

# 產科個案導向全人討論 - Case Presentation

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# Patient Profile – Ms. Chen, 40 y/o Female



- Current status(2022/07/29) :
  - Pregnant 36+0 weeks, EDC 2022/08/26
- Past history :
  - Denied
- Obstetric history :
  - G4 P1(NSD) SA2
- Personal history :
  - Alcohol : denied
  - Betel nut : denied
  - Cigarette : denied



# Present illness - OPD

2022/07/20 : 1st OPD

- Chief complaint :
  - **Hypertension** with bilateral leg pitting edema 3+ for one week (since 2022/07/14)
- Urine dipstick at 7/20 : **proteinuria 2+**
- 07/20~27 Elevated blood pressure **158-185 / 95-112**
  - Already under Methyldopa and Labetalol

2022/07/27 : 2nd OPD

- Urine dipstick at 7/27 : proteinuria 1+

## Present illness - Hospitalization 2022/07/27 ~ 07/29

### Workup

- Urine protein/creatinine > 0.3
- Platelet count : 196000 /uL
- Serum creatinine : 0.74 mg/dL
- Liver transaminases : ALT : 27 U/L , AST : 23 U/L
- Pulmonary edema : no clinical symptoms
- Intermittent headache with hypertension 170/110

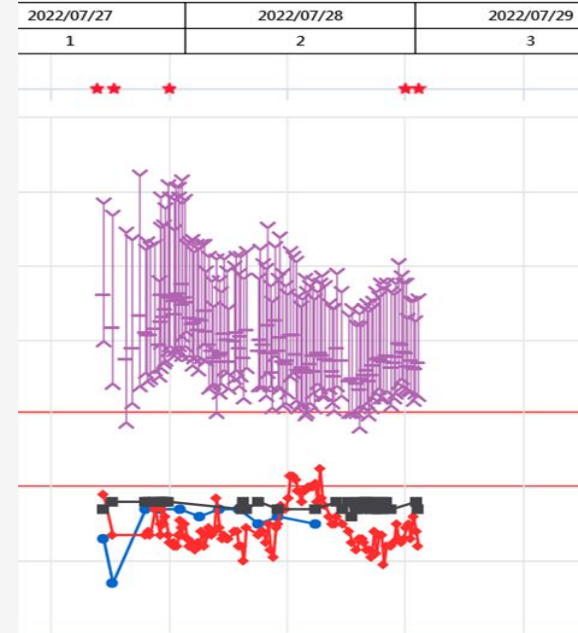
### Diagnosis

- **Pre-eclampsia with severe feature** diagnosed on 2022/07/27

# Treatment - Medication

**Pre-eclampsia with severe feature** diagnosed on 2022/07/27

- Mag. sulfate 200ml, IVA, Q12H (2022/07/29 ~ 07/30)
  - eclampsia prevention
- Dexamethasone 6mg, IM, Q12H (2022/07/27 ~ 07/30)
  - fetal lung maturation
- Labetalol IVA pump (2022/07/27 ~ 07/29)
- Nifedipine 30mg, PO, QD (2022/07/27 ~ 07/29)
  - Antihypertensive



# Fetal monitor before Cesarean Section



# Indications for Cesarean Section

## Pre-eclampsia with severe feature s/p Cesarean section on 07/29

1. Fetal distress (需附胎兒監視器報告)。
2. Failure to progress in active labor (產程進展不良)。
3. Antepartum haemorrhage (placenta previa, placental abruption) (產前出血)。
4. Malpresentation (including twin with malpresentation) (胎位不正)。
5. Cord prolapse (臍帶脫垂)。
6. Induction failure (催生失敗者)。
7. Active genital herpes (生殖道疱疹者)。
8. Previous C/S (前次剖腹產)。請註明前次剖腹產之理由，前次為自行要求剖腹產者，如無特殊理由須再度剖腹產者，僅得以自行要求剖腹產項目申報。
9. Previous uterine surgery (先前有子宮手術)。
10. Vulvar and/or vaginal condyloma acuminata, diffuse (陰部或陰道長尖形濕疣)。
11. Treatable fetal anomalies (e.g. gastroschisis, omphalocele, hydrocephalus) (胎兒先天不正常可治療者)

### 12. Preeclampsia with (子癇前症)：

- (1) uncorrectable severe preeclampsia。
  - (2) HELLP syndrome with failed induction (6hrs)。
  - (3) eclampsia with poor induction progress (6hrs)。
13. Extremely premature fetus < 1500gm (限有NICU設備院所)。(嬰兒體重<1500公克)
  14. Pelvic deformity (sequela of poliomyelitis or traffic accident, etc.) (骨盤畸型)。
  15. Fetal macrosomia (>4000gm EBW) (胎兒體重過重>4000公克)。
  16. Cephalopelvic disproportion (CPD) (胎頭骨盆不對稱)。
  17. Obstructive labor (e.g. myoma, ovarian tumor)。(阻塞性生產，如子宮肌瘤或卵巢腫塊)
  18. Major medical complications (主要內科併發症)。
  19. 經診斷為HIV(+)者。
  20. 其他特殊適應症，但需詳細說明。

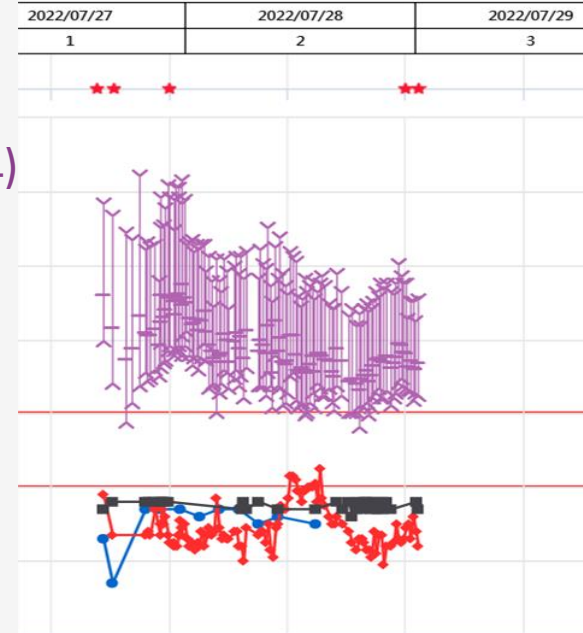
# 2022/07/29 Cesarean Section

1. Type of C/S: Low segment
2. Skin incision: Pfannenstiel
3. Uterine incision: Transverse
4. Operative findings:
  - \* Uterus: normal
  - \* Baby: normal NO: 48818242, time of delivery: 20220729 11:22  
Male baby, BW: 2310gm BH: 44cm, Apgar score: 8/9 at 1'/5' minutes  
presentation: Vertex ; Position: OA
  - \* Placenta: normal. Weight: 540 gm; Cord: 60 cm
  - \* Tubal ligation: ( A ) A: Parkland, B: Pomeroy, C:Madlener  
Fallopian tubes were cut & electrocauterized at openings  
Proximal and distal opening ends were ligated by silk
5. Blood loss: 770 ml.



# Post-operative follow up

- Labetalol tab 200 mg, PO, BIDCC (2022/07/30 ~ 08/18)
- Nifedipine tab 30 mg, PO, Q8HPRN (2022/07/30 ~ 08/04)
  - anti-hypertensive drugs
- Bromocriptine tab 2.5mg, PO, TIDCC (2022/08/01 ~ 08/08)





# **Discussion:**



# **Preeclampsia**

Clerk 林奕辰





# Prevalence

- 2-8% pregnancies globally
  - 9% maternal deaths in Africa and Asia
  - Much lower maternal mortality in high-income countries
  - Variations due to differences in the maternal age distribution and proportion of nulliparous pregnant patients.
- 
- 



# Definition

- Preeclampsia:
  - New onset of hypertension and proteinuria or other significant end-organ dysfunction after **20 weeks** of gestation.
- Chronic hypertension:
  - Hypertension diagnosed or present before pregnancy or before 20 weeks of gestation.
  - Hypertension that is first diagnosed during pregnancy and persists for at least 12 weeks post-delivery.



# Dignostic criteria

## Blood pressure

- BP  $\geq$  140/90 mm Hg on 2 occasions at least 4 hours apart
- BP  $\geq$  160/110 mm Hg



## 1 of the following:

- Proteinuria
  - $\geq$  300 mg in 24 hour urine
  - Protein/creatinine ratio  $\geq$  0.3
  - Dipstick of 2+
- Serum creatinine  $>$  1.1 mg/dL or doubling
- Platelet count  $<$  100,000/ $\mu$ L
- Liver enzymes  $>$  twice the upper limit
- Pulmonary edema
- New-onset headache unresponsive to medication
- Visual disturbance

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**Preeclampsia with  
severe features**



# Evaluation

- Blood pressure assessment
- Lab test
  - CBC with platelet
  - Serum creatinine
  - AST, ALT, bilirubin
  - Urinary protein
- PT, aPTT, fibrinogen
- Angiogenic factors: sFlt-1, PlGF
- Neurology consultation
- Nonstress test
- Biophysical profile (modified biophysical profile)
- Ultrasound: amniotic fluid volume and estimate fetal weight

# Management



**Delivery**



**Eclampsia  
prevention**



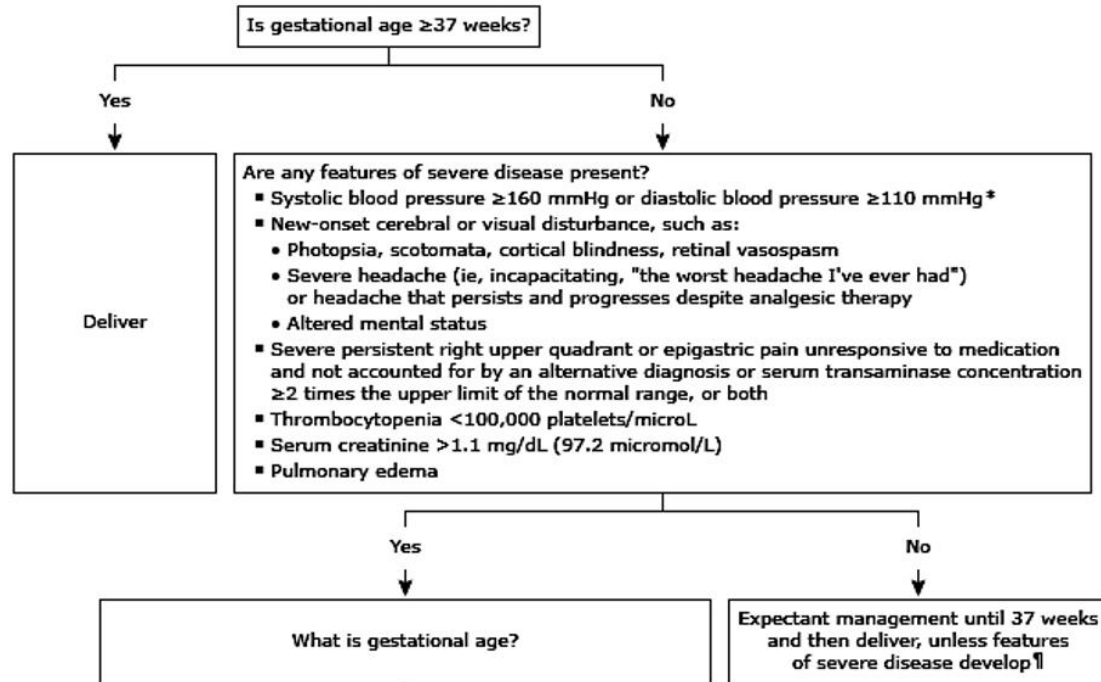
**Blood pressure  
control**

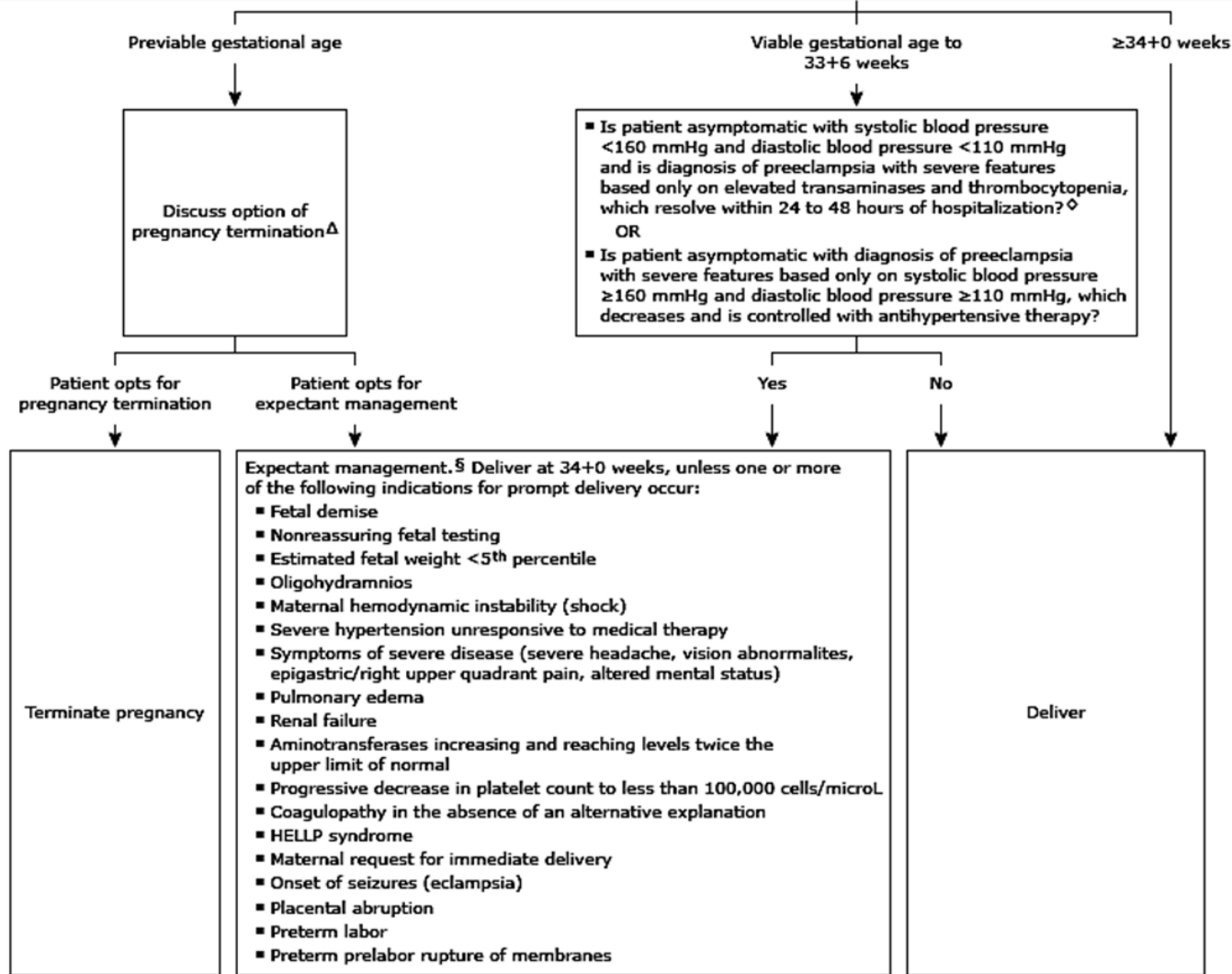




# Timing of Delivery

- The only definitive treatment is **delivery**.
- Prevent maternal or fetal complications from disease progression.







# Mode of Delivery

- The mode of delivery in women should be determined by routine obstetric considerations.
- Labor induction is less likely with decreasing gestational age.



# Eclampsia prevention

## Magnesium sulfate

- Should be used in **preeclampsia with severe features**
- No consensus in use in **preeclampsia without severe features**.
- Dosing:
  - 4 to 6 g loading dose over 20-30 minutes
  - 1 to 2 g/hour maintenance dose
  - Continue for 24 hours after delivery
- Toxicities: monitor tendon reflex, respiration status, urine output

### Serum Magnesium Concentration

mmol/L	mEq/L	mg/dL	Effect
2–3.5	4–7	5–9	Therapeutic range
>3.5	>7	>9	Loss of patellar reflexes
>5	>10	>12	Respiratory paralysis
>12.5	>25	>30	Cardiac arrest

# Blood pressure control

- To prevent CHF, MI, stroke, renal injury
- Target:
  - Non severe hypertension: 135/85 mmHg
  - Severe hypertension: < 160/110 mmHg within 180 min
- Management:

First-Line Drug	Route of Administration and Dosage Units	0 Min	30 Min	60 Min	90 Min	120 Min	150 Min
Labetalol	Oral — mg	200	—	200	—	200	—
	Intermittent IV — mg	10–20	20–40	40–80	40–80	40–80	40–80
	IV infusion — mg/min	0.5–2.0	→	→	→	→	→
Nifedipine	Oral capsule — mg	5–10	10	—	10	—	10
	Oral tablet (PA/MR) — mg	10	—	10	—	10	—
Hydralazine	Intermittent IV — mg	5	5–10	5–10	5–10	—	—
Methyldopa	Oral (if other medications unavailable or for in utero transfer without monitoring) — mg	1000	—	—	—	—	—

# PRE-ECLAMPSIA SCREEING & PREVENTION

Clerk 王祥瑀

Ref: Chaemsaitong, P., Sahota, D. S., & Poon, L. C. (2020). First trimester preeclampsia screening and prediction. *American journal of obstetrics and gynecology*. 2022





# Preeclampsia Screening Tools



**Maternal risk  
factor**



**MAP**



**UtA-PI**



**Biomarker**



## Maternal factor

TABLE 1

### Maternal risk factors for preeclampsia according to professional organizations

ACOG 2018 <sup>48</sup> (United States of America)	NICE 2019 <sup>49</sup> (United Kingdom)	SOGC 2014 <sup>50</sup> (Canada)	SOMANZ 2014 <sup>51</sup> (Australia)	ISSHP 2018 <sup>52</sup>	WHO 2011 <sup>53</sup>
<b>High-risk factors</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Previous pregnancy with PE</li> <li><input type="checkbox"/> Chronic hypertension</li> <li><input type="checkbox"/> Systemic lupus erythematosus</li> <li><input type="checkbox"/> Type 1 or type 2 diabetes mellitus</li> <li><input type="checkbox"/> Renal disease</li> <li><input type="checkbox"/> Multifetal gestation</li> <li><input type="checkbox"/> Antiphospholipid syndrome</li> </ul>	<b>High-risk factors</b> <ul style="list-style-type: none"> <li>• Previous pregnancy with PE</li> <li>• Chronic hypertension</li> <li>• Autoimmune disease</li> <li>• Type 1 or type 2 diabetes mellitus</li> <li>• Chronic kidney disease</li> <li>• Antiphospholipid syndrome</li> </ul>	<b>High-risk factors</b> <ul style="list-style-type: none"> <li>• Previous pregnancy with PE</li> <li>• Antiphospholipid syndrome</li> <li>• Preexisting diabetes mellitus</li> <li>• Renal disease or proteinuria</li> <li>• Chronic hypertension or booking diastolic BP, <math>\geq 90</math> mm Hg</li> </ul>	<b>Risk factors</b> <ul style="list-style-type: none"> <li>• Nulliparity</li> <li>• Multiple pregnancy</li> <li>• Previous history of PE</li> <li>• Family history of PE</li> <li>• Overweight</li> <li>• Obesity (BMI, <math>\geq 30</math> kg/m<sup>2</sup>)</li> <li>• Age, <math>\geq 40</math> y</li> <li>• Systolic BP, <math>&gt; 130</math> mm Hg or diastolic BP, <math>&gt; 80</math> mm Hg before 20 wk</li> <li>• Antiphospholipid syndrome</li> <li>• Preexisting diabetes mellitus</li> <li>• Underlying renal disease</li> <li>• Chronic autoimmune disease</li> <li>• Interpregnancy interval, <math>&gt; 10</math> y</li> </ul>	<b>High-risk factors</b> <ul style="list-style-type: none"> <li>• Prior PE</li> <li>• Chronic hypertension</li> <li>• Pregestational diabetes mellitus</li> <li>• BMI, <math>&gt; 30</math> kg/m<sup>2</sup></li> <li>• Chronic kidney disease</li> <li>• Antiphospholipid syndrome</li> </ul>	<b>Risk factors</b> <ul style="list-style-type: none"> <li>• Previous PE</li> <li>• Diabetes</li> <li>• Chronic hypertension</li> <li>• Renal disease</li> <li>• Autoimmune disease</li> <li>• Multifetal pregnancy</li> </ul>
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ACOG

NICE

SOGC

WHO





# USPSTF Guideline (United State Preventive Services Taskforce)

High-risk factors	High-risk factors	High-risk factors	Risk factors	High-risk factors	Risk factors
<input type="checkbox"/> Previous pregnancy with PE <input type="checkbox"/> Hypertension <input type="checkbox"/> Systemic lupus erythematosus <input type="checkbox"/> Type 1 or type 2 diabetes mellitus <input type="checkbox"/> Renal disease <input type="checkbox"/> Multifetal gestation <input type="checkbox"/> Antiphospholipid syndrome	<input type="checkbox"/> Previous pregnancy with PE <input type="checkbox"/> Renal disease <input type="checkbox"/> Multifetal gestation <input type="checkbox"/> Antiphospholipid syndrome	<input type="checkbox"/> Previous pregnancy with PE <input type="checkbox"/> Antiphospholipid syndrome	<input type="checkbox"/> Nulliparity <input type="checkbox"/> Multiple pregnancy <input type="checkbox"/> Previous history of PE <input type="checkbox"/> Family history of PE <input type="checkbox"/> Overweight <input type="checkbox"/> Obesity (BMI, $\geq 30$ kg/m <sup>2</sup> ) <input type="checkbox"/> Age, $\geq 40$ y <input type="checkbox"/> Systolic BP, $>130$ mm Hg or diastolic BP, $>80$ mm Hg before 20 wk <input type="checkbox"/> Antiphospholipid syndrome <input type="checkbox"/> Preexisting diabetes mellitus	<input type="checkbox"/> Prior PE <input type="checkbox"/> Chronic hypertension <input type="checkbox"/> Pregestational diabetes mellitus <input type="checkbox"/> BMI, $>30$ kg/m <sup>2</sup> <input type="checkbox"/> Chronic kidney disease <input type="checkbox"/> Antiphospholipid syndrome	<input type="checkbox"/> Previous PE <input type="checkbox"/> Diabetes <input type="checkbox"/> Chronic hypertension <input type="checkbox"/> Renal disease <input type="checkbox"/> Autoimmune disease <input type="checkbox"/> Multifetal pregnancy
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# Preeclampsia Screening Tools



+



**Maternal risk  
factor**

**MAP**

**UtA-PI**

**Biomarker**

**Fetal medicine Foundation** first trimester prediction model

**Early : 90%, Pre-term: 75%, FPR10%**

**FIGURE 3**

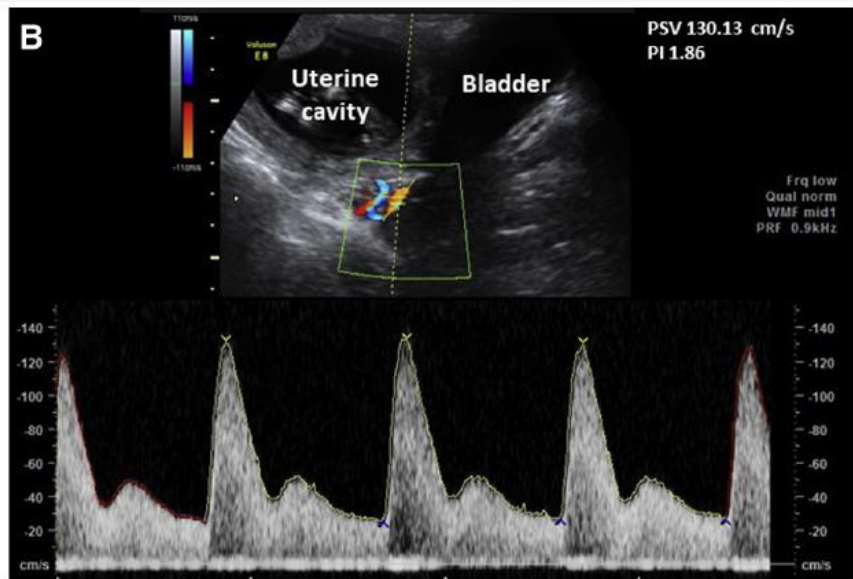
**Countries and regions with successful external validation of the first trimester FMF preeclampsia prediction models**





# Abnormal uteroplacental circulation → increased UtA-PI

## UtA-PI



A, Sagittal section of cervix is identified. Then ultrasound probe is tilted to see uterine artery. B, Uterine artery is identified at the level of cervical os.



## Biomarker



### ☐ **PIGF** ↓

**(80 - 120 pg/mL) → high specificity to r / i preeclampsia.**

Predictive Performance of PIGF (Placental Growth Factor) for Screening Preeclampsia in Asymptomatic Women

### ☐ **PAPP-A** ↓

**(< 10th percentile → significantly associated with preeclampsia)**

Luewan S, Teja-Intr M, Sirichotiyakul S, Tongsong T. Low maternal serum pregnancy-associated plasma protein-A as a risk factor of preeclampsia.

### ☐ **sFLT-1/PIGF** ↑

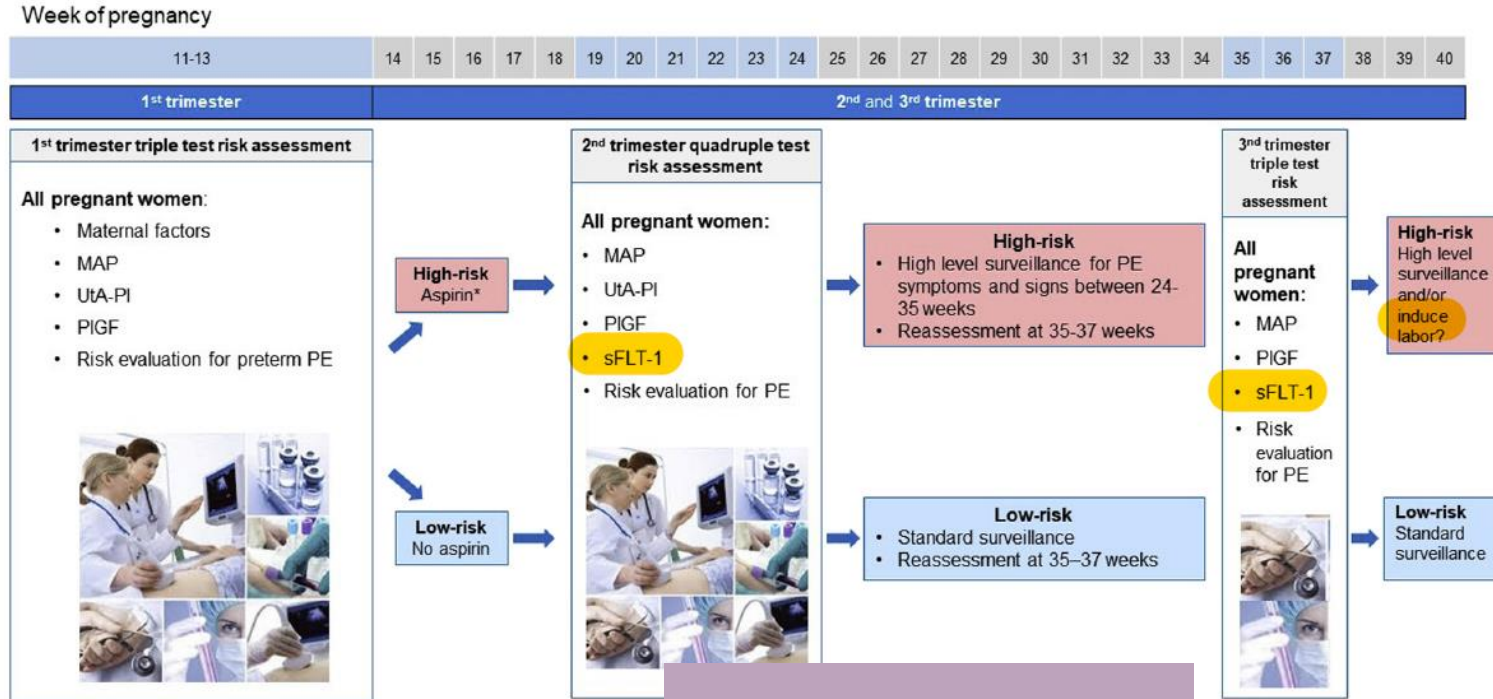
**( < 38 → Normal, NPV=99.3%)**

**( > 38, preeclampsia within 4 wks, PPV=36.7%)**

Predictive Value of the sFlt-1:PIGF Ratio in Women with Suspected Preeclampsia

**★ do not screen for preeclampsia only by using blood or imaging tests**

# Proposed screening and management during pregnancy



## FMF algorithm

\*Aspirin 100 or 160 mg/nightly from <16 weeks until 36 weeks' gestation

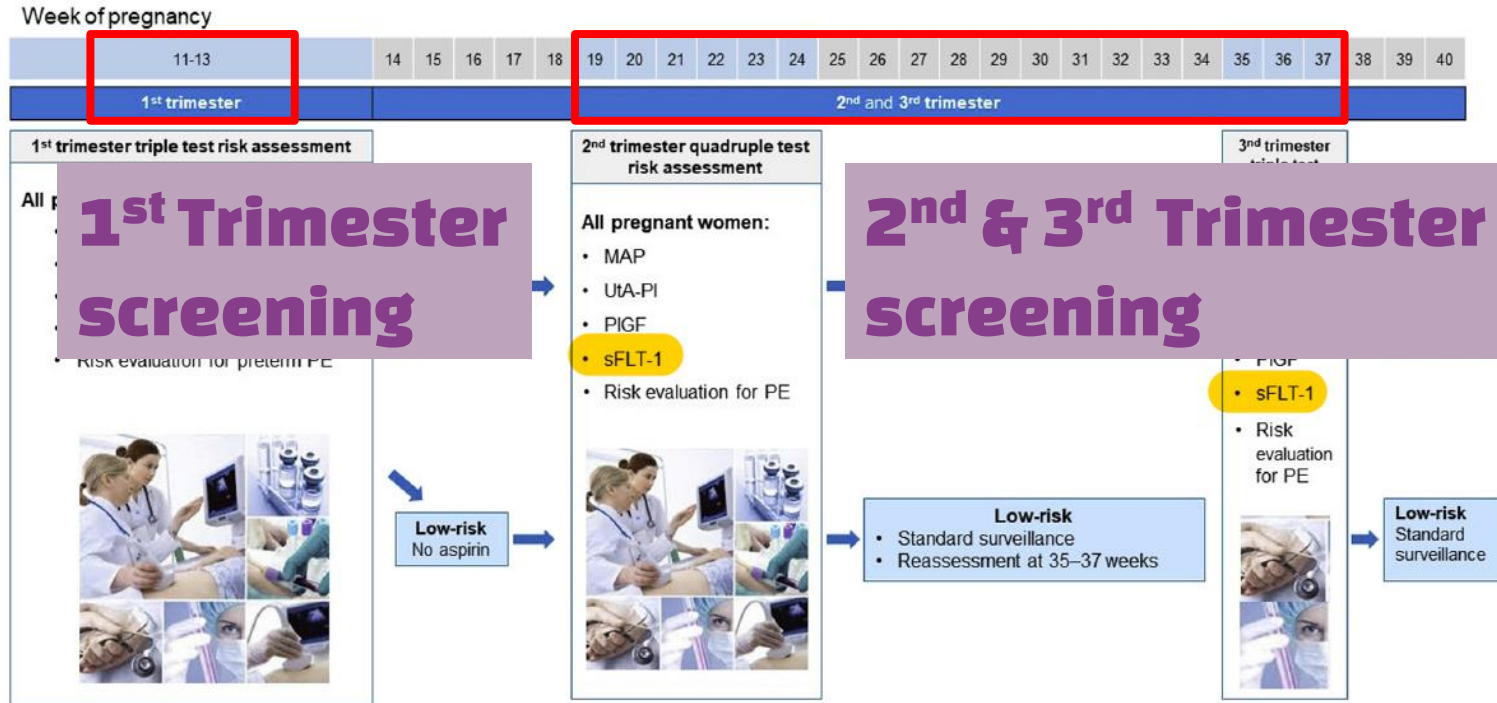
Preeclampsia risk assessment is based on the **FMF algorithms**.

FMF, Fetal Medicine Foundation; MAP, mean arterial pressure; PE, preeclampsia; PLGF, placental growth factor; sFLT-1, soluble fms-like tyrosine kinase-1; Uta-PI, uterine artery pulsatility index.

Chaemsaihong. First trimester preeclampsia screening and prediction. Am J Obstet Gynecol 2022.



# Proposed screening and management during pregnancy



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# Proposed screening and management during pregnancy



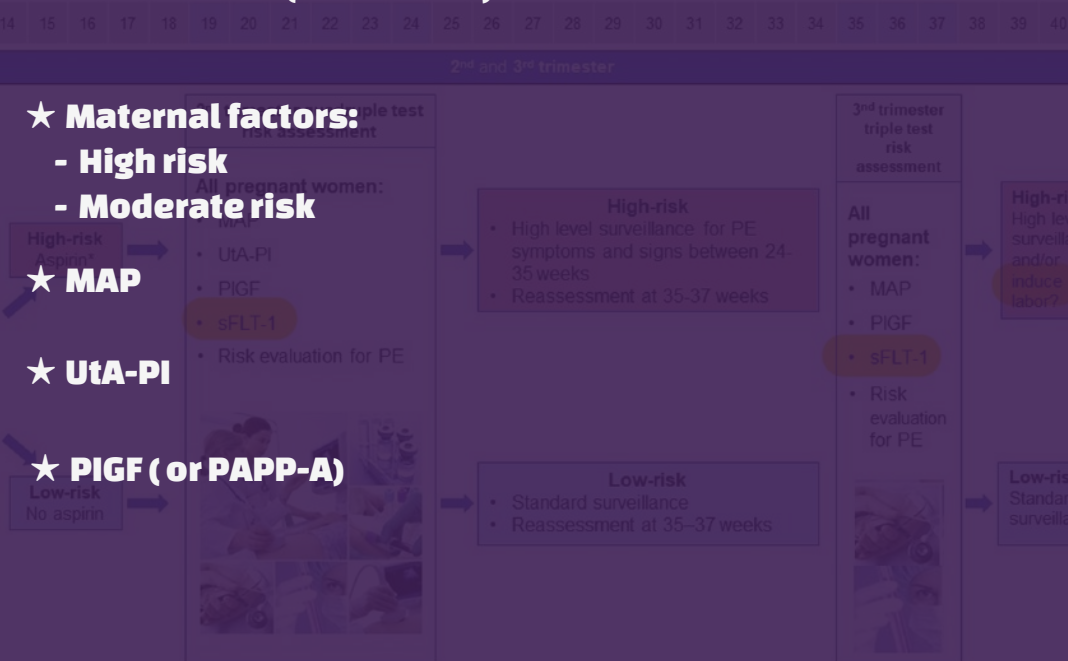
\*Aspirin 100 or 160 mg/nightly from <10 weeks until 36 weeks' gestation

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Chaemsaihong. First trimester preeclampsia screening and prediction. Am J Obstet Gynecol 2022.

## 1<sup>st</sup> Trimester (11- 13 wks)





## 2<sup>nd</sup> & 3<sup>rd</sup> Trimester (19-24 & 35-37 wks)

### ★ Maternal factors: - Hx. Of Pre-eclampsia

All pregnant women:

- Maternal factors

- MAP

### ★ Uta-PI

- Risk evaluation for preterm PE

### ★ PIGF (or PPAP-A)

### ★ MAP

### ★ sFLT-1

High-risk  
Aspirin\*

Low-risk  
No aspirin

### 2<sup>nd</sup> trimester quadruple test risk assessment

All pregnant women:

- MAP
- Uta-PI
- PIGF
- sFLT-1
- Risk evaluation for PE



### High-risk

- High level surveillance for PE symptoms and signs between 24-35 weeks
- Reassessment at 35-37 weeks

### Low-risk

- Standard surveillance
- Reassessment at 35-37 weeks

### 3<sup>rd</sup> trimester triple test risk assessment

All pregnant women:

- MAP
- PIGF
- sFLT-1
- Risk evaluation for PE



High-risk  
High level surveillance and/or induce labor?

Low-risk  
Standard surveillance

\*Aspirin 100 or 160 mg/nightly from <16 weeks until 36 weeks' gestation

Preeclampsia risk assessment is based on the FMF algorithms.

FMF, Fetal Medicine Foundation; MAP, mean arterial pressure; PE, preeclampsia; PIGF, placental growth factor; sFLT-1, soluble fms-like tyrosine kinase-1; Uta-PI, uterine artery pulsatility index.

Chaemsathong. First trimester preeclampsia screening and prediction. *Am J Obstet Gynecol* 2022.

## Risk for preeclampsia

Risks can be derived from maternal history and any combinations of biomarkers. Useful markers at 11-14 weeks are mean arterial pressure (MAP), uterine artery PI (UtPI) and serum PLGF (or PAPP-A when PLGF is not available).

The values for PLGF and PAPP-A depend on maternal characteristics and reagents used for analysis and they therefore need to be converted into MoMs. In the application below you can either use the MoM values reported by the laboratory or provide the raw data and the MoM values will be calculated.

Please record the following information and then press Calculate.

### Pregnancy type

Singleton or twins

### Pregnancy dating

Fetal crown-rump length

mm

(45-84 mm)

Examination date

### Maternal characteristics

Date of birth

Height

cm

ft

in

Weight

kg

lbs

Racial origin

Smoking during pregnancy

☐ Yes ☐ No

Mother of the patient had PE

☐ Yes ☐ No

Conception method

### Medical history

Chronic hypertension

☐ Yes ☐ No

Diabetes type I

☐ Yes ☐ No

Diabetes type II

☐ Yes ☐ No

Systemic lupus erythematosus

☐ Yes ☐ No

Anti-phospholipid syndrome

☐ Yes ☐ No

### Obstetric history

☐ Nulliparous (no previous pregnancies at  $\geq 24$  weeks)

☐ Parous (at least one pregnancy at  $\geq 24$  weeks)

### Biochemical measurements

Mean arterial pressure <sup>i</sup>

mmHg

Mean uterine artery PI <sup>i</sup>

Date of measurement

### Biochemical measurements

Includes serum PLGF

☒ No ☐ MoM ☐ Raw data

Includes serum PAPP-A

☒ No ☐ MoM ☐ Raw data

# 1<sup>st</sup> Trimester

- ☐ Maternal characteristics
- ☐ MAP
- ☐ UtA-PI
- ☐ PLGF( or PAPP-A)

## Risk for preeclampsia

Risks can be derived from maternal history and any combinations of biomarkers. Useful markers at 19-25 weeks are mean arterial pressure (MAP), uterine artery PI (UTPI), serum PLGF and sFLT-1.

The values for PLGF and sFLT-1 depend on maternal characteristics and reagents used for analysis and they therefore need to be converted into MoMs. In the application below you can either use the MoM values reported by the laboratory or provide the raw data and the MoM values will be calculated.

Please record the following information and then press Calculate.

### Pregnancy type

Singleton or twins

### Pregnancy dating

Gestational age

weeks

days

Examination date

### Maternal characteristics

Date of birth

Height

cm

ft

in

Weight

kg

lbs

Racial origin

Smoking during pregnancy

☐

Yes

No

Mother of the patient had PE

☐

Yes

No

Conception method

### Medical history

Chronic hypertension

☐

Yes

No

Diabetes type I

☐

Yes

No

Diabetes type II

☐

Yes

No

Systemic lupus erythematosus

☐

Yes

No

Anti-phospholipid syndrome

☐

Yes

No

### Obstetric history

☐ Nulliparous (no previous pregnancies at  $\geq 24$  weeks)

☐ Parous (at least one pregnancy at  $\geq 24$  weeks)

### Biophysical measurements

Mean arterial pressure <sup>i</sup>

mmHg



Mean uterine artery PI <sup>i</sup>



Date of measurement

### Biochemical measurements

Includes serum PLGF

☒

No

MoM

Raw data

Includes serum sFLT-1

☒

No

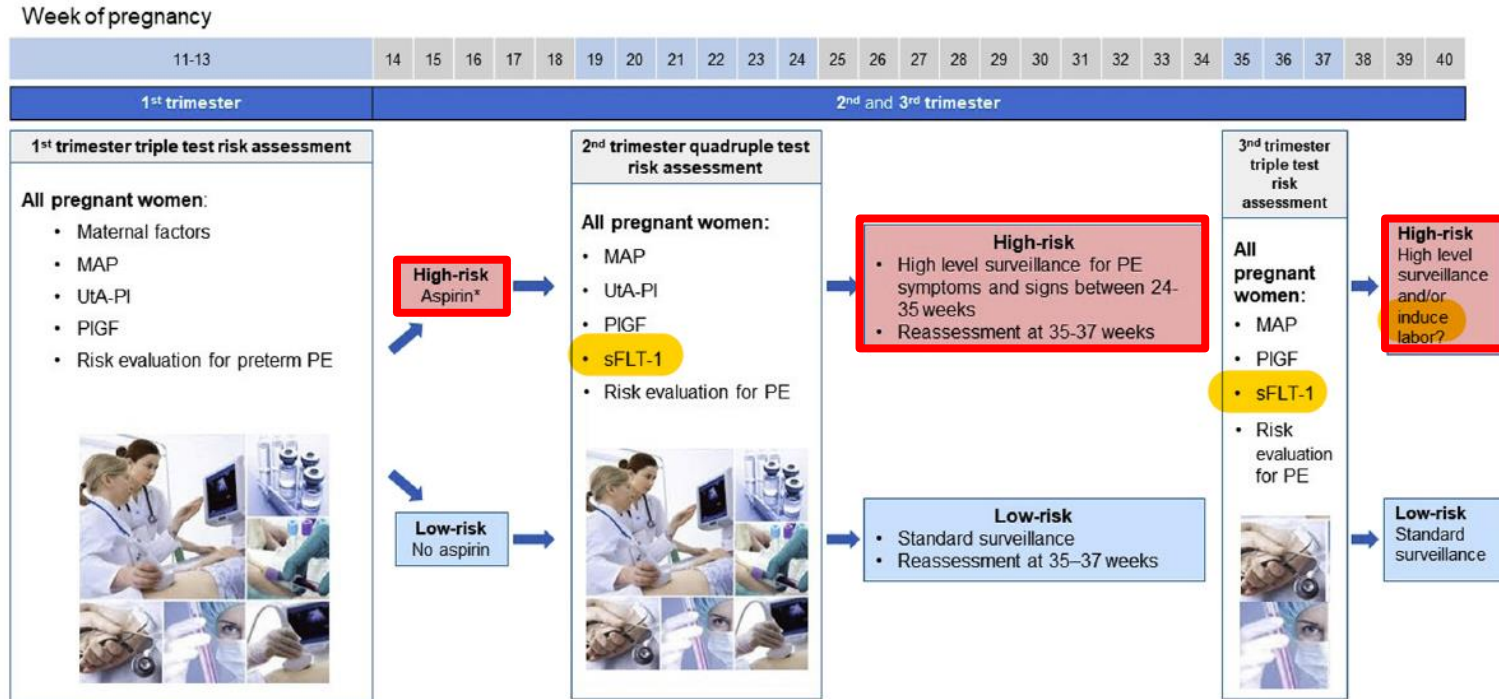
MoM

Raw data

## sFLT-1/PLGF

# 2<sup>nd</sup> & 3<sup>rd</sup> Trimester

# Proposed screening and management during pregnancy



\*Aspirin 100 or 160 mg/nightly from <16 weeks until 36 weeks' gestation

## Aspirin

Preeclampsia risk assessment is based on the FMF algorithms.

FMF, Fetal Medicine Foundation; MAP, mean arterial pressure; PE, preeclampsia; PIGF, placental growth factor; sFLT-1, soluble fms-like tyrosine kinase-1; UtA-PI, uterine artery pulsatility index.

Chaemsaihong. First trimester preeclampsia screening and prediction. Am J Obstet Gynecol 2022.

# Prevention

## ☐ Aspirin

### ACOG 2018<sup>48</sup> (United States of America)

#### Indications for aspirin

- 1 or more high-risk factors
- Consider if 2 or more moderate risk factors
- Dose: 81 mg/d initiated between 12 and 28 wk, optimally before 16 wk
- Continue daily until delivery

### NICE 2019<sup>49</sup> (United Kingdom)

#### Indications for aspirin

- 1 or more high-risk factors
- 2 or more moderate risk factors
- Dose: 75 to 150 mg/d from 12 wk
- Continue daily until delivery

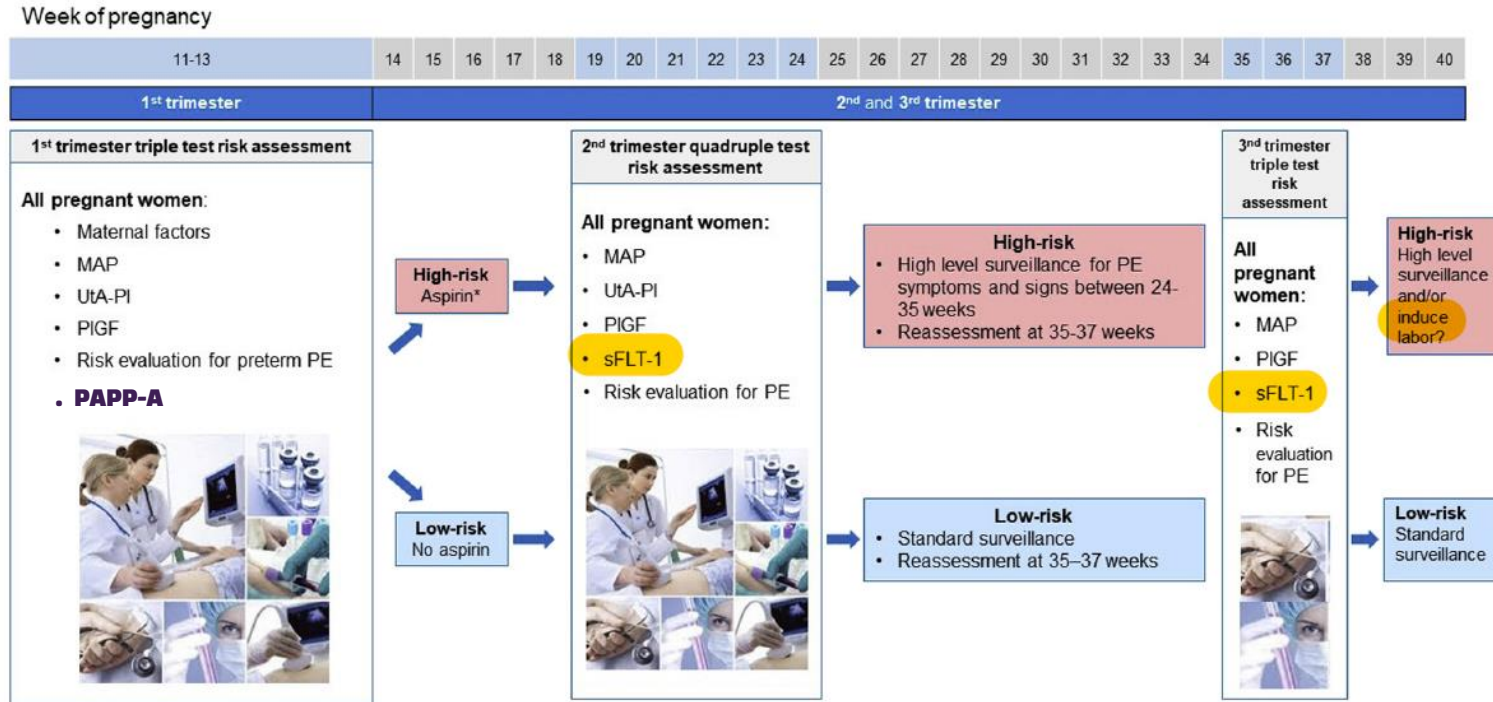
FMF: 100 or 160 mg/ nightly from < 16wks until 36 wks gestation

case-by-case basis to highly selected group:

- ☐ Calcium supplementation
- ☐ Weight loss
- ☐ Exercise



# Proposed screening and management during pregnancy



\*Aspirin 100 or 160 mg/nightly from <16 weeks until 36 weeks' gestation

Preeclampsia risk assessment is based on the FMF algorithms.

FMF, Fetal Medicine Foundation; MAP, mean arterial pressure; PE, preeclampsia; PIGF, placental growth factor; sFLT-1, soluble fms-like tyrosine kinase-1; Uta-PI, uterine artery pulsatility index.

Chaemsaihong. First trimester preeclampsia screening and prediction. Am J Obstet Gynecol 2022.



Q:

1/ 36週小孩出來週數不會太小嗎？

- 不算足月。但已經過34週，寶寶的循環、呼吸、消化和性器等器官的功能在這時候都已經發展成熟。

2/ 小孩需要插管或住保溫箱嗎？

- Guidelines 上並未寫到要直接插管；不過有建議要維持環境溫度，故要住保溫箱。

3/ 可以等到40週再生嗎？

- 根據前面報的guidelines 超過36週可以直接生產





Q:

4/ 我這樣嚴重子癲前症，產後會不會有長期後遺症？

- 有子癲前症病史的人在未來得到高血壓、心血管疾病、腎病變、糖尿病的風險都較一般人高。並且在下一次懷孕時，再次發生子癲前症的風險也較高。

5/ 下一胎要怎麼預防？

- 預防方式包括低劑量阿斯匹靈的使用，以及鈣離子的補充、減重、運動等方式。
- 