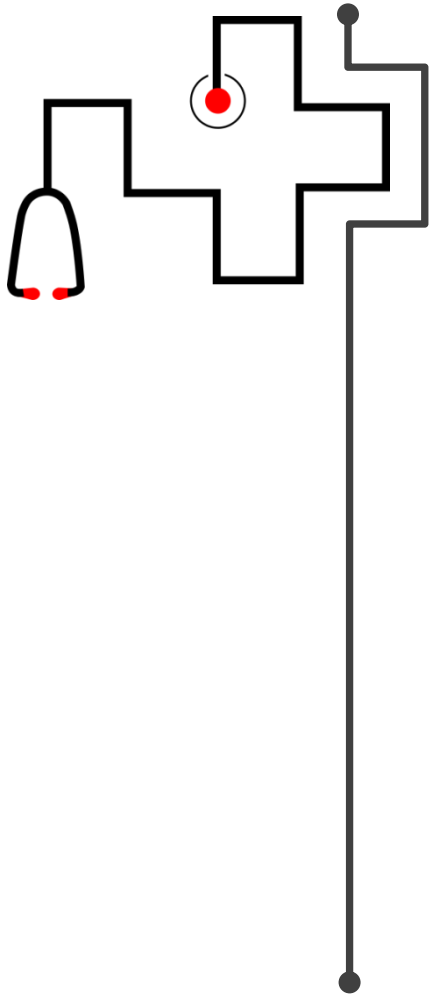




DM IN PREGNANCY

พญ.ธารทิพย์ อุทัยพัฒน์
สูติแพทย์ โรงพยาบาลกำแพงเพชร



Scope

- 01** Gestational Diabetes Mellitus
- 02** Pregestational Diabetes Mellitus
- 03** KPH Guideline



The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

INTERIM UPDATE

ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

NUMBER 190, FEBRUARY 2018

(Replaces Practice Bulletin Number 180, July 2017)

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the American College of Obstetricians and Gynecologists Committee on Practice Bulletins—Obstetrics with the assistance of Aaron B. Caughey, MD, PhD, and Mark Turrentine, MD.

INTERIM UPDATE: This Practice Bulletin is updated as highlighted to reflect a limited, focused change to clarify and provide additional information on the pharmacologic treatment of gestational diabetes mellitus.

Gestational Diabetes Mellitus



The American College of
Obstetricians and Gynecologists
WOMEN'S HEALTH CARE PHYSICIANS

ACOG PRACTICE BULLETIN

Clinical Management Guidelines for Obstetrician–Gynecologists

NUMBER 201

(Replaces Practice Bulletin Number 60, March 2005)

Committee on Practice Bulletins—Obstetrics. This Practice Bulletin was developed by the American College of Obstetricians and Gynecologists' Committee on Practice Bulletins—Obstetrics with the assistance of Aaron B. Caughey, MD, PhD; Anjali J. Kaimal, MD, MAS; and Steven G. Gabbe, MD.

Pregestational Diabetes Mellitus

THE JOURNAL OF CLINICAL AND APPLIED RESEARCH AND EDUCATION

VOLUME 42 | SUPPLEMENT 1

Diabetes Care

WWW.DIABETES.ORG/DIABETES CARE

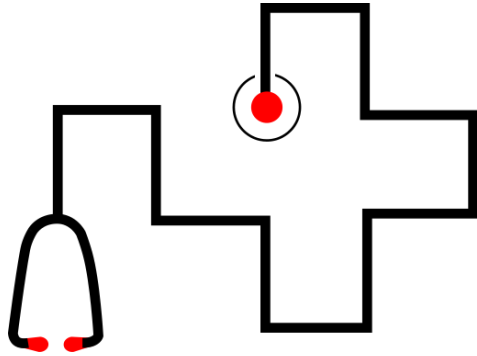
JANUARY 2019

SUPPLEMENT
1

AMERICAN DIABETES ASSOCIATION

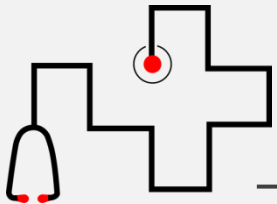
STANDARDS OF MEDICAL CARE IN DIABETES—2019

 American
Diabetes
Association
ISSN 0149-5992



Gestational Diabetes Mellitus

Maternal and Fetal Complications



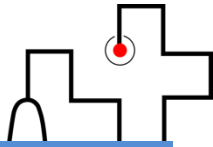
Maternal complication

- Preeclampsia
- Cesarean delivery
- Increased risk of developing diabetes

Fetal complication

- Macrosomia
- Neonatal hypoglycemia
- Hyperbilirubinemia
- Shoulder dystocia
- Birth trauma
- Stillbirth
- Childhood and adult-onset obesity and diabetes in offspring

GDM: Screening



Universal screening¹

- GA 24-28 week

Preventive Services Task Force
recommendation statement 2014

Risk based screening (KPH)

- Age ≥ 30 years (GCT at GA 24-28 week)
- Family history of DM in first degree relatives
- History of GDM
- Obesity as defined as pre-pregnancy BMI ≥ 25 kg/m²
- History of fetal macrosomia (BW ≥ 4000 g)
- History of unknown congenital fetal anomaly
- History of unexplained stillbirth/fetal death
- Hypertension
- Glucosuria; dipstick $\geq 1+$
- Excessive weight gain; ≥ 2 kg in 1 week

Screening (NEW)

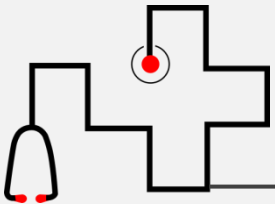


Early screening at 1st ANC

- Pregestational DM
or early GDM

GA 24-28 week(Universal)

- GDM

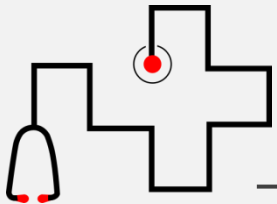


ADA 2019
ACOG 2018

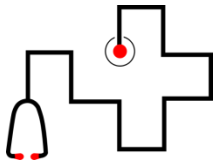
Pregestational DM

Early screening at 1st ANC

- **BMI > 25 and one or more additional risk factors**
 - **Physical inactivity**
 - **First-degree relative with diabetes**
 - **High-risk race or ethnicity**
 - **Previous child ≥ 4000 g**
 - **Previous GDM**
 - **Hypertension**
 - **HDL < 35 mg/dL ,TG > 250 mg/dL**
 - **PCOS**
 - **HbA1C $\geq 5.7\%$, IGT, IFG**
 - **Insulin resistance; severe obesity, acanthosis nigricans**
 - **Hx of cardiovascular disease**



Pregestational DM



FPG \geq 126 mg/dl
(no caloric intake \geq 8 hr)

OR

2hr PG \geq 200 mg/dL
(75-g OGTT)

OR

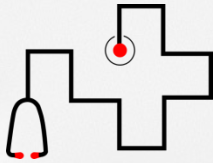
A1C \geq 6.5%

OR

Random plasma glucose
 \geq 200 mg/dL
with classic symptoms of
hyperglycemia or
hyperglycemic crisis

Pregestational DM

GDM: Screening and diagnosis



Two-step approach

50-g GCT



≥ 140 or 135 or 130 mg/dL

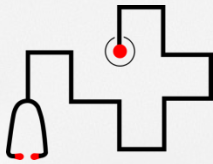
100-g OGTT



	Carpenter and Coustan	National Diabetes Data Group
Fasting	95 mg/dL	105 mg/dL
1 hour	180 mg/dL	190 mg/dL
2 hours	155 mg/dL	165 mg/dL
3 hours	140 mg/dL	145 mg/dL

Abnormal ≥ 2

GDM: Screening and diagnosis



One-step approach

75-g 2-hour OGTT



	International Association of Diabetes and Pregnancy Study Group (IADPSG)
Fasting	92 mg/dL
1 hour	180 mg/dL
2 hours	153 mg/dL

Abnormal ≥ 1

Blood glucose monitoring



Four times a day

Fasting or preprandial;

GOAL < 95 mg/dL

Fasting: Neonatal fat mass

childhood obesity and diabetes

Postprandial (1 or 2 hour); GOAL

1 hour < 140 mg/dL

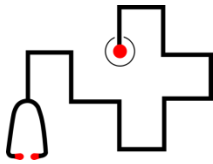
2 hour < 120 mg/dL

better glycemic control

lower incidence of LGA

lower rates of cesarean delivery

Nonpharmacologic treatments



Diet

Carbohydrate: Protein: Fat

33-40: 20: 40

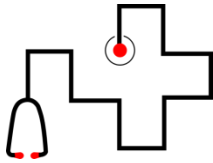
3 meals and 2 snacks

Exercise

- **30 minutes of moderate-intensity aerobic exercise at least 5 days a week**
- **or a minimum of 150 min/wk**
- **walking for 10-15 min after each meal**



Pharmacologic treatments



First line therapy: Insulin



Does not cross the placenta



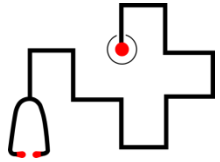
**Starting dose is 0.7–1.0
units/kg/day**



**Long-acting or intermediate
acting insulin in combination
with short-acting insulin**



Pharmacologic treatments



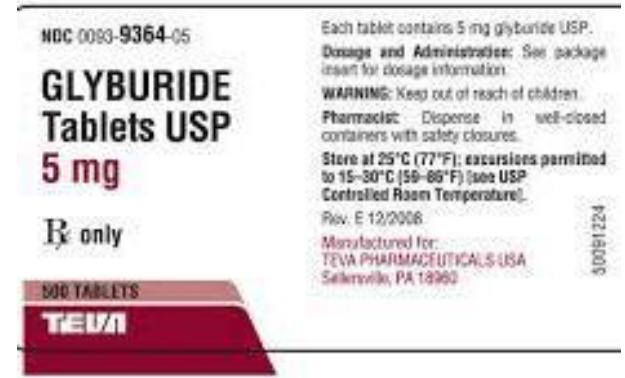
Metformin

- Equivalent to insulin
- Cross placenta
- Limit long term data
- may be a reasonable alternative approach

Oral Medications

Glyburide

- Cross placenta
- Increased risks of macrosomia and Hypoglycemia
- Should not be recommended as a first-choice pharmacologic treatment



Antepartum Care



Fetal testing

GA 32 wk

GA 40⁺⁶ wk

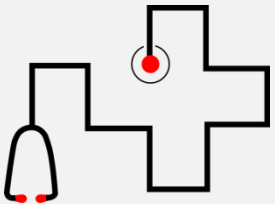


- Pregestational DM
- Poor-controlled GDM
- Medication use

Well-controlled GDMA1

NST 1/week

NST 1-2/week



Antepartum Care

Fetal Growth



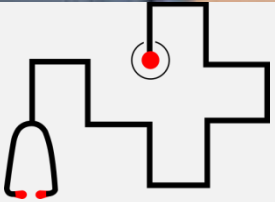
GA 32 wk

GA 36-39 wk



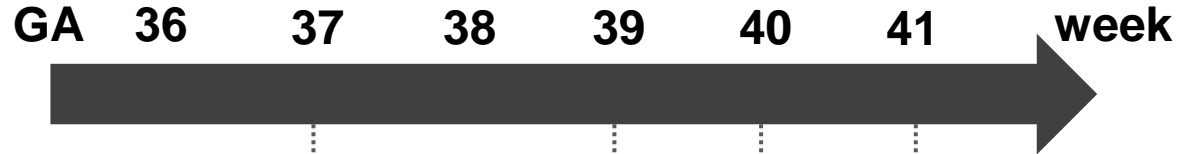
Ultrasound

Fetal weight
AFI



Delivery

Timing

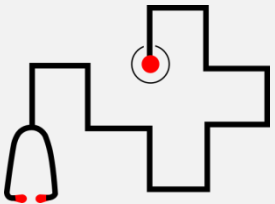


Well controlled GDMA1

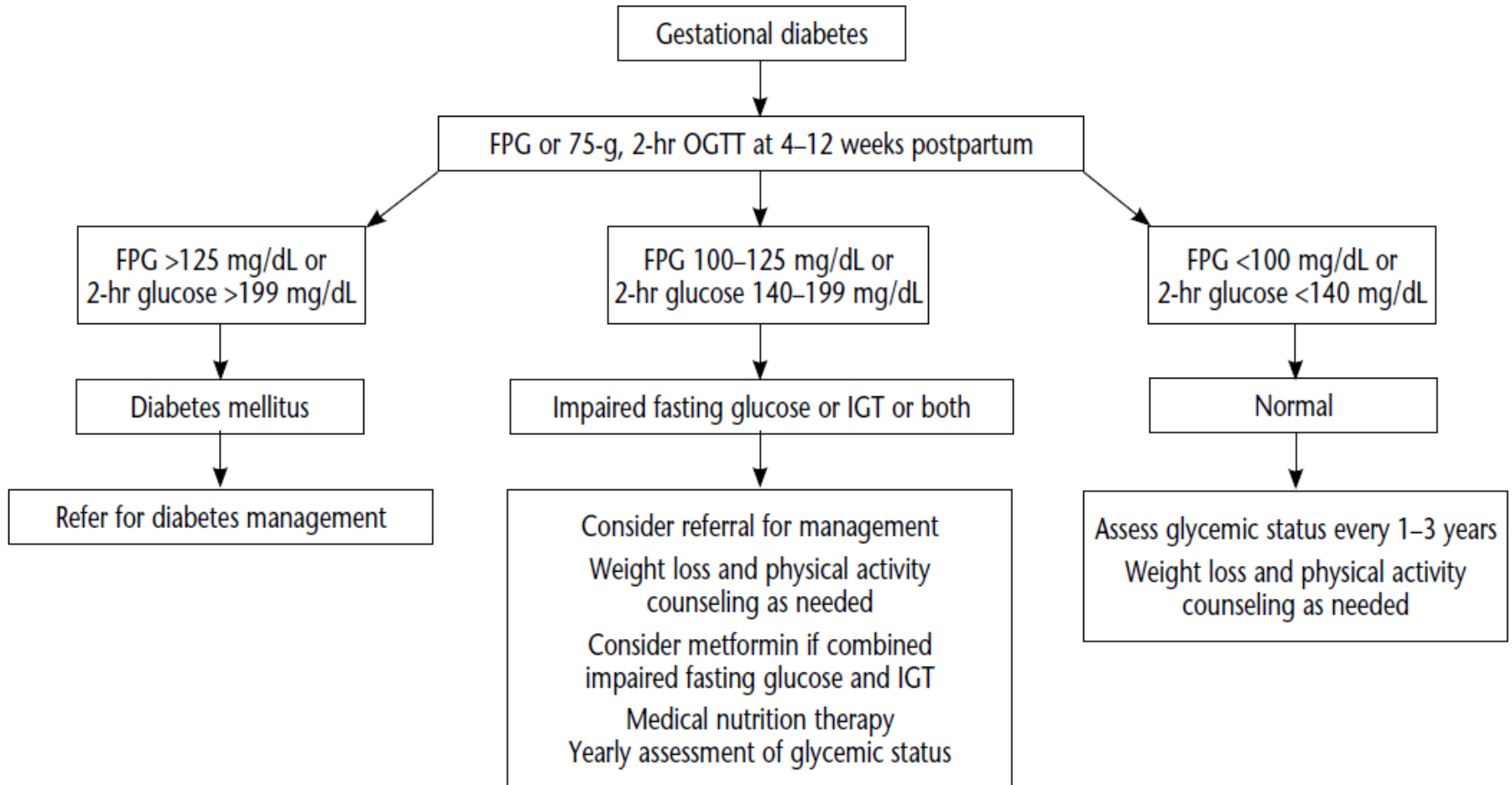
Well controlled GDMA2

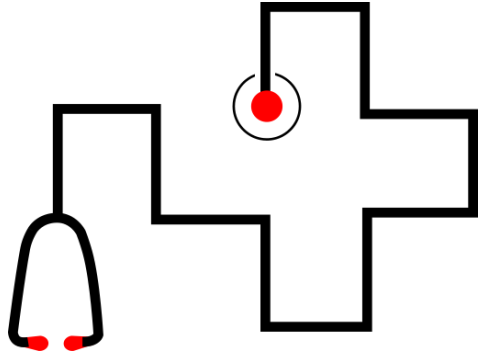
Poor controlled GDMA

Reasonable to scheduled C/S
when EFW \geq 4,500 g



Postpartum Care





Pregestational Diabetes Mellitus

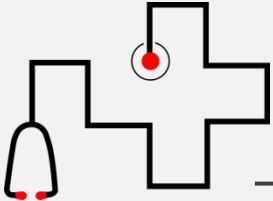


Maternal complication

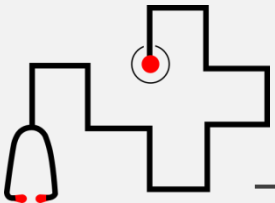
- Diabetic retinopathy
- Diabetic nephropathy
- Hypertension
- Acute myocardial infarction
- Diabetic neuropathy
- Diabetic ketoacidosis
- Preterm labor
- Polyhydramnios

Fetal complication

- Congenital anomalies; Complex cardiac defects; CNS, anencephaly and spina bifida; and skeletal malformations, sacral agenesis
- Spontaneous abortion
- Macrosomia
- Neonatal hypoglycemia
- Hyperbilirubinemia, Polycythemia
- Shoulder dystocia
- Stillbirth
- Obesity and diabetes



1. Counsel about potential complications
2. Evaluate for baseline complications;
hypertension, nephropathy, retinopathy, and
cardiovascular disease
3. Adequate contraception
4. Optimize **HbA1C (< 6.0%)**
5. Start increased folic acid when attempting to get
pregnant (**400 micrograms of folic acid**)

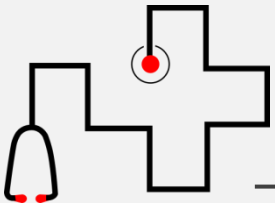


1. Prenatal labs/tests

- **HbA1C**
- **TSH**
- **24-hour urine**
- **electrocardiogram**

2. Evaluation by ophthalmologist, dietitian, possibly endocrinologist, cardiologist, nephrologist

3. Regular ongoing assessment of blood glucose



1. Start **low-dose aspirin** 12–28 weeks of gestation (optimally before 16 week)

2. **Ultrasonography**; detailed anatomical survey

3. Consider fetal echocardiography

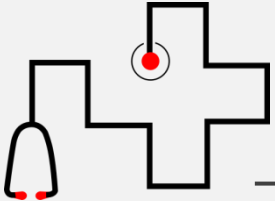


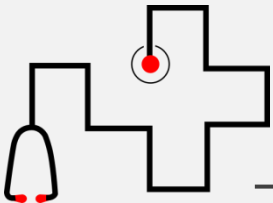
Table 1. Clinical Risk Factors and Aspirin Use*

Level of Risk	Risk Factors	Recommendation
High [†]	<ul style="list-style-type: none">• History of preeclampsia, especially when accompanied by an adverse outcome• Multifetal gestation• Chronic hypertension• Type 1 or 2 diabetes• Renal disease• Autoimmune disease (ie, systemic lupus erythematosus, the antiphospholipid syndrome)	Recommend low-dose aspirin if the patient has one or more of these high-risk factors
Moderate [‡]	<ul style="list-style-type: none">• Nulliparity• Obesity (body mass index greater than 30)• Family history of preeclampsia (mother or sister)• Sociodemographic characteristics (African American race, low socioeconomic status)• Age 35 years or older• Personal history factors (eg, low birth weight or small for gestational age, previous adverse pregnancy outcome, more than 10-year pregnancy interval)	Consider low-dose aspirin if the patient has more than one of these moderate-risk factors [§]
Low	<ul style="list-style-type: none">• Previous uncomplicated full-term delivery	Do not recommend low-dose aspirin

1. Evaluate fetal growth

2. Start low-dose aspirin by 28 weeks of gestation if not started in the second trimester

3. Fetal monitoring (nonstress test or amniotic fluid index, biophysical profile)



Blood glucose monitoring



Four times a day

Fasting or preprandial;

GOAL < 95 mg/dL

Postprandial (1 or 2 hour); GOAL

1 hour < 140 mg/dL

2 hour < 120 mg/dL

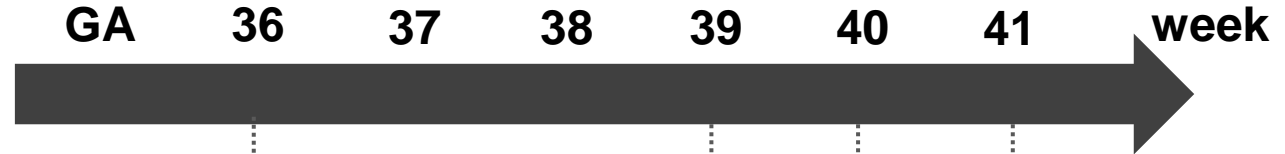
Mean capillary glucose \sim 100 mg/dL

HbA1C < 6%

Overt DM

Management: Delivery

Timing



Well controlled Overt DM
without vascular
complication

A red arrow points from the vertical dotted line at week 39 to the vertical dotted line at week 40.

Poor controlled Overt DM
or
with vascular complication

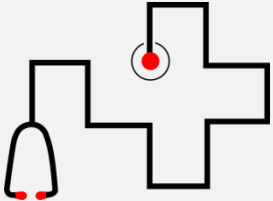
A small icon of a fetal scale is positioned to the left of the text box.

Reasonable to scheduled C/S
when EFW \geq 4,500 g

A red arrow points from the vertical dotted line at week 36 to the vertical dotted line at week 39.

Box 3. Insulin Management During Labor and Delivery

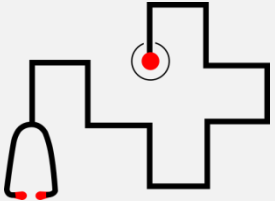
- Usual dose of intermediate-acting or long-acting insulin is given at bedtime.
- Morning dose of insulin is withheld or reduced based upon the timing of admission or delivery.
- Intravenous infusion of normal saline is begun.
- Once active labor begins or glucose levels decrease to less than 70 mg/dL, the infusion is changed from saline to 5% dextrose and delivered at a rate of 100–150 cc/h (2.5 mg/kg/min) to achieve a glucose level of approximately 100 mg/dL.
- Glucose levels are checked hourly using a bedside meter allowing for adjustment in the insulin or glucose infusion rate.
- Regular (short-acting) insulin is administered by intravenous infusion at a rate of 1.25 units/h if glucose levels exceed 100 mg/dL.

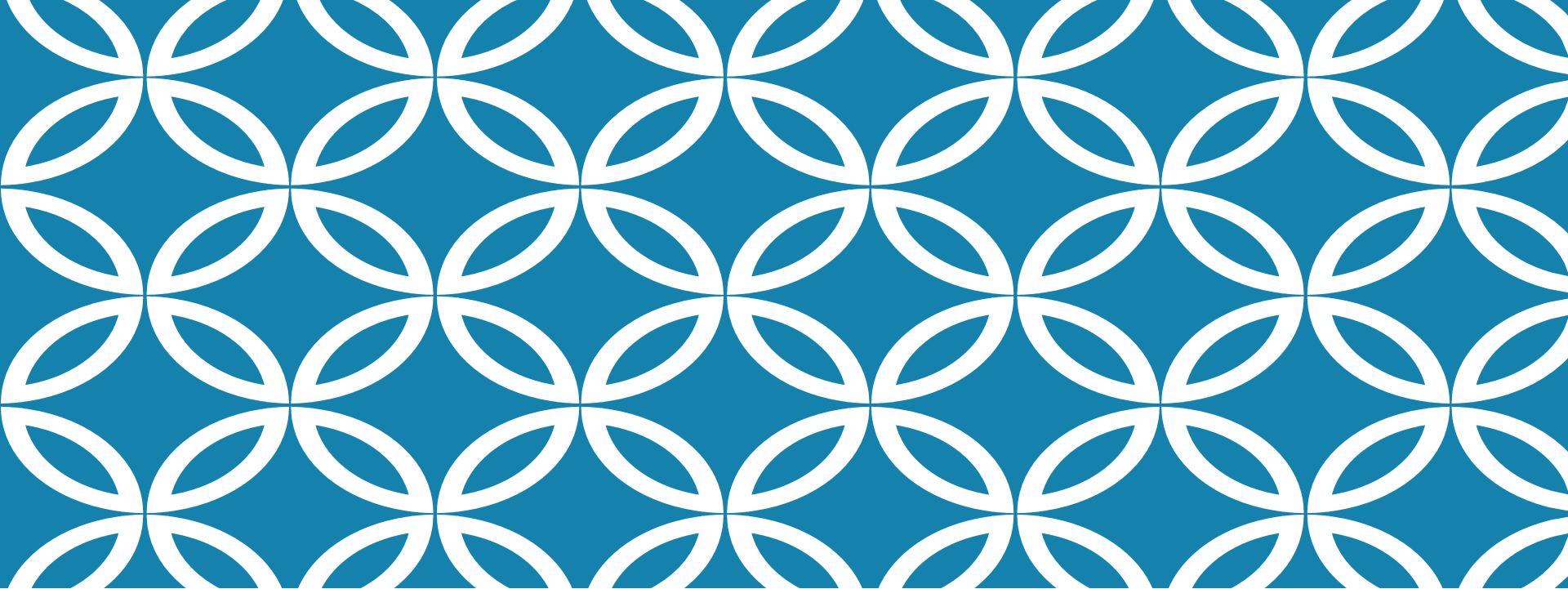


Breastfeeding +500 kcal/d

Contraception

- **Permanent contraception with tubal ligation**
- **Long-acting reversible contraception;
IUD or implantable progestin**





KAMPHAENGPHET GUIDELINE





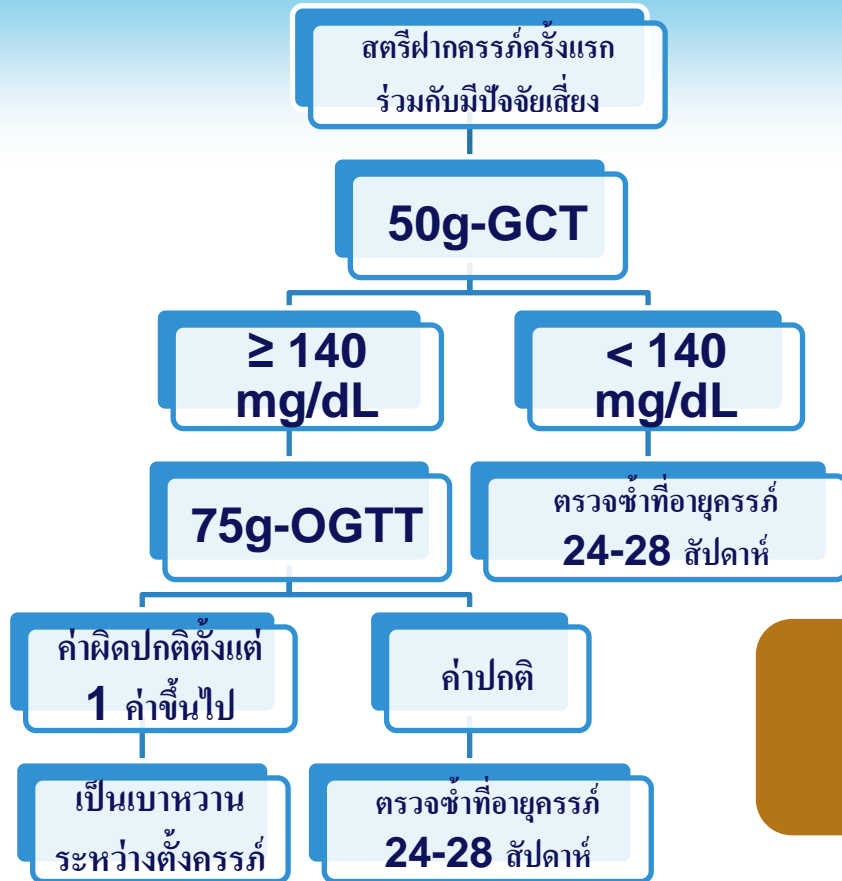
KPH guideline

ปัจจัยเสี่ยงต่อการเกิดเบาหวานระหว่างตั้งครรภ์

- Age \geq 30 years (GCT at GA 24-28 week)
- Family history of DM in first degree relatives
- History of GDM
- Obesity as defined as pre-pregnancy BMI \geq 25 kg/m²
- History of fetal macrosomia (BW \geq 4000 g)
- History of unknown congenital fetal anomaly
- History of unexplained stillbirth/fetal death
- Hypertension
- Glucosuria; dipstick \geq 1+
- Excessive weight gain; \geq 2 kg in 1 week



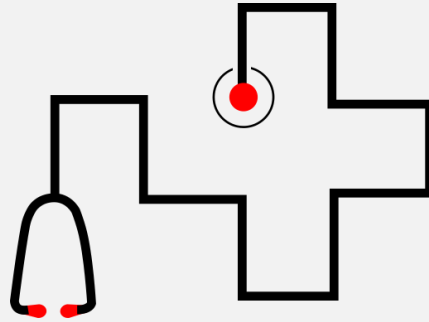
แนวทางการตรวจคัดกรองและวินิจฉัยภาวะเบาหวานระหว่างตั้งครรภ์



75g-OGTT;
fasting > 92 mg/dl
1 hr > 180 mg/dl
2 hr > 153 mg/dl

GDM; Target

- FBS ≤ 95 mg/dL
- 2hrPP ≤ 120 mg/dL



Thank you