GDM & DM ANTEPARTUM MGMT

FLAME LECTURE: 29A

LO/STELLER 1.26.24

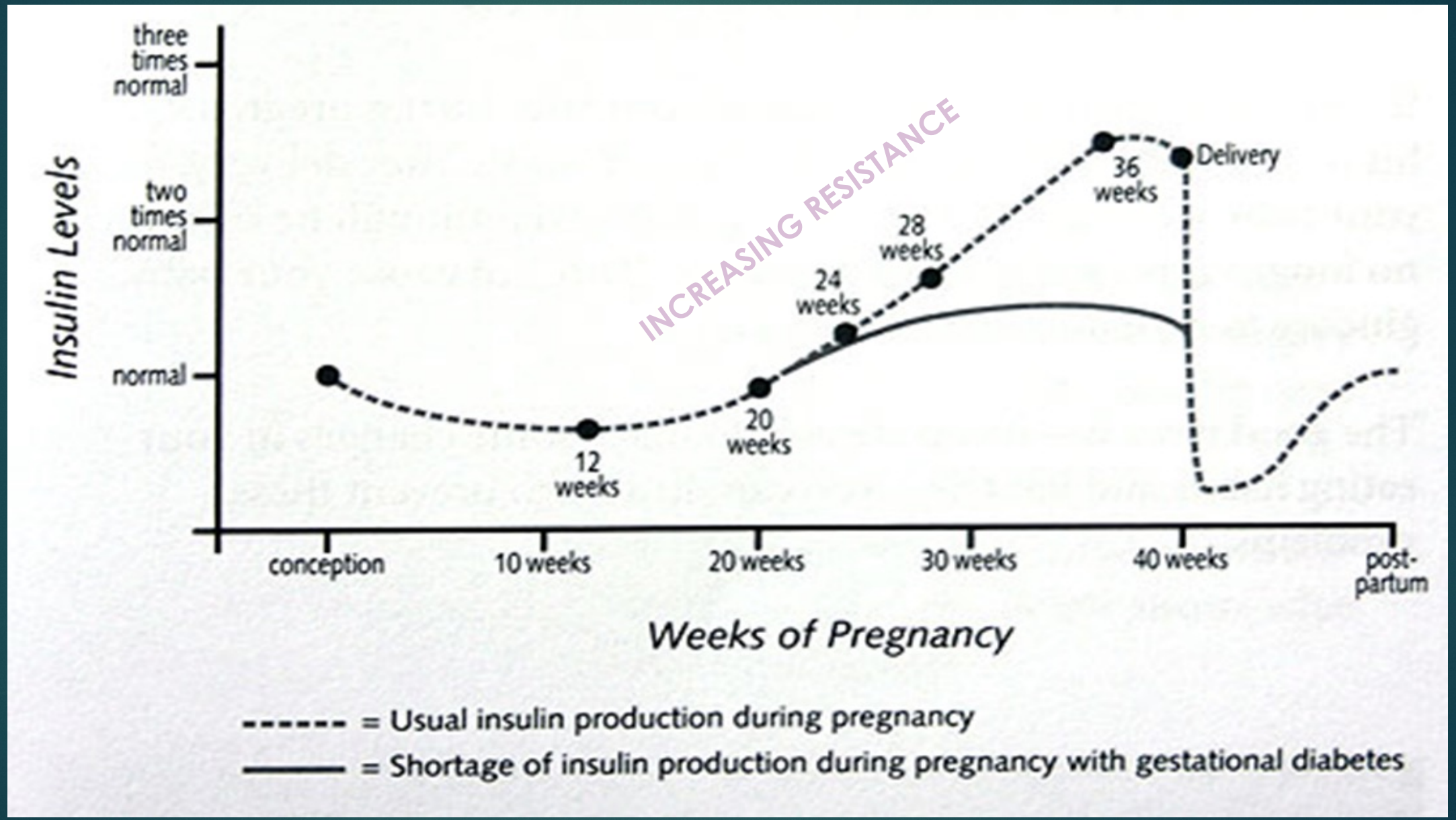
LEARNING OBJECTIVES

- To understand how gestational diabetes and DM complicates a pregnancy
- To describe the antepartum management of gestational diabetes and diabetes
- Prerequisites:
  - NONE
- See also – for closely related topics
  - FLAME LECTURE 26A/B: GDM/DM Epidemiology & Screening
  - FLAME LECTURE 29B: GDM/DM PARTUM/POSTPARTUM MGMT

ANTEPARTUM MANAGEMENT

- Pts with GDM or DM should keep logs recording both fasting sugars & either 1- or 2-hr post-prandial sugars after each meal
  - Fasting target: <95 mg/dL
  - 1-hour postprandial target: <140 mg/dL
  - 2-hour postprandial target: <120 mg/dL
- Keeping logs of the food consumed throughout the day adds further nuance to the interpretation

INSULIN REQUIREMENTS DURING PREG



HEALTHY BEHAVIORS

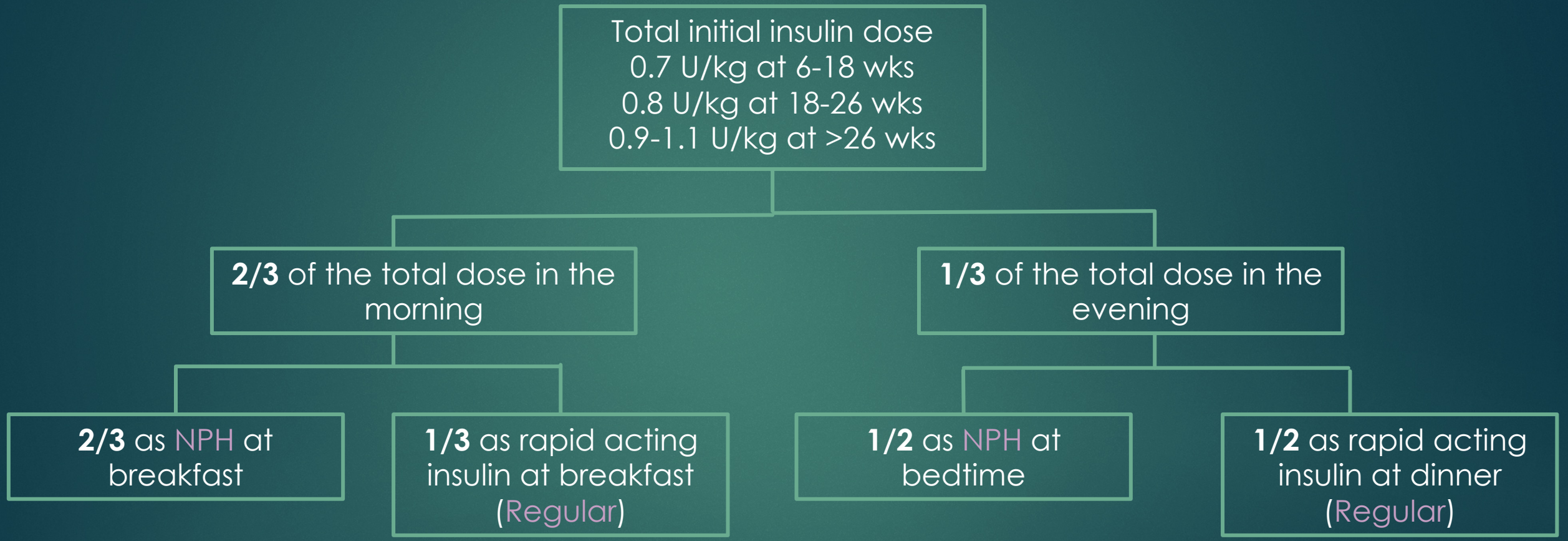
- Complex carbohydrates are better than simple carbohydrates given they are digested more slowly
- Recommended minimums: carbs 175g, protein 71g, fiber 28g
  - Breakfast: 15-30g total carbs / Lunch: 45-60g total carbs
  - Dinner: 45-60g total carbs / Snacks: 15-30g total carbs
- Sugar-free foods have less carbs
- Saturated fats can worsen insulin resistance
- In the absence of medical/obstetric restrictions, recommend >30 mins of moderate intensity physical activity >5 days/week
- Walking 15 minutes after meals decreases insulin needs

ANTEPARTUM MANAGEMENT

INSULIN

- If patient is unable to be adequately controlled with diet and exercise, insulin is the standard of care
  - There is NO specific threshold for starting treatment, so clinical judgement is necessary when there is sustained elevation of sugars
- Insulin does NOT cross the placenta
- The following slides show standard protocols for initiation of long- and short-acting insulin, however, if there are only isolated elevations at specific times of day, protocols can be customized
  - For example, patients with only elevated fasting levels may only just require night-time long-acting insulin

HISTORICAL INSULIN DOSING



- For less aggressive starting doses, 0.5, 0.6, 0.7 U/kg by trimester may also be considered
- Lispro and Aspart are now recommended to be used preferentially over Regular given faster onset of action, but then you are not receiving a rapid-acting insulin for lunch with this protocol
- In Latino women, consider adjusting the long-acting insulin to ½ in morning and ½ at night

MODERN INSULIN REGIMENS

Total initial insulin dose
0.7 U/kg at 6-18 wks
0.8 U/kg at 18-26 wks
0.9-1.1 U/kg at >26 wks

40-50% of the total dose as basal 1-2X daily (Glargine, Detemir, NPH)

50-60% of the total dose as rapid-acting split into THREE meals (Aspart, Lispro)

- For less aggressive starting doses, 0.5, 0.6, 0.7 U/kg by trimester may also be considered
- The ADA recommends rapid-acting should be split into 7 parts with 3 of those parts being at breakfast, 2 at lunch, and 2 at dinner; and even considering giving half of the basal insulin at bedtime, and splitting the other half up to be given pre-prandially with meals

ANTEPARTUM MANAGEMENT

INSULIN

- The bottom line with insulin regimens is that they can range from simple (i.e. only basal once a day) to very complex (counting carbs and also checking pre-prandials to calculate insulin needs based on carb ratios and correction factors), BUT, the proper insulin regimen should be WHAT THE PATIENT WILL BE COMPLIANT WITH
  - Often times, a simpler regimen that the patient is capable of performing is best! ("Better is the enemy of good")
- Try and individualize the regimen to the patient
  - Ex. If one has a small breakfast and a large dinner, then reduce dose for breakfast by 10-20% and increase dose for dinner by 10-20%
  - Ex. If a patient works the night shift, flip the timing of dosages. The basal "before bed" insulin will now be given before bed in the AM

ANTEPARTUM MANAGEMENT

INSULIN

- As mentioned previously, for capable pts who require complex/strict control, checking pre-prandial sugars, and adding *carb ratios* and *correction factors* can be implemented
  - However, this is beyond the scope of these FLAMEs
- Further, continuous subcutaneous insulin infusion therapy (insulin pumps) can be considered to provide basal/bolus administration in some patients
- Hospital admission should be considered for poor control, especially during organogenesis

ANTEPARTUM MANAGEMENT

METFORMIN

- Oral medications such as metformin and glyburide have been used despite no FDA approval for these medications
- Metformin is a biguanide that inhibits hepatic gluconeogenesis and glucose absorption, and stimulates glucose uptake in peripheral tissues
  - But it crosses the placenta where it can similarly affect the fetus and there is not robust long-term safety analyses
    - Given that Metformin has been increasingly used as an adjunct to cancer regimens for its antineoplastic effects on rapidly dividing cells, it deserves further long-term scrutiny
  - 26-46% of women started on metformin ultimately require insulin
  - Metformin is relatively contraindicated in pts with chronic renal disease
  - 2-45% of patients will experience abdominal pain and diarrhea

ANTEPARTUM MANAGEMENT

GLYBURIDE

- Is a sulfonylurea that binds to pancreatic beta-cell adenosine triphosphate potassium channel receptors to increase insulin secretion and insulin sensitivity of peripheral tissues
- Also crosses the placenta, and there may be increased associated risks of preeclampsia, fetal macrosomia, neonatal hypoglycemia, hyperbilirubinemia, and stillbirth
- The duration of action is also similar to that of Regular insulin making twice daily dosing problematic
  - Thus, it may be better used with meals to target postprandial hyperglycemia, and is not ideal for night-time use to help lower AM fasting glucose levels
- Should administer 30 minutes prior to meals
- Should NOT be used in patients with sulfa allergy

ORAL MEDICATION DOSING

GLYBURIDE

- Begin w/ 1.25 mg/day if maternal body weight < 200 lbs or 2.5 mg/day if > 200 lbs
- Give 30-60 minutes prior to breakfast
- Increase by 1.25 mg to 2.5 mg every 3-7 days
- Max dose 20-30 mg daily

METFORMIN

- Begin w/ 500 mg 1-2x/day with food
- Increase dose by 50 mg every 3-7 days as limited by GI side effects
- Max daily dose 2500 mg

ANTEPARTUM MANAGEMENT
OTHER NOTES

- Oral medications are often used instead of insulin in patients who decline insulin, or in those who are unable to safely administer or afford insulin
- Every patient on insulin should have a glucagon pen, and those closest to them should be instructed how to use it
- Initiate Aspirin 81-162 mg/day between 12-28 weeks to help prevent pre-eclampsia and continue until 1 week prior to delivery
- Aggressively treat patients with vomiting/hyperemesis or gastroparesis during pregnancy

ANTEPARTUM MANAGEMENT

OTHER NOTES

- Counsel the patient regarding nutrition, diet, and exercise and consider referral to registered dietician or diabetic educator
- Some patients with T1DM may have *hypoglycemic unawareness* (aka they don't become symptomatic with low glucose levels), so lows on logs should be scrutinized
- During times of illness or sustained sugars > 200 mg/dL, pts with DM should have *urine ketone testing strips* to monitor for impending DKA

ANTEPARTUM MANAGEMENT

ANTENATAL STEROIDS

- If there is concern for preterm delivery within 7-14 days, antenatal steroids may be considered
- If providing BMZ or dexamethasone <34 weeks:
  - Increase total daily dose by 20% on 1st day
  - Increase total daily dose by 40% on 2nd day
  - Increase total daily dose by 20% on 3rd day
  - Resume normal doses on 4th day
- Risks likely outweigh benefits to give antenatal steroids to patients with diabetes between 34-36 6/7 weeks

ANTEPARTUM MANAGEMENT

HYPOGLYCEMIA

- Causes: incorrect dosing, incorrect type of insulin administered, improper testing technique (not washing hands, squeezing fingertips), expired test strips, change in exercise/activity levels, illness
- Symptoms: irritability, hunger, sweating, anxiety, palpations, clammy skin, trembling, confusion, headache, seizure, coma
- Treatment: 15:15 rule
  - Give 15g of fat free carbs (juice) and recheck in 15 minutes
  - If sugars or patient not responding, give glucagon

ANTEPARTUM SURVEILLANCE

FIRST TRIMESTER

- Baseline pre-eclampsia labs:
  - CBC, ALT, AST, creatinine, 24-hour urine protein or P:C ratio
- For pre-existing diabetics:
  - Serial HgbA1c (and every 8-12 weeks after)
  - Lipid studies
  - Thyroid function studies (TSH)
  - Electrocardiogram (EKG)
  - Also consider referral to ophthalmologist, endocrinologist, cardiologist, or nephrologist PRN

ANTEPARTUM SURVEILLANCE
SECOND TRIMESTER

- Regardless of previous genetic screening (1st trimester screen or cell free DNA), consider offering maternal serum AFP to evaluate for neural tube defects
- Detailed anatomy ultrasound at 18-20 weeks
- Fetal echocardiogram indicated if Hgb A1c > 6.5, or concern on detailed anatomy US for a possible cardiac defect

ANTEPARTUM SURVEILLANCE
THIRD TRIMESTER

- Serial growth US indicated between 32-39 weeks or PRN sooner to evaluate for both macrosomia and fetal growth restriction
- 1-2 times/week fetal NST/AFI starting at 32 weeks to evaluate for fetal acidemia with hopes of decreasing risk of stillbirth
  - If patient has a history of DKA in pregnancy or hx of vasculopathy/HTN, start the NST/AFI weekly testing at 28 weeks

RESOURCES

- ACOG Practice Bulletin #190: Gestational Diabetes Mellitus (2018)
- ACOG Practice Bulletin #201: Diabetes Mellitus (2018)