Diabetes Management through the Lifecycle

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Objectives

1.- Identify and describe some of the challenges in the management of diabetes in children and adolescents.

2.- Identify and describe some of the challenges in the management of diabetes in the adult population.

3.- Identify and describe some of the challenges in the management of diabetes in the elderly population.

" Diabetes Management must be "Individualized" "

Diabetes in Children …

Who is the patient when Type 1 Diabetes is diagnosed in children?

Goal A1C across for Pediatric patients

Position Statement

Table 15—Plasma blood glucose and A1C goals for type 1 diabetes by age-group

Values by age (years)	Plasma blood glucose goal range (mg/dL)		A1C	Rationale
	Before meals	Bedtime/ overnight		
Toddlers and preschoolers (0–6)	100–180	110–200	<8.5%	• Vulnerability to hypoglycemia • Insulin sensitivity • Unpredictability in dietary intake and physical activity • A lower goal (<8.0%) is reasonable if it can be achieved without excessive hypoglycemia
School age (6–12)	90–180	100–180	<8%	• Vulnerability of hypoglycemia • A lower goal (<7.5%) is reasonable if it can be achieved without excessive hypoglycemia
Adolescents and young adults (13–19)	90–130	90–150	<7.5%	• A lower goal (<7.0%) is reasonable if it can be achieved without excessive hypoglycemia

Key concepts in setting glycemic goals:
• Goals should be individualized and lower goals may be reasonable based on benefit-risk assessment.
• Blood glucose goals should be modified in children with frequent hypoglycemia or hypoglycemia unawareness.
• Postprandial blood glucose values should be measured when there is a discrepancy between preprandial blood glucose values and A1C levels and to help assess glycemia in those on basal/bolus regimens.

Glycemic Target for Pediatrics

Professional Associations	Goal A1C
American Diabetes Association (ADA) Pediatric Endocrine Society International Diabetes Federation International Society for Pediatric and Adolescent Diabetes (ISPAD)	≤ 7.5%

Chiang JL, Kirkman MS, Laffel LM et al. Type 1 Diabetes through the Life Span: A Position Statement of the American Diabetes Association. Diabetes Care 2014:37:2034-2054.
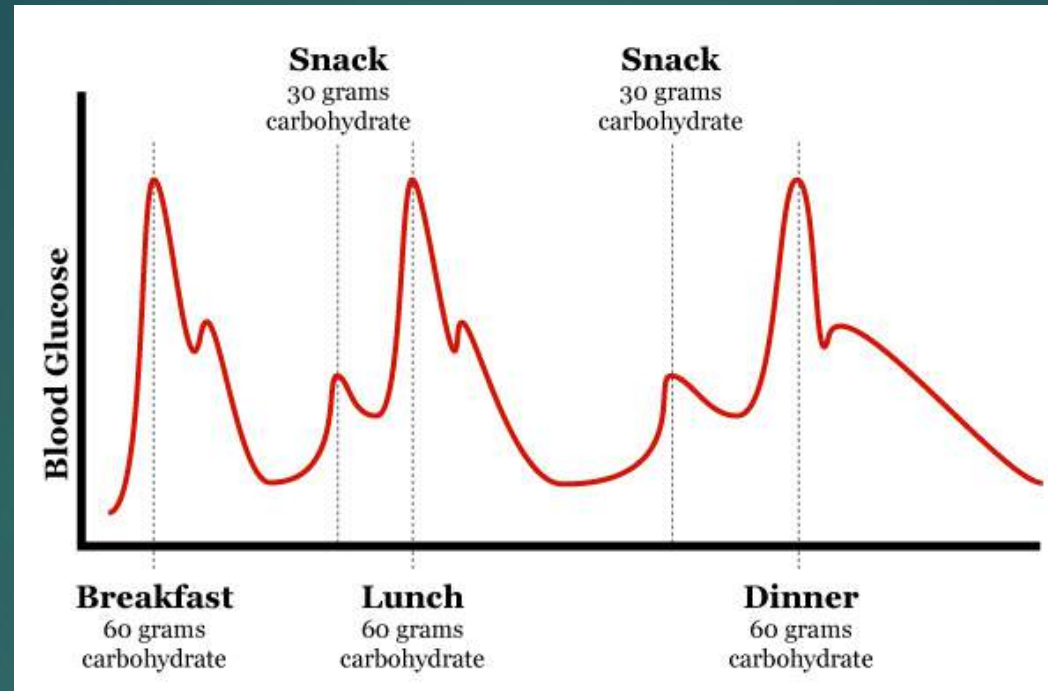
Table 2—Major developmental issues and their effect on diabetes in children and adolescents

Developmental stages (ages)	Normal developmental tasks	Type 1 diabetes management priorities	Family issues in type 1 diabetes management
Infancy (0–12 months)	Developing a trusting relationship or bond with primary caregiver(s)	Preventing and treating hypoglycemia Avoiding extreme fluctuations in blood glucose levels	Coping with stress Sharing the burden of care to avoid parent burnout
Toddler (13–26 months)	Developing a sense of mastery and autonomy	Preventing hypoglycemia Avoiding extreme fluctuations in blood glucose levels due to irregular food intake	Establishing a schedule Managing the picky eater Limit-setting and coping with toddler's lack of cooperation with regimen Sharing the burden of care
Preschooler and early elementary school (3–7 years)	Developing initiative in activities and confidence in self	Preventing hypoglycemia Coping with unpredictable appetite and activity Positively reinforcing cooperation with regimen Trusting other caregivers with diabetes management	Reassuring child that diabetes is no one's fault Educating other caregivers about diabetes management
Older elementary school (8–11 years)	Developing skills in athletic, cognitive, artistic, and social areas Consolidating self-esteem with respect to the peer group	Making diabetes regimen flexible to allow for participation in school or peer activities Child learning short- and long-term benefits of optimal control	Maintaining parental involvement in insulin and blood glucose management tasks while allowing for independent self-care for special occasions Continuing to educate school and other caregivers

Chiang JL, Kirkman MS, Laffel LM et al. Type 1 Diabetes through the Life Span: A Position Statement of the American Diabetes Association. Diabetes care 2014:37:2034-2054.

Honeymoon period or Partial Remission of Type 1 Diabetes

❑ Considerable drop in insulin requirements while maintaining good metabolic control

❑ Similar remission rates were seen in boys and girls

❑ Variability with respect to age of T1DM diagnosis

  ❖ < 3 years old = rare

  ❖ 3 – 5 years old ~ 70%

  ❖ 5-12 years old ~ 79%

❑ Remission presented

  ❖ After 1 month ~ 40% cases

  ❖ After 3 months ~ 74% cases

  ❖ After 6 months ~ 30% cases

  ❖ After 1 year ~ 10% cases

Abdul-Rasoul M, Habib H, Al-Khouly. "The Honeymoon Phase" in children with type 1 diabetes mellitus: frequency, duration, and influential factors. Pediatric Diabetes 2006:7;101-107.

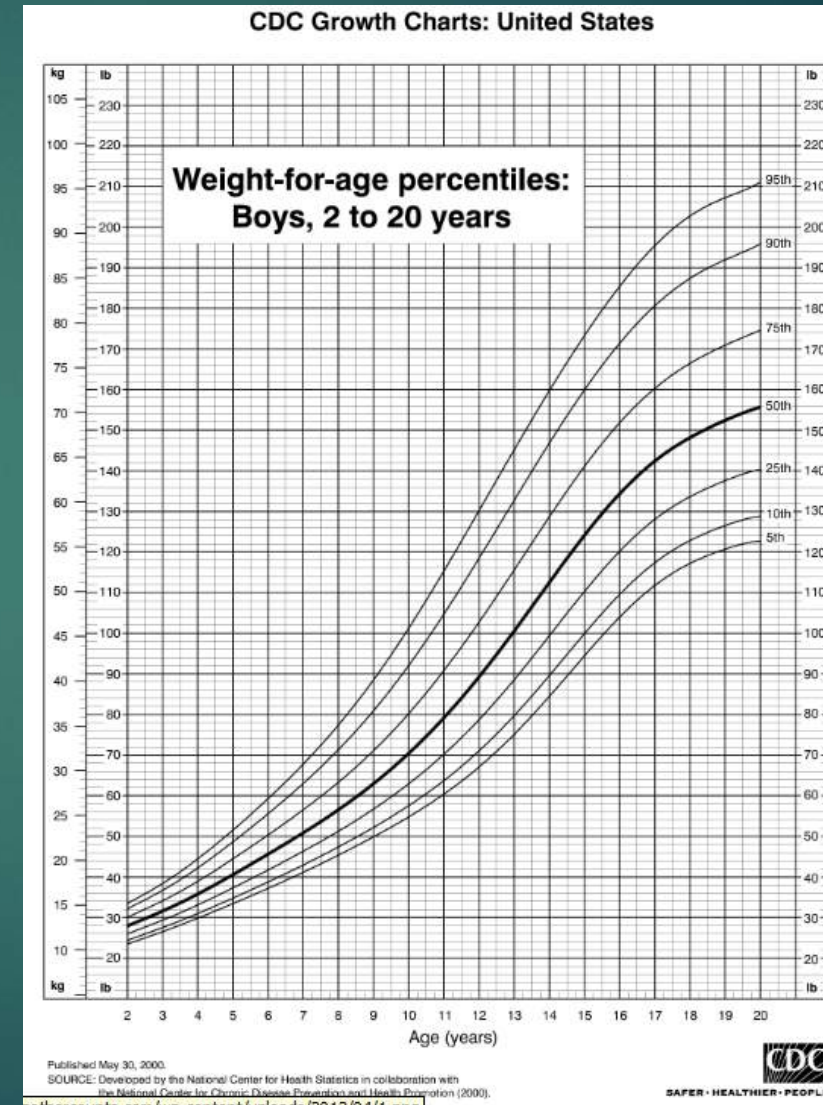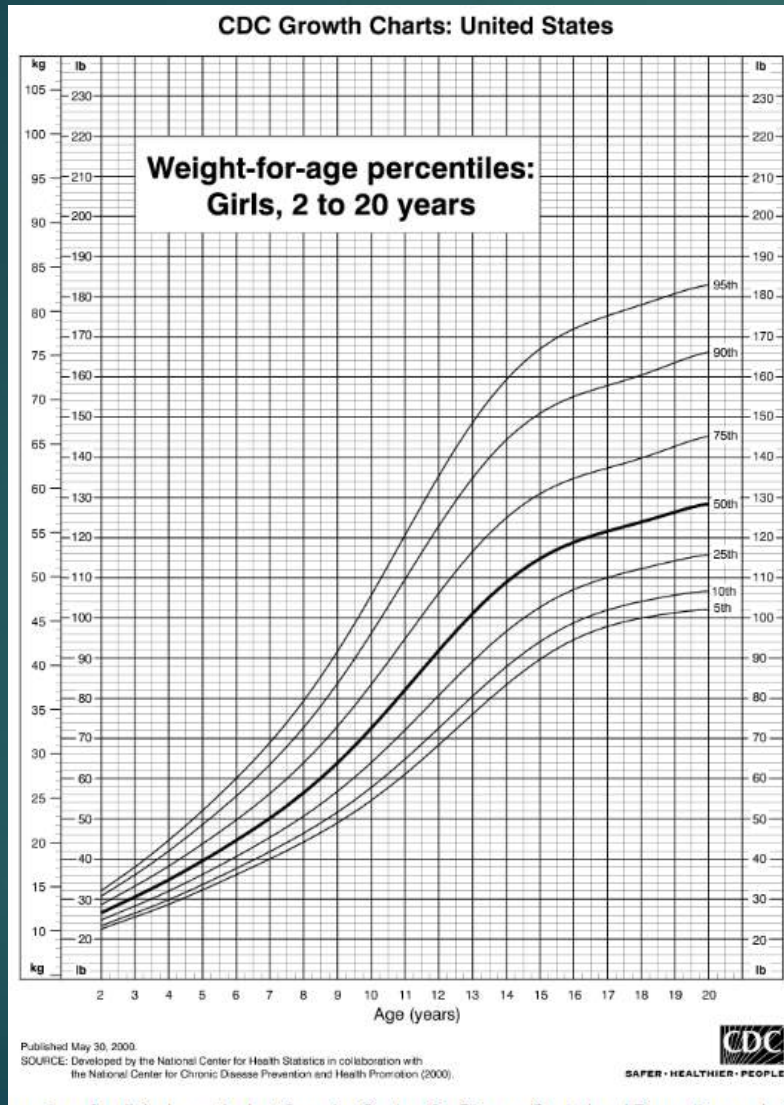# Diabetes Detective 101

Diabetes and Children in School

➢ Laws that protects children with Diabetes:

❑ Section 504 of the Rehabilitation Act of 1973

❑ The American with Disabilities Act

❑ Individuals with Disabilities Education Act (IDEA) → Development of an "Individualized Education Plan" (IEP)

EXCELLENT resource for Sample 504 Plan from Pre-K through High School (SAT and ACT Test taking) → http://www.childrenwithdiabetes.com/504/

Monitoring Children with type 1 Diabetes Growth

Demir K, Altincik A, Abaci A et. Al. Growth of children with Type 1 Diabetes Mellitus. J Clin Res Pediatr Endocrinol 2010;2(2):72-77.

Diabetes and Coexisting Autoimmunity

- Celiac Disease
  - Higher incidence in patients with type 1 diabetes ~ 1-16% vs 0.3-1% in general population
  - Symptoms: diarrhea, weight loss or poor weight gain, abdominal pain, bloating, chronic fatigue, malnutrition due to malabsorption of nutrients, unexplained hypoglycemia or erratic glucose levels
- Some children are asymptomatic and only show slow growth or weight gain
- Screen by obtaining → Serum levels of Tissue Transglutaminase or Antiendomysial Antibodies
- If Celiac disease is confirmed → Following a "Gluten-free" diet reduces symptoms and hypoglycemia

Many Camps and Activities for Children with Diabetes
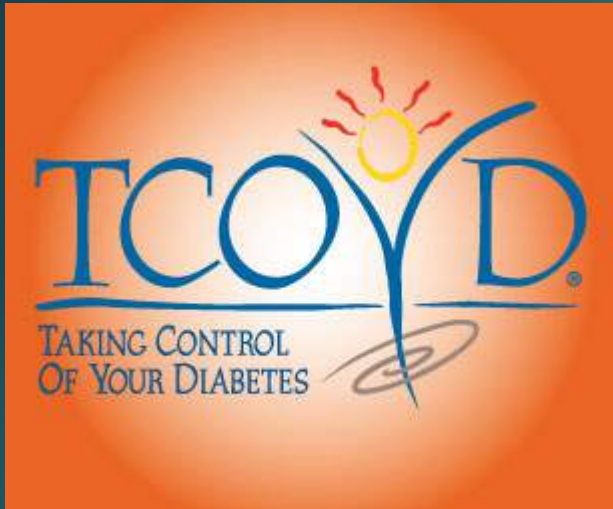
Diabetes in Children

Is it time to consider changing injections to insulin pump?

Diabetes Management in Adolescents

Diabetes Management in Adolescents

Table 2—Major developmental issues and their effect on diabetes in children and adolescents

Developmental stages (ages)	Normal developmental tasks	Type 1 diabetes management priorities	Family issues in type 1 diabetes management
Early adolescence (12–15 years)	Managing body changes Developing a strong sense of self-identity	Increasing insulin requirements during puberty Diabetes management and blood glucose control becoming more difficult Weight and body image concerns	Renegotiating parent and teenager's roles in diabetes management to be acceptable to both Learning coping skills to enhance ability to self-manage Preventing and intervening in diabetes-related family conflict Monitoring for signs of depression, eating disorders, and risky behaviors
Later adolescence (16–19 years)	Establishing a sense of identity after high school (decisions about location, social issues, work, and education)	Starting an ongoing discussion of transition to a new diabetes team (discussion may begin in earlier adolescent years) Integrating diabetes into new lifestyle	Supporting the transition to independence Learning coping skills to enhance ability to self-manage Preventing and intervening with diabetes-related family conflict Monitoring for signs of depression, eating disorders, and risky behaviors

Chiang JL, Kirkman MS, Laffel LM et al. Type 1 Diabetes through the Life Span: A Position Statement of the American Diabetes Association. Diabetes care 2014;37:2034-2054.

Adolescents with Diabetes

Promoting **"ADHERENCE"** to Diabetes management is key

1) Complexity diabetes regimen vs "teens busy life"
2) Rebellion → do "NOT" want to have diabetes
3) Peer Influences wanting to "fit in"
3) Depression
4) Family Intervention
5) Motivational Interviewing

Adolescents with Diabetes
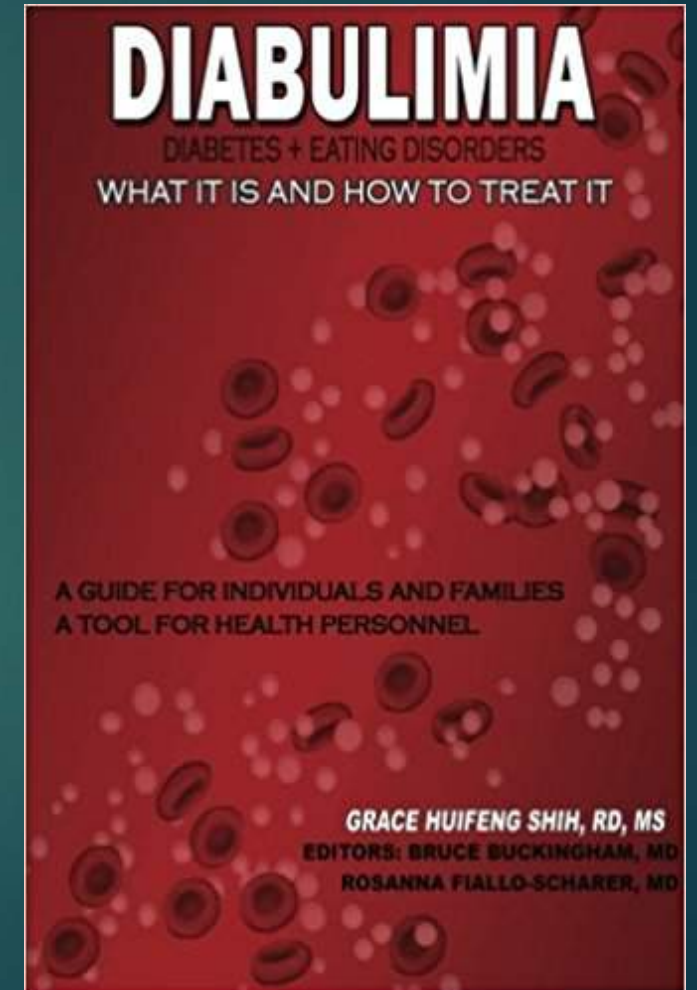
Promoting "**ADHERENCE**" to Diabetes management

6) Exercise -- "Hypo" and "Hyperglycemia"

7) Realistic approaches to Eating

8) Extending provider's reach – phone, emailing, texting

9) Eating Disorders

Eating Disorder in Adolescent with Type 1 Diabetes

❑ DIABULIMIA

❖ Restricting insulin administration

❖ Leads to weight loss

❖ Mood swings

❖ Severe dehydration

❖ Frequent DKA

❖ Development of long-term complications

DIABULIMIA
DIABETES + EATING DISORDERS
WHAT IT IS AND HOW TO TREAT IT

A GUIDE FOR INDIVIDUALS AND FAMILIES
A TOOL FOR HEALTH PERSONNEL

GRACE HUIFENG SHIH, RD, MS
EDITORS: BRUCE BUCKINGHAM, MD
ROSANNA FIALLO-SCHARER, MD

Type 1 Diabetes and Transition from Pediatric to Adults

➢ Pediatric endocrinologist VERSUS Adult endocrinologist

➢ High School to College transition

➢ Competitive sports

➢ Drinking alcoholic beverages

➢ Sick day management

COLLEGE STUDENT WITH

TYPE 1 DIABETES

WHAT I FEAR THE MOST
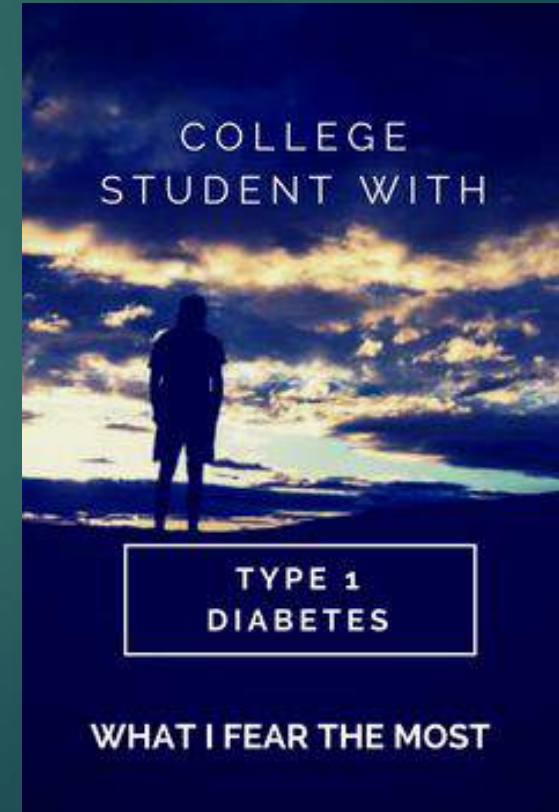
Type 1 Diabetes Management

Is it time to consider changing injections to insulin pump?

Adults with Type 1 Diabetes

Increased risk of developing other autoimmune disease such as: Hypothyroidism, Celiac disease, Eczema among others.
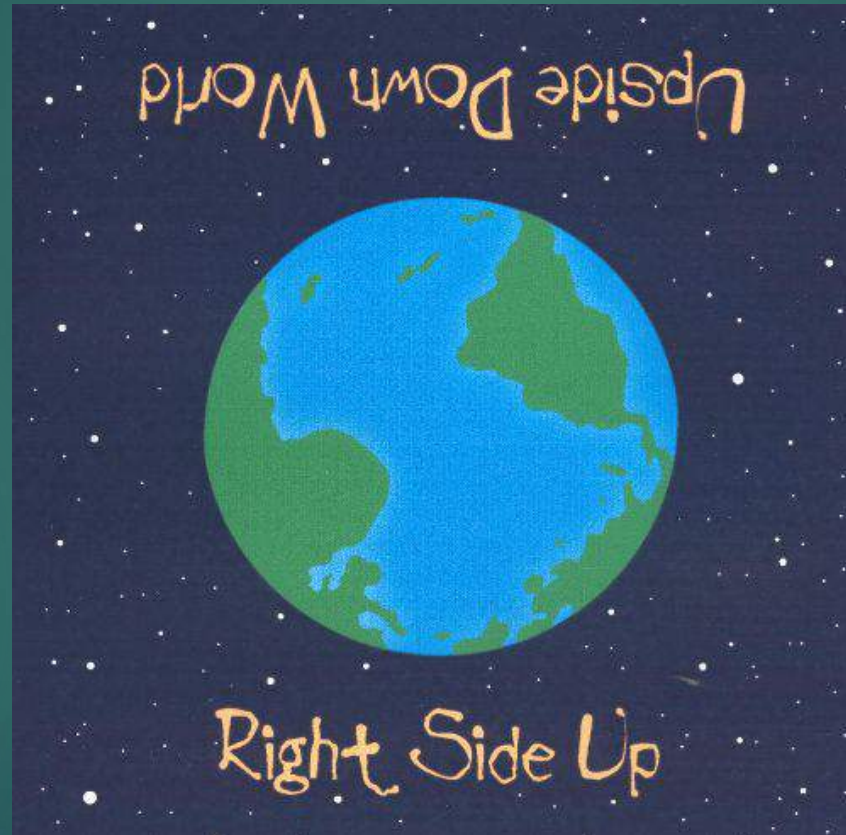
Women

❑ High risk Pregnancy

❑ Gestational Diabetes Mellitus (GDM)

❑ Tight Glycemic control

❑ Diabulemia

Men

❑ Very Tight Glycemic Control

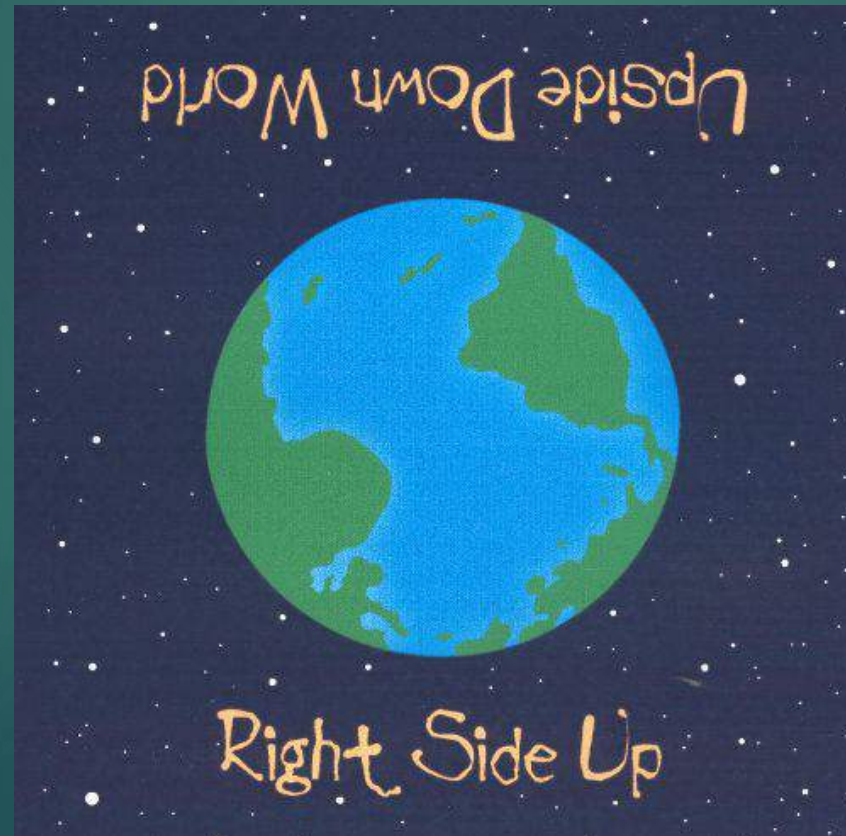❑ Frequent "hypoglycemic events" – Hypoglycemia Unawareness

Adults Diagnosed with Type 2 Diabetes

Adults with Type 2 Diabetes

➢ Diagnosis of Type 2 Diabetes in Adults …

➢ What do you mean? But I feel fine … Well yes, I am overweight

Adults with Type 2 Diabetes

❑ Diagnosed when individuals are heavily involved with parenteral and professional responsibilities

❑ Complexity of regimen to manage type 2 diabetes:

➢ Diabetes Management Education (visit with endocrinologist, diabetes educator and nutritionist)

➢ Patients are asked to restructure their "lifestyle"

❖ Change food selections

❖ Include exercise

❖ Monitor and record blood glucose readings

❖ Take antiglycemic medication(s)

Adults with Type 2 Diabetes

Complexity of regimen to manage type 2 diabetes:

➢ Economic burden

Glycemic Targets in Adults with Type 2 Diabetes

Goal A1C	Rationale for A1C goal
< 7%	Most common goal for individuals with type 2 diabetes
<6.5%	**For selective patients** -- Patients with short duration of diabetes -- Patients able to achieve such goal WITHOUT significant hypoglycemic events -- Patients with type 2 diabetes treated with Lifestyle modification or with Metformin only or no significant Cardiovascular disease
<8%	Patients with history of severe hypoglycemia Limited Life expectancy Advanced cardiovascular disease

Adults with Type 2 Diabetes

Glycemic Recommendations	Goal Blood Glucose Readings
Preprandial	80-130 mg/dL
Peak Post-prandial	< 180 mg/dL

Standards of Medical Care 2017.Diabetes Care;40:S1-S135.

Adults with Type 2 Diabetes

➤ Prevention Acute complications

  ❖ HYPERGLYCEMIA = medication adherence, exercise and healthy meal plan

  ❖ HYPOGLYCEMIA = patients using sulphonylureas, meglitinides or using insulin

➤ Preventing Long-term complications

  ❖ Retinopathy

  ❖ Nephropathy

  ❖ Neuropathy (Autonomic and Peripheral)

  ❖ Cardiovascular disease
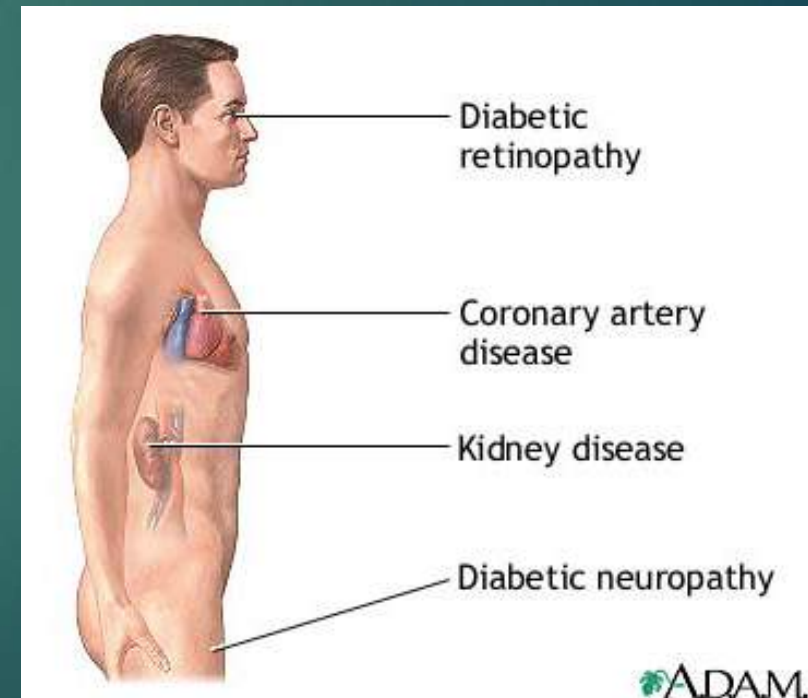
Diabetes in the Elderly

➢ Diabetes does not presents with the classical symptoms due to physiological changes:

❖ Dehydration

❖ Urinary Incontinence

❖ Confusion

Middle-age onset

➢ Prognosis Elderly with Diabetes

falls in 2 categories

Elderly-onset

Challenges Managing Diabetes in Elderly

➢ Diabetes and geriatric syndrome

❖ Cognitive function

➢ Functional impairment / Vision hearing impairment

➢ Depression

Challenges Managing Diabetes in Elderly

➢ Polypharmacy

➢ Nutrition Needs

➢ Age-specific aspects of pharmacotherapy

➢ Cost

Commonly Used Tools in CGA [40]

Cognitive Status
Mini Mental Status Examination (MMSE)

Affective Status
Yesavage Geriatric Depression Scale (GDS)

Mobility – Gait and Balance
Tinetti Performance-Oriented Mobility Assessment (POMA)

Functional Status - Activities of Daily Living
Katz Activities of Daily Living (ADL)

Functional Status - Instrumental Activities of Daily Living
Lawton Instrumental Activities of Daily Living (IADL)

Nutritional Adequacy
Mini Nutritional Assessment (MNA®)

http://www.mna-elderly.com/forms/MNA_english.pdf

Glycemic Target in Elderly with Diabetes

➢ Few studies provide clinical recommendations for optimal glycemic control in the "elderly population"

- ❑ UKPDS – United Kingdom Prospective Diabetes Study
- ❑ ACCORD - Action to Control Cardiovascular Risk
- ❑ VADT – The Veteran's Affairs Diabetes
- ❑ ADVANCE – Action in Diabetes and Vascular Disease: Pretex and Diamicron

Managing Diabetes in the Elderly

Table 11.1—Framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes

Patient characteristics/health status	Rationale	Reasonable A1C goal‡	Fasting or preprandial glucose	Bedtime glucose	Blood pressure	Lipids
Healthy (few coexisting chronic illnesses, intact cognitive and functional status)	Longer remaining life expectancy	<7.5% (58 mmol/mol)	90–130 mg/dL (5.0–7.2 mmol/L)	90–150 mg/dL (5.0–8.3 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Complex/intermediate (multiple coexisting chronic illnesses* or 2+ instrumental ADL impairments or mild-to-moderate cognitive impairment)	Intermediate remaining life expectancy, high treatment burden, hypoglycemia vulnerability, fall risk	<8.0% (64 mmol/mol)	90–150 mg/dL (5.0–8.3 mmol/L)	100–180 mg/dL (5.6–10.0 mmol/L)	<140/90 mmHg	Statin unless contraindicated or not tolerated
Very complex/poor health (LTC or end-stage chronic illnesses** or moderate-to-severe cognitive impairment or 2+ ADL dependencies)	Limited remaining life expectancy makes benefit uncertain	<8.5%† (69 mmol/mol)	100–180 mg/dL (5.6–10.0 mmol/L)	110–200 mg/dL (6.1–11.1 mmol/L)	<150/90 mmHg	Consider likelihood of benefit with statin (secondary prevention more so than primary)

This represents a consensus framework for considering treatment goals for glycemia, blood pressure, and dyslipidemia in older adults with diabetes. The patient characteristic categories are general concepts. Not every patient will clearly fall into a particular category. Consideration of patient and caregiver preferences is an important aspect of treatment individualization. Additionally, a patient's health status and preferences may change over time. ADL, activities of daily living. ‡A lower A1C goal may be set for an individual if achievable without recurrent or severe hypoglycemia or undue treatment burden. *Coexisting chronic illnesses are conditions serious enough to require medications or lifestyle management and may include arthritis, cancer, congestive heart failure, depression, emphysema, falls, hypertension, incontinence, stage 3 or worse chronic kidney disease, myocardial infarction, and stroke. By "multiple," we mean at least three, but many patients may have five or more (40). **The presence of a single end-stage chronic illness, such as stage 3–4 congestive heart failure or oxygen-dependent lung disease, chronic kidney disease requiring dialysis, or uncontrolled metastatic cancer, may cause significant symptoms or impairment of functional status and significantly reduce life expectancy. †A1C of 8.5% (69 mmol/mol) equates to an estimated average glucose of ~200 mg/dL (11.1 mmol/L). Looser A1C targets above 8.5% (69 mmol/mol) are not recommended as they may expose patients to more frequent higher glucose values and the acute risks from glycosuria, dehydration, hyperglycemic hyperosmolar syndrome, and poor wound healing.

Managing Diabetes in the Elderly

➢ Tight A1C Glycemic goals

  ❖ Hypoglycemia – Risk of Falls

  ❖ Nocturnal hypoglycemia

  ❖ Complex Risk : Benefit decision

➢ Higher A1C Glycemic Goals

  ❖ Hyperglycemic Hyperosmolar Syndrome

Managing Diabetes …

Thank you for your kind attention…

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