Gestational Diabetes

Changes & Challenges in Diabetes Care & Education
April 8-9, 2025

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No disclosures

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Learning Objectives

1. Understand the risk factors for gestational diabetes.
2. Identify the screening and diagnostic criteria of gestational diabetes.
3. Understand the potential risks of uncontrolled gestational diabetes.
4. Learn effective medical nutrition therapy and physical activity management strategies for gestational diabetes.

Definition of Gestational Diabetes Mellitus (GDM) 3

- Traditional: abnormal glucose tolerance first found in pregnancy.
- Newer (ADA): diabetes diagnosed after 15 weeks gestation.
- New definition: excludes diagnosis <15 weeks pregnancy - earlier dx likely type 2 diabetes.
- The American College of Obstetricians and Gynecologists (ACOG) : "a condition in which carbohydrate intolerance develops during pregnancy“.
- Estimated prevalence: 7.8 % in US up to 10 % in North America

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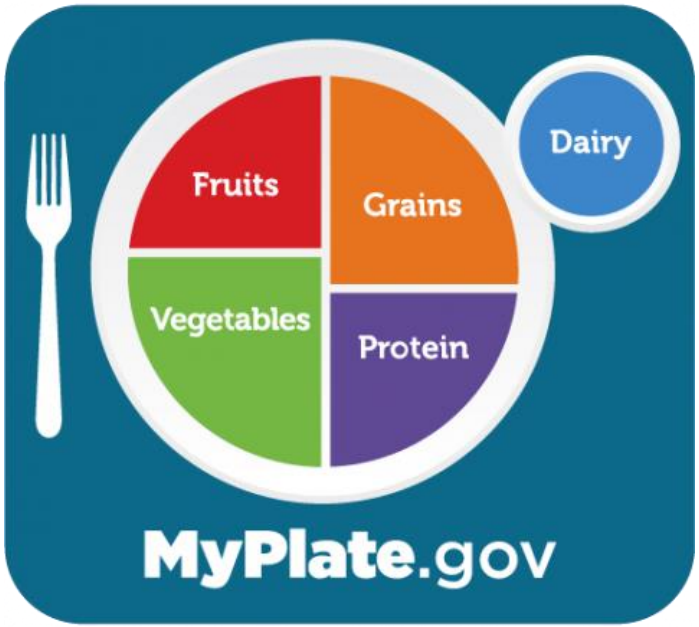
Other Terminology 4

Class A1GDM -

refers to diet-controlled GDM



Class A2GDM

refers to GDM where medications are required

Risk Factors for GDM 3, 12*, 13*

Pre-pregnancy:

- IFG (Impaired glucose tolerance) or elevated fasting glucose
- Prediabetes (24% of those of reproductive age 12*)
- Polycystic ovary syndrome (PCOS)
- BMI ≥30 kg/m^2 (~40% of those of reproductive age 13*)
- Age ≥35 years of age
- Previous birth of an infant ≥ 9 pounds
- GDM in a previous pregnancy (40 % risk of recurrence)

Risk Factors for GDM 3

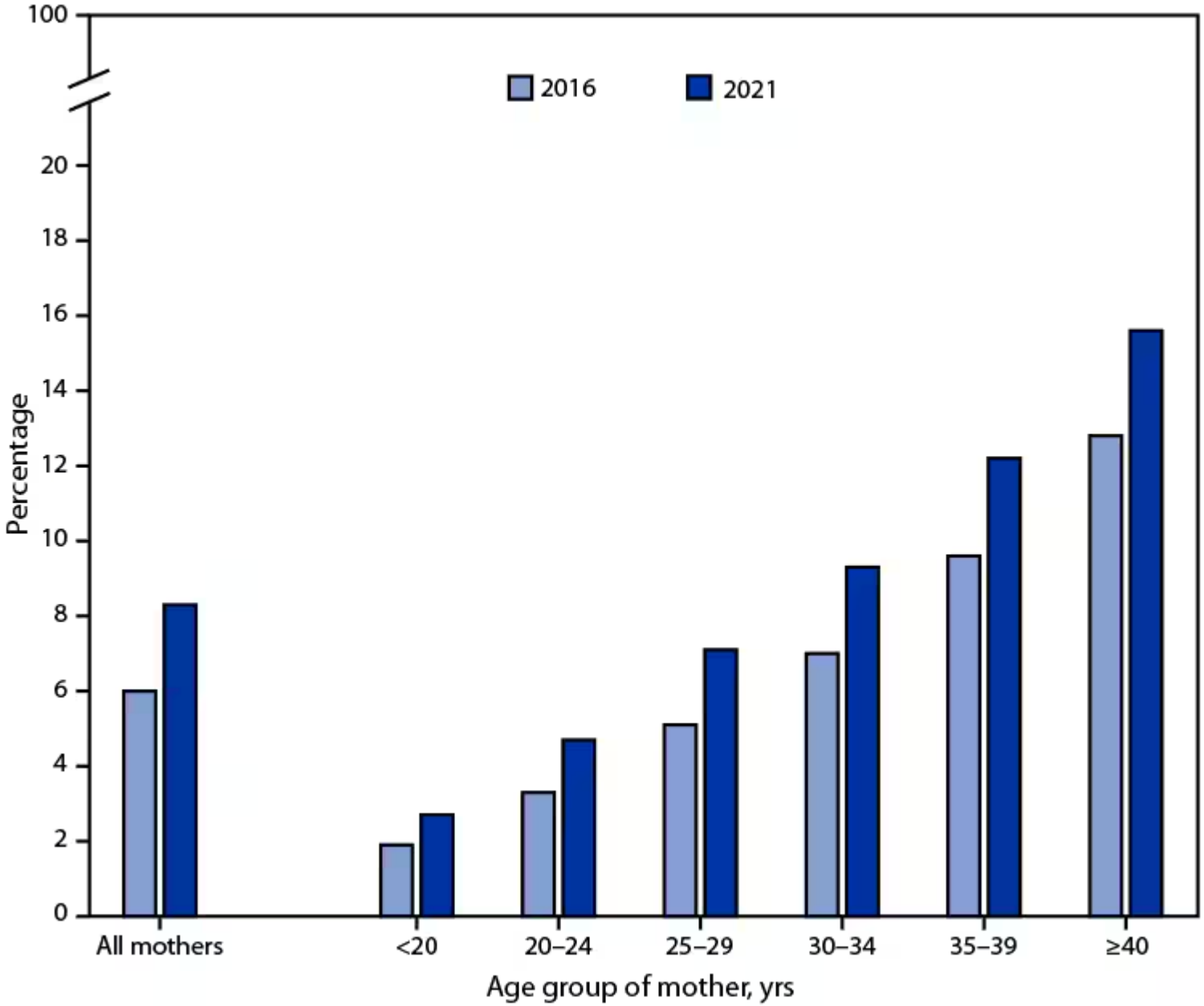
- Significant weight gain in early adulthood or between pregnancies
- Excessive weight gain in first 24 weeks of pregnancy
- Family history of diabetes, especially in 1st degree relative
- From group w/ high prevalence of type 2 diabetes:

  Hispanic American; Native American

  Native Alaskan or Native Hawaiian

  South or East Asian, Pacific Islander

Quick Stats: Percentage of Mothers with Gestational Diabetes,



Diagnosis Criteria – ADA, 2025 (1)

	FPG mg/dL	A1C %	OGTT 2-hr PG mg/dL	Random PG, mg/dl
Diabetes *	≥126	≥6.5	≥200	≥200 w/classic symptoms
Prediabetes	**100-125**	**5.7-6.4**	**140-199**	

*In the absence of unequivocal hyperglycemia, dx requires 2 abnormal test results.

General Screening and Diagnosis – ADA Standards 1

1. BMI ≥25 (≥23 if of Asian ancestry) PLUS 1 or more risk factors:

- **First-degree relative with diabetes**
- **High-risk group: African American, Latino, Native American, Asian American**
- **Hx of PCOS**
- **Physical inactivity**
- **Hypertension (≥130/80 mmHg or therapy for hypertension)**
- **Low HDL cholesterol level (<35 mg/dL) and/or high triglyceride level >250 mg/dL**
- **Conditions associated with insulin resistance (e.g., acanthosis nigricans, metabolic dysfunction–associated steatotic liver disease)**
- **History of cardiovascular disease**

General Screening and Diagnosis – ADA Standards 1

2. History of GDM

3. Prediabetes, IGT, or IFG

4. For all others, start testing at age 35 years

5. If results are normal, repeat testing a minimum of 3-year intervals

6. Individuals in other high-risk groups (e.g., people with HIV, exposure to high-risk medicines, evidence of periodontal disease, history of pancreatitis) should also be closely monitored

2025 ADA Standards: Screen 1

Pre-pregnancy **B**

- **Those planning pregnancy, screen those w/ risk factors**
- **Use standard dx criteria**

In Pregnancy, before 15 weeks gestation **B**

- **Test individuals w/ risk factors**
- **Use standard dx criteria**

In pregnancy, at 24–28 weeks **A**

- **Screen for GDM in all not previously diagnosed w/ diabetes or high-risk abnormal glucose**
- **Use GDM dx criteria**

2025 ADA Standards: Screen 1

Postpartum screening with hx of GDM

4-12 weeks:

- **Screen for prediabetes or diabetes**
- **Use 75-g OGTT & STANDARD nonpregnancy diagnostic criteria**

Lifelong

- **Screen for prediabetes or diabetes**
- **Every 1–3 years**
- **Use standard dx criteria**

Test your knowledge: Screen? When?

A) 31 y/o, not pregnant, annual OB/GYN visit, BMI 26, dad has type 2 DM, desiring pregnant

B) 28 y/o, not pregnant, annual OB/GYN visit, desiring pregnancy, BMI 24, Asian descent, had A1c of 5.8% one year ago

C) 21 y/o, 9 weeks pregnant, BMI is 30, mom has type 2 diabetes

D) 35 y/o, 8 weeks pregnant, BMI 23

E) 25 y/o, 24 weeks pregnant, pre-pregnancy BMI 22

F) 27 y/o, 9 weeks pregnant, BMI 20

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GDM Screening at 24-28 weeks 1

GDM diagnosis via either of 2 strategies:

- 1) One-step = 75-g OGTT (IADPSG criteria)

2) Two-step = a 50-g (non-fasting) screen; if positive, then 100-g OGTT

(Carpenter-Coustan criteria)

One Step: 75-g OGTT

1

Fast 8 hours

Check fasting plasma glucose (PG) then 1 & 2 hours after

Dx GDM if **ANY 1 VALUE** is

Fasting:	≥92 mg/dL
1 hour:	≥180 mg/dL
2 hour:	≥153 mg/dL

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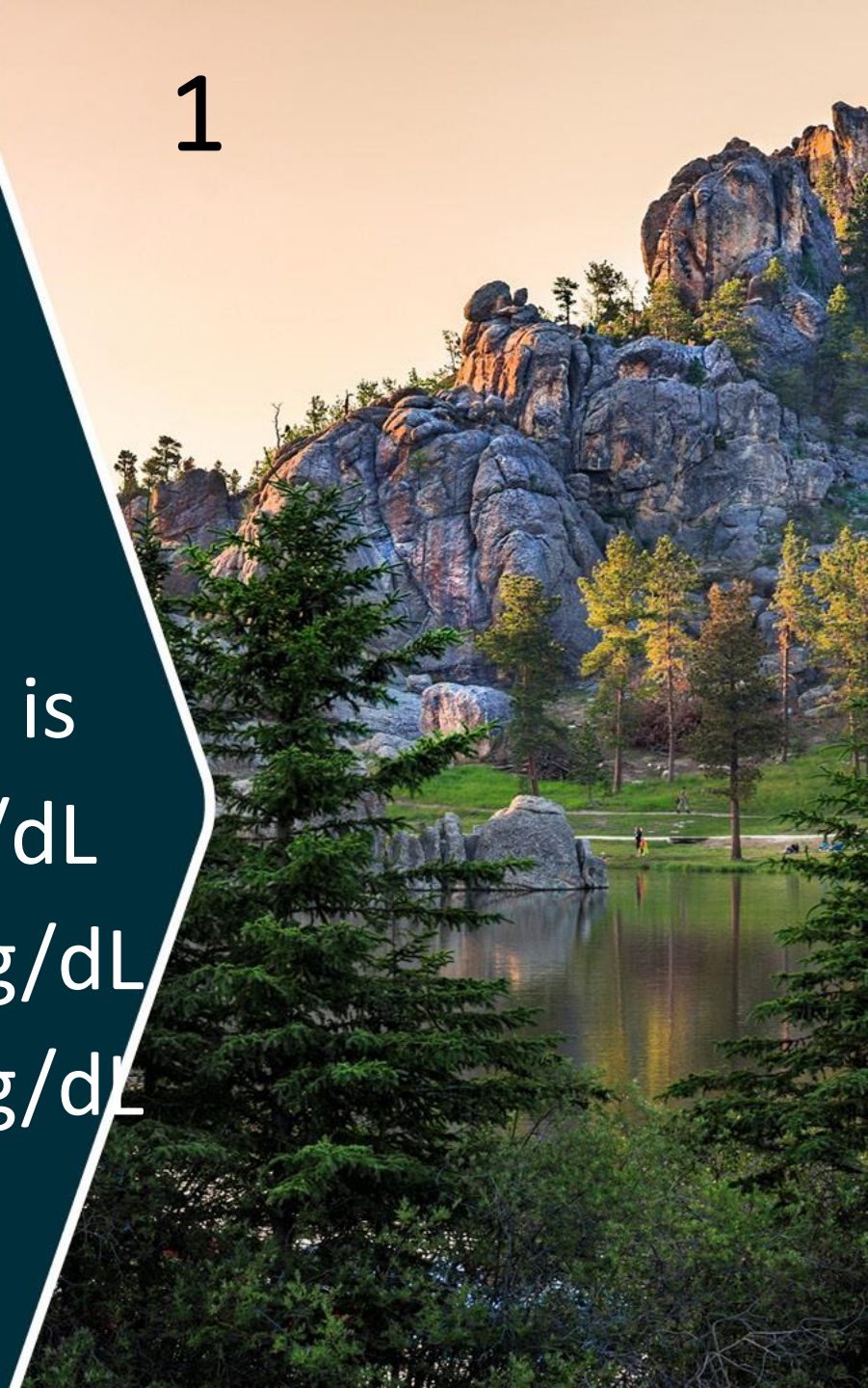

Two Step: 1st - 50g GLT (glucose load test) 1

Non-fasting state

Give 50 g glucose

Measure PG at 1 hour

Proceed to 2nd step if:

- **1 hour after PG is ≥ 130, 135, or 140 mg/dL**

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Two Step: 2nd – 100 g OGTT

Fasting state, check fasting PG

Give 100 g glucose

Measure PG at 1, 2 & 3 hours

Dx GDM IF AT LEAST 2* PG levels are

Fasting:	≥ 95 mg/dL
1 h:	≥180 mg/dL
2 h:	≥155 mg/dL
3 h:	≥140 mg/dL

* ACOG: 1 abnormal Value accepted

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A1c Note 1

A1C is not reliable for screening for GDM or for preexisting diabetes

- Not used 15 weeks of gestation or later
- Due to higher red blood cell turnover in pregnancy
- And unknown pre-pregnancy diabetes status

Potential Risks of GDM 14

Short-term

- Preeclampsia, gestational hypertension
- Polyhydramnios (excess amniotic fluid)
- Macrosomia or large for gestational age newborn
- Need for C-section

Potential Risks of GDM

Short-term – for offspring

- Fetal/neonatal cardiomyopathy
- Neonatal respiratory problems
- Neonatal metabolic problems (**hypoglycemia & hyperbilirubinemia the most common;** hypocalcemia, hypomagnesemia, polycythemia and hyper-viscosity syndrome)

Potential Risks of GDM

Long-term - maternal

- Diabetes mellitus (primarily type 2)
- Lifetime maternal risk for diabetes is

  50 to 60%

- Cardiovascular disease – higher risk & at a younger age, independent of DM status

Potential Risks of GDM

Long-term - for offspring

- Diabetes mellitus
- Obesity
- Hypertension
- Metabolic syndrome
- Possibly adverse neurodevelopment

Treatment


TRESIBA
FlexTouch
NovoLog FlexPen
Prefilled Syringe
textingmypancreas.com

Lifestyle Management

- 70-85% w/ GDM can mange with lifestyle modification alone (based on Two Step Criteria)
- Likely higher when dx is based on One Step Method 2
- One Step diagnoses 2x as many w/ GDM 3

1 Step ~ 16 %

2 Step ~ 8 %

Medical Nutrition Therapy 5,10

- Refer to a Registered Dietitian Nutritionist (RDN) for Medical Nutrition Therapy (MNT)
- MNT is primary treatment
- Ideally: 1st MNT visit in 1 week of referral
- Minimum of 3 MNT visits are recommended
- Post-partum MNT visit as well
- Monitor & evaluate: SMBG, food records, eating patterns, weight changes, physical activity, pharmacological therapies

Nutrition Therapy 2

- CONCEPTT Study (n-=325 planning pregnancy or already pregnant) found less than desirable nutrition quality
- **Patterns were high fat, low fiber, poor quality of carbohydrates; low fruit & vegetable, and 1 in 4 had micronutrient deficiency**
- Promote: fruits, vegetables, legumes, whole grains, nuts, seeds, fish and other lean protein, healthy fats
- Limit saturated fats, trans fats

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Nutrition Therapy 2,5

Recommended Dietary Allowance (RDA) for pregnancy

Minimum daily intake

- 175 g carbohydrate
- 71 g protein

  (RDA 1.1 g pro/kg or additional 25 g/day after the first trimester)
- 28 g fiber

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Energy Needs 6

•No increase in energy needs in first trimester

Energy Needs Increase in 2nd & 3rd trimesters:

- Increase of 340 kcal/d in the second
- Increase of 452 kcal/d in the third trimester

Energy – adequate to promote appropriate weight gain without ketosis

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Estimated Energy Requirements (EER) for pregnancy 8

Use pre-pregnancy + 342 kcals/d (2nd trimester) or 452 kcals/d (3rd trimester)

Calculate EER pre-pregnancy, for women aged 19 years and older, as follows:

EER = 354 – (6.91 x age [years] + PA x [(9.36 x weight in kg + 726 x height in m)]

PA = 1.0 for sedentary (physical activity level [PAL] is >1.0 but <1.4)

PA = 1.12 for low activity (PAL is ≥ 1.4 but < 1.6)

PA = 1.27 for active (PAL is ≥1.6 but < 1.9) PA = 1.45 for very active (PAL is ≥1.9)

BMI	**Kcals/kg using pre-gravid weight**		**Total Weight Gain Range in Pounds**		**Rate of Weight Gain, 2 & 3 Trimester, Pounds per Week**
	Single	Multiple	Single	Multiple	
<18.5 (underweight)	36-40	42-50	28-40	Insufficient info	1 (1.0 - 1.3)
18.5-24.9 (Normal)	30	40-45	25-35	37-45	1 (0.8 - 1.0)
25-29.9 (Overweight)	24	30-35	15-25	31-50	.6 (0.5 - 0.7)
➢ 30 (Obese)	Insufficient info		11-20	25-42	.5 (0.4 - 0.6)

Obesity and Pregnancy 5, 9

- **Weight loss not recommended 5**
- **Modest energy reduction of 30% of usual intake slowed weight gain without adverse outcomes 5**
- **Could also calculate EER and reduce by 30-33% to estimate needs in those that are obese 9**

Nutrition Therapy 2

Balance of all nutrients recommend

Avoid severely restricted diets

- Ketogenic – high fat, very low carb
- May enhance lipolysis & free fatty acids
- May worsen insulin resistance
- May cause fetal overgrowth due to calorie density

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Ketone Testing? 2, 5

Ketone Testing – guidelines vary:

- Use to identify those severely restricting carb 2
- Recommended if insufficient energy and/or carb intake and/or there is weight loss 5

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Nutrition Therapy 2

Other restrictive diets

- Paleo – restricts dairy
- Any high in saturated fats

Do recommend:

- Whole foods – fruit, vegetables, legumes, whole grains, lean protein, healthy fats, nuts, seeds & fish
- Limit: Processed foods, fatty red meat,
- Limit: sweetened foods and beverages

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Nutrition Therapy 5, 10

Academy of Nutrition & Dietetics Evidence Analysis Library (AND EAL):

In women with GDM, what impact does the amount of carbohydrate consumed (independent of dietary patterns based on the DASH diet and glycemic index) have on fetal/neonatal and maternal outcomes?

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Nutrition Therapy 5, 10

Carbohydrate-Quantity

Study 1: Carb 202g/day vs >270g/day

- 202g reduced PP glucose at all meals
- 270g CHO reduced PP glucose at 2 meals.

Study 2: CHO intake > 211g/day vs < 211g/day

- > 211g/day: Zero incidence of large-for-gestational age (LGA) infants
- <211g/day: 23% incidence LGA infants

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Nutrition Therapy 5, 10

Carbohydrate Quality

2 Studies

- Low glycemic index (GI) & medium GI diets
- Carb range of 36.7% - > 60% of caloiries
- Have been shown to have positive impact;
- Limited in that they were not compared to high GI diets.

Nutrition Therapy 5, 10

Carbohydrate Quality – DASH Diet vs Std

- Same macronutrient (40-50% Carb) prescribed
- Consumed: DASH 65%-67% Carb, higher fiber, less processed, less fat & sat. fat

DASH group

- Improved glucose tolerance
- Lower birth weights
- Lower rate of C-sections

Limited -2 studies

Nutrition Therapy 5, 10

Carbohydrate

- No ideal amount of carb in % of calories or number of grams
- Minimum of 175g/day
- Amount and Type *TOGETHER* important
- Studies: positive effects on glycemic control & maternal/fetal outcomes <u>WHEN BOTH ARE CONSIDERED</u>.

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Nutrition Therapy 5, 10

Carbohydrate - Individualize

- Amount and type
- Over 3 meals and 2-4 snacks
- Guide to whole food
- Guide to reduce refined carb and /or decrease total carb to meet glycemic targets

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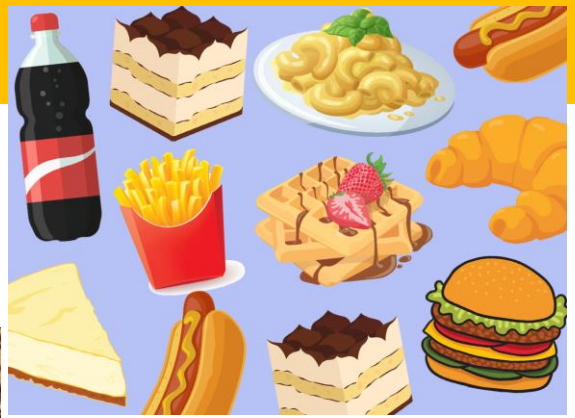
Regardless of Carb Amount

Minimize: refined carb with added sugars, fat and/or sodium



https://www.eatthis.com/wp-content/uploads/sites/4/2020/12/unhealthiest-foods-planet.jpg?quality=82&strip=1

Focus on high quality, nutrient dense Carb sources that are high in fiber & minimally processed

https://cdn1.sph.harvard.edu/wp-content/uploads/sites/30/2012/09/carbohydrates.jpg

Nutrition Therapy 5, 10

Carbohydrate

- Limit at breakfast to 15 – 30 g and/or use lower glycemic index (GI) foods; higher insulin resistance in AM
- Encourage HS snack to prevent ketosis (and hypoglycemia if on glucose lowering medication). Add protein at HS
- Redistribute carb over the day based on glycemic outcomes and patient preferences

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Nutrition Therapy 5, 10

- Protein 71g/day – protein w/meals and snacks
- Eating Patterns: DASH, Low or Medium GI, other
- Avoid alcohol
- Limit caffeine
- 10 cups fluids/day

High Intensity Sweeteners

- Choose only FDA approved or generally recognized as safe (GRAS)
- Limit her intake to the acceptable daily intake (ADI)

Safe Levels of Sweeteners –FDA

Adapted from FDA PDF

Brand Name Examples	Sweetener	# Packets/day consumed to meet ADI *
Nutrasweet® Equal® Sugar Twin®	Aspartame	75
Sweet One® Sunett®	Acesulfame Potassium (Ace-K)	23
Splenda®	Sucralose	23
Newtame®	Neotame	23
Advantame®	Advantame	4920
Sweet and Low® Sweet Twin®	Saccharin	45
Truvia®, PureVia®, Enliten®	Rebaudioside A (i.e., Stevia products)	27

* ADI – Acceptable Daily Limit

GRAS (generally recognized as safe)

- Steviol glycosides: from Stevia rebaudiana plant, commonly known as Stevia
- Swingle fruit extract commonly known as Luo Han Guo or monk fruit
- Thaumatin is a group of intensely sweet basic proteins isolated from the West African Katemfe fruit).

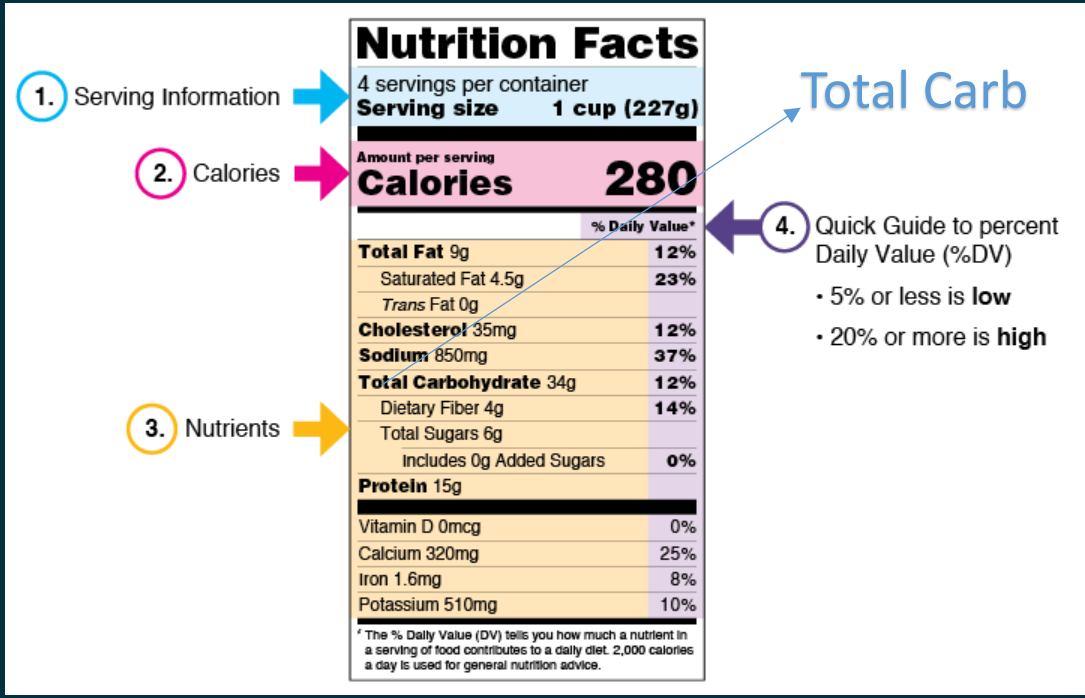
GRAS List: Other Sugar Substitutes

- Sugar alcohols: FDA approved

(sorbitol, xylitol, lactitol, mannitol, erythritol, and maltitol)

- Other: Sugars that have the chemical definition of a sugar, but they are metabolized, or used by the body, differently than traditional sugars like sucrose. GRAS are D-allulose (also referred to as D-psicose), D-tagatose, and isomaltulose

Carb Counting – Advanced skill



Label graphic from https://www.accessdata.fda.gov/scripts/interactivenutritionfactslabel/assets/InteractiveNFL_TotalCarbohydrate_October2021.pdf

Meal Planning Methods

Carbohydrate Counting Grams or Choices

(1 choice = 15 grams)

Minimum of 175 grams of carbohydrate daily						
	Breakfast	**Snack**	**Lunch**	**Snack**	**Dinner**	**Snack**
Grams	**30**	**15**	**45-60**	**15**	**45-60**	**15-30**
Choices	**2**	**1**	**3-4**	**1**	**3-4**	**1-2**

Meal Planning Methods

Carbohydrate Counting Grams or Choices

(1 choice = 15 grams)

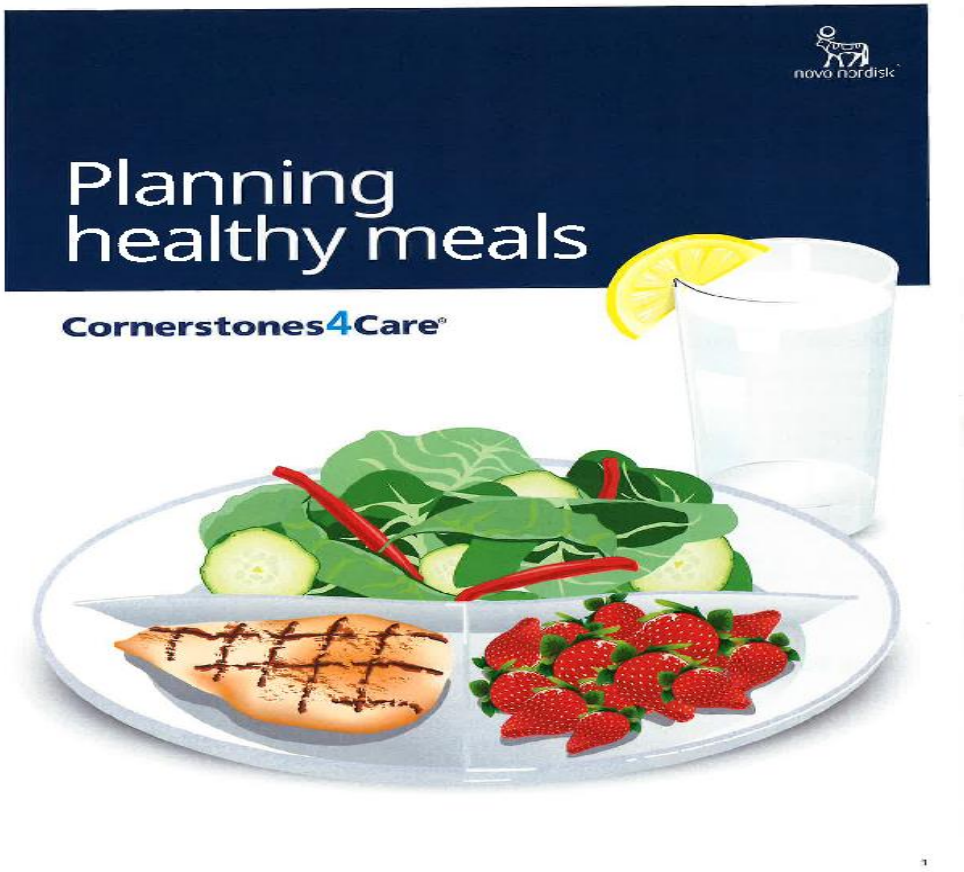
Minimum of 175 grams of carbohydrate daily						
	Breakfast	**Snack**	**Lunch**	**Snack**	**Dinner**	**Snack**
Grams	**30-45**	**15**	**45**	**15**	**45-60**	**15-30**
Choices	**2-3**	**1**	**3**	**1**	**3-4**	**1-2**

Meal Planning Methods

Carbohydrate Counting Grams or Choices

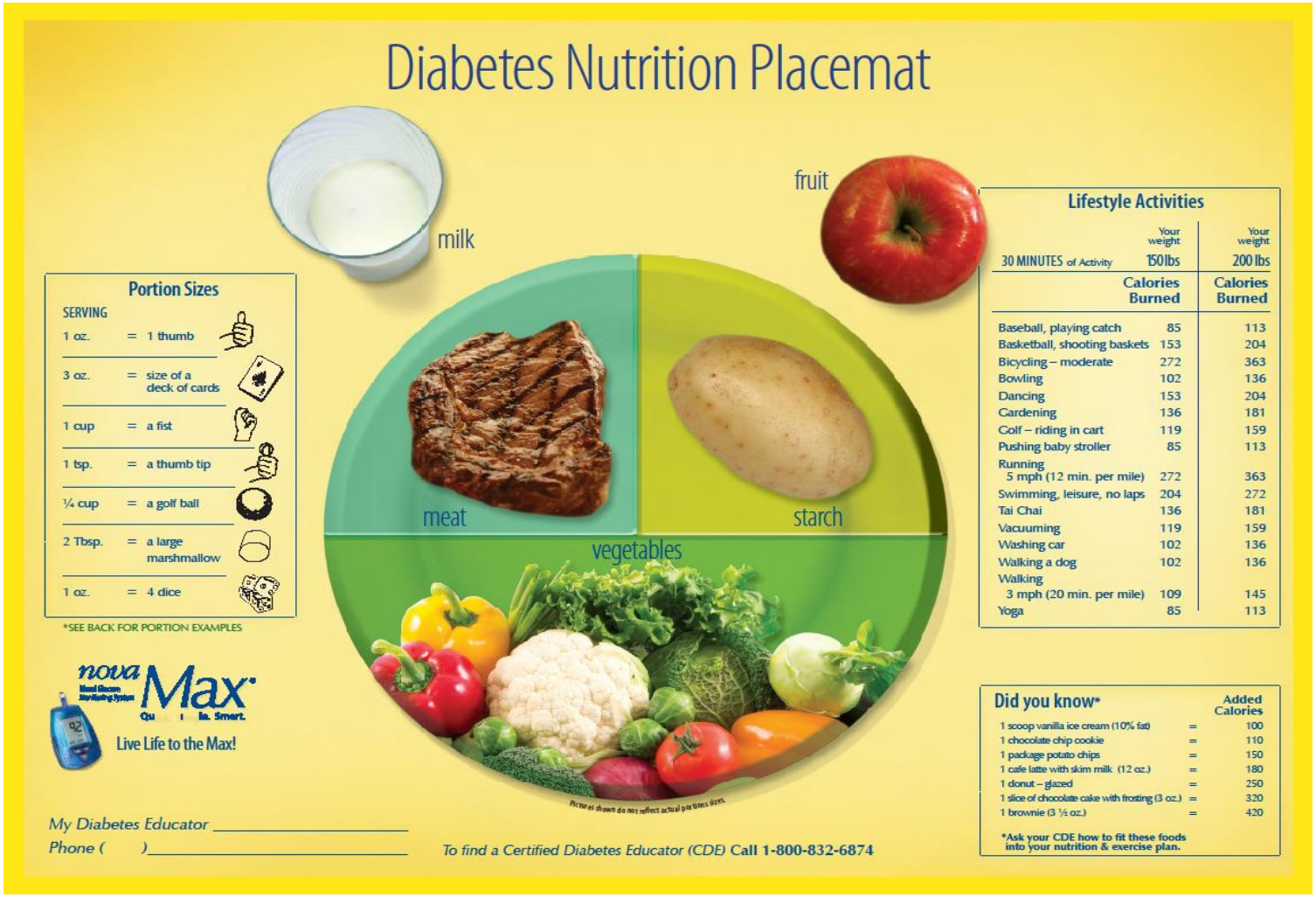
(1 choice = 15 grams)

Minimum of 175 grams of carbohydrate daily						
	Breakfast	**Snack**	**Lunch**	**Snack**	**Dinner**	**Snack**
Grams	**30**	**30**	**30**	**30**	**30**	**30**
Choices	**2**	**2**	**2**	**2**	**2**	**2**



Teaching tool from Novo Nordisk

https://www.novomedlink.com/content/dam/novonordisk/novomedlink/new/diabetes/patient/disease/library/documents/planning-healthy-meals.pdf



From Nova Max
http://www.novacares.com/downloads/

Targets for Gestational Diabetes:
Fasting / Before Meals - < 95
1 hour After Meals - Less than 140
2 Hours After Meals - Less than 120

Date	Breakfast			Lunch		Supper		Comments
	Carb grams	Fasting/ Before	After	Carb grams	After	Carb grams	After	

Physical Activity (PA)

- Lowers blood glucose
- Reduces need to start insulin
  or ↑ insulin doses
- Improves fitness
- Reduces risk for excessive GWG & increases post-partum weight loss

Gestational Weight Gain

Physical Activity

2

- Recommendations are 150 minutes/week
- Aerobic, moderate intensity
- Spread over the week

- Aerobic vs resistance: insufficient data to suggest which type has most impact on outcomes
- Seek guidance from OB/Provider before big changes

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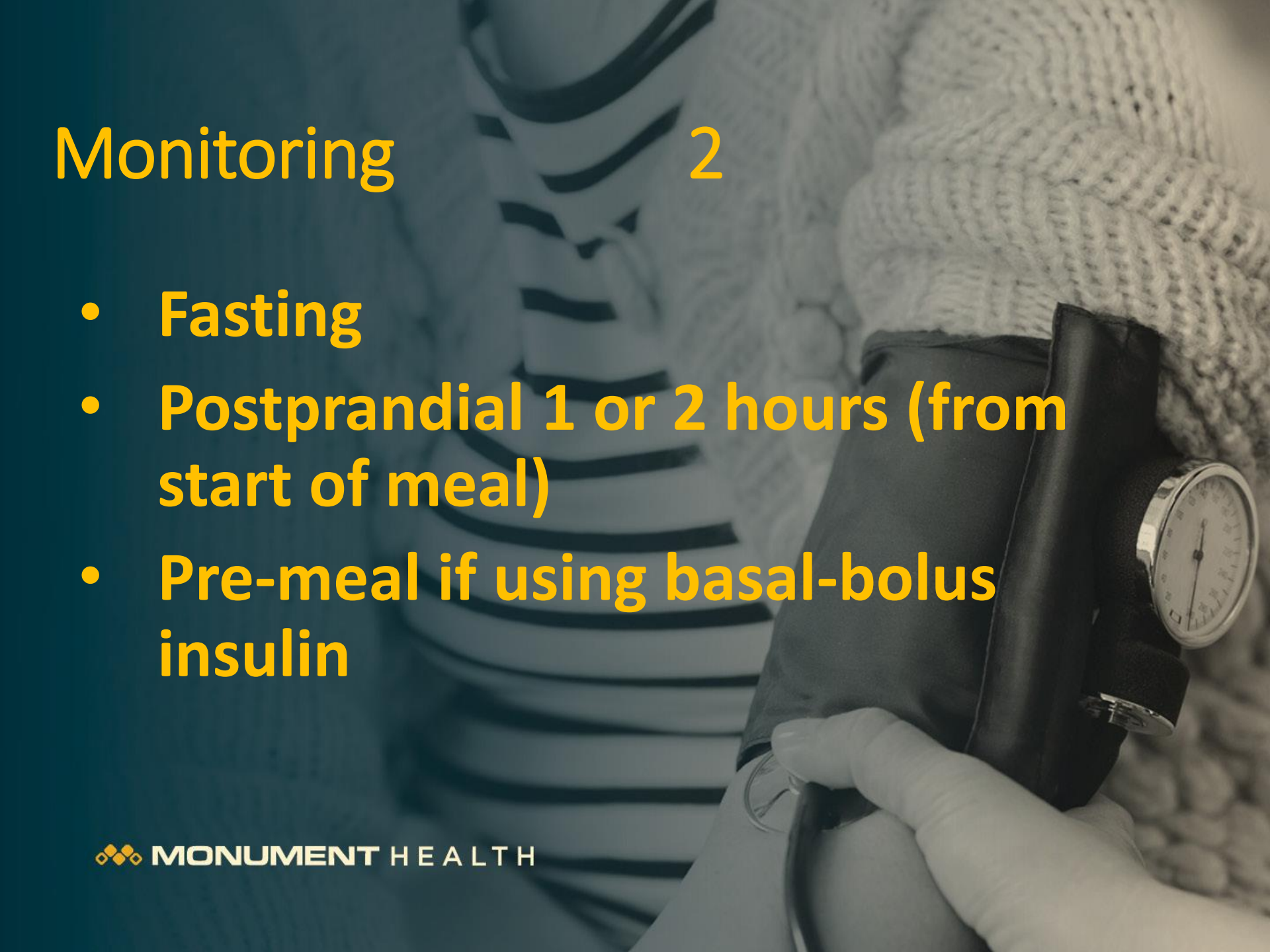
Monitoring 2

- **Fasting**
- **Postprandial 1 or 2 hours (from start of meal)**
- **Pre-meal if using basal-bolus insulin**



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Blood Glucose Goals 2

Glu	GDM Not On Insulin	GDM On Insulin
Fasting	< 95 mg/dL	70-95 mg/dL
1-h Post-prandial	< 140 mg/dL	110-140 mg/dL
2-h Post-prandial	<120 mg/dL	100-120 mg/dL

Adapted from Table 15.2, Chapter 15, Management of Diabetes in Pregnancy: Standards of Care in Diabetes - 2025

A1c in GDM 2

- < 6.0% in 2nd & 3rd trimesters has lowest risk of LGA, pre-term delivery, preeclampsia

  (large for gestational age)
- Is rarely checked in GDM
- If available, goal < 6.0%
- Is secondary measure after SMBG, due to increase in RBC turnover, & it may not fully capture PP hyperglycemia ➔ macrosomia

CGM in GDM 2

- Has been found to be beneficial in Type 1 diabetes
- Insufficient data to support use in GDM but may be useful outside of T1
- Choose to use based on individual circumstances, preferences, needs
- International Consensus on TIR (time in range), suggests the **same CGM glucose goal ranges** as in T1 DM w/ pregnancy but **cannot quantify the goal for time in each range** due to lack of data

CGM Goals in T1 DM & Pregnancy 2

Goal Sensor Glucose Range 63-140 mg/dL, **TIR, goal >70%**

TBR (<63 mg/dL): Level 1 **TBR, goal < 4%**

TBR (< 54 mg/dL): Level 2 **TBR, goal < 1%**

TAR (>140 mg/dL): **TAR, goal < 25%**

Insufficient data for GDM (or T2 DM)

TIR: Time in range TBR: Time below Range
TAR: Time Above Range

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Medications in GDM 2

- Insulin is preferred/recommended
- Metformin and glyburide are not recommended as first-line therapy; known to cross the placenta; data on long-term safety is of concern.
- Oral agents may be of use in those who are unable to use insulin safely or effectively due to cost
- Adjust meal plan for medications, if needed

Upcoming CEU: Empowered Care in GDM: Overcoming Bias and Supporting High-Risk Populations During Pregnancy

April 17, 2025 from 1:00 PM to 02:15 PM ET for a live, 75-minute webinar,

LEARNING OBJECTIVES

• Biases in health care delivery that impact the management of GDM in high-risk populations, with a focus on improving communication and trust-building.

• Evidence-based strategies for GDM management during pregnancy, including nutrition counseling, glucose monitoring, and pharmacotherapy tailored to the unique needs of high-risk communities.

•Team-based care that addresses the specific social and economic barriers faced by women in high-risk populations during pregnancy.

•Sponsored by American Diabetes Association

- https://professionaleducation.diabetes.org

Questions?

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