

# EMPOWERMENT AND SELF-MANAGEMENT OF DIABETES: THE PHARMACIST AND DIABETES CARE

## SESSION 1: PATHOGENESIS AND DIAGNOSIS OF DIABETES

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MUTE



CHAT



RAISE HAND



Q&A

# NATIONAL CENTER FOR HEALTH IN PUBLIC HOUSING (NCHPH)

- The National Center for Health in Public Housing (NCHPH), a project of North American Management, is supported by the Health Resources and Services Administration (HRSA) of the U.S. Department of Health and Human Services (HHS) under grant number U30CS09734, a National Training and Technical Assistance Cooperative Agreement (NCA) for \$608,000, and is 100% financed by this grant. This information or content and conclusions are those of the author and should not be construed as the official position or policy of, nor should any endorsements be inferred by HRSA, HHS or the U.S. Government.
- The mission of the National Center for Health in Public Housing (NCHPH) is to strengthen the capacity of federally funded Public Housing Primary Care (PHPC) health centers and other health center grantees by providing training and a range of technical assistance.



Training and  
Technical  
Assistance



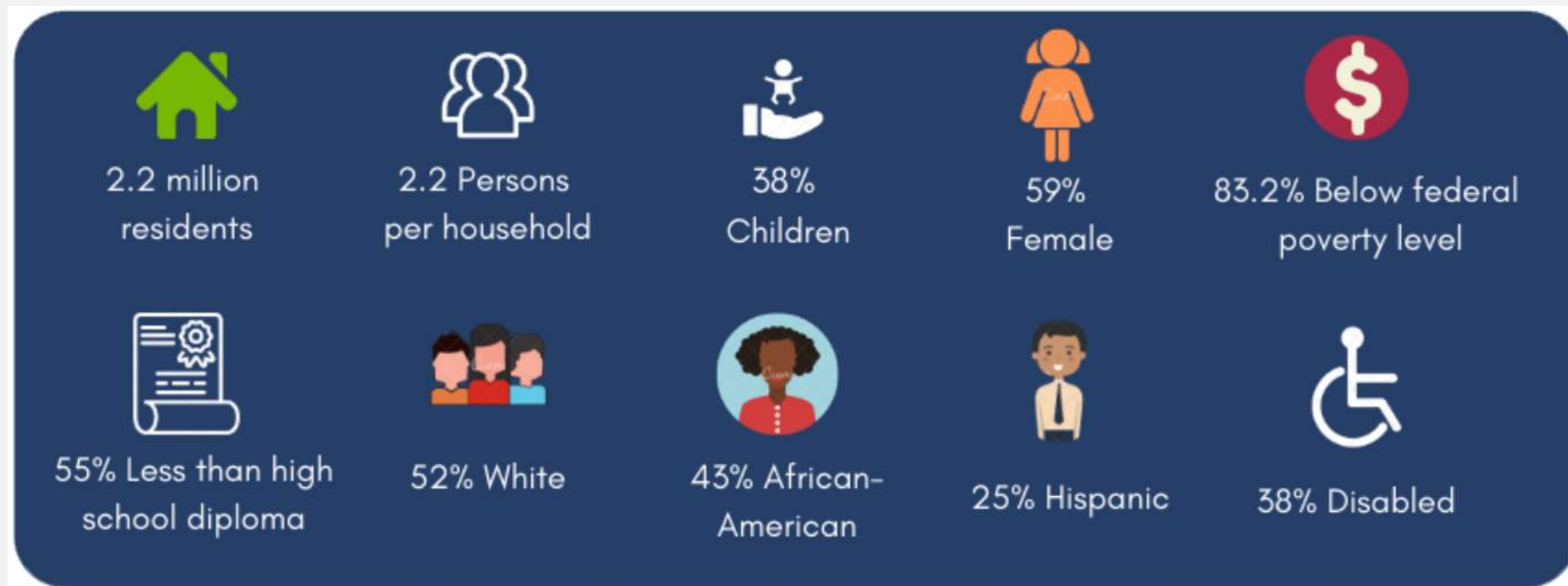
Research and  
Evaluation



Outreach  
and  
Collaboration

Increase access, quality of health care, and improve health outcomes

# PUBLIC HOUSING DEMOGRAPHICS



# DIABETES IN HEALTH CENTERS

A little over 15% of health center (HC) patients have diabetes

32% of HC patients have Poorly Controlled Hemoglobin A1c (HbA1c > 9%)

9% of Public Housing Grantee patients have diabetes

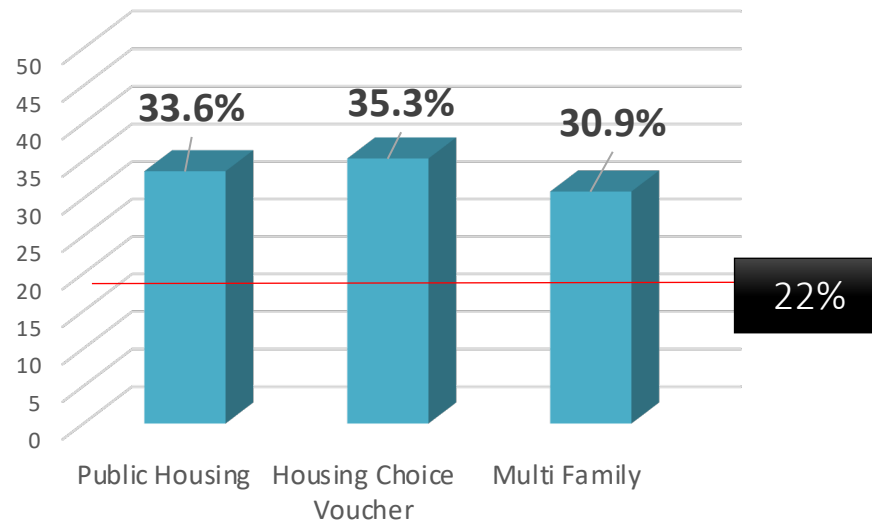
Source: UDS, 2018



# A Health Picture of HUD-Assisted Adults, 2006-2012

Adults in HUD-assisted housing have higher rates of chronic health conditions and are greater utilizers of health care than the general population. \* Updated version expected in Summer 2020

## Adult Smokers with Housing Assistance



Source: Helms VE, 2017

	HUD-Assisted	Low-income renters	All Adults
Fair/Poor Health	35.8%	24%	13.8%
Overweight/Obese	71%	60%	64%
Disability	61%	42.8%	35.4%
Diabetes	17.6%	8.8%	9.5%
COPD	13.6%	8.4%	6.3%
Asthma	16.3%	13.5%	8.7%



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# **The Pharmacist and Diabetes CARE**

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# Objectives

- Describe the prevalence associated with Diabetes in the United States and its economic burden
- Pharmacist opportunities to relieve the burden- The Underserved - HPSAs and MUA/Ps
- Discuss highlights of classification, pathophysiology and clinical manifestations Diabetes
- Discuss important concepts behind a patient centered approach towards glycemic management in Type 2 Diabetes
- Patient Case: Apply the Pharmacist Patient Care Process to critically evaluate patient manifestations and characteristics through a comprehensive patient centered approach- the collection of patient information, assessment of the information, formulating a plan, implementation of the plan and finally monitoring and following up with the patient

# Content

## Diabetes Mellitus

- Prevalence
- Pharmacist Role
- Classification
- Diagnostic Criteria
- Patient Case

## Pharmacist Patient Care Process

- Collect
- Assess
- Plan
- Implement
- Monitor and Follow-up

# Prevalence

<https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>

\*The Patient Access to Pharmacists' Care Coalition (PAPCC) <https://pharmacistscare.org/access-to-care/the-value-of-pharmacy/>

<http://pharmacistscare.org/wp-content/uploads/2014/06/PAPCC-Scope-of-Services-one-pager.pdf>

[https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci\\_2020\\_diabetes\\_fast\\_facts\\_sheet\\_final.pdf](https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci_2020_diabetes_fast_facts_sheet_final.pdf)

Data.HRSA.gov

[https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci\\_2020\\_diabetes\\_fast\\_facts\\_sheet\\_final.pdf](https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci_2020_diabetes_fast_facts_sheet_final.pdf)

<https://pharmacistscare.org/access-to-care/the-unmet-need/>

<https://bhw.hrsa.gov/shortage-designation/muap>

# CDC National Diabetes Statistics Report 2020- Estimates of Diabetes and Its Burden in the United States & ADA 2020

Among the US population overall, crude estimates for 2018 were:

- 34.2 million people of all ages—or 10.5% of the US population—had diabetes. That's 1 in 10 Americans
- Of the 34.2 million adults with diabetes, 26.9 million were diagnosed, and 7.3 million were undiagnosed adults aged 18 years or older who met laboratory criteria for diabetes were not aware of or did not report having diabetes
- 34.1 million adults aged 18 years or older—or 13.0% of all US adults—had diabetes
- The percentage of adults with diabetes increased with age, reaching 26.8% among those aged 65 years or older.
  - 14.3 million, or 1 in 4 adults age 65 or older, have diabetes
- 88 million American adults have prediabetes
- Nearly 6,000 youth are newly diagnosed with type 2 diabetes annually
- Nearly 1.6 million Americans have type 1 diabetes, including about 187,000 children and adolescents

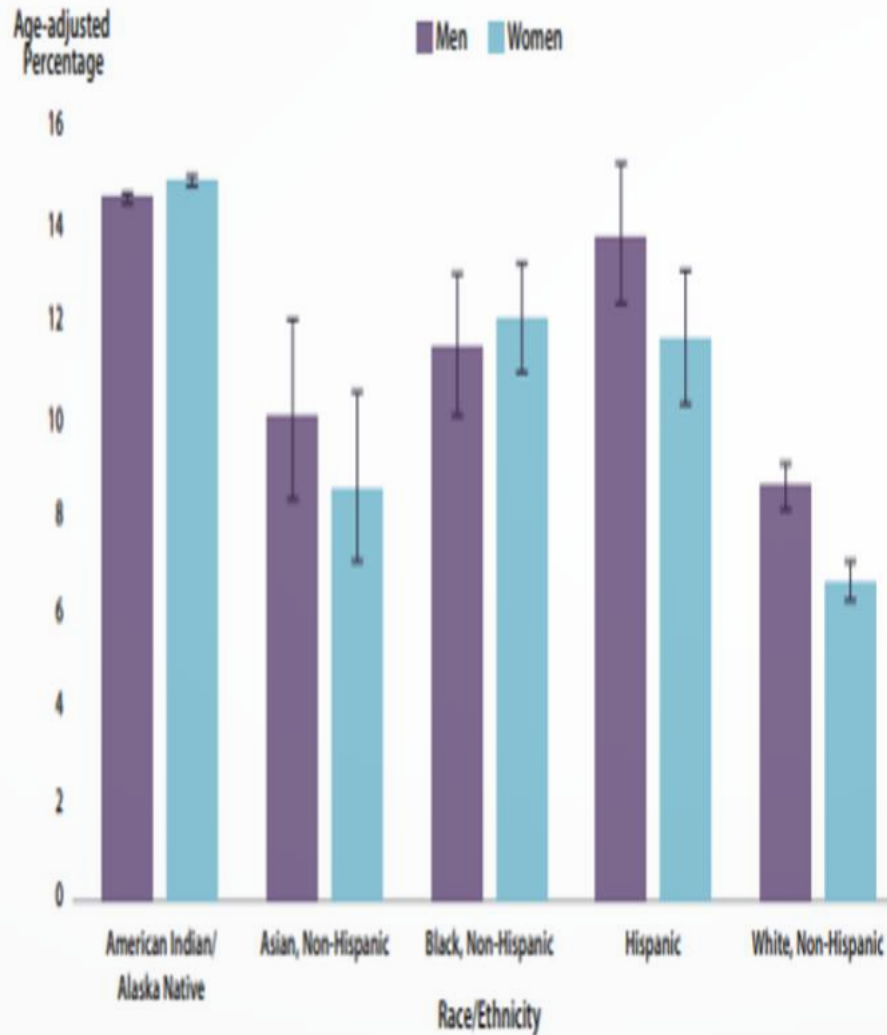
<https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>

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[https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci\\_2020\\_diabetes\\_fast\\_facts\\_sheet\\_final.pdf](https://professional.diabetes.org/sites/professional.diabetes.org/files/media/sci_2020_diabetes_fast_facts_sheet_final.pdf)

**Figure 2. Age-adjusted estimated prevalence of diagnosed diabetes by race/ethnicity group and sex for adults aged 18 years or older, United States, 2017–2018**



Note: Error bars represent upper and lower bounds of the 95% confidence interval.

Data sources: 2017–2018 National Health Interview Survey; 2017 Indian Health Service National Data Warehouse (for American Indian/Alaska Native group only).

- >14% American Indian/Alaska Native
- >12% Hispanic
- >11% Black, Non-Hispanic
- >26% Seniors
  - 1 in 4 Age ≥ 65 have diabetes

# Cost of Diabetes

- \$327 billion is the total economic burden in 2017 in the U.S. of diagnosed diabetes. This includes \$237 billion in direct costs and \$90 billion in reduced productivity.
- Individuals with diagnosed diabetes have health care costs 2.3 times higher than someone without diabetes
- 1 in 7 health care dollars is spent treating diabetes and its complications
- 1 in 5 health care dollars is spent caring for people with diabetes
- The average price of insulin nearly tripled between 2002 and 2013

# HRSA The Medically Underserved Pharmacists Focus on Relieving the Burden

- Medically Underserved Areas (MUAs) and Medically Underserved Populations (MUPs) identify geographic areas and populations with a lack of access to primary care services.
- MUPs are specific sub-groups of people living in a defined geographic area with a shortage of primary care health services.
  - Have economic, cultural, or linguistic barriers to health care i.e. Homeless, low income, Medicaid-eligible, Native American, Migrant farmworkers
- HPSA- Health Professional Shortage Area – are designations that indicate health care provider shortages in primary care, dental health; or mental health. Scored between 0-26, the higher the score the higher the need

Handout (#3): <https://www.ashp.org/Advocacy-and-Issues/Provider-Status/Pharmacy-and-Medically-Underserved-Areas-Enhancement-Act#>

<https://bhw.hrsa.gov/shortage-designation/muap>





# The Perfect Storm- The Need for Access to Pharmacist Services

- A growing aging population with multiple co-morbidities
- Declining supply of physicians – both specialists and PCPs
- Association of American Medical Colleges (AAMC) – predicts that by 2020 the US will have 91,000 fewer physicians than what will be needed to meet anticipated demand
- ***Shortage Already Exists***: according to HRSA - as of June 2014- 6100 Health Professional Shortage Areas (HPSAs) were identified where the **ratio of primary physician to people is 1:3500**
- **Pharmacists can be part of the solution** - we can help relieve the burden by enabling pharmacists to practice to the full extent of their licenses and training especially in HPSAs and related Medically Underserved Areas (MUAs) in an interdisciplinary and collaborative fashion.
- The Problem is the reimbursement barrier- Handout (#2):  
<https://www.pharmacytimes.com/publications/directions-in-pharmacy/2014/december2014/hr-4190-addressing-increased-demand-for-chronic-care-services>

- Although pharmacists are trained and licensed to deliver several vital healthcare services, current Medicare policy does not cover these services when provided by a pharmacist
- Limits Medicare beneficiary access to health-care services
- Limits Medicare beneficiary access in medically underserved communities



- Easing access- nearly 95% of the population lives within 5 miles of a pharmacy
- Fill a Gap- Current Medicare policy does not cover services when provided by a pharmacist. Collaborative Services include:
  - Health and Wellness (AWV)
    - Referrals To Preventive Care Specialists – Ophthalmologists, Podiatrists, Dentist, Social Workers, LCSW, RD
    - Order, interpret, and monitor Labs
    - Coordinate follow-ups with PCP and Pharmacist members of the interdisciplinary team
  - Chronic Disease Management
    - Initiate, modify, monitor and follow-up
    - Preventive Care Services - Immunizations, Point of Care testing, pADE surveillance
  - Comprehensive Medication Management (CMM)- whole patient
  - Patient Education and Counseling -Smoking Cessation, Diet and Weight management counseling
  - Medication management – Patient encounter/communications
    - Collect information- medication reconciliation, prospective and retrospective reviews, physical assessment/take vitals
    - Assess- identify abnormal readings, medication related problems (patient driven like non-adherence, ADEs, pADEs), labs, evaluate and identify risk and barriers
    - Plan- collaboratively and evidence based
    - Implement – interdisciplinary – provider/team consultations
    - Monitor and follow up – retrospective chart review Care Transitions- reduction of hospital re-admissions

According to The (PAPCC)

- In 48 states and the District of Columbia, pharmacists are authorized to enter into collaborative practice agreements (CPAs) with a physician or another prescriber.
- CPAs enable pharmacists not otherwise authorized by law to provide a range of services such as initiation, monitoring, and modification of a patient's drug therapy, or ordering and interpreting lab tests
- Has been utilized by the Indian Health Service for 40 years, as well as the Department of Veterans Affairs and the Department of Defense
- The lack of reimbursement of pharmacists (Part B) for services provided within their state scope of practice unnecessarily limits patient access to certain health care services and the contributions pharmacists can make to their health care and outcomes.
- Most states authorize pharmacists to perform many of the preventative services mandated under the Patient Protection and Affordable Care Act (PPACA):

Handout (#3): <https://www.ashp.org/Advocacy-and-Issues/Provider-Status/Pharmacy-and-Medically-Underserved-Areas-Enhancement-Act#>

<http://pharmacistscare.org/wp-content/uploads/2014/06/PAPCC-Scope-of-Services-one-pager.pdf>


**Pharmacists Services- more legislation is needed at state/federal level for reimbursement of services. State scopes need to align with the evolving scope of practice of pharmacy.**

Pharmacist services authorized by PPACA:

- **Blood Pressure** screening for all adults
- **Cholesterol screening** for adults of certain ages or at higher risk
- **Diabetes (Type 2)** screening for adults with high blood pressure
- **Diet counseling** for adults at higher risk for chronic disease
- **Immunizations**
- **Obesity** screening and counseling for all adults
  - 89% of adults with diagnosed diabetes are overweight or obese
- **Tobacco Use** screening for all adults and cessation interventions for tobacco users
- **COVID19-** order and test for virus in many states

# Pharmacy and Medically Underserved Areas Enhancement Act

- The Pharmacy and Medically Underserved Areas Enhancement Act (H.R. 592/ S. 109) is bipartisan legislation that will amend section 1861 (s) (2) of the Social Security Act to include pharmacists on the list of recognized healthcare providers
- Aligns with State Scope of Pharmacy Practice - Pharmacists would be able to offer Medicare beneficiaries the same services that they are authorized to provide by their state pharmacy practice acts
- Other Professionals have been granted provider status via this path: The legislation would help meet unmet health care needs in underserved areas, a significant first step toward broader provider status. This strategy follows a similar successful path taken by other health care professionals to gain recognition under Medicare. Nurse practitioners initially received the ability to provide services in rural health clinics. Later they were granted provider status in any setting
- In 2012, the Centers for Medicare & Medicaid Services broadened the concept of “medical staff” to allow hospitals to grant other practitioners privileges to practice in the hospital in accordance with state law
- ASHP encourages members to reach out to your members of Congress via email to ask them to support legislation that addresses pharmacists’ lack of provider status



# Highlights Classification and Characteristics ADA 2020 Standards of Care

(Source: American Diabetes Association DOI: 10.2337/dc20-S002 Published 1 January 2020 Diagnosis and Classification of Diabetes Mellitus- [https://care.diabetesjournals.org/content/37/Supplement\\_1/S81](https://care.diabetesjournals.org/content/37/Supplement_1/S81))

# Classification – ADA 2020 Standards of Care

Diabetes can be classified into the following general categories:

- Type 1 diabetes (due to autoimmune b-cell destruction, usually leading to absolute insulin deficiency)
- Type 2 diabetes (due to a progressive loss of adequate b-cell insulin secretion frequently on the background of insulin resistance)
- Gestational diabetes mellitus - diabetes diagnosed in the second or third trimester of pregnancy **that was not clearly overt diabetes prior to gestation**). Has stricter targets
- Specific types of diabetes due to other causes, e.g., monogenic diabetes syndromes such as neonatal diabetes and maturity-onset diabetes of the young (MODY), diseases of the exocrine pancreas (such as cystic fibrosis and pancreatitis), and drug- or chemical-induced diabetes (such as with glucocorticoid use, in the treatment of HIV/AIDS, or after organ transplantation)

# Diabetes Mellitus

- Diabetes Mellitus (DM) is a metabolic disorder characterized by the presence of chronic hyperglycemia accompanied by greater or lesser impairment in the metabolism of carbohydrates, lipids and proteins. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels.
- The origin and etiology of DM can vary greatly but always include defects in either insulin secretion or insulin response or both at some point in the course of disease.
- Mostly patients with diabetes mellitus have either type 1 or type 2 diabetes (95% of cases)
  - Type 1 DM - which is immune-mediated (controversy: LADA- latent autoimmune diabetes with an adult onset- debate about classification- per ADA 2020 all autoimmune diabetes mediated by autoimmune destruction of B-cells are included under the rubric of type 1 diabetes- longer duration of marginal insulin secretion).
  - Type 2 DM (formerly known as non-insulin dependent DM) is the most prevalent form of DM characterized by hyperglycemia, insulin resistance, and relative insulin deficiency. Type 2 DM results from interaction between genetic, environmental and behavioral risk factors.
- Once hyperglycemia occurs, patients with all forms of diabetes are at risk for developing the same chronic complications, although rates of progression may differ
- Hyperglycemia- Degree reflects the severity of the disease and dictates therapeutic regimens

# Type 1 or Type 2- Characteristics Overlap

- Type 1 – distinction is autoimmune destruction of the pancreatic Beta-cells with deficiency- does not happen in Type 2
- Classification is important for determining therapy but it's not so easy to do at onset – scenarios can be difficult to differentiate due to overlapping patient presentations (polyuria, polydipsia)
- Traditional paradigms of type 2 diabetes occurring only in adults and type 1 diabetes only in children no longer hold true such as Type 1 only happens in the young and Type 2 only happens in adults (According to ADA Nearly 6,000 youths are newly diagnosed with type 2 diabetes annually)
- Children with type 1 diabetes typically present with the hallmark symptoms of polyuria/polydipsia, and approximately one-third present with diabetic ketoacidosis (DKA)
- The onset of type 1 diabetes may be more variable in adults; they may not present with the classic symptoms seen in children and may experience temporary remission from the need for insulin (Honeymoon period)
- Misdiagnosis is common at presentation – for example diabetic ketoacidosis (DKA) is more demonstrative of Type 1 DM but it is seen in Type 2 DM particularly in ethnic minorities (Migrant and Seasonal Agricultural Workers).
- And is as far as GDM did the chicken come before the egg- screening on women that did not have a diagnosis of diabetes before the pregnancy in those that are planning a pregnancy and have other risk factors. Emphasis has been put on preconception care, medical assessment and screening.
- Although difficulty in differentiating in the beginning, diagnosis becomes more obvious over time





# Type 1 DM Diagnostic Criteria

## Three Distinct Stages

- Glucose and A1C rise well before clinical onset of diabetes-
- **Early diagnosis is feasible before the onset DKA**

FPG, 2-h PG during 75-g OGTT, and A1C  
Are equally appropriate for diagnostic  
screening

	Stage 1	Stage 2	Stage 3
Characteristics	<ul style="list-style-type: none"><li>• Autoimmunity</li><li>• Normoglycemia</li><li>• Presymptomatic</li></ul>	<ul style="list-style-type: none"><li>• Autoimmunity</li><li>• Dysglycemia</li><li>• Presymptomatic</li></ul>	<ul style="list-style-type: none"><li>• New-onset hyperglycemia</li><li>• Symptomatic</li></ul>
Diagnostic criteria	<ul style="list-style-type: none"><li>• Multiple autoantibodies</li><li>• No IGT or IFG</li></ul>	<ul style="list-style-type: none"><li>• Multiple autoantibodies</li><li>• Dysglycemia: IFG and/or IGT</li><li>• FPG 100–125 mg/dL (5.6–6.9 mmol/L)</li><li>• 2-h PG 140–199 mg/dL (7.8–11.0 mmol/L)</li><li>• A1C 5.7–6.4% (39–47 mmol/mol) or <math>\geq 10\%</math> increase in A1C</li></ul>	<ul style="list-style-type: none"><li>• Clinical symptoms</li><li>• Diabetes by standard criteria</li></ul>

# Type 1 DM

- Accounts for about 5 to 10% of all DM
- Immune Mediated - Autoimmune Beta-cell destruction usually leads to absolute insulin deficiency
- Autoantibodies are proportionally associated with Predicting Hyperglycemia
- Autoantibodies are present in 85-90% of individuals when fasting hyperglycemia is detected

# Type 1 DM

- Also related to environmental factors that are poorly defined
- Rate of Beta-cell destruction vary greatly
- Rapid — mainly in infants and children- common to see DKA as first manifestation of the disease however modest hyperglycemia can rapidly change to severe hyperglycemia and/or DKA in the presence of stress or infection.
- Slower — mostly adults- retain residual Beta-cell function sufficient to prevent DKA for many years before eventually becoming dependent on insulin and increased risk for DKA develops proportionally. At this stage there is little, or no insulin secretion and they will manifest with low or undetectable levels of **plasma C-peptide**.
- Patient is rarely obese at presentation but don't be quick to rule it out, it is not considered to be incompatible with the diagnosis
- Patients are prone to other autoimmune disorders- Recommendation to Screen in Standards- Thyroid and Celiac
  - Grave's disease
  - Hashimoto's thyroiditis
  - Addison's disease
  - Vitiligo
  - Celiac sprue
  - Autoimmune hepatitis
  - Myasthenia gravis
  - Pernicious anemia

# To Summarize the Arsenal Differentiation of Type 1 DM

- Autoimmunity component – presence of autoantibodies
- Hyperglycemia- depending on what stage - chance to catch it before clinical symptomology
- Plasma C-Peptide- low levels (may be useful in clinical practice)
- Presence of other autoimmune disorders- i.e. Thyroid, Celiac, Addison's
- DKA – in youth more indicative of Type 1 especially in the presence of infection
- Obesity not common place but should not be ruled

**PATIENT MANIFESTATIONS AND LONG-TERM CONSEQUENCES OF HYPERGLYCEMIA- patients with all forms of diabetes are at risk for developing the same chronic complications, although rates of progression may differ**

- Polyuria
- Polydipsia
- Weight Loss
- Polyphagia
- Blurred vision
- Chronic hyperglycemia — can impact growth and increase the susceptibility to infections
- DKA- mostly in Type 1 — but can happen in Type 2 especially in ethnic minorities
- Hyperosmolar syndrome
- Based on my experience patients can present with fatigue, tingling of hands and feet and even disorientation
- Retinopathy with potential loss of vision
- Nephropathy leading to kidney failure
- Peripheral neuropathy- increasing the risk of foot ulcers, amputations and Charcot joints
- Autonomic neuropathy — causing gastroparesis, genitourinary and cardiovascular symptoms, and sexual dysfunction
- Increased risk of atherosclerotic cardiovascular, peripheral artery and cerebrovascular disease (stroke)
- Hypertension
- Dyslipidemias

**Psychosocial care – Important component of a comprehensive evaluation- May present with depression**

# Psychosocial Recommendations- Patient Engagement Relies on How Well We Assess

- Psychosocial care should be integrated – complex environmental, social, behavioral, and emotional factors influence living with diabetes for patients and caregivers
- Screening- we should routinely monitor people with diabetes for diabetes distress, particularly when treatment targets are not met and/or at the onset of diabetes complications, for example when first diagnosed or when there is need for intensification of therapy
- Simple/informal tools can be used for example asking if they have had persistent changes in mood, have circumstances (financial, diagnosis of a co-morbid condition) that have changed that may pose new barriers
- ADA position statement- Psychosocial Care for People With Diabetes- [list of assessment tools \(Handout 6\)](#)

# Prediabetes

- Prediabetes
- 1 in 3 U.S. adults aged 20 years or older has prediabetes
- 88 million Americans aged 20 years or older have prediabetes, and 85% of them don't know they have it
- **ADA Recommendation-**
  - Prediabetes is associated with heightened cardiovascular (CV) risk; therefore, **screening of and treatment of modifiable risk factors** for CVD are suggested- HTN, Dyslipidemia, Obesity, Smoking
  - DSME and support programs may be appropriate venues for people with prediabetes – supports the development and maintenance of behaviors that can prevent or delay the development of type 2 diabetes - Motivational Interviewing



## Who Should We Screen

- ❖ Testing should be considered in overweight or obese ( $\text{BMI} \geq 25 \text{ kg/m}^2$  or  $\geq 23 \text{ kg/m}^2$  in Asian Americans) adults who have one or more of the following risk factors:
  - First-degree relative with diabetes
  - High-risk race/ethnicity (e.g., African American, Latino, Native American, Asian American, Pacific Islander)
  - History of CVD
  - Hypertension ( $\geq 140/90$  mmHg or on therapy for hypertension)
  - HDL cholesterol level  $< 35 \text{ mg/dL}$  ( $0.90 \text{ mmol/L}$ ) and/or a triglyceride level  $> 250 \text{ mg/dL}$  ( $2.82 \text{ mmol/L}$ )
  - Women with polycystic ovary syndrome
  - Physical inactivity
  - Other clinical conditions associated with insulin resistance (e.g., severe obesity, acanthosis nigricans)
- ❖ Patients with prediabetes ( $\text{A1C} \geq 5.7\%$  [ $39 \text{ mmol/mol}$ ], IGT, or IFG) should be tested yearly.
- ❖ Women who were diagnosed with GDM should have lifelong testing at least every 3 years.
- ❖ For all other patients, testing should begin at age 45 years.
- ❖ If results are normal, testing should be repeated at a minimum of 3-year intervals, with consideration of more frequent testing depending on initial results and risk status.
- ❖ CVD, cardiovascular disease; GDM, gestational diabetes mellitus.

# Criteria for Screening

	Prediabetes	Diabetes
A1C	5.7 to 6.4% (39-47 mmol/mol)	≥6.5 (48 mmol/mol)
Fasting plasma glucose	100 to 125 mg/dL (5.6-6.9 mmol/L)	≥126 mg/dL (7.0 mmol/L)
Oral glucose tolerance test	140-199 mg/dL (7.8-11.0 mmol/L)	≥200 mg/dL (11.1 mmol/L)
Random plasma glucose		≥200 mg/dL (11.1 mmol/L)

- ❖ In the absence of unequivocal hyperglycemia, diagnosis requires two abnormal test results from the same sample or in two separate test samples.
- ❖ The random plasma glucose is only diagnostic in a patient with classic symptoms of hyperglycemia or hyperglycemic crisis
- ❖ To avoid misdiagnosis or missed diagnosis, the A1C test should be performed using a method that is certified by the NGSP and standardized to the Diabetes Control and Complications Trial (DCCT) assay.
- ❖ A1C relationship to glycemia can be altered by conditions that affect red blood cell turnover, such as sickle cell disease, HIV, anemias. In conditions associated with an altered relationship between A1C and glycemia, such as sickle cell disease, pregnancy (second and third trimesters and the postpartum period), glucose-6-phosphate dehydrogenase deficiency, HIV, hemodialysis, recent blood loss or transfusion, or erythropoietin therapy, only plasma blood glucose criteria should be used to diagnose diabetes.

# A1C Testing

- Perform the A1C test at least two times a year in patients who are meeting treatment goals (and who have stable glycemic control).
- Perform the A1C test quarterly in patients whose therapy has changed or who are not meeting glycemic goals.
- **Point-of-care testing** for A1C provides the opportunity for more timely treatment changes.
- The frequency of A1C testing should depend on the clinical situation, the treatment regimen, and the clinician's judgment. **(Patient motivation!)**

# A1C Things to Keep in Mind

- Certain blood disorders (anemias) and transfusions , chronic diseases (ESKD), medications (Epogen), genetic variants can result in discrepancies between the A1C and the patient’s true glycemia
- Glycemic control is best evaluated by the combination of results from SMBG or CGM, and A1C. The Diabetes Technology Society Blood Glucose Monitoring System Surveillance program provides information on device performance for SMBG- [diabetestechnology.org/surveillance](http://diabetestechnology.org/surveillance)
- Always important to compare A1C with the patient’s SMBG or CGM
- Most assays in US are accurate – for list go to [www.ngsp.org/interf.asp](http://www.ngsp.org/interf.asp)
- Fructosamine and 1,5-anhydroglucitol don’t translate into average glucose levels as compared to A1C

A1C (%)	eAG mg/dL
5	97 (76–120)
6	126 (100–152)
7	154 (123–185)
8	183 (147–217)
9	212 (170–249)
10	240 (193–282)
11	269 (217–314)
12	298 (240–347)

# Recommendations

- At least annual monitoring for the development of type 2 diabetes in those with prediabetes is suggested
- Patients with prediabetes should be referred to an intensive behavioral lifestyle intervention program modeled on the Diabetes Prevention Program (DPP) to achieve and maintain 7% loss of initial body weight and increase moderate-intensity physical activity to at least 150min/week.
- Based on patient preference technology-assisted diabetes prevention interventions may be effective at preventing T2DM and should be considered. TELEHEALTH!!!!!!
- **Metformin therapy for prevention of T2DM** should be considered in those with prediabetes, especially for those with a BMI  $\geq 35$  kg/m<sup>2</sup> or greater, those who are less than 60 years old, and in women with prior gestational diabetes.
- Long-term use of metformin may be associated with biochemical vitamin B12 deficiency, and periodic measurement of vitamin B12 levels should be considered in metformin-treated patients, especially in those with anemia or peripheral neuropathy.

# Recommendations

- Prediabetes is associated with heightened cardiovascular risk; therefore, screening for and treatment of modifiable risk factors for cardiovascular disease are suggested and that DSME and support programs may be appropriate venues for people with prediabetes to receive education and support to develop and maintain behaviors that can prevent or delay the development of T2DM.
- Advise all patients not to use cigarettes and other tobacco products or e-cigarettes.
- After identification of tobacco or e-cigarette use, include smoking cessation counseling and other forms of treatment as a routine component of diabetes care.

# Recommendations

- CGM- Ambulatory Glucose Profile (AGP) – should be considered as a standard printout
- TIR (Time in Range) –
  - Goal of 70% has aligned with an A1C of ~7% in two prospective studies
  - Associated with risk of microvascular complications
- Time below target and time above target- useful in evaluating treatment regimen, offers opportunities to address hypoglycemia and hypoglycemia unawareness, offers opportunities to intensify regimen

# AGP Report

Name \_\_\_\_\_

MRN \_\_\_\_\_

## GLUCOSE STATISTICS AND TARGETS

26 Feb 2019–10 Mar 2019  
% Time CGM is Active

13 days  
99.9%

Glucose Ranges	Targets [% of Readings (Time/Day)]
Target Range 70–180 mg/dL	Greater than 70% (16h 48min)
Below 70 mg/dL	Less than 4% (58min)
Below 54 mg/dL	Less than 1% (14min)
Above 180 mg/dL	Less than 25% (6h)
Above 250 mg/dL	Less than 5% (1h 12min)

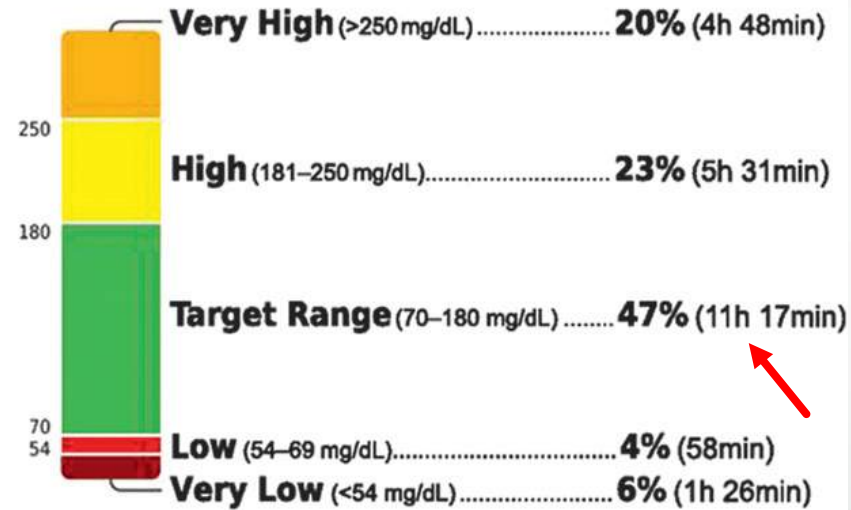
Each 5% increase in time in range (70–180 mg/dL) is clinically beneficial.

**Average Glucose**  
**Glucose Management Indicator (GMI)**  
**Glucose Variability**

**173 mg/dL**  
**7.6%**  
**49.5%**

Defined as percent coefficient of variation (%CV): target  $\leq 36\%$

## TIME IN RANGES



- How long to wear – recommended at 14 days
- GMI -approximates A1C level
- Glucose variability – swings in glycemia (hyper and hypo) – tied to risk of complications- target less than or equal to 36%
- Time in range - ~70%



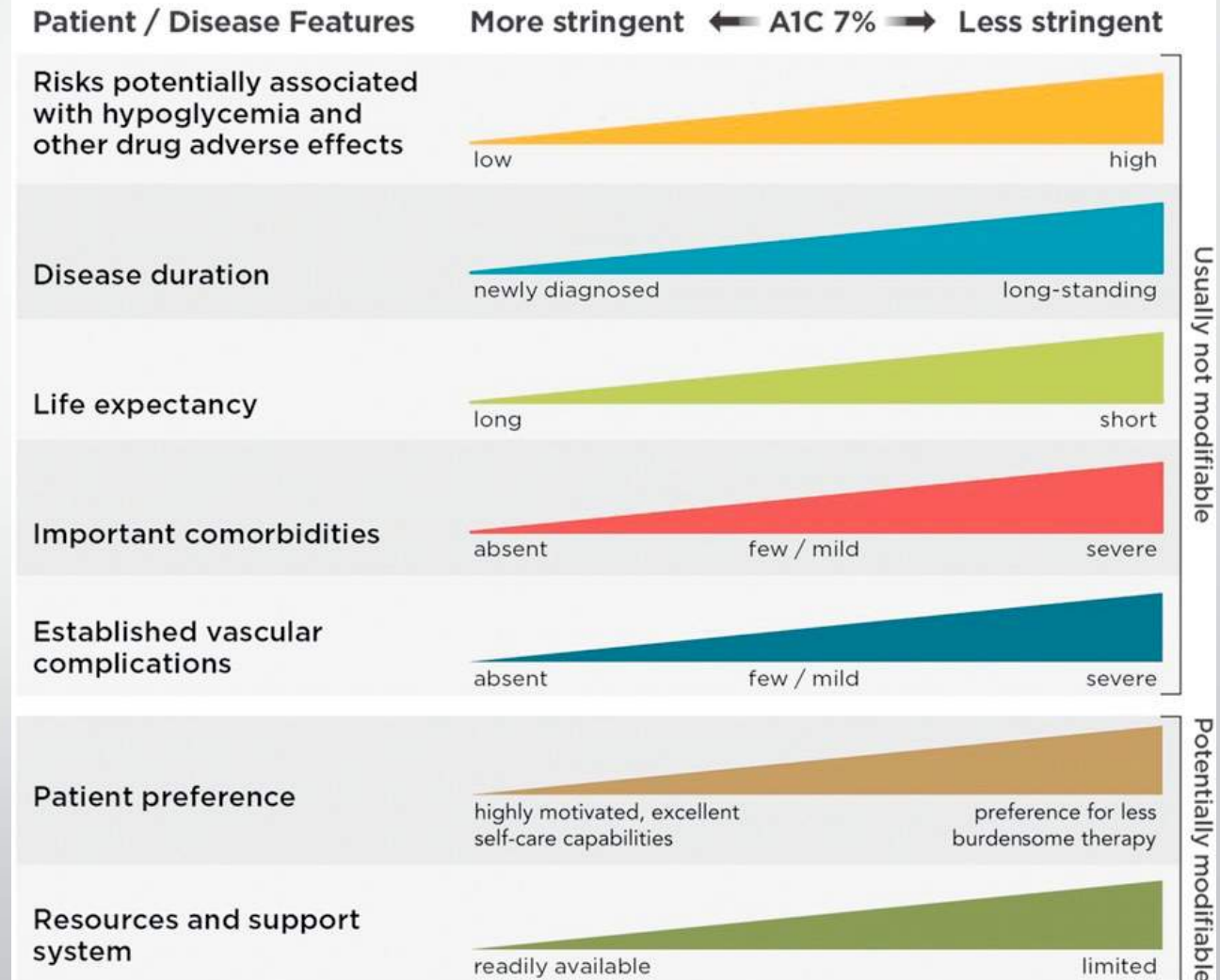
# Targets

- Approach should be **individualized**
- **Relies on patient characteristics** (Motivation- Disease Features- Preferences)
- Disease duration
- Life expectancy
- Comorbid conditions
- Vascular complications
- Resources and support system

## In General:

- < 7% in nonpregnant adults
- < 6.5% can be considered if safe
- < 6% in pregnancy if no hypoglycemia , if not < 7%
- < 8% in patients with advanced micro/macro complications, extensive co-morbid conditions, and in long-standing diabetes despite DSME, appropriate SMBG or treatment regimens

## Approach to Individualization of Glycemic Targets



# Hypoglycemia- Major Limiting Factor in Mgt

- Level 1 <70 mg/dL (3.9 mmol/L) and >54 mg/dL (3.0 mmol/L)
- Level 2 <54 mg/dL (3.0 mmol/L)
- Level 3 -A severe event characterized by altered mental and/or physical status requiring assistance for treatment of hypoglycemia

- Assess risk and events of at each encounter
- Counsel patients on situations that can increase their risk of hypoglycemia- Risk with exercise, fasting for tests or procedures, alcohol consumption, during sleep
- **All patients should know how - 15-15 Rule-** 15-20g of glucose is preferred treatment for conscious individuals (can be any form). Wait 15 minutes retest- if still <70 repeat. Once above 70 eat a meal
- Treating with protein/fat containing foods not recommended for rescue- slow down the absorption of glucose - protein containing foods can cause insulin secretion in type 2
- **Glucagon should be prescribed for those at risk of level 2.** Caregivers/school personnel, family members should be trained. Available – intranasal, soluble and injector pens
- **Hypoglycemia unawareness** (hypoglycemia-associated autonomic failure) and level 3 hypoglycemia should trigger hypoglycemia avoidance education and reevaluation of the treatment regimen. **Consider raising glycemic targets** in insulin treated in those with hypoglycemia unawareness, one level 3, or pattern of unexplained level 2 events
- Raising the target in people with unawareness can be effective in reversing the unawareness and reduce the risk of future episodes
- **Ongoing assessment of cognitive function** is suggested with increased vigilance for hypoglycemia by the clinician, patient, and caregivers if low cognition or declining cognition is found

# Pharmacotherapy Approaches

- Type 1- multiple daily injections (prandial and basal) or continuous insulin infusion depending on patient preference
- Type 1 and Type 2 - Injection techniques should be evaluated and taught- i.e. IM injections of insulin vs subcutaneous. Sites – abdomen, thigh, upper buttock, and upper arm. Rotation of sites. Dexterity issues should be assessed- Pens are good choices (needle fear, ease of application, patient friendly features)
- T2- Metformin still first line in the absence of contraindication or intolerance. Consider in pre-diabetes despite FDA indication. All other agents are added onto metformin.
  - **Indication**: Metformin Hydrochloride Tablets USP are indicated as an adjunct to diet and exercise to improve glycemic control in adults and children with type 2 diabetes mellitus.
- T2- early introduction of insulin can be considered if ongoing weight loss (catabolism) is evident, symptoms of hyperglycemia or if A1C > 10% or BG  $\geq$ 300 mg/dL.
- Patient centered approach- consider CV comorbidities (ASCVD – SGLT2, GLP-RA1), hypoglycemic risk, weight gain, side effects, and patient preferences- psychosocial impacts

# Pharmacotherapy Approaches

- Those with established ASCVD or indicators of high risk, established kidney disease, or heart failure – consider adding an SGLT2 inhibitor or GLP1-RA with demonstrated cardiovascular disease benefit- empagliflozin and canagliflozin. Choose **empagliflozin** over canagliflozin (CANVAS trial) in those with increased risk of bone fractures- osteoporosis, or amputations. GLP1-RA – liraglutide (Victoza) (label -to reduce the risk of major adverse cardiovascular events in adults with type 2 diabetes mellitus)- **cost barrier**
- T2- if greater glucose lowering is needed, the addition of GLP1-RAs are preferred to insulin when possible- (One is available in oral- **semaglutide**- cost barrier)
- Avoidance of therapeutic inertia-Intensification of treatment for patient with T2 that are not meeting goals should not be delayed- **Frequent follow-up and patient engagement are key- Opportunities that identify patient characteristics/barriers are key to mediate solutions that are targeted towards patient preferences, efficacy, costs, adverse effects, etc.**
- Medication regimen and medication-taking behavior should be reevaluated at regular intervals (every 3–6months) and adjusted as needed to incorporate specific factors that impact choice of treatment **Caveat- more often if possible – pharmacist can capture before the patient's follow up visit**

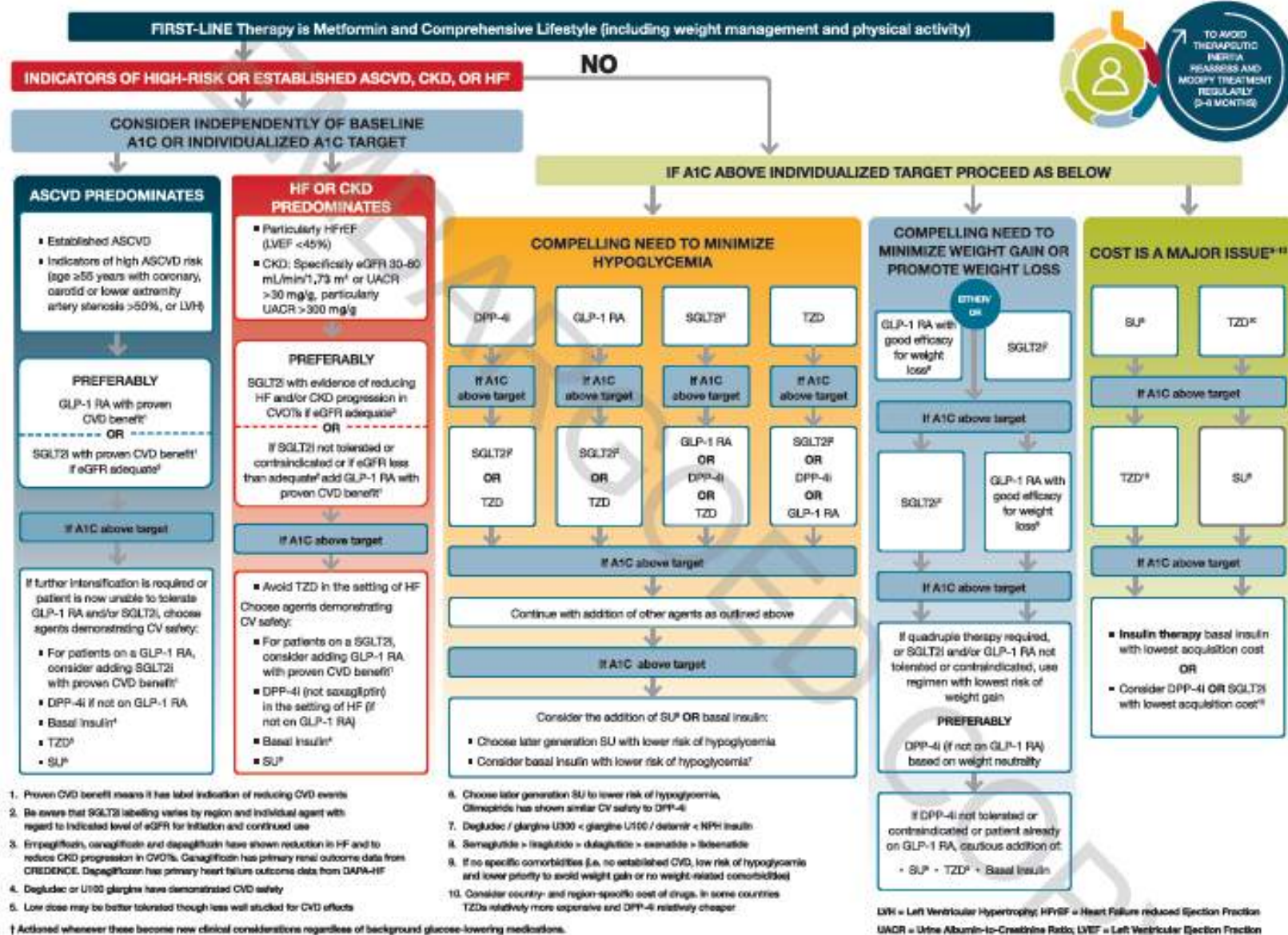


Figure 9.1—Glucose-lowering medication in type 2 diabetes: overall approach. For appropriate context, see Fig. 4.1. ASCVD, atherosclerotic cardiovascular disease; CKD, chronic kidney disease; CV, cardiovascular; CVD, cardiovascular disease; CVDts, cardiovascular outcomes trials; DPP-4i, dipeptidyl peptidase 4 inhibitor; eGFR, estimated glomerular filtration rate; GLP-1 RA, glucagon-like peptide 1 receptor agonist; HF, heart failure; SGLT2i, sodium-glucose cotransporter 2 inhibitor; SU, sulfonylurea; TZD, thiazolidinedione. Adapted from Davies and colleagues (33,34).

# How Do We Begin the Conversation

Technique- The patient has the answers: goal- identify barriers- psychosocial, access (transportation)

Begin with – Building Trust - Eye Contact, Welcome the patient, Describe your role and intentions

Ask open ended questions/Actively Listen: What most concerns you about living with diabetes?

Cost/Resources

Fear and Denial, Anxiety

Depression

Acceptance- comorbidities

Impacts on lifestyle- SMBG

Medications – need, cost, benefit



<https://www.pharmacy.umn.edu/about/ask-your-pharmacist/pharmacists-provide-patients-medication-expertise>

Patient is referred to pharmacist for comprehensive medication management by PCP  
**Patient Assessment – Assess – Subjective and Objective Information**

4.24.20 – Follow up with PCP was supposed to be on  
4.9.20 – patient missed appointment

27 y.o. Hispanic Female (Carmen)- initial visit (new patient) with PCP was 3/10/20 where she presented with a UTI. Recently migrated from Mexico. Has 3 children and parents are alive all reside in Mexico. Has no family in the U.S.

**Social History**

- Occupation- line cook
- Housing- lives alone, rents a room in a private home
- Sexual orientation- heterosexual, has one sexual partner, no history of contraception
- Denies illicit drug use, denies alcohol use
- Non-smoker
- Education- 6<sup>th</sup> grade education

**Family History-** Mom and Dad T2DM, Dad had an MI 3 years ago, no siblings, has 3 children 2 girls one boy the oldest – 3, 5 and 9 years of age

**Vitals 3/10/20** – BP- 142/85, Wt- 195LBs, Ht- 5’1”  
BMI- 36.9, HR- 92, RR-18, Temp- 99

**POC-** 3.10.20- A1C- 6.2%- Denies symptoms of Hyperglycemia

**Pertinent Labs**

3/22/20

PG- 120 (fasting)

AST- 45

ALT- 62

TC- 215

LDL- 195

TG- 205

HDL- 42

HbA1C- 6.2%

eGFR- 65

BUN- 10

Creatinine – 0.8

Urine ketones - neg

**Medication List**

Bactrim DS  
one tablet by mouth  
in the morning and  
one tablet in the  
evening for 14 days.

**Patient Presentation**

Patient fear of diabetes, her  
grandmother died of diabetes

She is concerned about eating and  
cost – she sends money to family in  
Mexico- is teary about her situation

Med reconciliation- patient  
finished antibiotic no side  
effects. UTI has resolved.

## Poll Question

What key specific factors about Carmen's presentation would you take into consideration in your initial assessment?

- A. Literacy and Health Literacy
- B. Co-morbidities (HTN, dyslipidemia, obesity) & Clinical characteristics (age, weight, A1c)
- C. Psychosocial Issues such as motivation and depression & Cultural and socioeconomic barriers
- D. All of the above



## All of The Above- Patient is pre-diabetic

- **Current lifestyle/Motivation and Depression/Cultural and Socioeconomic Barriers/ Health Literacy-** social content including potential food insecurity, housing stability, and financial barriers play an important role on how we can help the patient. In Carmen's case – areas to probe:
  - Access to food/food choices – she likes beans, rice, plantains, chicken, fish, pork, beef – MNT and DSME- community resources
  - Housing stability- how stable is she? - community resources- address these disparities is to match patient needs to existing community resources
  - SDOH – Healthy People 2020 - “**create social and physical environments that promote good health for all**” - Community resources – **cultural organizations, promotoras and community health workers, community pantries (churches), gyms, grocery store services** (Registered Dieticians)
  - Contraception – a conversation of preconception care – “Beginning at the onset of puberty or at diagnosis of diabetes, all adolescent girls and women with childbearing potential should receive education about the risks of malformations associated with poor metabolic control and the use of effective contraception to prevent unplanned pregnancy.”
    - Family planning, discussion of options for patient – How do you feel about contraception? Can be a delicate conversation probing for religious beliefs and prior methods of contraception
    - Options – consider costs and feasible choices – Barrier methods (condoms), oral contraception, implants

# Current lifestyle/Motivation and Depression/Cultural and Socioeconomic Barriers/ Health Literacy

- In Carmen's case a depression screening- referral to Behavioral Health- consider annual screening – can be a simple two question assessment assessing feeling of hopelessness or interest in doing things or PHQ9  
<https://www.webpsychology.com/assessing-depression>
- Literacy and Health Literacy – Carmen has achieved a 6th grade level education – patient centered approach – How comfortable is the patient with technology? Mobile apps/computer diabetes.org. REALM (reading level assessment) can be utilized – simple reading of words in five seconds or the SAHLSA – Spanish-measures comprehension
- Visual educational tools/IT – plate method, nutritional labels- aid in the discussion about healthy eating and open opportunities where the patient's culture and healthier options may converge
  - <https://www.diabeteseducator.org/living-with-diabetes/spanish-resources>
  - <https://professional.diabetes.org/search/site/spanish%20resources?retain-filters=1>



## Poll Question

What conditions will impact your treatment recommendations?

- A. Prediabetes & Obesity
- B. Dyslipidemia
- C. Hypertension
- D. All of the above

# Carmen's Co-Morbidities- ALL OF THE ABOVE

- Hypertension – PCP- 142/85 – with you – 154/85
  - ACE or ARB – lisinopril, losartan - education on side effects, cough adverse effects (angioedema), dosing, cost
- LDL > 190- ASCVD - ASCVD Calculator- Carmen's LDL 195
- <https://clincalc.com/Cardiology/ASCVD/PooledCohort.aspx>
  - Lifestyle changes – modification of diet/food choices, exercise
  - Moderate to high intensity – rosuvastatin, atorvastatin
- BMI= 36.1 Obesity - BMI Categories: Underweight = <18.5| Normal weight = 18.5–24.9 | Overweight = 25–29.9 | BMI of 30 or greater
  - Introduce patient to plate method, accessible technologies web-based programs
  - Refer to community resources- community health workers
  - Refer to MNT- RD- free resources in certain supermarkets (Shoprite)
  - Conduct and/or refer to DSME
  - Frequent touch- Telehealth

## Poll Question

Is metformin an appropriate medication to consider for Carmen?

- A. Yes
- B. No
- C. Relies on patient preference
- D. Never

# Discussions about Medications- Pros and Cons

- Utilization of shared decision making to create a management plan: patient engagement – facilitates education of the patient - <https://shareddecisions.mayoclinic.org/decision-aid-information/decision-aids-for-chronic-disease/diabetes-medication-management/>
- Benefits of medications- for example – Conversation may include- Whole patient care – address all aspects and risks associated with the development of diabetes
  - ACE/ARB- lowers blood pressure and protects kidneys from effects of diabetes on the kidneys. Low side effect profile, discussion on cough and angioedema
  - Statins vs Lifestyle changes – Carmen might have heard about liver issues or muscle aches and doesn't want to take a statin- Her LDL is 195 – moderate to high intensity statin - lifestyle changes are an option – explain the labs, importance of follow up for surveillance, lower the risk of ASCVD, reinforce follow up with PCP
  - Metformin – recommended in prevention of T2DM (BMI of 35 or more, those aged <60, and women with prior gestational diabetes mellitus) can be considered in pre-diabetes to prevent the onset of T2DM – discussion of gestational diabetes history with the patient would be helpful here. Cost effective, known track record, weight neutral
  - Prevention – immunizations- this may be a good place to discuss immunizations with the patient – flu, tetanus, etc.

# Shared Decision-Making Tools- Resources- English and Spanish- handouts and online interactive tools

## Diabetes Medication Decision Aid cards

- **AHRQ The Share Approach -**  
<https://www.ahrq.gov/sites/default/files/wysiwyg/professionals/education/curriculum-tools/shareddecisionmaking/tools/tool-9/share-tool9.pdf>
- <https://shareddecisions.mayoclinic.org/decision-aid-information/decision-aids-for-chronic-disease/diabetes-medication-management/>
- <https://diabetesdecisionaid.mayoclinic.org/index?lang=ES&v=m-> an online educational tool you can use along with your patient





# Diabetes Medication Choice

## Decision Aid



BACK

SHOW ALL

WHICH ISSUE WOULD YOU LIKE TO DISCUSS NEXT?

			A1C ↓	DAILY ROUTINE	LOW BLOOD SUGAR	WEIGHT CHANGE	HEART BENEFITS	COSTS	
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Metformin	1 - 2 %					(Generic available) \$0.10 per day	\$9 / 3 months
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Insulin	∞					(No generic available) prices varies by dose Lantus NPH Short acting analog insulin	Per 100 units Vial: \$26 / Pen: \$26 Vial: \$2.50 / Pen: \$28 Vial: \$25 / Pen: \$30
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Pioglitazone	1 %					(Generic available) \$0.50 per day	\$42 / 3 months
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Liraglutide Exenatide	0.5 - 1%					(No generic available) \$20.00 per day	\$1,800 / 3 months
<input type="checkbox"/>	<input checked="" type="checkbox"/>	Sulfonylureas	1 - 2 %					(Generic available) \$0.10 per day	\$12 / 3 months

<https://diabetesdecisionaid.mayoclinic.org/app/diabetes?lang=EN&v=m->



## Poll Question

What will SMART goals target?

- A. Diagnostic Criteria (A1C, FBG)
- B. Co-morbidities- (BP, Weight, Lipids)
- C. Psychosocial issues (Housing, Finance, Employment Status, Depression)
- D. All of the above

# Setting Realistic Goals- Keep it simple and patient centered- let the patient decide- avoid overwhelming

Specific	This may be a discussion on what behavior would the patient like to tackle first – food choices, how much exercise, skipping meals
Measurable	How often will you implement this change? With a goal of 150 minutes a week where will the patient like to start? walking, dancing, group exercises – step counters may be a simple way to measure and help motivate the patient
Attainable	Keep it realistic – if the patient is not exercising at all, maybe start with 10 minutes a day. Try to keep it to one or two things the patient feels comfortable changing. Don't try and do all at once. Little changes make a difference!
Relevant	How relevant is it to the patient? Non-judgmental conversation - the ruler method may help gauge patient motivation Scale from 1 to 10
Time Bound	What is feasible to the patient? Lose 7% of weight 3 to 6 months? In Carmen's case we are talking about 14 pounds. How much does she think she can loose by decreasing caloric intake, modifying food choices, serving sizes? – What is she willing to change? – Let the patient lead the way.

# Follow Up- Evaluate Progress, Re-enforce Support, Encourage Team Based Care

- More frequent for DSME and support – every 2 weeks
- Medication tolerability- reconciliation should be done at every visit – high touch can avoid MRP every 2 weeks
- Emotional well-being, tolerability of medications, monitor glycemic status- if POC available measure A1C to help patient motivation as well even if its before 3 months, BP for efficacy of HTN regimen will also reinforce adherence but important to clarify maintenance to patient
- Patient progress on changes agreed to in SMART goals – lipids take longer than A1C to modify – a change in food choices may be helpful to patient – unsaturated fats vs saturated fat food choices
- Community resources – what has the patient tapped into- evaluate progress on support for the patient. Do they need more support?
- Evaluate what changes were comfortable for the patient from those recommended  
Communications with the team – PCP, RD, CDCES, Community health workers

# COMING UP NEXT:

## SESSION 2:

Nutrition, Dietary Choices and Lifestyle Changes

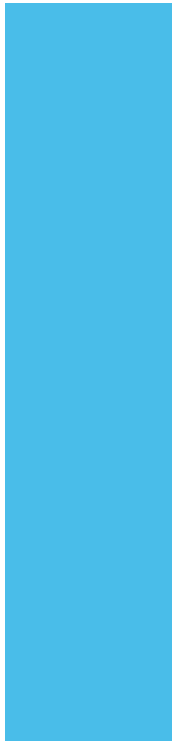
## DATE:

May 14, 2020 at 1:00 – 2:15 pm EDT

Registration Link:

<https://attendee.gotowebinar.com/register/4005408015980884236>





## Q&A

If you would like to ask the presenter a question, please submit it through the questions box on your control panel.

If you are dialed in through your telephone and would like to verbally ask the presenter a question, use the “raise hand” icon on your control panel and your line will be unmuted.



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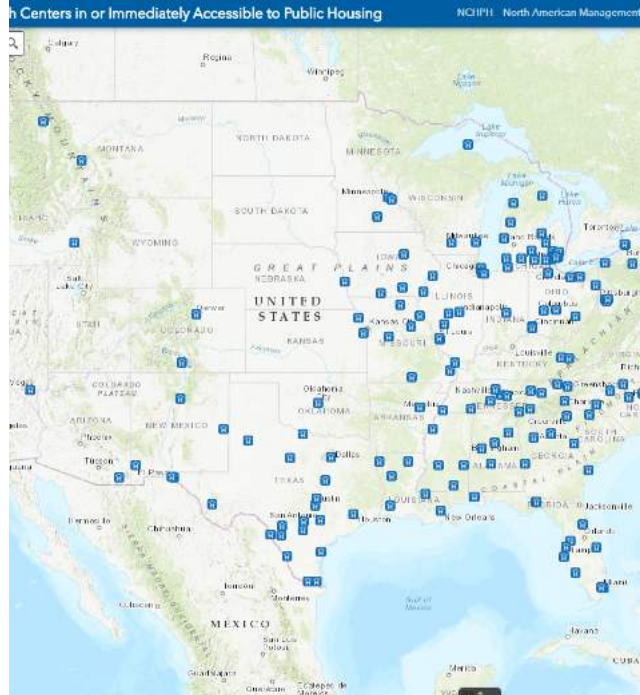
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**THANK YOU!**

