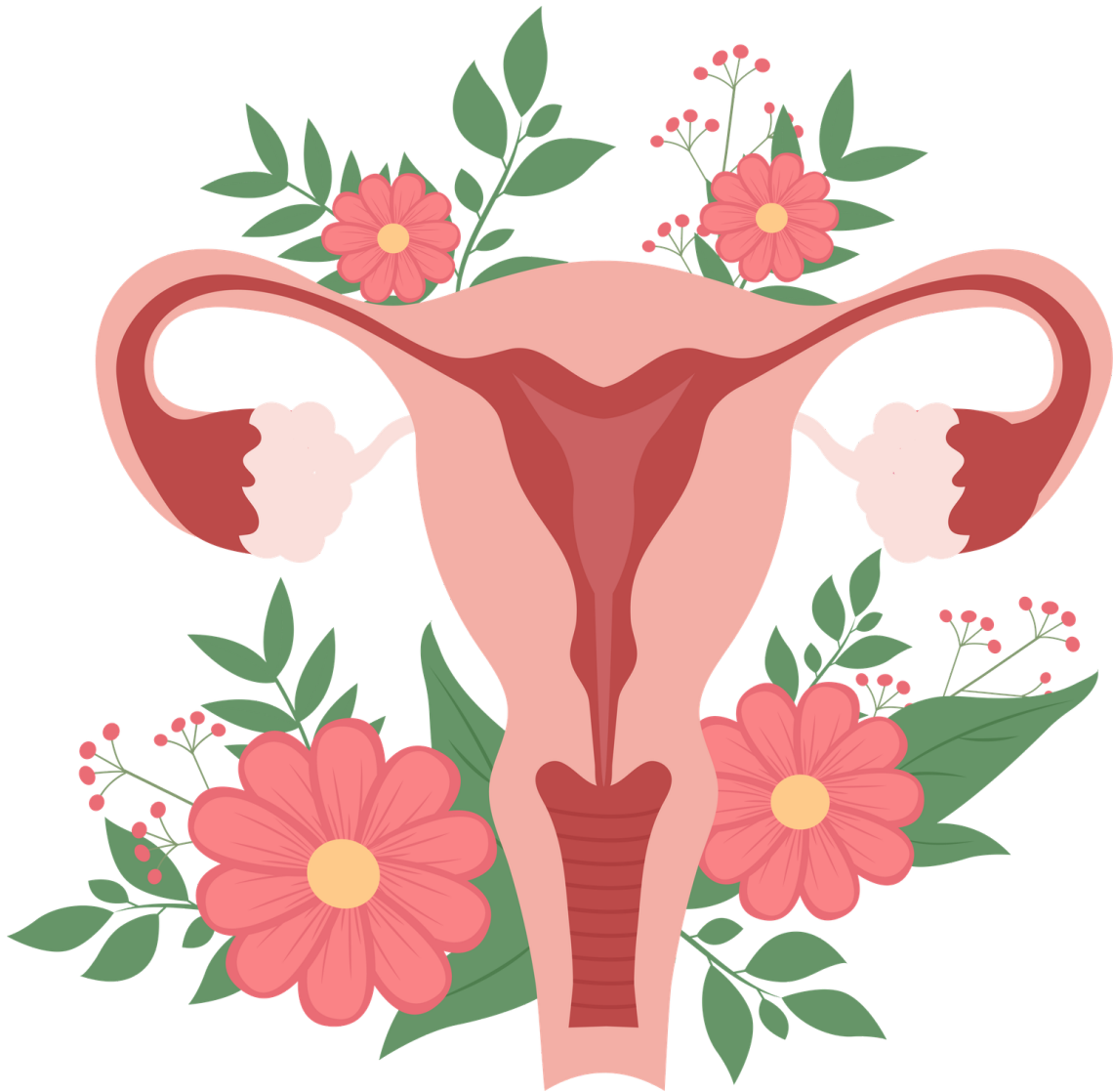


OBS & GYNE

UPDATED 2026 NOTES



OBS PLUS
PART 1

MATERNAL PHYSIOLOGY

1



PRO

Maternal Physiological Adaptations in Pregnancy

★ 4.6 | 98 Min | **NEW**

2



PRO

Gametogenesis, Fertilization & Implantation: I

★ 4.7 | 69 Min | **NEW**

3



PRO

Gametogenesis, Fertilization & Implantation: II

★ 4.5 | 63 Min | **NEW**

4



PRO

Gametogenesis, Fertilization & Implantation: III

★ 5.0 | 43 Min | **NEW**

PRECONCEPTIONAL & PRENATAL CARE

5



PRO

Rh Negative Pregnancy

★ 4.5 | 54 Min

6



PRO

Fetal Aneuploidy Screening

★ 4.4 | 36 Min

7



PRO

Teratogens And Fetotoxic Agents

★ 4.4 | 59 Min

PLACENTA

8



Placenta

★ 4.3 | 36 Min

PRO

9



Abnormalities of the Placenta

★ 4.8 | 82 Min

PRO

10



Disorders of Amniotic Fluid

★ 4.3 | 28 Min

PRO

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EARLY PREGNANCY ISSUES

11



Ectopic Pregnancy

★ 4.5 | 68 Min

PRO

12



Recurrent Miscarriages

★ 4.5 | 56 Min

PRO

13



Gestational Trophoblastic Disease

★ 4.4 | 40 Min

PRO

14



Abortion & Comprehensive Abortion Care

★ 4.5 | 87 Min

PRO

LABOUR COMPLICATIONS & THEIR MANAGEMENT

15



PRO

Physiology of Labour

★ 4.3 | 54 Min

16



PRO

Induction of Labour

★ 4.5 | 90 Min

17



PRO

Labour Dystocia

★ 4.5 | 19 Min

18



PRO

Obstetric Analgesia

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★ 4.4 | 51 Min

19



PRO

Instrumental Delivery and Assisted Vaginal Birth

★ 4.4 | 71 Min

20



PRO

Obstetric Anal Sphincter Injuries (OASIS)

★ 4.5 | 46 Min | **NEW**

21



PRO

Uterine Inversion

★ 4.6 | 25 Min | **NEW**

MATERNAL PHYSIOLOGICAL ADAPTATION IN PREGNANCY

----- Active spa

Reproductive tract

00:01:22

uterus :

myocyte arrangement :

- There are three muscle layers : The inner circular layer, the middle interlacing layer, and the outer longitudinal layer.
- The middle interlacing layer is responsible for contractions.
- The vessels lie between this layer.
- This interlacing nature of the muscles helps prevent blood loss during delivery.
- There is myocyte hypertrophy.

Division :

- The upper uterus has more longitudinal fibres because that is where contraction happens.
- The lower uterus has circular fibres for constriction, because once the baby is delivered the canal constricts.

Size change :

- A non pregnant uterus weighs around 70 g.
- A pregnant uterus weighs around 1 Kg.

Shape change :

- It is initially spherical, then becomes oval, then becomes cylindrical.

Fundal height :

- At 12 weeks the uterus becomes a pelvic organ.
- At 20 weeks it is at the level of the umbilicus.
- At 36 weeks it is at the level of the xiphoid process.

Positional change :

- The uterus comes into the pelvis and undergoes some dextrorotation.
- It dextrorotates to the right because the sigmoid colon lies on the left side.
- This is why the left lateral position is better to increase blood flow to the uterus.
- It forms a 90° angle with the vagina, but this is only maintained in early

----- Active space -----

pregnancy, after which it becomes an abdominal organ.

- Once it becomes an abdominal organ, there is dextrorotation.

Displacement :

- As the uterus rises it displaces everything upward.
- The stomach and intestines move up, which increases the chance of gastrooesophageal reflux.
- The heart also moves up and laterally.

Contractility changes :

- There is hypertrophy of the smooth muscle, with almost a 10 time increase in size.
- Gap junctions increase, more towards term in preparation for parturition.
- Contractile proteins such as actin and myosin increase.
- There is an effect of progesterone and oxytocin.
- Oxytocin receptors are fewer earlier in pregnancy and then increase exponentially.
- The action of oxytocin is therefore seen better later in pregnancy.
- Progesterone maintains the quiescent stage until term, after which there is a dip.
- This is the logic of giving progesterone to a female with preterm labour or twin pregnancy.
- In twin pregnancy many guidelines allow vaginal progesterone, because there is excessive distension of the uterus and progesterone helps with that.

uteroplacental blood flow :

- Cardiac output increases, so more blood goes to the uterus and placenta.
- Prepregnancy uterine blood flow is 50 to 90 ml per minute.
- At term it increases to 500 to 700 ml per minute.

Reasons for increased uterine blood flow :

- Systemic vascular resistance goes down.
- Endothelial nitric oxide helps.
- Progesterone helps.
- Angiogenesis occurs.
- There is vascular remodelling, causing refractoriness, so the vessel becomes refractory to anything causing constriction.
- Three main reasons : Vascular refractoriness, more blood vessels through angiogenesis, and endothelial nitric oxide.

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Distribution :

- At term, 80% of uterine blood flow goes to the placenta and only 20% goes to the uterus.

Auto transfusion :

- As delivery happens the placenta comes out and pressure on the IVC is relieved.
- There is auto transfusion, so much of that blood enters the systemic circulation.
- Patients with heart disease or preeclampsia cannot tolerate this massive shift, and it can lead to pulmonary oedema.

Cardiac output to the uterus :

- In the prepregnancy state, only 3.5% of cardiac output goes to the uterus.
- In a pregnant female, 12% of cardiac output goes to the uterus.

Vascular adaptations :

- There is spiral artery remodelling.
- As the embryo implants, the trophoblast invades the spiral artery and remodels it.
- The muscular nature is lost, so it becomes a low resistance, high flow vessel.
- There is vessel dilatation, with a 4 to 6 fold increase in diameter.
- There is increased permeability of the endothelium.
- There is angiogenesis with new blood vessel formation.
- Vasodilatation occurs because of prostacyclins and nitric oxide.

Consequences if vascular adaptation is deficient :

- Foetal growth restriction, due to deficient uteroplacental blood flow.
- Preeclampsia, due to lack of proper spiral artery remodelling, an obstetric vasculopathy.
- Placental abruption, because acute flow disruption can lead to abruption.
- Preterm labour, due to increased contractility from disruption in blood flow.
- The interlacing fibres and vessels help prevent bleeding, which is their role in PPH.

Cervix :

- The cervix becomes softened.
- On per vaginal examination, senior gynaecologists used to diagnose pregnancy by feeling the softening of the cervix when ultrasounds were not easily available.

----- Active space -----

- On per speculum examination, bluish discolouration of the cervix can be seen.
- Position changes from posterior to anterior (Part of the Bishop scoring).
- Consistency changes from firm to softened.

Goodell sign :

- This softening is the Goodell sign, seen around 6 weeks.

Chadwick sign :

- The bluish discolouration is the Chadwick sign, seen around 8 weeks.

mucus plug :

- The cervical canal has a mucus plug.
- It has an immunological and protective role.
- It prevents organisms from entering to an extent.
- It prevents ascending infection.
- The cervix then dilates for labour.

Cervical length :

- The normal cervical length is around 3 to 4 cm.
- Concern arises when it is <2.5 cm.

Ovary :

- The ruptured follicle forms the corpus luteum, which secretes hormones.
- The corpus luteum secretes oestrogen and progesterone for 7 to 9 weeks.
- At 7 to 9 weeks the shift happens and the placenta takes over.
- If the corpus luteum is removed before 9 weeks, before the placenta has taken over, the pregnancy will not survive.

Pregnancy related ovarian masses :

- There are two kinds : Hyperreactio luteinalis and pregnancy luteoma.

Pregnancy luteoma :

- It is a benign neoplasm.
- It can be unilateral or bilateral.
- It is usually solid.
- Luteinised stromal cells in the ovary lead to its formation.
- It usually occurs in the 2nd half of pregnancy, in the 2nd or 3rd trimester.
- It is associated with an increase in androgen, so testosterone levels increase.
- up to 25 to 30% of pregnant females develop features of virilisation.
- 80% of female foetuses are affected if the mother is affected.
- If the mother is not affected, the baby will not be affected.

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- The chance of female foetal virilisation is extremely high.
- There is no treatment; it follows spontaneous regression.

Hyperreactio luteinalis :

- On ultrasound it looks like a stimulated ovary, mimicking ovarian hyperstimulation syndrome with multiple cysts.
- It occurs because of an increase in HCG, which increases androgen, so it is also associated with virilisation.
- Around 30% of these females can have virilisation, but the chance of the foetus being affected is negligible.

Associations of hyperreactio luteinalis :

1. Gestational trophoblastic disease.
2. Multifoetal gestation.
3. Alloimmunisation and placentomegaly due to diabetes mellitus.
4. Preeclampsia, with an association with growth restricted foetuses.
5. Hyperthyroidism, because HCG and TSH share the alpha subunit, as these are glycoprotein hormones.

Protective mechanisms against virilisation :

- Sex hormone binding globulin increases; in pregnancy all globulins increase, and once SHBG increases the androgen is suppressed because it binds to SHBG.
- The placental enzyme aromatase increases, which converts androgen into oestrogen.

Fallopian tube :

- The fallopian tube slightly lengthens and distends.
- There is increased peristaltic activity, to allow fertilisation.
- There is increased ciliary movement, which enhances transport of the egg, sperm, and finally the embryo into the uterus.
- There is increased blood supply to the fallopian tube.

Vagina :

- There is increased blood flow to the vagina, which can cause bluish discolouration.
- The vagina has a normal microflora and an acidic pH; if disturbed, there is increased chance of ascending infection.

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- Earlier studies, around 20 years ago, researched the association of bacterial vaginosis with preterm labour.
- It is now known that only GBS is important and can lead to preterm labour, and it is necessary to treat.
- The acidic pH decreases further as a protective mechanism.
- There are increased secretions; pregnant females often report white discharge, called leucorrhoea.
 - Leucorrhoea is normal when it is white, has no odour, and is not associated with itching.
- The vaginal epithelium becomes thickened and stratified squamous.
- Lactobacilli increase to maintain the acidic environment.

Perineum :

- The perineal muscle has to stretch and prepare for delivery.
- There is increased blood supply.
- There is increased stretching because of relaxin and oestrogen.
- There is reduced perineal tone.

Consequences if the vaginal flora changes :

- Increased chance of vaginitis, fungal infection, and bacterial infection, which can lead to preterm labour.
- This is why ACOG guidelines in developed nations screen for GBS at 35 to 37 weeks.

GBS screening indications :

- History of GBS in a prior pregnancy.
- Prolonged rupture of membranes.
- Unknown GBS status.

Breast

00:17:07

Overview :

- Breast size increases because of changes in the ducts and stromal tissue.
- There is breast enlargement by almost 25 to 50% by the third trimester.
- The nipples become darker with increased pigmentation.
- The Montgomery glands become very prominent.

Areola :

----- Active space -----

- The areola increases in size and pigments more.
- The nipple does not increase in size; the areola increases and both darken.

Vascularity :

- There is increased vascularity, with visible venous engorgement that can appear as bluish discolouration from veins.
- Striae gravidarum can form because of the increase in size, and the breast is one of the more common sites.

Glandular changes :

- The alveoli proliferate more than the glands.
- There is increased formation of lobules, with 15 to 25 lobules per lobe, compared with the normal 10 to 15.
- There is ductal branching.
- There are stromal changes because of increased connective tissue.

Colostrum :

- Colostrum, the yellowish first milk, starts at 16 to 20 weeks.

Nipple discharge :

- Some patients report breast or nipple discharge in pregnancy.
- One cause can be withdrawal of progesterone, and such a patient may have imminent labour.
- Nipple stimulation can help in labour as a natural technique; the female starts from the 34th week, three times a day for about an hour.
- Lactogenesis increases.

Hormonal regulation :

- Oestrogen controls ductal growth.
- Progesterone controls the alveoli, with a 15 to 20% growth in the alveoli.
- Prolactin maintains the breast milk.
- Human placental lactogen is responsible for breast development.
- Growth hormone helps in tissue development.

Breast cancer screening :

- Pregnancy is a good time for ruling out breast lumps.
- In a country like India with a large population and limited doctors, breast cancer screening should happen in pregnancy.
- The female can be taught how to palpate a lump, usually in the first or early second trimester.

----- Active space -----

- Nipple care should be explained, as mastitis can occur later during feeding.

Skin and hair changes

00:21:21

Linea nigra :

- The linea alba darkens to become the linea nigra.
- It is a dark coloured line from the umbilicus to the pubis.
- It is usually present in 70 to 90% of females.

melasma :

- The mask of pregnancy is melasma, which is hyperpigmentation of the face.

Pigmentation :

- The areola and nipple darken.
- The genitalia darken.
- The axilla can darken.

Freckles :

- Freckles become more visible, especially in females from equatorial regions, because of skin changes in pregnancy.

Striae gravidarum :

- They appear silvery, reddish, or purplish.
- They occur in 50 to 90% of females.

Predisposing factors :

- Protein deficiency.
- Genetic predisposition to striae.

Prevention :

- There is no definite way to prevent them.
- Only almond oil, vitamin E, and aloe vera have been shown to help to some extent.
- Commercial products such as bio oil do not work.
- The female should never scratch the striae, as this increases them.

Sites :

- They are most commonly present on the abdomen, breast, thigh, and buttocks.
- They are initially red and purplish and then become silvery.

Risk :

----- Active space -----

- Females with rapid weight gain are at risk.
- Genetic predisposition is a risk.
- moisturisation is key.

Vascular changes :

- There is increased blood flow and therefore stasis.
- Spider angiomas can be seen, which are also common in liver disease, so it is important to know what is normal.
- Spider angiomas are usually seen on the face, chest, and near the breast.
- There is palmar erythema, so the palms become red.
- Varicose veins are common because of venous stasis in the lower limbs.
- Haemangiomas may increase in size if any are present.

Hair changes :

- There can be hirsutism, which can be due to ovarian disease such as an ovarian mass, but in general because androgens are increasing.
- It is not permanent and usually occurs over the face and abdomen; many females develop facial hair on the chin which they never had.
- There can be telogen effluvium.
- Pregnancy has a prolonged anagen phase, so many females report shinier, better hair in pregnancy.
- Postpartum, the anagen phase converts to telogen, causing telogen effluvium for a long time.
- up to 90% of females regain their hair, so it is not lost permanently in most; only 10% or less do not regain it.
- Regrowth can take time, around 3 months, 6 months, up to 18 months.
- Hair texture can change and become dry.
- Nails become brittle and their growth rate increases, so these females may need to cut their nails twice a week.

Skin lesions :

- There is prurigo of pregnancy.
- There is increased itching; patients are advised to apply aloe vera gel, moisturise well, and drink plenty of water.
- There can be pruritic urticarial papules.
- Intrahepatic cholestasis (Spider angiomas).

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Carbohydrate metabolism

00:25:47

Basal metabolic rate increases by around 25%, which is around 77,000 kilocalories.

Changes in carbohydrate metabolism :

- Pregnancy is a state of fasting hypoglycaemia, which can be prolonged.
- There is postprandial hyperglycaemia.
- There is reduced insulin sensitivity.
- There can be hyperinsulinaemia.
- There is increased hepatic gluconeogenesis.
- Glucose uptake also increases.

Note :

- Insulin sensitivity decreases by around 30 to 70%, due to human placental lactogen, progesterone, and oestrogen.
- Fasting glucose reduces by 10% compared with the non pregnant value.
- There is postprandial hyperglycemia because of human placental lactogen, which reduces glucose uptake by maternal tissue.
- The pancreatic beta cell mass ↑ to compensate for insulin resistance.
- Hepatic glycogen stores increase, with increased hepatic gluconeogenesis.

Insulin dynamics :

- In the first trimester there is initially increased insulin sensitivity, so insulin requirement is lower.
- Insulin resistance then keeps increasing, so insulin requirement also keeps increasing.
- Peak resistance is in the third trimester.
- This normalises usually by 48 hours postpartum.
- Because insulin sensitivity increases in the first trimester, testing is usually done at 24 to 28 weeks.

Glucose thresholds (ACOG) :

Parameter	Normal	GDM
Fasting	<92 mg/dL	≥92 mg/dL
1-hour	<180 mg/dL	≥180 mg/dL
2-hour	<153 mg/dL	≥153 mg/dL
HbA1c	<5.7%	≥6.5%

management of glucose intolerance :

----- Active space -----

- Diet and lifestyle initially.
- Carbohydrate counting, with three major meals and two to three snacks.
- Reduce meals with high glycaemic index.
- Exercise around 150 minutes per week, around 40 to 45 minutes, 3 to 5 times, of moderate activity.
- monitor by fasting and postprandial glucose.
- For a female with impaired glucose tolerance prior to pregnancy who is not diabetic, monitoring with **fasting** and **postprandial glucose** is important.
 - In a female already on metformin (~~e.g. started for PCOD~~ and continued through and after pregnancy), an OGTT has no value, so monitoring is done with fasting and a hour postprandial glucose.
- Ideally the OGTT is done between 24 to 28 weeks.

Fat metabolism

00:30:42

There are many changes in the lipid profile.

Total cholesterol increases by 25 to 50%, peaking in the third trimester.

Triglycerides, LDL, HDL, and free fatty acids all increase.

Hormonal control :

- Oestrogen increases HDL and increases triglycerides.
- Progesterone promotes fat storage.
- In a pregnant female gaining weight, there is increased uptake of fat from food and increased fat storage.
- Human placental lactogen increases lipolysis and reduces glucose utilisation.
- There is increased use of fat for energy, and glucose is saved.

Weight and fat gain :

- Total fat gain is around 3 to 3.5 kg.
- Average total weight gain is around 12 kg.

Components of weight gain :

- The baby is around 3.3 kg.
- Fat gain is around 3.4 kg.
- The placenta is around 650 g.
- The amniotic fluid is around 800 g.
- The uterus becomes almost 1 kg.
- The breasts increase by 450 to 500 g.
- The extravascular fluid and blood together are around 1.48 to 1.5 kg.

----- Active space -----

- Subcutaneous fat increases because of progesterone.
- Fat deposition in South Asian females is usually near the buttocks and thighs.

Lipid levels by trimester :

- Total cholesterol, LDL, HDL, and triglycerides all increase.
- If triglycerides are >400 , there is increased risk of pancreatitis in pregnancy.

Haematological system

00:33:16

Plasma volume :

- Plasma volume increases by 40 to 50% by the third trimester.
- This is an addition of 1500 to 1600 ml.
- The peak is at 32 to 34 weeks.
- This is due to renin angiotensin aldosterone activation, and the increase in aldosterone causes the increase in plasma volume.
- Two thirds is in the extracellular compartment and one third is in the intracellular compartment.

Significance :

- The increased plasma volume supports uteroplacental perfusion.

RBC mass and physiological anaemia :

- If RBCs did not increase, the increased blood would cause a massive dilutional anaemia.
- RBCs increase by 20 to 30%, which is almost 450 ml.
- Because RBCs increase by 20 to 30% and plasma volume increases by 40 to 50%, there is physiological anaemia of pregnancy.
- Haematocrit decreases to 30 to 33%.

Iron requirement :

- The iron requirement in pregnancy is 1000 mg.
- 500 mg is required by the foetus and placenta.
- 300 to 400 mg is utilised by maternal erythrocytes.
- 200 mg is excreted.
- The daily requirement is 6 to 7 mg, which is not met by diet alone, so iron supplements are started.

Coagulation system :

----- Active space -----

- Pregnancy is a hypercoagulable state.
- Fibrinogen increases.
- Prothrombin slightly reduces.
- Platelets may reduce by 10 to 20%.
- Thrombocytopenia is when the count is <1.5 lakh.

Trimester wise blood changes :

Parameter	First Trimester (1-12 weeks)	Second Trimester (13-27 weeks)	Third Trimester (28-40 weeks)
Hemoglobin (g/dL)	11.3-14.3 mean : 12.8 ↓ 5-10% from baseline	10.1-13.3 mean : 11.7 ↓ 15-20% (hemodilution)	10.1-14.1 mean : 12.2 Slight recovery
Hematocrit (%)	35-44 mean : 39.5 Physiologic anemia begins	32-42 mean : 37 ↓ 15% from baseline	33-43 mean : 38 Stabilizes
WBC ($\times 10^9/L$)	5.1-12.1 mean : 8.6 ↑ 30% from non-pregnant	6.1-13.4 mean : 9.8 Peak leukocytosis	5.6-12.4 mean : 9.0 Slight decrease
Platelets ($\times 10^9/L$)	184-374 mean : 279 Normal range	164-356 mean : 260 ↓ 10-15%	145-349 mean : 247 ↓ 20% from baseline
MCV (fL)	82-96 mean : 89 ↑ 5-10 fL	85-98 mean : 91 ↑ 7-10 fL	86-99 mean : 92 Stabilizes

- WBC $>15,000$ points towards infection or inflammation.

Iron details :

- Iron requirement is 1000 mg.
- The foetus and placenta take 500 mg.
- Maternal erythrocytes take around 300 mg.
- Excretion is 200 mg.
- Iron absorption from the GI tract increases to meet the physiological requirement.
- Hepcidin slightly reduces and remains low throughout; hepcidin is also an inflammatory marker, and low hepcidin maximises intestinal absorption and promotes iron release.
- There is active transport of iron from mother to baby, so the mother may be anaemic while the baby is not.

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Ferritin :

- Ferritin slightly reduces with a gradual decline.
- The threshold to diagnose iron deficiency anaemia is when it is $<30 \mu\text{g/L}$.

Iron supplementation :

- The routine iron supplement is 30 to 60 mg per day, given daily or twice a week as an intermittent regimen.
- Always give on an empty stomach, with lemon water or vitamin C (E.g., A LINC tablet).
- Give IV iron if malabsorption is suspected, the patient is non compliant, or a rapid rise is needed.

Coagulation factors :

- All procoagulant factors increase because of increased hepatic synthesis.
- The half life of these factors is unchanged at 3 to 4 days.

Factor	Non-Pregnant	Pregnancy	Change
Fibrinogen	250-300 mg/dL	400-450 mg/dL	+50%
Factor II	100%	120-150%	+30%
Factor V	100%	110-130%	+20%
Factor VII	100%	150-200%	+75%
Factor VIII	100%	150-250%	+100%
Factor X	100%	120-150%	+35%

Clotting pathway :

- The extrinsic pathway is through tissue factor.
- The intrinsic pathway is through factor 12.
- Both converge on the common pathway through factor 10 activation, which activates prothrombin to thrombin.
- Thrombin increases and cleaves fibrinogen, so fibrin also increases.
- Pregnancy shifts towards a procoagulant state.

Anticoagulant factors :

- Protein C, protein S, antithrombin, & tissue factor pathway inhibitor reduce.
- This increases the chance of DVT and venous thromboembolism, and the risk can remain for up to 6 weeks as levels normalise.

magnitudes :

- Protein C and protein S reduce by 30 to 40%, because of plasma volume increase and no other reason.