

# Updates in Gestational Diabetes

## HIPP Clinic

(Hyperglycemia in Pregnancy Program)

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# Objectives

- Present diagnostic criteria for diagnosis of Pre-existing Diabetes and Gestational Diabetes
- Present SRSU protocols for GDM/DM Screening in pregnancy
- Review pearls of therapeutic interventions in Diabetic Pregnancy
- Update on HIPP (Hyperglycemia in Pregnancy Program) Clinic and resources
- Review preconception goals

# Old Protocol at NNMC

- First prenatal visit
  - Screen for pre-existing diabetes: HbA1C
    - $\geq 6.5\%$  at  $\leq 20$  weeks
  - Screen for gestational diabetes: 1Hour GCT
    - 3Hour GTT for diagnosis if elevated
- 24-28 wks
  - Re-screen for gestational diabetes: 1Hour GCT
    - 3H GTT for diagnosis if elevated

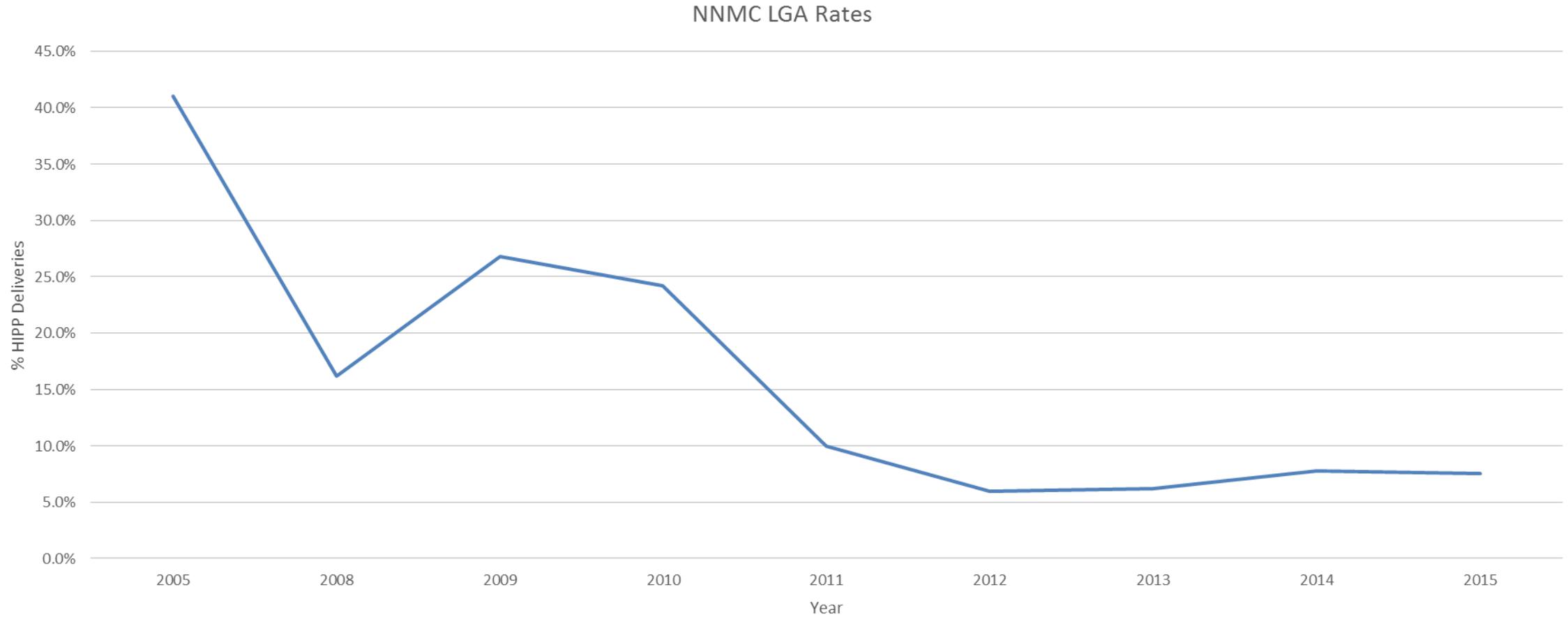
# Before the HIPP Days.....

Our 2005 NNMC statistics .....

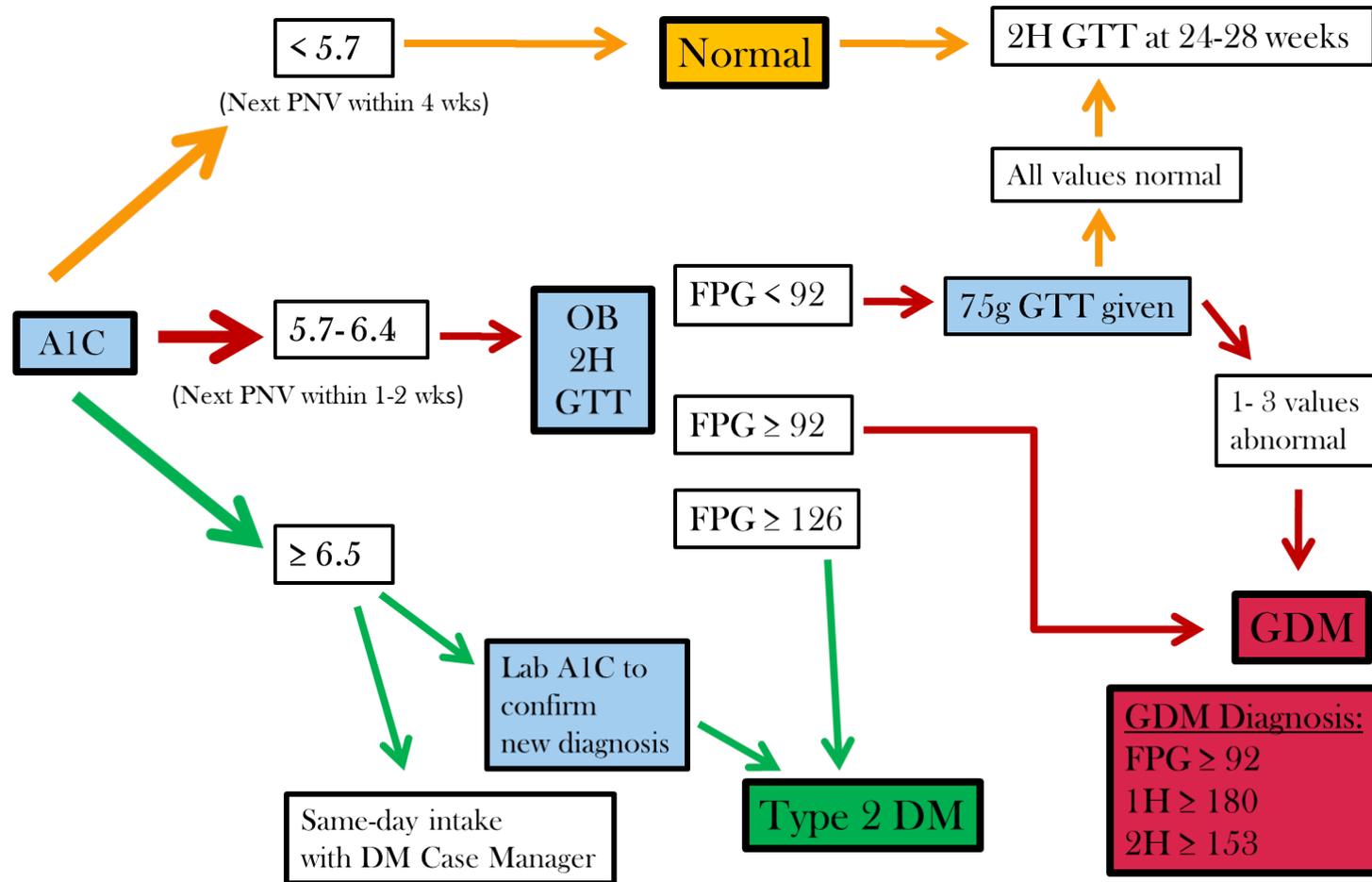
- LGA rate 45% in GDM patients
- Dx to intervention lag time = 30+ days
- 'Intervention' was not unified or coordinated.
- Case Manager program established.....

Fast forward..... One step (sorta) testing began....in 2011.....

# Case Management Effects



# Initial Prenatal Intake (<24 Weeks)



# Goal of intake A1C: Early Intervention

HbA1C*	% Malformations	RR (95% CI)
<6	3.0%	1.0
6.1-9.0	5.2%	1.7 (0.4-1.7)
9.1-12.0	4.3%	1.4 (0.3-8.3)
12.1-15.0	38.9%	12.8 (4.7-35.0)
>15.0	40.0%	13.2 (4.3-40.4)

## Glucose Control and Malformations

\*1st trimester HbA1c in 303 insulin-requiring diabetics

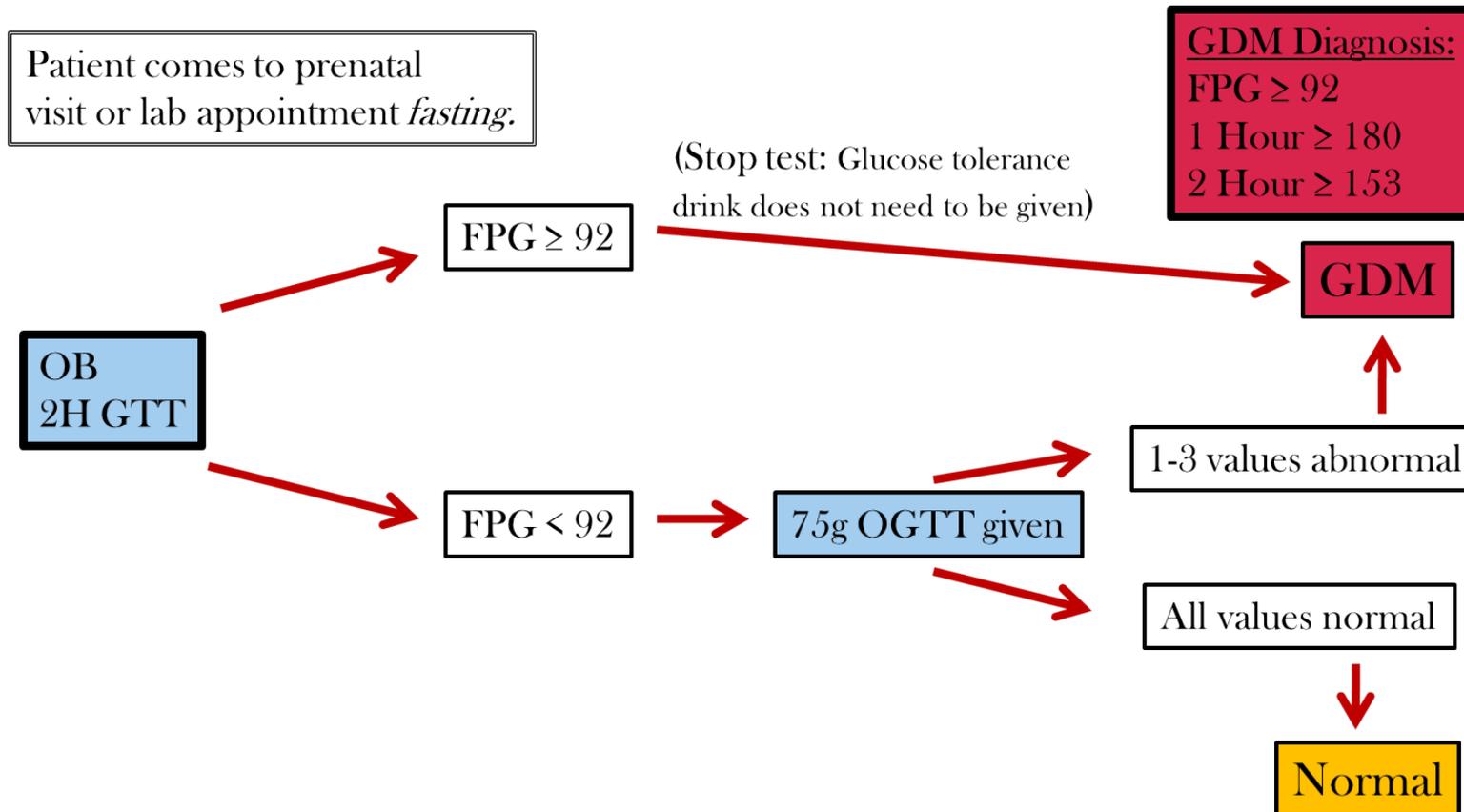
(Green et al. Teratology 39:224-231, 1989)

# GDM 2H Glucose Tolerance Test

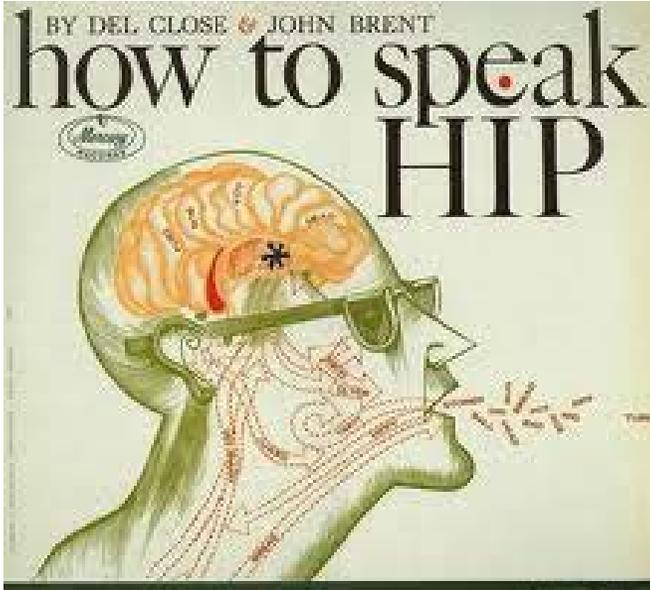
- 75 mg glucose tolerance beverage
- Patient must fast overnight for at least 8 hours prior to test, remain seated, and no smoking
- Abnormal venous plasma values during pregnancy:
  - FBG > 92 mg/d
  - 1 hour > 180 mg/dl
  - 2 hour > 153 mg/dl
- If one or more values are met or exceeded treat for gestational diabetes

# 24-28 Week GDM Screening

- 75 gram OGTT: fasting, 1Hour, 2Hour levels



# HIPP Days are Ahead! ....



Hip (hĩp) :

- a. Keenly aware of or knowledgeable about the latest trends or developments ...
- b. Usually used to begin a cheer ...

# Hyperglycemia in Pregnancy Program (HIPP)

- Multidisciplinary patient-centered
- One-stop shopping
- Comprehensive Prenatal & Diabetes Care
  - DM Standards of Care Assessments
  - Frequent glycemic control assessments
  - Insulin Titration
    - Various methods of communication
  - MD/CNM/CDE/RD/PT/MSW



# Prenatal visit at HIPP

## **GDM Nurse Case Manager**

- Glucometer review
- Insulin titration
- Antenatal Monitoring

## **Dietitian**

- Nutrition counseling and follow-up

## **MD or CNM consultation**

- BP check, Urine dip
- Fetal heart tones, Fundal height measurement
- Management of co-morbidities (CHTN, etc)
- Growth ultrasound

## **Other**

- Lab testing: A1C, PEC labs, 24H urine collection
- Case Management, Social Work



# Antenatal Management Best Practices

- Self Care Education & Support
- Home glucose monitoring:
  - Fasting (60-89), 1-hour post-prandial (100-129)
  - Controlled:  $\geq 80\%$  of levels within goal
- Medical Nutrition Therapy Counseling
- Physical Activity Support
- Care Coordination
- Creative Services & Scheduling



# Medical Nutrition Therapy

- Determine weight goals
- Develop individualized, nutritionally balanced meal plan
- Provide nutrition education
- Achieve and maintain optimal glycemic control
  - Limit hypo/hyperglycemia
  - Prevent excessive weight loss or gain

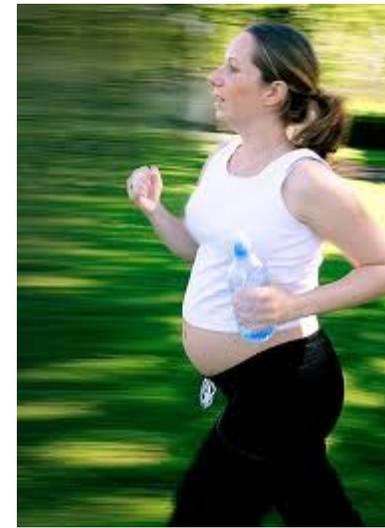
# Basic GDM Meal-planning Guidelines

- Carbohydrates (CHO) Focus
  - milk, starches, fruit & starchy vegetables
- CHO 40-45% of kcal/day (about 200- 250 grams of CHO/day)
- Minimum CHO/day = 180 grams (12 servings)
- Eat 3 meals and 3 snacks per day
  - Bedtime snack is important
- Space meals evenly 2-3 hours apart
- No more than 10 hour between bedtime snack and morning breakfast



# Initiating Therapy

- Medical Nutrition Therapy (MNT)
  - 50-90% can be managed with this alone
- Exercise
  - Level I data to show that this lowers fasting and postprandial glucose levels
  - Aerobic, 20 minutes, 3x/week (10 min post meal daily)
- Insulin: The Gold Standard
  - Preferred regimen: long-acting insulin BID
  - with rapid-acting insulin analogue
  - **Detemir/NPH/Novolog**

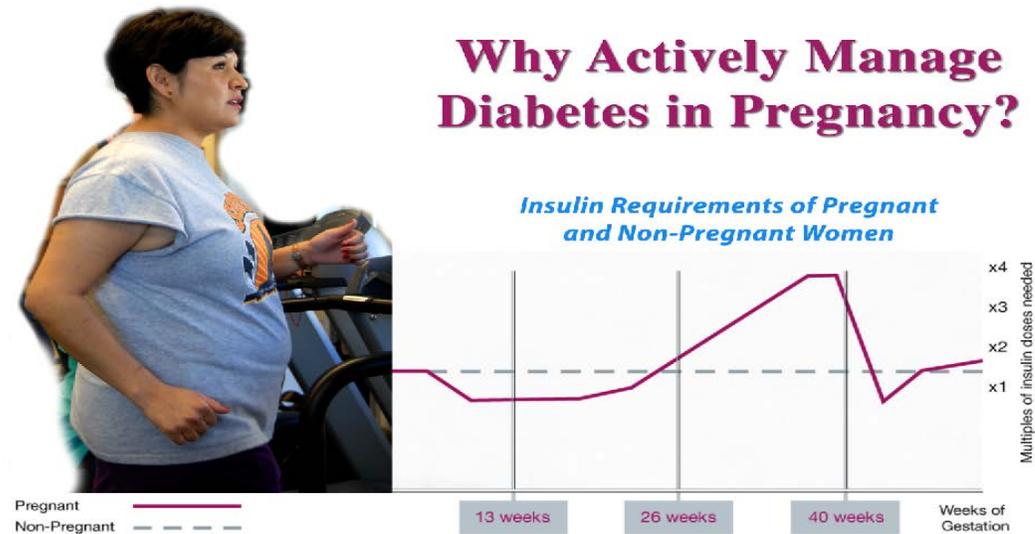


# Pearls of Insulin Titration

- When to start insulin?
  - 2-3 day trend of elevated FBS
    - FBS most predictive of neonatal outcome
  - 2 post meal values above target
    - Especially if there were no choice excursions
    - 150 is usually the trigger point
  - US eval BPD:AC Ratio
    - ABD fat suggestive of hyperglycemia

# Pearls of Insulin Titration (cont.)

- Evaluation & Titration Successes
  - Twice weekly eval until 80% in target
  - Titration Q 72 hours to prevent stacking



# Insulin Pumps

- Ideal Candidate – High dose user ( $\wedge 100$  units per meal) or
  - Dedicated to SBGM and repeated titration with minimal effect
  - Simple dose calc –  $\frac{1}{2}$  TDD = basal rate
  - 500 rule for Insulin to Carb Ratio Divide 500 by TDD = ICR
  - Cost – PDA \$700 Pods \$300/month
  - Funding source SDPI Grant



# Oral Medications

- Metformin (crosses placenta)
  - Reduces insulin resistance
  - Improves insulin action
  - Add to insulin regimen if repeated titration shows minimal effect
  - Slow titration to reduce GI side effects (500 mg po BID x 7 days)
- Glyburide (crosses placenta)
  - Secretagogue – targets pancreatic release of insulin
  - Use to target elevated data – start low 2.5 mg/max dose 20 mg/day

# Antenatal Management Best Practices (cont.)

- Detailed anatomy U/S with fetal echo for T2 DM
  - Increased risk of congenital anomalies
- Periodic growth U/S
- Antenatal testing 32-34 wks
- Monitor closely for preeclampsia
- Term U/S for estimated fetal weight
  - Delivery plan discussion
  - C-Section offered if >4500 grams
- Deliver by 39 wks
  - 38 wks if uncontrolled

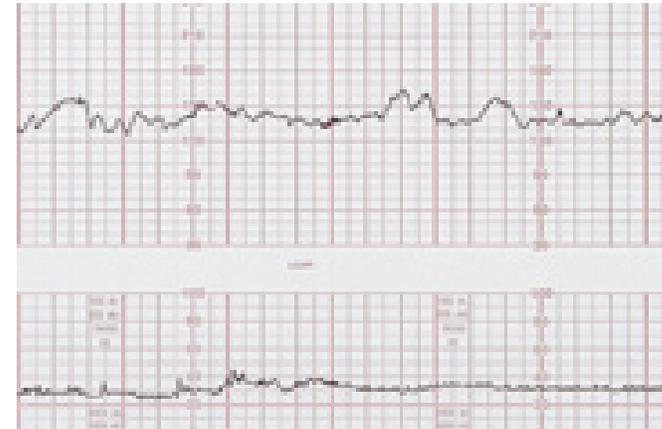


# Role of A1C in Prenatal Care

- Q30 day A1C – HIPP Clinic Routine
  - “When maternal glycemia is elevated and rapidly brought toward normal in pregnancy, A1c has been reported to show significant decrease within 2 weeks compared with the baseline elevation; thus measurement of A1c every 2-6 weeks confirms SBGM measurements.”
  - Perform A1c test at initial prenatal visit and then monthly until target levels < 6.0% are achieved. Conduct tests every 2-3 months thereafter.

# Antenatal monitoring

- Twice weekly nonstress test (NST)
  - Marker of acute hypoxia or acidosis
- Once weekly amniotic fluid index (AFI)
  - Marker of placental insufficiency
- A1GDM: generally not needed
- A2GDM
  - Start at 32-34 weeks
- Type 2 DM
  - Class C and above: start at 28-30 weeks



# Breastfeeding



- Prevention of neonatal hypoglycemia
  - Colostrum does not stimulate insulin production the way formula does
- Prevention of maternal type 2 diabetes
  - Weight loss
    - >10 lb associated with 50% ↓ risk of developing type 2\*
  - Glycemic control
- Prevention of childhood obesity
  - Children who are breastfed for at least 6 months have half the rate of obesity
- Prevention of childhood onset diabetes



\*Peters RK, Lancet 347: 227, 1996

# Preconception Counseling

- “Standard care for all women with diabetes ... beginning at the onset of puberty or at diagnosis:



- 1) education about the risk of malformations associated with unplanned pregnancies and poor metabolic control
- 2) use of effective contraception at all times, unless the patient has good metabolic control and is actively trying to conceive”\*

\*ADA, Standards of Medical Care in Diabetes - 2011

# Preconception Counseling (cont.)

- Meta-analysis: comparing diabetic women who had received preconception care/counseling to those who didn't
  - lower 1<sup>st</sup> trimester A1C (mean difference 2.3%)
  - decreased major congenital anomalies (2.1% vs. 6.5%, RR 0.36 CI 0.22-0.59)

Ray et al., QJM 2001; 94:435.



# NNMC Statistics 2015

- Current LGA Rate 8%
  - 100% receive MNT
  - 98% show rate
  - FVRx Program pilot
  - Program Sweet Success accreditation continues

# Preconception Recommendations

- Folic acid – 4 mg daily
- Optimal glycemic control: A1C < 6%
  - Effective contraception until this is achieved
  - Optimal A1C prior to discontinuation of contraception is the marker associated with the lowest rate of adverse pregnancy outcomes (OR 0.2, CI 0.06-0.67)\*
- Optimal blood pressure control
- Assessment for retinopathy, nephropathy
- Screen for hypothyroidism
- Smoking cessation
- Counsel on glycemic goals during pregnancy

\*Pearson et al. BJOG 2007; 114:104.

# Preconception: Adjust medications

- Adjustment of medications for pregnancy
  - ACE-I, diuretics → Labetolol, Nifedipine, Methyldopa
  - Statins → stop
- **Switch to insulin**
  - Based on expert opinion and extensive research in pregnancy
  - Glyburide potentiates weight gain in pregnancy
  - Avoid jeopardizing glycemic control in 1st trimester when switching agents

# References

- Diagnosis and Classification of Diabetes Mellitus. *Diabetes Care*. Jan 2011, 34(1): S62-69.
- Coustan DR, Lowe LP, Metzger BE, et al. The Hyperglycemia and Adverse Pregnancy Outcome (HAPO) study: paving the way for new diagnostic criteria for gestational diabetes mellitus. *Am J Obstet Gynecol* 2010;202:654.e16.
- Crowther CA, Hiller JE, Moss JR, McPhee AJ, Jeffries WS, Robinson JSL. Effect of treatment of gestational diabetes mellitus on pregnancy outcomes. *N Engl J Med* 2005;353:2477-86.
- Green MF, Hare JW, Cloherty JP, Benacerraf BR, Soeldner JS. First-trimester hemoglobin A1 and risk for major malformation and spontaneous abortion in diabetic pregnancy. *Teratology* 1989; 39:224-231.
- HAPO Study Cooperative Research Group. Hyperglycemia and adverse pregnancy outcomes. *N Engl J Med* 2008;358:1991-2002.
- International Association of Diabetes and Pregnancy Study Groups Recommendations on the Diagnosis and Classification of Hyperglycemia in Pregnancy. *Diabetes Care* March 2010 33(3):676-682.
- Landon MB, Spong CY, Thorn E, et al. A randomized trial of treatment for mild gestational diabetes. *N Engl J Med* 2005;361:1339-48.
- O'Sullivan JB, Mahan CM. Criteria for the oral glucose tolerance test in pregnancy. *Diabetes*. 1964. May-Jun;13:278-85
- Pearson DW, Kernaghan D, Lee R, Penney GC. Scottish Diabetes in Pregnancy Study Group. The relationship between pre-pregnancy care and early pregnancy loss, major congenital anomaly or perinatal death in type I diabetes mellitus. *BJOG* 2007; 114:104.
- Ray JG, O'Brien TE, Chan WS. Preconception care and the risk of congenital anomalies in the offspring of women with diabetes mellitus: a meta-analysis. *QJM* 2001; 94:435.

# References (cont.)

- Sacks. AJOG 1989;161;642
- Kitzmiller, JL, et al, Managing Preexisting Diabetes and Pregnancy Technical Reviews and Consensus Recommendations for Care, American Diabetes Association, 2008;13-15
- Indian Health Diabetes Best Practice, Diabetes in Pregnancy, 2011; 13-39 <http://www.ihs.gov/MedicalPrograms/Diabetes/>