucose 100-180 mg/dL

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GLYCEMIC GOALS: OLDER ADULTS WITH DIABETES

Very complex/poor health

- A1C goal <8.5%
- Fasting or preprandial glucose 100-180 mg/dL
- Bedtime glucose 110-200 mg/dL

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RATIONALE FOR LESS STRIGENT GOALS

- Frail older adults
- Patients
  - Life expectancy < 5years
  - Pronounced risk for severe hypoglycemia
  - Advanced comorbidities

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HYPOGLYCEMIA OF OLDER ADULTS

- Major risk factors
  - Advanced age
  - Polypharmacy
  - Use of sulfonylureas (SU) and/or insulin
- Increased risk for medication induced hypoglycemia:
  - Slowed glucagon response
  - Inadequate food intake
  - Renal insufficiency

ADA Standards of Medical Care in Diabetes, Glycemic Targets 2017; 40 (Suppl 1): S54

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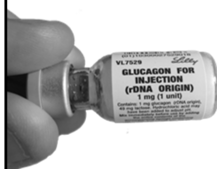
TREATMENT OF HYPOGLYCEMIA



- Fast acting carbohydrate (CHO)
  - Rule of 15
  - Use 4 glucose tabs, commercial liquid glucose product, ½ cup juice, 1 cup milk
- If meal delayed, follow with snack
- If person unable to swallow, administer glucagon if available

ADA Standards of Medical Care in Diabetes, Glycemic Targets, Diabetes Care 2017; 40 (Suppl 1); S54

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HYPEROSMOLAR HYPERGLYCEMIC STATE (HHS)

- **Life-threatening** condition
- Usually precipitated by
  - Infections, drugs, dehydration
- May be insidious-gradual onset
- Classic symptoms
  - Thirst, confusion
- Treated with
  - Fluids
  - Electrolyte replacement
  - Insulin

Therapy for Diabetes Mellitus & Related Disorders, 5th ed., 2014, ch. 37, Diabetic Ketoacidosis &Hyperglycemic Hyperosmolar State in Adults, 621-640

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Appropriate Treatment Regimens

- Comprehensive monitoring
  - Blood glucose self monitoring
  - Screening for depression and cognitive impairment
  - A1c
  - Fasting lipid profile
  - Foot exam
  - Kidney function
  - Eye exam
  - Recommended immunizations

ADA Standards of Medical Care in Diabetes, Comprehensive Medical Evaluation & Assessment of Comorbidities, Diabetes Care 2017; 40 (Suppl 1): S25-S32

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Blood Glucose Self Monitoring

- When prescribed as part of a broader educational context, SMBG results may be helpful to guide treatment decisions and/or patient self-management for patients using less frequent insulin injections or noninsulin therapies.
- When prescribing SMBG, ensure that patients receive ongoing instruction and regular evaluation of SMBG technique and SMBG results, and their ability to use SMBG data to adjust therapy.
- Glycemic goals may be relaxed in some older patients.
- Avoid hypoglycemia in older adults.

American Diabetes Association Standards of Medical Care in Diabetes. Glycemic targets. Diabetes Care 2017; 40 (Suppl. 1): S48-S56

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Blood Glucose Self Monitoring

Patient	Fasting/preprandial blood glucose	Bedtime blood glucose
Healthy	90 – 130 mg/dL	90 – 150 mg/dL
Complex/intermediate	90 – 150 mg/dL	100 – 180 mg/dL
Very complex/poor health	100 – 180 mg/dL	110 – 200 mg/dL

American Diabetes Association Standards of Medical Care in Diabetes. . Older Adults. Diabetes Care 2017; 40 (Suppl. 1): S99-104

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Blood Glucose Self Monitoring

- Most patients on multiple-dose insulin (MDI) or insulin pump therapy should do SMBG
  - Prior to meals and snacks
  - At bedtime
  - Prior to exercise
  - When they suspect low blood glucose
  - After treating low blood glucose until they are normoglycemic
  - Prior to critical tasks such as driving
  - Occasionally postprandially

American Diabetes Association Standards of Medical Care in Diabetes. Glycemic targets. Diabetes Care 2017; 40 (Suppl. 1): S48-S56

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Screening for Depression & Cognitive Impairment

- Older adults with DM should be considered a high-priority population for depression screening and treatment.
- Annual screening for early detection of mild cognitive impairment or dementia is indicated for adults 65 years of age or older.

American Diabetes Association Standards of Medical Care in Diabetes.
Older adults. Diabetes Care 2017; 40 (Suppl. 1): S99-S104

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Hemoglobin A1c

- Perform the A1C test at least 2x annually in patients that meet treatment goals (and have stable glycemic control).
- Perform the A1C test *quarterly* in patients whose therapy has changed or who are not meeting glycemic goals.

American Diabetes Association Standards of Medical Care in Diabetes.
Glycemic targets. Diabetes Care 2017; 40 (Suppl. 1): S48-S56

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Blood Pressure

- Measure at every routine visit
- People ≥ 60 year old <150/90 mmHg (per JNC 8)
- People with diabetes and hypertension should be treated blood pressure goal of <140/90 mmHg (per ADA 2017).
  - Lower target <130/80 may be appropriate for certain individuals at high risk for CVD if they can be achieved without undue treatment burden.

American Diabetes Association Standards of Medical Care in Diabetes.
Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87

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Blood Pressure

Type of Patient	Goal blood pressure
Healthy	< 140/90 mmHg
Complex/intermediate	< 140/90 mmHg
Very complex/poor health	< 150/90 mmHg

American Diabetes Association Standards of Medical Care in Diabetes.
. Older Adults. Diabetes Care 2017; 40 (Suppl. 1): S99-104

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Fasting Lipid Profile

- In adults not taking statins, a screening lipid profile is reasonable
  - At diabetes diagnosis
  - At the initial medical evaluation
  - And every 5 years, or more frequently if indicated
- Obtain a lipid profile at initiation of statin therapy, and periodically thereafter.

American Diabetes Association Standards of Medical Care in Diabetes.
Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87

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Fasting Lipid Profile

Age	Risk Factors	Statin Intensity*
<40 years	None	None
	ASCVD risk factor(s)	Moderate or high
	ASCVD	High
40–75 years	None	Moderate
	ASCVD risk factors	High
	ACS & LDL ≥50 or in patients with history of ASCVD who can't tolerate high dose statin	Moderate + ezetimibe
>75 years	None	Moderate
	ASCVD risk factors	Moderate or high
	ASCVD	High
	ACS & LDL ≥50 or in patients with history of ASCVD who can't tolerate high dose statin	Moderate + ezetimibe

American Diabetes Association Standards of Medical Care in Diabetes.
Cardiovascular disease and risk management. Diabetes Care 2017; 40 (Suppl. 1): S75-S87

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Foot Exam

- Perform a comprehensive foot evaluation annually to identify risk factors for ulcers & amputations.
  - History & 10g monofilament testing, vibration sensation (large-fiber function), and temperature or pinprick (small-fiber function)
- All patients with diabetes should have their feet inspected at every visit
- History should contain prior history of ulceration, amputation, Charcot foot, angioplasty or vascular surgery, cigarette smoking, retinopathy & renal disease; and should assess current symptoms of neuropathy and vascular disease.

American Diabetes Association Standards of Medical Care in Diabetes.
Microvascular complications and foot care. Diabetes Care 2017; 40 (Suppl. 1): S88-S98

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Kidney Function

- At least once a year, assess urinary albumin and estimated glomerular filtration rate (eGFR)
  - In patients with type 1 diabetes duration of ≥5 years
  - In all patients with type 2 diabetes
  - In all patients with comorbid hypertension

American Diabetes Association Standards of Medical Care in Diabetes.
Microvascular complications and foot care. Diabetes Care 2017; 40 (Suppl. 1): S88-S98

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Eye Exam

- Initial dilated and comprehensive eye examination by an ophthalmologist or optometrist
  - Adults with type 1 diabetes, within 5 years of diabetes onset.
  - Patients with type 2 diabetes at the time of diabetes diagnosis.

American Diabetes Association Standards of Medical Care in Diabetes.
Microvascular complications and foot care. Diabetes Care 2017; 40 (Suppl. 1): S88-S98

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Eye Exam

Screening

- If no evidence of retinopathy for one or more eye exam, exams every 2 years may be considered.
- If diabetic retinopathy is present, subsequent examinations should be repeated at least annually by an ophthalmologist or optometrist.
- If retinopathy is progressing or sight-threatening, more frequent exams required

American Diabetes Association Standards of Medical Care in Diabetes.
Microvascular complications and foot care. Diabetes Care 2017; 40 (Suppl. 1): S88-S98

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Recommended Immunizations

- Administer hepatitis B vaccine to unvaccinated adults with diabetes aged 19-59 years.
- Consider administering hepatitis B vaccine to unvaccinated adults with diabetes ≥ 60 years old.
- Pneumococcal: PCV 13 and PPSV 23
- Influenza
- Herpes zoster vaccine
- Td/Tdap

American Diabetes Association Standards of Medical Care in Diabetes.
Lifestyle Management. Diabetes Care 2017; 40 (Suppl. 1): S33-S43

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BASIC MEDICAL NUTRITIONAL THERAPY PRINCIPLES

- MNT with registered dietitian
- Review of needs
  - Dietary
  - Physical activity needs
  - Supplements (i.e. vitamins)
- Obese patients
  - Meal plans incorporate moderate caloric restriction
- Consider CHO distribution throughout day

ADA Standards of Medical Care in Diabetes, Lifestyle Management, Diabetes Care 2017; 40 (Suppl 1): S33-S43

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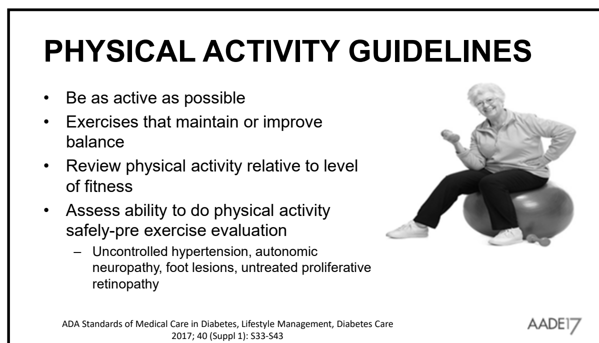

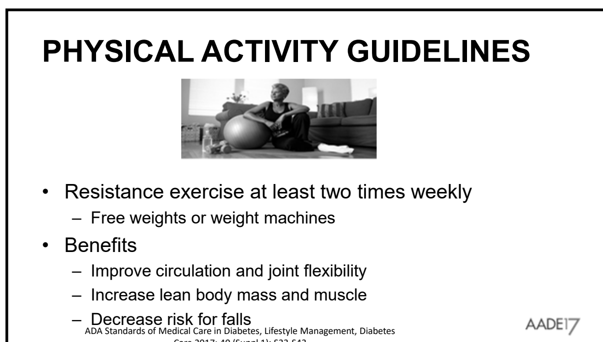

Appropriate Treatment Regimens

- Pharmacotherapy
  - Beers criteria (2015)
  - ADA Standards of Care: Older Adults (2017)
  - Customization of medication regimen

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Beers Criteria

- Avoid
  - Insulin: sole sliding scale
  - Sulfonylureas
    - Chlorpropamide
    - Glyburide

American Geriatrics Society 2015 Updated Beers Criteria for Potentially Inappropriate Medication Use in Older Adults. J Am Geriatr Soc 2015; 63(11):2227-40

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ADA Standards of Care: Older Adults

- Cost

Medication	
Metformin	Avoid in advanced renal insufficiency or heart failure
Thiazolidinediones	Very cautiously use in CHF or at risk for falls/fractures
Insulin Secretagogues	Adverse effect: Hypoglycemia
Incretin-Based Therapies (DPP-IV inhibitors & GLP-1 agonists)	Cost
SGLT2-inhibitor	Limited long term experience
Insulin Therapy	Must have good visual & motor skills and cognitive ability

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Customization of Medication Regimen

- Keys
  - Achieving glycemic control while avoiding hypoglycemia
  - Start with lowest dose and go slow
  - Insurance Formulary
    - Medicare
    - Medicaid

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Customization of Medication Regimen

- Considerations
  - Comorbidities
  - Kidney and liver function
  - Cognitive function
  - Support system
  - Risk of hypoglycemia
  - Disease Duration

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Customization of Medication Regimen

American Diabetes Association Standards of Medical Care in Diabetes.
Approaches to glycemic treatment. Diabetes Care 2017; 40 (Suppl. 1): S64-S74

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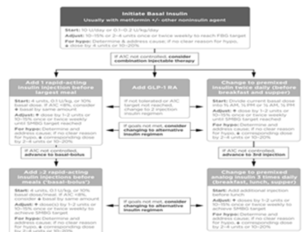
Customization of Medication Regimen



American Diabetes Association Standards of Medical Care in Diabetes.
Approaches to glycemic treatment. Diabetes Care 2017; 40 (Suppl. 1): S64-S74

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Patient Case

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  - Current meds: metformin 1000 mg BID, glyburide 5 mg BID, lisinopril 10 mg QD, Norvasc 5 mg QD, acetaminophen 500 mg BID PRN
  - BG averages: fasting 200 mg/dL and bedtime 250 mg/dL
  - A1c: 9%
  - BP 145/85
  - eGFR 50 mL/min

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Patient Case

- What medication adjustments would you make for PW?

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Appropriate Treatment Regimens

- Individualized strategies for geriatric population
  - Achieving glycemic control while avoiding hypoglycemia
  - Considerations when selecting pharmacotherapy
    - Renal and hepatic function
    - Visual, physical and cognitive limitations
    - Support system
    - Financial

ADA Standards of Medical Care in Diabetes, Lifestyle Management, Diabetes Care 2017; 40 (Suppl 1): S33-S43

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References

- American Diabetes Association Standards of Medical Care in Diabetes, Diabetes Care 2017; 40 (Suppl 1).
- American Association of Diabetes Educators: Quick Guide to Medications, 5th ed., 2014.
- Special considerations in the management and education of older persons with diabetes: AADE Practice Synopsis, December 2013.
- Therapy for Diabetes & Related Disorders, 6th ed., 2014.

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