Obstetrics and Gynaecology

MBBS Recap: high-yield notes for revision

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Revision notes for the MD/MS entrance: the facts an examiner asks, grouped by topic, in the order of the practice questions.

Physiology of pregnancy and antenatal care

Hormones of pregnancy

- **hCG**: made by the syncytiotrophoblast; detectable in serum about 8-9 days after conception, doubles every 48 hours early on, **peaks at 8-10 weeks, then falls** to a lower plateau. Alpha subunit is shared with LH, FSH and TSH; the beta subunit is specific. Very high in molar pregnancy, twins and Down syndrome; low in ectopic and failing pregnancy.
- **Progesterone**: corpus luteum until about 7-9 weeks (the luteo-placental shift), then placenta. **Human placental lactogen (hPL)**, **oestriol** and prolactin keep rising to term.
- **Oestriol** comes from the fetal-placental unit (fetal adrenal DHEA-S is the precursor); it is low in anencephaly, fetal adrenal hypoplasia and placental sulfatase deficiency.
- hPL is anti-insulin (diabetogenic), which drives gestational diabetes.

Early ultrasound sequence (transvaginal)

Structure	Seen at (weeks)
Gestational sac (first sign)	about 4.5-5
Yolk sac	about 5.5
Fetal pole and cardiac activity	about 6-6.5

- **No gestational sac in the uterus at an hCG above the discriminatory level** (1,500-3,500 IU/L, depending on centre) points to an ectopic (or failed) pregnancy.
- **Crown-rump length (8-13+6 weeks) is the best dating method**; it overrides the LMP if they differ by more than 5-7 days. Naegele's rule: LMP + 9 months + 7 days.

Signs of early pregnancy

- Chadwick (bluish vagina and vulva, 6-8 weeks), Hegar (soft isthmus, 6-8 weeks), Goodell (soft cervix), Osiander (pulsation in lateral fornix), Jacquemier (the same bluish-violet vaginal mucosa; Chadwick and Jacquemier are usually treated as one sign). Only ultrasound or hCG is diagnostic.

Maternal adaptations

- **Blood**: plasma volume rises about 40-50%, red cell mass only 20-30%, so **haemoglobin falls (physiological, dilutional anaemia)**: anaemia is Hb below 11 g/dL in the first and third trimesters, below 10.5 in the second. Iron needs rise; coagulation factors (fibrinogen, VII, VIII, X) rise, so pregnancy is hypercoagulable; platelets fall slightly.
- **Cardiovascular**: **cardiac output rises 30-50%**, peaking at 28-32 weeks (and surging in labour and just after delivery); heart rate rises 10-20 bpm; BP falls in the second trimester; systemic vascular resistance falls.
- **Respiratory**: tidal volume and minute ventilation rise; **functional residual capacity and residual volume fall** (about 20%); vital capacity and respiratory rate are unchanged; PaCO2 about 30 mmHg (mild respiratory alkalosis, compensated).
- **Renal**: GFR up about 50%, so creatinine falls (above 0.9 mg/dL is abnormal); glycosuria is common; hydronephrosis of the right ureter.
- **Other**: LES tone falls (reflux); gallstones; weight gain 11-16 kg for a normal BMI.

Antenatal care

- WHO 2016 model: **eight contacts** (first before 12 weeks; then 20, 26, 30, 34, 36, 38 and 40 weeks), replacing the older four-visit focused antenatal care (FANC) model.
- **Nepal**: the National Medical Standard for Maternal and Newborn Care (Ministry of Health and Population, 2020) adopts **WHO's eight contacts**; but the Aama Suraksha programme's cash incentive and the national indicator (ANC4) still count the older **four visits, at the 4th, 6th, 8th and 9th months**. An exam may ask either: four visits is Nepal's programme schedule, eight contacts its current standard.
- **Aama programme (Nepal, Ministry of Health and Population)**: now the **Aama and Newborn programme** under the Safe Motherhood programme. It has provided **free delivery care since 2009** (user fees removed, with payments to facilities) and a **transport incentive for an institutional delivery that is graded by region, highest in the mountains, then the hills, lowest in the Terai** (the rates change, so learn the principle), plus an incentive for completing the antenatal visits. Its aim is more births with a skilled birth attendant. Safe motherhood in the curriculum means antenatal care, a skilled attendant at birth, emergency obstetric care and postnatal care.
- **Imaging in pregnancy**: ultrasound and MRI without gadolinium are safe at any stage; the fetal risk from ionising radiation is negligible below **50 mGy** (ACOG 2017), and a chest X-ray or an abdominal CT gives far less than that, so a needed scan is not withheld; the main risks are in the first weeks after conception and above 100 mGy. Gadolinium is avoided; iodinated contrast is acceptable when needed.
- Routine at booking: blood group and Rh, Hb, urine (asymptomatic bacteriuria is treated: nitrofurantoin, cefalexin), HIV, hepatitis B, syphilis, rubella status, glucose risk.
- Iron plus folic acid daily (WHO: 30-60 mg elemental iron and 400 micrograms folic acid); tetanus-diphtheria toxoid; low-dose aspirin from 12-16 weeks if high risk for pre-eclampsia (see hypertension).

- **Folic acid**: 400 micrograms daily from before conception to 12 weeks; **4 mg (UK: 5 mg) daily if a previous neural tube defect**, or on antiepileptics, diabetes or obesity (UK). Folic acid cuts the NTD risk by about 70%.
- **Rubella**: if non-immune at booking, **do not give MMR in pregnancy** (live vaccine); give **MMR after delivery**, and avoid conception for 4 weeks. Primary rubella in the first 16 weeks gives congenital rubella syndrome (cataract, deafness, PDA).

Rhesus disease

- Rh-negative mother with Rh-positive fetus. **Anti-D immunoglobulin 300 micrograms (1,500 IU) IM** at 28 weeks to every Rh-negative woman with a negative indirect Coombs test, and again within 72 hours of delivery if the baby is Rh-positive; also after antepartum bleeding, abdominal trauma, miscarriage or abortion at 12 weeks or more, surgically treated ectopic pregnancy, amniocentesis, CVS and external cephalic version. Before 12 weeks recent guidance lets anti-D be omitted after miscarriage or abortion (WHO abortion care 2022; ACOG clinical practice update 2024; NICE 2019 gives it only for surgical management); older texts give it at any gestation. 300 micrograms covers 30 mL fetal whole blood (15 mL red cells); the **Kleihauer-Betke test** (acid elution, fetal cells resist) measures the bleed to give extra doses.
- If the **indirect Coombs is already positive**, anti-D is useless: follow antibody titre and **middle cerebral artery peak systolic velocity** (above 1.5 MoM signals fetal anaemia), then intrauterine transfusion. Hydrops is the severe end.
- ABO incompatibility is milder and not prevented by anti-D.

Screening and fetal assessment

- **Nuchal translucency** (11-13+6 weeks) with free beta-hCG and PAPP-A (combined test). In Down syndrome: NT up, hCG up, PAPP-A low.
- **Quadruple test, best at 15-20 weeks**: AFP, hCG, unconjugated oestriol, inhibin A. Down: **AFP low, oestriol low, hCG high, inhibin A high**. Edwards: all low. Neural tube defect: AFP high. Cell-free DNA (NIPT, from 10 weeks) is the most sensitive screen for trisomy 21; it is a screen, not a diagnosis.
- Diagnosis: **CVS 10-13 weeks**, **amniocentesis from 15-16 weeks**; amniocentesis loss risk about 0.1-0.5%.
- **Maternal serum AFP**: raised in open neural tube defects, abdominal wall defects (gastroschisis, exomphalos), twins, fetal death and underestimated gestation; lowered in Down and Edwards syndromes and with overestimated gestation. The **triple test** (AFP, unconjugated oestriol, hCG) and the **quadruple test** (the same plus inhibin A) are done at 15-20 weeks: **Down syndrome gives low AFP, low oestriol, high hCG (and high inhibin A)**; Edwards syndrome gives all three low (inhibin A normal).
- **Fetal lung maturity**: amniotic fluid **lecithin-sphingomyelin ratio of 2 or more** (mature), presence of phosphatidylglycerol; the foam stability test is a bedside screen. Fetal lung tests are rarely used now; steroids are given instead.
- **Fetal well-being**: non-stress test (reactive: two accelerations of 15 bpm for 15 seconds in 20 minutes); contraction stress test (positive if late decelerations with over half the contractions); **biophysical profile** (NST, breathing, movements, tone, fluid, 2 marks each); **modified BPP = NST plus amniotic fluid index**. Umbilical artery Doppler is the one test shown to cut perinatal deaths in growth restriction: absent or reversed end-diastolic flow is ominous; middle cerebral artery shows brain sparing.

Amniotic fluid

- **Oligohydramnios**: AFI below 5 cm or **single deepest pocket below 2 cm**. Causes: rupture of membranes, growth restriction, renal agenesis (Potter sequence, pulmonary hypoplasia), post-term, NSAIDs and ACE inhibitors.
- **Polyhydramnios**: AFI above 24-25 cm or deepest pocket above 8 cm; causes: diabetes, **oesophageal atresia and other upper gut obstructions (the fetus cannot swallow, so liquor builds up)**, anencephaly (no swallowing reflex), twin-twin transfusion (recipient twin), hydrops, and idiopathic in about half. Renal agenesis gives the opposite, oligohydramnios. Normal AFI 5-25.

Twins

- Chorionicity is set by when a monozygotic embryo divides: **days 0-3 dichorionic diamniotic**; days 4-8 monochorionic diamniotic (the commonest monozygotic type, about 70%); days 8-12 monochorionic monoamniotic; after day 13 conjoined. Dizygotic twins are always dichorionic.
- Ultrasound in the first trimester: **lambda (twin peak) sign = dichorionic**, T sign = monochorionic.
- **Monochorionic twins are at higher risk** because they **share placental vascular anastomoses**: twin-twin transfusion syndrome (donor oligohydramnios, recipient polyhydramnios; Quintero stages; **fetoscopic laser ablation** is the treatment), twin anaemia-polycythaemia sequence, selective growth restriction, and cotwin death. Monochorionic twins are scanned every 2 weeks from 16 weeks.
- Delivery: uncomplicated dichorionic at 37-38 weeks; monochorionic diamniotic at 36-37; monoamniotic at 32-34 by caesarean.
- **Mode of delivery**: if the first twin is cephalic, vaginal birth is planned whatever the second twin's lie (internal version or breech extraction by an experienced operator if needed); if the **first twin is breech or transverse, caesarean section** is advised.

Lactation

- Prolactin makes milk; oxytocin ejects it (let-down); suckling inhibits GnRH (lactational amenorrhoea). Colostrum is rich in IgA. Contraindications to breastfeeding are few (galactosaemia, untreated TB mother in an infectious state, HIV where formula is safe and affordable, though WHO advises breastfeeding with maternal ART).

Labour and its complications

Pelvis and fetal skull

- Pelvic inlet: **obstetric conjugate about 10 cm** (the shortest AP diameter, measured from the sacral promontory to the posterior surface of the symphysis; cannot be measured directly); diagonal conjugate about 12.5 cm (felt on PV; obstetric = diagonal minus 1.5-2 cm). Ischial spines mark the midpelvis; the **interspinous distance (about 10 cm) is the narrowest transverse diameter of the cavity** (the intertuberous, about 11 cm, is the outlet's transverse; the inlet's is about 13 cm).
- Skull diameters: **in a well-flexed vertex the suboccipitobregmatic diameter (about 9.5 cm) presents**; deflexed (occipitoposterior) occipitofrontal (about 11.5 cm);

face: submentobregmatic (9.5 cm); brow: mentovertical (about 13-14 cm, the largest, so a persistent brow cannot deliver vaginally).

- Pelvis types: gynaecoid (best, 50%), android (male-type, heart-shaped inlet; deep transverse arrest), anthropoid (favours OP), platypelloid (flat).

Stages and normal labour

- First stage: onset of regular contractions to full dilatation; latent then active phase. Second stage: full dilatation to delivery of the baby. Third stage: to expulsion of the placenta (up to 30 minutes with active management, WHO).
- **Latent phase is prolonged when it exceeds 20 hours in a nullipara (14 hours in a multipara).** It is not an indication for caesarean: rest, analgesia, then oxytocin or amniotomy.
- Active phase begins at about 5-6 cm (ACOG-SMFM 2014 uses 6 cm; WHO 2018 uses 5 cm). **Exam answer**: Friedman's 1 cm per hour (1.2 nullipara, 1.5 multipara) and the partograph's alert line. **Current practice** (WHO 2018): 1 cm per hour is too fast for many normal women and is not used alone to decide on intervention; the active first stage usually lasts up to 12 hours in a first labour and 10 hours in later ones. The WHO Labour Care Guide (2020) replaces the partograph's alert and action lines with time limits at each centimetre.
- **Arrest of the active phase** (ACOG): at 6 cm or more with ruptured membranes, no cervical change over 4 hours with adequate contractions (above 200 Montevideo units) or 6 hours with inadequate contractions despite oxytocin; **the treatment is caesarean delivery**. Second-stage arrest (ACOG-SMFM 2014): no descent or rotation after **at least 3 hours of pushing in a nullipara, 2 hours in a multipara**, longer allowed individually with an epidural (the older rule was 2 hours, plus 1 with an epidural, in a nullipara).
- **Cardinal movements**: engagement, descent, **flexion, then internal rotation**, extension, restitution, external rotation, expulsion.
- Passage, passenger, power. Causes of poor progress: inadequate uterine action (the commonest in a nullipara; treat with oxytocin if no obstruction), malposition, cephalopelvic disproportion.

Malposition and malpresentation

- **Occipitoposterior position**: the head is deflexed and presents a larger diameter, so the first stage is long, back pain is typical, and the second stage is long. Most rotate to anterior; if not, manual rotation, instrumental rotation or caesarean.
- Breech types: **frank** (hips flexed, knees extended, feet by the head), **complete** (hips and knees both flexed, feet beside the buttocks), **footling** (one or both feet below the buttocks), kneeling (rare). Breech: frank breech commonest at term, footling commonest in preterm; external cephalic version at 36-37 weeks (tocolysis improves success); planned caesarean is advised for term singleton breech (Term Breech Trial) though vaginal breech delivery is possible in selected cases. Entrapment of the aftercoming head: Mauriceau-Smellie-Veit, Piper forceps.
- Face presentation: mentoanterior can deliver vaginally; mentoposterior cannot. Brow: caesarean. Transverse lie: caesarean; neglected shoulder presents risk of rupture of uterus.

Obstetric emergencies

- **Shoulder dystocia**: the "turtle sign" after delivery of the head; the anterior shoulder is impacted behind the symphysis. Risk factors: macrosomia, diabetes, previous shoulder dystocia, obesity. **First step: call for help, then McRoberts manoeuvre (hyperflexed thighs) with suprapubic pressure**; then internal manoeuvres (Rubin, Woods screw, delivery of the posterior arm), then Zavanelli (cephalic replacement) as last resort. Never fundal pressure or traction. Complications: Erb's palsy (C5-6), clavicle and humerus fractures, hypoxia.
- **Partograph (WHO modified)**: plots cervical dilatation against time from 4 cm, descent, contractions, fetal heart rate, liquor and maternal observations; the **alert line** follows 1 cm per hour and the **action line is 4 hours to its right**, where review and intervention are due. WHO's Labour Care Guide (2020) replaces it.
- **Cord prolapse**: membranes ruptured, cord below the presenting part (visible or palpable); **emergency caesarean section** (unless full dilatation and delivery is imminent). While waiting: **elevate the presenting part manually**, knee-chest or head-down left lateral position, fill the bladder with 500 mL saline, tocolytic if contracting; keep the cord warm and minimal handling.
- **Uterine rupture**: a previous caesarean scar is the commonest cause where caesarean rates are high (classical vertical scar risk 4-9%, low transverse 0.5-1%); in low-resource settings, Nepal among them, **obstructed labour** (often with oxytocin or misoprostol misuse in a multipara) remains a leading cause; sudden pain, scar tenderness, **sudden stop of contractions**, fetal bradycardia, **fetal parts felt superficially under the skin and recession of the presenting part (loss of station)**, fresh bleeding, haematuria if the bladder is involved, maternal tachycardia and shock. Treatment: **resuscitation and urgent laparotomy**.
- **Amniotic fluid embolism**: sudden collapse, hypoxia, DIC.
- **Obstructed labour** and its sequelae: rupture of the uterus, **vesicovaginal fistula** (continuous leakage) caused by **ischaemic pressure necrosis of the tissue between the fetal head and the pubic symphysis**, with sloughing a few days later; it is the commonest obstetric fistula in places with limited care. Obstetric fistula and uterine prolapse remain important problems in Nepal. Bandl's ring (pathological retraction ring) is a sign. The **three-swab (methylene blue) test** localises a fistula: dye instilled into the bladder stains the **middle swab in a vesicovaginal fistula**, the lowest in a urethrovaginal one, while a wet but unstained upper swab suggests a ureterovaginal fistula. Timely caesarean for obstructed labour prevents fistula; continuous bladder drainage by catheter for some weeks after prolonged obstructed labour can heal a small fresh fistula; established ones need surgical repair (vaginal route mostly).
- Perineal tears: first degree (skin and vaginal mucosa), second (perineal muscle), **third** (anal sphincter: 3a under 50% of external sphincter, 3b over 50%, 3c both external and internal sphincter), **fourth (through the sphincter complex and the anal epithelium)**. Repair of third and fourth degree tears by an experienced operator in theatre (overlap or end-to-end), with antibiotics and laxatives; avoid constipation. Episiotomy mediolateral; restrictive use only. **Next pregnancy after a third or fourth degree tear**: an asymptomatic woman with normal endoanal ultrasound and manometry may choose vaginal birth; one with persisting faecal incontinence

symptoms or abnormal findings is offered **elective caesarean section** (RCOG Green-top 29).

Preterm labour

- Delivery before 37 weeks; causes: infection (bacterial vaginosis, UTI, chorioamnionitis), short cervix, multiple pregnancy, polyhydramnios, previous preterm birth. Fetal fibronectin and cervical length help prediction.
- **Antenatal corticosteroids** when preterm birth is likely within 7 days at **24 to 34 weeks** (WHO 2022, if gestation is reliably known and the newborn can get adequate care; ACOG: 24-33+6, considered from 22 weeks and in selected late preterm women): **betamethasone 12 mg IM, two doses 24 hours apart** (dexamethasone 6 mg IM four doses 12 hours apart). Reduces RDS, intraventricular haemorrhage and neonatal death.
- **Magnesium sulfate** before 32 weeks for fetal neuroprotection: **reduces cerebral palsy**.
- Tocolytics (short course to allow steroids or transfer): nifedipine, atosiban; avoid after 34 weeks; contraindicated in abruption, chorioamnionitis, severe pre-eclampsia. Indomethacin (before 32 weeks only; closes ductus). Antibiotics in PPROM (erythromycin 10 days, NICE; ampicillin with erythromycin or azithromycin, ACOG); **avoid co-amoxiclav (necrotising enterocolitis)**; no antibiotics for preterm labour with intact membranes. Vaginal progesterone (200 mg nightly) or cervical cerclage for a short cervix; 17-OHPC injections were withdrawn in the US in 2023 after the PROLONG trial showed no benefit.

Fetal monitoring (CTG)

- Baseline 110-160 bpm; variability 5-25 bpm.
- **Early decelerations**: head compression, benign. **Variable**: cord compression. **Late decelerations (after the contraction peak, nadir after its end): uteroplacental insufficiency** (fetal hypoxia); treat by stopping oxytocin, left lateral position, oxygen and fluids; deliver if persistent. Sinusoidal pattern: severe fetal anaemia.
- Fetal blood sampling pH: below 7.20 abnormal; 7.20-7.25 borderline. Fetal ECG (ST analysis) adjunct.

Induction and instruments

- **Bishop score** (dilatation, effacement, station, consistency, position): over 8 means favourable (labour as likely to end vaginally as if spontaneous) and **6 or less unfavourable** (ACOG, NICE 2021; some texts put the cut-off at 5 or less) (a firm, long, posterior, closed cervix at station -3 scores low and needs ripening **before** oxytocin works). Unfavourable cervix: prostaglandin E2 (dinoprostone) or misoprostol (PGE1, oral 25 micrograms 2-hourly in WHO 2022) or a Foley balloon. After a previous caesarean: **misoprostol is contraindicated**; a balloon is preferred, PGE2 only with caution. Favourable: amniotomy and oxytocin. Complication: uterine hyperstimulation.
- Ventouse and forceps need full dilatation, an engaged head (no more than 1/5 palpable abdominally), empty bladder, known position and adequate analgesia. **Forceps** are used for the aftercoming head of a breech, face (mentoanterior), below 34 weeks and when maternal effort is not possible; more perineal and anal sphincter trauma. **Vacuum** fails more often and causes cephalhaematoma, retinal and **subgaleal haemorrhage**; contraindicated before 34 weeks and in face presentation. Either can rotate an OP head (Kielland forceps or a posterior cup).
- **Post-term pregnancy**: **42 completed weeks (294 days) or more** from the last menstrual period (late term is 41 weeks to 41 weeks 6 days; term is 37 to 41 weeks 6 days). Risks: stillbirth, meconium aspiration, macrosomia, oligohydramnios. Dating by early ultrasound, not the last period, avoids false post-term labelling; induction is offered from **41 weeks** (NICE 2021; WHO 2018 also recommends it at 41 completed weeks), and the exam asks the definition.
- Caesarean: classical vs lower segment; VBAC offered after one previous low transverse caesarean (success 60-80%; rupture risk about 0.5-1%).

Third stage and postpartum haemorrhage

Definitions

- **PPH, exam answer**: blood loss of **500 mL or more after vaginal birth, 1,000 mL or more at caesarean** (classic WHO and textbook definition), within 24 hours; 1,000 mL or more is severe. ACOG (2017): 1,000 mL cumulative, by any route, or any loss with signs of hypovolaemia.
- **Current practice (WHO-FIGO-ICM guideline, October 2025)**: measure blood loss objectively (a **calibrated drape** at vaginal birth) and diagnose PPH at **500 mL, or at 300 mL with any abnormal vital sign** (raised pulse, falling BP), so treatment starts earlier. **Primary** within 24 hours; **secondary** from 24 hours to 12 weeks (infection and retained products).
- The commonest cause of maternal death worldwide. Four Ts: **Tone** (atony, about 70%), **Trauma**, **Tissue** (retained placenta or membranes), **Thrombin** (coagulopathy).
- Risk factors for atony: multiple pregnancy, polyhydramnios, macrosomia, prolonged labour, grand multiparity, chorioamnionitis, magnesium, general anaesthesia.

Diagnosing the cause

- **Bright red steady bleeding with a firm, well-contracted uterus is genital tract trauma** (cervical, vaginal, perineal tear): examine under good light. Atony gives a soft, boggy fundus. Retained tissue: incomplete placenta. Suspect coagulopathy if the blood does not clot (a bedside clot test in a tube).
- **Inversion of the uterus**: commonest cause is **cord traction (or fundal pressure) on a placenta that has not separated**; spontaneous inversion also occurs with an atonic uterus or fundal placenta. Shock (neurogenic, then haemorrhagic) out of proportion to blood loss, a soft globular mass in the vagina and no palpable fundus. **Replace at once with resuscitation**: manual replacement (Johnson manoeuvre, the part that came out last going back first), or hydrostatic (O'Sullivan) method with warm saline; leave an attached placenta until the uterus is replaced; give oxytocin only after replacement, a tocolytic if the ring prevents it. Surgery if these fail: Huntington (traction on the round ligaments) then Haultain (incision of the ring).
- **Genital tract haematoma**: vulval is commonest; severe pain, retention of urine, a tense bluish swelling, and shock out of proportion if it tracks up to the broad ligament. Small (under about 5 cm), non-expanding: ice, analgesia, antibiotics. Large, expanding or with unstable vital signs: incision, evacuation and ligation of the bleeder under anaesthesia; laparotomy for a broad ligament haematoma.

Prevention: active management of the third stage

- **Oxytocin 10 IU IM or IV is the WHO first-choice uterotonic for every birth. Heat-stable carbetocin 100 micrograms IM**

or IV (no cold chain) is an equal alternative where its cost is comparable (WHO 2018; CHAMPION trial, non-inferior to oxytocin); ergometrine or syntometrine (contraindicated in hypertension and pre-eclampsia); misoprostol 400-600 micrograms orally where injectables cannot be given or stored (in Nepal, community distribution of misoprostol for home births); its characteristic side effect is **shivering and transient fever** (carboprost: bronchospasm; ergometrine: hypertension; rapid oxytocin: hypotension).

- Controlled cord traction only by a trained attendant (WHO 2012 makes it optional); delayed cord clamping at 1-3 minutes; sustained uterine massage is no longer recommended routinely for women who have had oxytocin, but tone is checked after delivery.
- **Oxytocin must not be given as a rapid IV bolus**: it causes **marked hypotension and tachycardia** (vasodilatation). Give slowly or by infusion (e.g. 20-40 IU in 500-1000 mL).

Treatment: a stepped bundle

- **Current practice: the first-response bundle given at once, not drug by drug** (WHO 2023 recommendation, from the E-MOTIVE trial, about 60% fewer severe bleeds, death or laparotomy; kept in WHO-FIGO-ICM 2025): **E**arly detection by calibrated drape, then **MOTIVE**: uterine **M**assage, **O**xytocic drugs, **T**ranexamic acid, **IV** fluids, **E**xamination of the genital tract and **E**scalation if bleeding goes on.

1. Call for help, two large IV lines, blood for group and cross-match, fibrinogen and clotting, warm fluids, catheter, uterine massage, oxytocin infusion.
2. **Tranexamic acid 1 g IV over 10 minutes within 3 hours of birth** for any PPH, whatever the cause (WOMAN trial 2017; WHO 2017); a second 1 g if bleeding continues after 30 minutes or restarts within 24 hours. It reduces death from bleeding by about a third when given within 3 hours; no benefit after 3 hours.
3. Second-line drugs: ergometrine 0.2 mg IM (avoid in hypertension), **carboprost (15-methyl PGF2 alpha) 250 micrograms IM every 15 minutes, maximum 8 doses; avoid in asthma (bronchospasm)**, misoprostol 800 micrograms sublingually or rectally.
4. Mechanical: bimanual compression, **intrauterine balloon tamponade** (Bakri), vaginal packing.
5. Surgical: compression sutures (B-Lynch), uterine artery ligation, internal iliac artery ligation or embolisation, **hysterectomy as a last resort**. Non-pneumatic anti-shock garment buys time.

- Retained placenta (not delivered by 30 minutes with active management): controlled traction, then **manual removal** under anaesthesia with antibiotic cover.
- Transfusion: massive haemorrhage protocol; keep fibrinogen above 2 g/L.

Placenta accreta spectrum

- **Accreta**: villi attach to the myometrium surface because of **absent or deficient decidua basalis** (Nitabuch layer); **increta**: invade the myometrium; **percreta**: penetrate the full thickness through the serosa and may **invade the bladder**.
- Risk: previous caesarean with a low-lying placenta (the risk rises with the number of scars: about 3% with previa and one scar, over 60% with previa and 4 or more), prior uterine surgery, Asherman syndrome.
- Diagnosis: ultrasound (loss of the clear zone, lacunae) with colour Doppler; MRI if doubtful. Management: planned delivery at 34-36 weeks by caesarean in a centre with a multidisciplinary team; caesarean hysterectomy through a uterine incision away from the placenta (often classical or fundal), with the placenta left in situ; conservative approaches (leaving the placenta) in selected women. Do not try to remove the placenta forcibly.

Antepartum haemorrhage

	Placenta praevia	Abruption
Pain	**Painless**	Painful
Blood	**Bright red**, revealed	Dark, may be concealed
Uterus	**Soft, non-tender**; presenting part high, malpresentation	Hard, “woody”, tender
Fetus	Usually well	Distress or death
Cause	Low-lying placenta	Pre-eclampsia, trauma, cocaine, smoking, hypertension

- **Placenta praevia**: **transabdominal ultrasound first to locate the placenta** (transvaginal is safe and more accurate). **No digital vaginal examination.** Grades by relation to the os; a major praevia is delivered by caesarean at 36-37 weeks; consider accreta. Symptoms often start at 28-32 weeks with a “warning” bleed.
- Abruption releases thromboplastin into the maternal blood, so **DIC (consumption of fibrinogen and platelets) is likelier with a dead fetus**; a bedside tube that does not clot signals it. Abruption: complications are DIC, Couvelaire uterus, renal failure, Sheehan syndrome. Treatment: resuscitate, deliver; fetal death gives vaginal delivery with amniotomy.
- Vasa praevia: bleeding at rupture of membranes with fetal bradycardia (sinusoidal); caesarean before labour.
- Postpartum: **Sheehan syndrome**: the pituitary enlarges in pregnancy (lactotroph hyperplasia) without a matching blood supply, so hypotension from severe haemorrhage causes **ischaemic necrosis**; failure to lactate first, then amenorrhoea, fatigue, hypothyroidism and adrenal failure; replace hormones.

Hypertension, diabetes and other medical disorders in pregnancy

Hypertensive disorders

- **Pathogenesis**: normally trophoblast invades and replaces the muscular wall of the spiral arteries (to the myometrial segments by 16-20 weeks), making wide low-resistance channels; with **inadequate invasion the arteries stay narrow**, the placenta is ischaemic and releases anti-angiogenic factors (sFlt-1) that cause maternal endothelial dysfunction.
- Classification: **chronic hypertension** (before 20 weeks), **gestational hypertension** (new after 20 weeks, no proteinuria), **pre-eclampsia** (new after 20 weeks with proteinuria or end-organ dysfunction), superimposed pre-eclampsia, eclampsia. Hypertension is 140/90 mmHg or more on two readings 4 hours apart; **severe-range is 160/110 mmHg or higher**.
- Severe features (ACOG 2020): platelets below 100,000, creatinine above 1.1 mg/dL, liver transaminases twice normal, pulmonary oedema, new headache or visual

symptoms. Proteinuria: protein:creatinine ratio 0.3 or more, or 300 mg per 24 hours.

- Prevention: **low-dose aspirin** in high-risk women, started from 12 weeks and ideally before 16: NICE 2019 75-150 mg daily from 12 weeks to birth; ACOG 2021 81 mg from 12-28 weeks to delivery; FIGO 2019 and the ASPRE trial (2017, preterm pre-eclampsia cut by about 60%) **150 mg at night** from 11-14 weeks to 36 weeks; WHO 75 mg, started before 20 weeks. **Calcium 1.5-2 g daily** where dietary intake is low (WHO).
- **Modern screening and prediction**: first-trimester combined screening (maternal factors, mean arterial pressure, uterine artery Doppler, PlGF; the FMF algorithm) chooses who gets aspirin; the **sFlt-1:PlGF ratio** (or PlGF alone) helps rule pre-eclampsia in or out when suspected at 20-35 weeks (a ratio of 38 or less makes it unlikely within a week; NICE DG49, 2022).
- Antihypertensives: **labetalol, nifedipine, methyldopa**; **avoid ACE inhibitors (enalapril), ARBs and diuretics** (ACE inhibitors cause fetal renal failure, oligohydramnios and skull hypoplasia). In a woman with **asthma**, labetalol (a non-selective beta-blocker) is best avoided and nifedipine used; enalapril is acceptable after delivery and when breastfeeding. **Methyldopa is stopped within 2 days of birth** (risk of postnatal depression; NICE NG133, 2019). Acute severe hypertension (ACOG 2020): **IV labetalol, IV hydralazine or oral immediate-release nifedipine**, all first line, given within 30-60 minutes to prevent stroke. Target in chronic hypertension: below 140/90 (CHAP trial 2022, fewer adverse outcomes than treating only at 160/105).
- Delivery: gestational hypertension or pre-eclampsia without severe features at 37 weeks; with severe features at 34 weeks or more, or at any gestation if the mother or fetus is unstable (expectant care before 34 weeks only in a tertiary centre, with steroids); delivery of the placenta is the only cure.

Eclampsia and magnesium sulfate

- **Magnesium sulfate is the drug of choice to control eclamptic convulsions and to prevent them** (Eclampsia Trial, MAGPIE); better than diazepam or phenytoin.
- **Timing of fits**: exam answer **about half antepartum**, about a fifth in labour and about a third postpartum (Dutta), most postpartum fits within 48 hours; in high-income series a larger share is postpartum, as antenatal care treats pre-eclampsia earlier (Williams). So a woman is not safe after delivery. First step: airway, left lateral position, oxygen, magnesium sulfate.
- Regimens: Pritchard (4 g IV loading, 10 g IM, then 5 g IM 4-hourly alternate buttocks); Zuspan (4 g IV loading, then 1 g/h infusion); WHO also supports shorter courses. Continue for 24 hours after delivery or last fit.
- Therapeutic level 4-7 mEq/L (about 4.8-8.4 mg/dL). Toxicity: **loss of the patellar reflex (at about 8-10 mEq/L, the earliest sign)**, then respiratory depression (10-12), then cardiac arrest (above 25). Monitor reflexes, respiratory rate above 12 per minute, urine above 30 mL/hour; **antidote: calcium gluconate 1 g IV**. Renal failure raises the risk.

HELLP syndrome

- **Haemolysis (schistocytes, raised LDH), Elevated Liver enzymes, Low Platelets**, with epigastric or right upper quadrant pain in a hypertensive woman (BP may be only mild). Tennessee criteria: LDH 600 or more, AST 70 or more, platelets below 100,000. Management: stabilise (magnesium, BP control) and deliver; steroids for fetal lungs if under 34 weeks. **High-dose dexamethasone to raise platelets is not recommended routinely** (it raises the count but improves no maternal outcome: Cochrane, ACOG); older texts recommend it. Complications: hepatic haematoma or rupture, DIC, abruption.

Gestational diabetes (GDM)

- **75 g oral glucose tolerance test, IADPSG/WHO 2013 criteria** (any one value): **fasting 92 mg/dL (5.1 mmol/L)**, 1 hour 180 (10.0), 2 hours 153 (8.5). Test at 24-28 weeks (early in high-risk women). Alternatives: the 50 g screen then 100 g 3-hour test (two-step, Carpenter-Coustan; ACOG); NICE 2015 uses fasting 5.6 mmol/L or 2 hours 7.8.
- **Insulin requirement rises in the second and third trimesters** because placental lactogen, cortisol, progesterone and placental insulinase antagonise insulin; it falls in the first trimester (nausea, hypoglycaemia risk) and drops sharply after delivery of the placenta.
- First-line: diet and exercise; then insulin or metformin; glibenclamide is second choice. Targets: fasting under 95 mg/dL (5.3), 1 hour under 140, 2 hours under 120. Delivery (ACOG 2018): diet-controlled at 39-40+6 weeks; well controlled on medication at 39-39+6; earlier if poorly controlled; NICE 2015: by 40+6 for diet-controlled GDM, 37-38+6 for pre-existing diabetes.
- Maternal complications: pre-eclampsia, polyhydramnios, caesarean, type 2 diabetes later; test 6-12 weeks postpartum with a fasting glucose or OGTT.
- Fetal: macrosomia, shoulder dystocia, neonatal hypoglycaemia, polycythaemia, jaundice, RDS (delayed lung maturity).
- **Pregestational diabetes**: the most common anomalies are cardiac (VSD, transposition) and neural tube defects; **caudal regression syndrome is the most specific** (rare); HbA1c below 6.5% and 5 mg folic acid before conception; stop ACE inhibitors and statins.

Heart disease in pregnancy

- Rheumatic **mitral stenosis** is the commonest valve lesion in places where rheumatic fever persists. It is **poorly tolerated as pregnancy advances because a faster heart rate and increased cardiac output shorten the diastolic filling time**, raising left atrial pressure and causing pulmonary oedema. Danger points: 28-32 weeks, labour, the first hours after delivery. Treatment: beta-blockers, diuretics, limited effort; balloon valvotomy in severe cases.
- Contraindications to pregnancy (modified WHO class IV): pulmonary hypertension and Eisenmenger syndrome (mortality 30-50%), severe mitral stenosis, Marfan with aortic root above 45 mm, severe left ventricular dysfunction (EF below 30%), peripartum cardiomyopathy with residual dysfunction.
- **Mechanical valves**: warfarin embryopathy (weeks 6-12: nasal hypoplasia, stippled epiphyses) and fetal haemorrhage. **First trimester**: warfarin continued if the dose is low (5 mg or less daily), or a switch to LMWH (anti-Xa monitored) or UFH in weeks 6-12 (ESC 2018 and 2025). **Second and third trimesters: warfarin is the safest for the valve** (ESC 2025 class IIa; LMWH only if valve thrombosis risk is low and anti-Xa monitoring is available, IIb; the ROPAC registry found more valve thrombosis on LMWH). **At 36 weeks, switch to adjusted-dose heparin (LMWH with anti-Xa monitoring, or**

unfractionated), and to IV UFH at least 36 hours before planned delivery, so that it can be stopped and reversed (protamine); restart warfarin after delivery. Mechanical valves carry the highest thrombosis risk; bioprosthetic valves need no anticoagulation in pregnancy.

- Peripartum cardiomyopathy: late pregnancy to 5 months postpartum, EF below 45%; bromocriptine (with prophylactic anticoagulation) may be added to standard heart failure treatment (ESC: may be considered); ACE inhibitors only after delivery.

Cholestasis and acute fatty liver

- **Intrahepatic cholestasis of pregnancy**: third trimester, **intense itching of palms and soles, worse at night, no rash**, raised bile acids (**RCOG 2022: peak random total bile acids 19 micromol/L or more**; older texts and labs 10), mild transaminase rise. **Exam answer: ursodeoxycholic acid** relieves the itch. **Current practice**: the PITCHES trial (2019) showed it does not reduce stillbirth or preterm birth, so RCOG 2022 no longer recommends it to improve outcomes, though it may still be used for itch. The risk is stillbirth, which rises sharply at bile acids of 100 or more. Timing of delivery by peak bile acids (RCOG 2022): 19-39, consider from 40 weeks; 40-99, 38-39 weeks; 100 or more, 35-36 weeks (older texts: 37-38 weeks for all). Vitamin K only if there is steatorrhoea or abnormal clotting.
- **Acute fatty liver of pregnancy**: third trimester, nausea, jaundice, hypoglycaemia, raised ammonia, coagulopathy; **fetal long-chain 3-hydroxyacyl-CoA dehydrogenase (LCHAD) deficiency, a fatty acid oxidation defect, in a heterozygous mother**; Swansea criteria; treatment is prompt delivery and supportive care.

Other medical conditions

- **HIV**: WHO recommends **lifelong antiretroviral therapy for all (test and treat), started as soon as possible, whatever the CD4 count**; the main reason is to **lower the viral load and reduce mother-to-child transmission** (risk 15-45% untreated, below 1-2% with suppressed viral load) and protect maternal health. Standard regimen: tenofovir, lamivudine (or emtricitabine) and dolutegravir. Infant prophylaxis (nevirapine or zidovudine); caesarean at 38 weeks only if viral load above 1,000 copies/mL near delivery; breastfeeding is acceptable with maternal ART and good adherence (WHO).
- **Anaemia**: iron deficiency commonest; oral 100-200 mg elemental iron daily; IV iron (ferric carboxymaltose) in the second and third trimesters when oral fails; transfusion only if severe near term.
- Thyroid: overt hypothyroidism needs levothyroxine increased by about 30%; Graves disease: **propylthiouracil in the first trimester** (carbimazole and methimazole cause embryopathy: aplasia cutis, choanal atresia), then carbimazole from the second trimester because of propylthiouracil's liver toxicity; radioiodine is contraindicated.
- Epilepsy: valproate is the most teratogenic; lamotrigine and levetiracetam safer; 5 mg folic acid.
- Antiphospholipid syndrome: low-dose aspirin plus prophylactic heparin (LMWH).
- Hyperemesis gravidarum: fluids, thiamine before glucose (Wernicke encephalopathy), antiemetics (antihistamines first, then ondansetron or metoclopramide); GDF15, a placental hormone, was shown in 2023 to be its main cause.
- Venous thromboembolism: LMWH; warfarin and DOACs avoided in pregnancy.

Ectopic pregnancy, abortion and trophoblastic disease

Ectopic pregnancy

- Risk factors: previous ectopic (the strongest), pelvic inflammatory disease (chlamydia), tubal surgery or sterilisation failure, IUCD in situ (it lowers the overall risk but a pregnancy that occurs is more often ectopic), assisted reproduction, smoking, endometriosis. Half of women have no risk factor.
- Sites: **ampulla about 70% (commonest)**, isthmus 12%, fimbria 11%, cornual/interstitial 2-3%, then ovarian, cervical, caesarean scar, abdominal. **The isthmus has the narrowest lumen and ruptures earliest (6-8 weeks)**; ampullary at 8-12 weeks; interstitial late (12-16 weeks) with catastrophic bleeding. Heterotopic pregnancy is common after IVF.
- Presentation: amenorrhoea, lower abdominal pain, vaginal bleeding (6-8 weeks), shoulder tip pain and shock if ruptured. Positive urine hCG, tender adnexal mass; Cullen sign is rare. Arias-Stella reaction in the endometrium is not diagnostic.
- **Diagnosis**: transvaginal ultrasound with serum beta-hCG. **An empty uterus with beta-hCG above the discriminatory level (about 1,500 IU/L, up to 3,500 in some guidelines) strongly suggests ectopic pregnancy**; at 3,500 IU/L and 6 weeks a normal intrauterine sac should be seen. Beta-hCG rising less than 35% in 48 hours (normal rise 49-66%) suggests an abnormal pregnancy. "Pregnancy of unknown location": repeat in 48 hours. Serum progesterone below 5 ng/mL indicates a non-viable pregnancy.
- **Management**:
  - **Methotrexate 50 mg/m2 IM single dose** (folate antagonist) for a **haemodynamically stable woman with an unruptured ectopic, beta-hCG below 5,000 IU/L, no fetal cardiac activity, mass below 3.5-4 cm**, no significant pain, no intrauterine pregnancy, and ability to follow up (ACOG 2018; NICE 2019: methotrexate first line below 1,500 IU/L, a choice of methotrexate or surgery at 1,500-5,000; expectant care for hCG below 1,500 and falling with no pain). Check beta-hCG on days 4 and 7; at least a 15% fall; repeat the dose if not. Avoid NSAIDs, folic acid supplements and pregnancy for 3 months afterward. Contraindications: breastfeeding, hepatic or renal disease, ruptured ectopic.
  - **Surgery** (laparoscopic salpingectomy preferred; salpingostomy if the other tube is diseased and fertility is wanted): shock, rupture, fetal heart activity, high hCG, a mass above 4 cm.
  - Expectant for low and falling beta-hCG. Anti-D (250 IU) to Rh-negative women who have surgery (NICE 2019); not needed for medical or expectant management.
- Interstitial and caesarean scar ectopic need specialist management (methotrexate, hysteroscopic or laparoscopic).

Spontaneous abortion (miscarriage)

- Loss before 20 weeks (or below 500 g; WHO defines 22 weeks). Commonest cause in the first trimester: **chromosomal abnormality (about 50%)**: autosomal trisomies are the commonest group (trisomy 16 the commonest trisomy), and monosomy X (45,X) the commonest single abnormality. Recurrent miscarriage: **exam answer three or**

more consecutive losses; current definitions are **two or more** (ESHRE 2017/2022, ASRM, RCOG 2023), not necessarily consecutive in ESHRE. Work up: antiphospholipid antibodies (lupus anticoagulant, anticardiolipin, anti-beta-2 glycoprotein I, persistent on two tests 12 weeks apart; the most treatable cause: **low-dose aspirin plus prophylactic LMWH** raises live birth; steroids, immunoglobulin and progesterone alone do not help), parental karyotype, uterine anomalies, thyroid function and glycaemic control. A **septate uterus** is the anomaly most linked to miscarriage; the classic answer is hysteroscopic septum resection, but the TRUST trial (2021) found no gain in live birth and ESHRE 2022 no longer recommends it routinely. **Vaginal micronised progesterone 400 mg twice daily** for threatened miscarriage in a woman with a previous miscarriage (PRISM trial 2019; NICE 2021).

- Cervical insufficiency: painless second-trimester loss with bulging membranes; **cerclage (McDonald or Shirodkar) at 12-14 weeks** when indicated by history (three or more second-trimester losses or preterm births, or one with features of insufficiency); ultrasound-indicated when the cervix is below 25 mm before 24 weeks in a woman with a previous preterm birth or second-trimester loss; rescue (emergency) cerclage for a dilated cervix with intact membranes.
- Types: **threatened** (bleeding, cervical os closed, viable fetus), **inevitable (cervical os dilated with ongoing bleeding)**, incomplete (some products retained), complete, **missed** (fetus dead, no expulsion), septic. Treatment: expectant; medical (WHO 2022, under 14 weeks): **missed miscarriage, mifepristone 200 mg then misoprostol 800 micrograms** vaginally, sublingually or buccally after 1-2 days (misoprostol alone if mifepristone is unavailable); **incomplete, misoprostol 600 micrograms orally or 400 sublingually**; or surgical evacuation (manual or electric vacuum aspiration; **sharp curettage is not recommended**). Anti-D for Rh-negative women.
- **Medical abortion (WHO 2022 regimen, up to 12 weeks)**: **mifepristone 200 mg orally** (an antiprogestogen), followed after 24-48 hours by **misoprostol 800 micrograms** (vaginal, sublingual or buccal); success above 95%. Misoprostol alone is the alternative. Mifepristone is contraindicated in chronic adrenal failure and long-term steroid use, haemorrhagic disorders and suspected ectopic.
- Surgical abortion: manual vacuum aspiration (a skilled birth attendant at a primary facility; uterine size up to **12 weeks**, WHO 2022 accepts up to 14); dilatation and evacuation later.
- **Nepal's law** (Indian MTP limits do not apply): the Muluki Criminal Code 2074 (s. 189) allows abortion by a licensed health worker, with the woman's consent, **up to 12 weeks on her own request**; up to 18 weeks after rape or incest; with no week limit when a licensed doctor judges that her life or her physical or mental health is at risk, or the child would be born disabled, or she has HIV or another incurable disease. The Right to Safe Motherhood and Reproductive Health Act 2075 (2018), s. 15, also keeps 12 weeks on request and allows up to 28 weeks on the health, disability, rape or incest, HIV or incurable disease and fetal defect grounds. Know both.

Gestational trophoblastic disease

	Complete mole	Partial mole
Karyotype	**46,XX (rarely XY), all paternal** (an empty egg fertilised by one sperm that doubles, or by two)	**Triploid** 69,XXY (two paternal, one maternal)
Fetus	None	May be present (abnormal)
Villi	All hydropic, trophoblastic hyperplasia	Some normal villi
hCG	Very high	Modest
p57 staining	**Negative** (maternal allele missing)	Positive
Malignant risk	15-20%	Below 5%

- Presentation: bleeding at 6-16 weeks, **uterus large for dates**, passing grape-like vesicles, hyperemesis, early pre-eclampsia before 20 weeks, hyperthyroidism (hCG acts on the TSH receptor), theca lutein cysts. Ultrasound: "snowstorm" or "cluster of grapes".
- **Suction evacuation is the method of choice** (avoid medical induction and hysterotomy), with oxytocin only after emptying, if bleeding needs it (not before: it may embolise trophoblast). Hysterectomy for older women with completed families. Follow-up by serial hCG (exam answer: weekly until normal three times, then monthly for 6 months). RCOG 2020: **complete mole**, if hCG is normal within 56 days of evacuation, follow up to 6 months from evacuation, otherwise monthly for 6 months after normalisation; **partial mole**, one confirmatory normal hCG 4 weeks later. Avoid pregnancy until follow-up ends; hormonal contraception is acceptable once hCG is normal; IUCDs are avoided until it is. Prophylactic chemotherapy is not recommended.
- **Gestational trophoblastic neoplasia (GTN)**: diagnosed by a plateau of hCG over 3 weeks (four values), a rise of 10% or more over 2 weeks (three values), or histological choriocarcinoma (FIGO 2018; older criteria also counted hCG still raised 6 months after evacuation). FIGO 2000 prognostic score: **0-6 low risk: single-agent methotrexate or actinomycin D; 7 or more: multiagent EMA-CO**; 13 or more is ultra-high risk. Low-risk cure is close to 100%, high-risk above 90%. Chemotherapy-resistant disease: immune checkpoint inhibitors (pembrolizumab, avelumab) now induce remissions.
- **Choriocarcinoma**: follows a mole (50%), abortion or normal pregnancy; biphasic cytotrophoblast and syncytiotrophoblast; **no villi**; very high hCG. **The lung is the commonest site of metastasis**, then vagina, brain and liver, because the cells **lack stroma and invade vessels, spreading through the blood**; highly chemosensitive. Placental site trophoblastic tumour: hPL, low hCG, hysterectomy.

Contraception

Efficacy and methods

Method	Failures in the first year per 100 women (perfect and typical use, Trussell)
Implant, LNG-IUS, Cu-IUD, vasectomy, female sterilisation	below 1
Combined pill	0.3 perfect use; about 7-9 typical
DMPA	0.2 perfect use; about 4-6 typical
Male condom	2 perfect; 13-18 typical
Withdrawal	4 perfect; about 20 typical

Method	Failures in the first year per 100 women (perfect and typical use, Trussell)
Fertility awareness	0.4-5 perfect; up to about 15-23 typical

- **Mechanism of the LNG-IUS**: local levonorgestrel thickens cervical mucus and thins the endometrium (atrophy); ovulation usually continues (unlike DMPA, which suppresses it). Copper ions are toxic to sperm.
- Copper IUD (Cu-T 380A): **licensed for 10 years** (evidence of efficacy to 12; the older copper T 200 lasted about 3 years); LNG-IUS 52 mg: 5-8 years (also reduces menstrual loss, treats endometrial hyperplasia, protects the endometrium in HRT); etonogestrel implant (68 mg): 3 years; levonorgestrel 2-rod implant: 5 years. IUD insertion is possible immediately postpartum (within 10 minutes to 48 hours), with a higher expulsion rate, or after 4 weeks. Complications: expulsion, perforation, pelvic infection in the first 3 weeks, missing threads.

Emergency contraception

- **Copper IUD within 5 days is the most effective** (above 99%) and gives continuing contraception.
- **Ulipristal acetate 30 mg, up to 120 hours** (a selective progesterone receptor modulator; more effective than levonorgestrel, particularly 72-120 hours and in obesity). **Levonorgestrel 1.5 mg** single dose, best within 72 hours (licensed up to 120 hours in some countries); less effective with BMI above 26 or weight above 70 kg, when FSRH advises a double dose (3 mg) or ulipristal. Yuzpe (combined pill) is inferior. Interactions: enzyme inducers (rifampicin) reduce the effect; ulipristal's effect is blunted by progestogen taken within 5 days.

Combined hormonal contraception

- Mechanism: inhibits ovulation (LH surge), thickens mucus. **Protects against ovarian, endometrial and colorectal cancer** (benefit lasts 15-20 years); slightly raises cervical cancer risk (HPV-related), and breast cancer risk; raises VTE risk (the highest with drospirenone and desogestrel pills, lowest with levonorgestrel); hepatic adenoma. Non-contraceptive uses: dysmenorrhoea, menorrhagia, PCOS, endometriosis, acne.
- WHO/UK MEC category 4 (do not use): **less than 6 weeks postpartum if breastfeeding**; migraine with aura; smoker aged 35 or over (15 or more cigarettes); **acute or past DVT or pulmonary embolism** (category 4; WHO MEC gives 3 for a past VTE at lower risk of recurrence); known thrombogenic mutations (thrombophilia); major surgery with prolonged immobilisation; ischaemic heart disease, stroke; BP 160/100 or higher; current breast cancer; SLE with antiphospholipid antibodies; diabetes with vascular disease; severe cirrhosis or liver tumours.
- **Missed pills (combined)**: one pill late by over 24 hours: take it as soon as remembered, continue; no emergency contraception needed. Two or more missed: take the last missed, use condoms for 7 days, skip the pill-free interval if the missed pills were in the final 7 pills; emergency contraception if intercourse took place in week 1 after a pill-free interval.

Progestogen-only methods

- **Postpartum and breastfeeding**: the progestogen-only pill, implant, DMPA, LNG-IUS and Cu-IUD are safe and do not reduce milk; **at 3 weeks postpartum with full breastfeeding the progestogen-only pill is the best choice**. Combined pills are avoided for the first 6 weeks (they lower milk volume and add VTE risk). The lactational amenorrhoea method is over 98% effective only if the mother is fully breastfeeding, amenorrhoeic and the baby is under 6 months.
- **Depot medroxyprogesterone acetate** 150 mg IM every 12-13 weeks: **suppresses the LH surge (and FSH), preventing ovulation**; thickens mucus. Effects: irregular bleeding, then amenorrhoea, delayed return of fertility (up to a year), reduced bone mineral density (reversible), weight gain. The subcutaneous form (104 mg) can be self-administered.
- POP: desogestrel 75 micrograms (12-hour window), traditional levonorgestrel or norethisterone pills (3-hour window); the newer drospirenone 4 mg pill (24 active, 4 inactive) has a 24-hour window.
- **Levonorgestrel IUS is safe in a woman with a previous deep vein thrombosis** (WHO MEC category 2: no increase in VTE risk, because the systemic dose is minimal); likewise the copper IUD, the implant and POP; avoid oestrogen. DMPA carries a possible small VTE risk.

Sterilisation

- **Vasectomy** (no-scalpel technique): not immediately effective; use other contraception until **semen analysis (usually at 12 weeks, after about 20 ejaculations) shows no sperm**; a few non-motile sperm may be accepted. Failure about 1 in 2,000 after clearance. Female sterilisation (Pomeroy, laparoscopic clips or rings, salpingectomy) is permanent; failure carries a raised proportion of ectopics.
- Condoms protect against sexually transmitted infections (the only method that does along with abstinence).

Menstrual disorders, endocrinology and infertility

Normal cycle and bleeding disorders

- **Dyspareunia**: superficial (pain at entry: vaginismus, vulvovaginitis, narrow introitus) or deep (endometriosis, pelvic infection, prolapsed ovary). **Vaginismus** is involuntary spasm of the pelvic floor muscles at attempted penetration; treatment is counselling and graded dilators.
- Normal: cycle 24-38 days (FIGO), flow up to 8 days, loss below 80 mL. **Abnormal uterine bleeding is classified by FIGO PALM-COEIN**: Polyp, Adenomyosis, Leiomyoma, Malignancy and hyperplasia (structural); Coagulopathy, Ovulatory dysfunction, Endometrial, Iatrogenic, Not yet classified (non-structural). The term "dysfunctional uterine bleeding" is now retired.
- **Anovulatory bleeding (commonest at the extremes of reproductive life) is caused by unopposed oestrogen without progesterone**: the endometrium keeps proliferating, outgrows its support and sheds irregularly; risk of hyperplasia and cancer. Ovulatory heavy bleeding relates to prostaglandins.
- Treatment of heavy bleeding: **LNG-IUS first line** (also treats hyperplasia), tranexamic acid, NSAIDs, combined pill, cyclical progestogens (norethisterone 5 mg, days 5-26 or 15-26); GnRH analogues short term; endometrial ablation; hysterectomy. Acute bleed: IV oestrogen or high-dose progestogen, tranexamic acid. In an older woman, sample the endometrium first.

- Terms: menorrhagia (heavy regular), metrorrhagia (irregular), polymenorrhoea, oligomenorrhoea; dysmenorrhoea (primary: prostaglandin-driven, NSAIDs).

Amenorrhoea

- **Primary**: no menstruation by 15 years with secondary sexual characteristics, or 13 years without (some books use 16 and 14; guidance differs).
Cause	Findings
Turner (45,X)	Short, streak ovaries, **high FSH**, absent puberty, webbed neck
MRKH (Mayer-Rokitansky-Küster-Hauser)	**46,XX, normal breasts and pubic hair, blind vagina, absent or rudimentary uterus**, normal ovaries and hormones; renal and skeletal anomalies
Androgen insensitivity	46,XY, breasts present, **scanty pubic and axillary hair**, blind vagina, testes (inguinal), female phenotype; **gonadectomy after puberty** (the testes' androgen is aromatised to oestrogen for breast development; no virilisation, as the tissues are insensitive), because of a later risk of gonadoblastoma and germ cell tumour; current practice: the risk in complete AIS is low before adulthood (about 1-2%), so gonadectomy is deferred to early adulthood and some women choose to keep the gonads under surveillance (DSD consensus)
Imperforate hymen, transverse septum	Cyclic pain, haematocolpos, bulging bluish membrane
Kallmann	Low GnRH, anosmia, low FSH and LH
Constitutional delay	Low gonadotrophins, normal later
- **Secondary** amenorrhoea (no periods for 3-6 months): **after excluding pregnancy, the commonest cause is PCOS** (followed by hypothalamic amenorrhoea, hyperprolactinaemia, premature ovarian insufficiency, thyroid disease, Asherman syndrome). Premature ovarian insufficiency: oligo- or amenorrhoea for 4 months or more below age 40 with FSH above 25 IU/L (ESHRE 2016: twice, 4 weeks apart; **ESHRE 2024: one raised FSH is enough**, repeated FSH or AMH only if in doubt). Investigate with hCG, FSH, LH, prolactin, TSH and a pelvic ultrasound; hysteroscopy for Asherman. **Asherman syndrome**: intrauterine adhesions after vigorous curettage (especially for a missed abortion or postpartum), giving secondary amenorrhoea or hypomenorrhoea with **normal FSH and oestradiol and no withdrawal bleed after oestrogen then progestogen** (the outflow tract, not the hormones, is at fault); hysteroscopic adhesiolysis with an oestrogen course.

Sex determination

- **SRY (sex-determining region Y) lies on the short arm of the Y chromosome** (Yp11.2, next to the pseudoautosomal region; some texts give 11.3; it can cross to the X in meiosis, giving 46,XX males) and triggers testis development; SOX9 follows; Sertoli cells produce anti-Müllerian hormone (regresses the Müllerian ducts) and Leydig cells produce testosterone (maintains the Wolffian ducts); DHT virilises the external genitalia. Without these, the Müllerian ducts form the tubes, uterus and upper vagina.
- Müllerian anomalies: septate uterus is the commonest (repeated miscarriage; hysteroscopic septum resection); **bicornuate (two horns, a fundal cleft over 1 cm, one cervix)**; **didelphys (two uteri, two cervices, often a double vagina)**; unicornuate (one horn, a rudimentary horn may be present); a septate uterus has a normal external fundus. Wolffian remnants: Gartner's duct cyst, epoophoron.

PCOS

- **Rotterdam criteria: two of three** (after excluding other causes such as thyroid disease, hyperprolactinaemia and non-classic congenital adrenal hyperplasia): **oligo- or anovulation; clinical or biochemical hyperandrogenism; polycystic ovaries** (international guideline 2018/2023: 20 or more follicles per ovary, or volume over 10 mL; anti-Müllerian hormone may replace the ultrasound in adults). In adolescents, both oligo-anovulation and hyperandrogenism are needed.
- Features: obesity, insulin resistance, acanthosis, raised LH:FSH, **low SHBG** (insulin suppresses its hepatic synthesis, and with LH-driven ovarian androgens this raises free testosterone and causes hirsutism), endometrial hyperplasia and cancer risk, type 2 diabetes, sleep apnoea.
- Treatment: weight loss and exercise (first line); combined pill for cycles and hirsutism; antiandrogens; metformin; **for ovulation induction in an obese woman with PCOS the preferred first-line drug is letrozole** (aromatase inhibitor; international guideline; higher live birth than clomiphene), letrozole 2.5-7.5 mg for 5 days from day 2-3; then clomiphene (50-150 mg for 5 days from day 2-5; a selective oestrogen receptor modulator), gonadotrophins, laparoscopic ovarian drilling, IVF. OHSS is a risk with gonadotrophins.

Infertility

- Defined as failure to conceive after 12 months of regular unprotected intercourse (6 months over age 35). Causes: ovulatory 25-30%, tubal 25-35%, male factor 30%, unexplained 15-25%.
- **Ovulation is confirmed by mid-luteal serum progesterone** (7 days before the expected period; above 30 nmol/L, or about 9 ng/mL, ovulatory); cycle regularity, basal body temperature, endometrial biopsy are older. Ovarian reserve: AMH, day-3 FSH, antral follicle count.
- **Hysterosalpingography is done after bleeding stops and before ovulation (days 7-10)**: avoid pregnancy and during menstruation; contraindicated in active pelvic infection; shows tubal patency and cavity shape; a **distended tube with no spill of contrast is a hydrosalpinx** (distal occlusion after infection), and salpingectomy before IVF improves success. Laparoscopic chromopertubation is the gold standard for the tubes.
- **Semen** (WHO 2021, fifth centile): volume 1.4 mL, concentration 16 million/mL, total motility 42%, progressive motility 30%, normal forms 4%. Azoospermia with small testes and raised FSH is testicular failure (Klinefelter); with normal testes and normal FSH, obstruction.
- Treatment: ovulation induction, IUI, IVF (blocked tubes, severe male factor, unexplained), ICSI for male factor.

Fibroids

- Smooth muscle tumours; oestrogen and progesterone dependent; **commonest type: intramural**; subserosal (pressure, torsion), **submucous (least common, but most associated with heavy menstrual bleeding and infertility/ miscarriage)**; cervical, broad ligament. Whorled bundles; pseudocapsule.
- Degenerations: hyaline (commonest), cystic, calcific (postmenopausal), **red (carneous) degeneration in**

pregnancy (pain and fever, managed conservatively), sarcomatous (under 0.5%; rapid growth after menopause).

- Treatment: asymptomatic, observe; tranexamic acid, LNG-IUS; GnRH agonists or antagonists (oral relugolix and elagolix with add-back) to shrink before surgery; ulipristal (restricted); myomectomy (fertility), **hysteroscopic resection for submucous**; uterine artery embolisation; MR-guided focused ultrasound; hysterectomy.

Genital tract infections and endometriosis

- Vaginal discharge: **bacterial vaginosis** (Gardnerella; thin grey fishy discharge, clue cells, pH above 4.5, positive whiff test; Amsel criteria, 3 of 4, clinically; Nugent score on Gram stain is the laboratory gold standard; metronidazole), **trichomoniasis** (frothy yellow-green, strawberry cervix; metronidazole to both partners: CDC 2021, women 500 mg twice daily for 7 days, better than the 2 g single dose; NAAT is the test of choice), **candidiasis** (curdy white, itching; fluconazole).
- Chlamydia and gonorrhoea cause cervicitis and pelvic inflammatory disease (tubal infertility, ectopic pregnancy). **Lymphogranuloma venereum** (Chlamydia trachomatis L1-L3): painless ulcer, then tender inguinal buboes (groove sign), proctitis; treat with doxycycline. Syphilis: painless chancre; chancroid: painful ulcer (Haemophilus ducreyi); granuloma inguinale: Donovan bodies.
- **Endometriosis**: ectopic functioning endometrium; dysmenorrhoea, dyspareunia, infertility; ovarian "chocolate" cyst (endometrioma); **exam answer: laparoscopy (with biopsy) is the gold standard**; current practice (ESHRE 2022, NICE 2024): transvaginal ultrasound or MRI first and empirical medical treatment, laparoscopy when imaging is negative and symptoms persist or treatment fails; treat with NSAIDs, combined pill or progestogens (dienogest), GnRH analogues, surgery. Adenomyosis: glands within myometrium, a bulky tender uterus, heavy menses, diagnosed by MRI or ultrasound.

Menopause

- Mean age 51 (below 40 is premature ovarian insufficiency); FSH high, oestradiol low. Hot flushes, vaginal atrophy (genitourinary syndrome), osteoporosis.
- HRT: oestrogen alone only if no uterus; add progestogen to protect the endometrium (**unopposed oestrogen causes endometrial hyperplasia and carcinoma**; the levonorgestrel IUS is another way to give the progestogen). Risks: breast cancer, VTE (less with transdermal), stroke; benefits: vasomotor symptoms, bone; start under 60 or within 10 years of menopause. Non-hormonal: fezolinetant (a neurokinin-3 receptor antagonist), SSRIs, gabapentin. Vaginal oestrogen locally.

Gynaecological oncology and prolapse

Cervical carcinoma

- **Persistent high-risk HPV (16 and 18 cause about 70%)**: E6 binds p53 and E7 binds Rb. Risk factors: early intercourse, multiple partners, smoking, HIV, immunosuppression, parity. Commonest type is squamous (80%), then adenocarcinoma.
- **It arises in the transformation zone** (the squamocolumnar junction): **immature metaplastic cells there are vulnerable to HPV** infection and transformation; the junction moves outward at puberty and during pregnancy.
- Screening (**WHO 2021**): **HPV DNA as the primary test, from age 30, every 5-10 years** (screen-and-treat or screen, triage and treat); **women living with HIV from 25, every 3-5 years**, with triage; self-collected samples are acceptable; stop after 50 with two consecutive negative tests. Cytology (Pap, every 3 years) or VIA where HPV testing is unavailable; VIA is a fallback, then treat by thermal ablation or cryotherapy. **Nepal**: the 2010 national guideline screens women aged 30-60 by VIA every 5 years (coverage is low); HPV DNA screening is being piloted in several districts (revised guideline, 2022). Colposcopy: acetowhite epithelium, punctation, mosaicism, atypical vessels. CIN1 (LSIL) is observed; CIN2/3 is treated by large loop excision (LLETZ) or cold-knife cone. **CIN by depth**: CIN 1 lower third of the epithelium, CIN 2 lower two thirds, CIN 3 more than two thirds up to full thickness with the basement membrane intact (carcinoma in situ); breaching the basement membrane is invasion. **Cytology pathway**: ASCUS is repeated or HPV-triaged; LSIL with HPV to colposcopy; **HSIL to colposcopy with directed biopsy (and endocervical sampling), whatever the HPV result**; ASCCP 2019 also allows immediate excision ("see and treat") for HSIL with a positive HPV test in non-pregnant women 25 or over. **VIA positive**: a dense, well-defined acetowhite area next to the squamocolumnar junction (brown iodine staining is the normal Lugol response). Vaccine types: quadrivalent 6, 11, 16, 18; bivalent 16, 18; nonavalent adds 31, 33, 45, 52, 58; **types 6 and 11 cause genital warts and are not oncogenic**. Vaccination: WHO (2022) allows a **single dose** for girls aged 9-14 (and 15-20), two doses 6 months apart from 21 (at least two, ideally three, in the immunocompromised and HIV). **Nepal**: a national single-dose campaign in February 2025 (girls in grades 6-10 and out-of-school girls aged 10-14, about 94% coverage), now in the routine programme for grade 6 girls (or out-of-school girls aged 10).
- **Bleeding after intercourse with a visible friable growth: biopsy** (punch biopsy of the lesion) is the next step; a Pap smear is not appropriate for a visible growth.
- **FIGO 2018 staging** (imaging and pathology permitted):
  - IA1 invasion under 3 mm; IA2 3-5 mm; IB1 over 5 mm and under 2 cm; IB2 2-4 cm; IB3 4 cm or more.
  - IIA upper two thirds of the vagina; IIB parametrium.
  - IIIA lower third of the vagina; IIIB pelvic wall or hydronephrosis; **IIIC: pelvic (IIIC1) or para-aortic (IIIC2) lymph node metastasis, whatever the size of the primary**.
  - IVA adjacent organs (bladder, rectum); IVB distant metastasis.
- Treatment: up to IB2 and IIA1 surgery (radical hysterectomy with pelvic lymphadenectomy, or sentinel node; simple hysterectomy or conisation for IA); beyond that, **concurrent chemoradiation with cisplatin** (then brachytherapy); pembrolizumab with chemoradiation for stage III-IVA (KEYNOTE-A18; approved 2024). Radical hysterectomy is done open: laparoscopic and robotic routes had worse survival (LACC trial 2018); simple hysterectomy suffices for low-risk tumours of 2 cm or less (SHAPE trial 2024).

Endometrial carcinoma

- Postmenopausal bleeding is cancer until proven otherwise (5-10%). **Transvaginal ultrasound: endometrial thickness 4 mm or less (some guidelines 3 mm) makes cancer unlikely; above this, take an endometrial biopsy** (pipelle or hysteroscopy with biopsy). So 9 mm needs biopsy, not reassurance.

- Type I endometrioid (oestrogen driven: obesity, anovulation, PCOS, diabetes, late menopause, unopposed oestrogen, **tamoxifen**, Lynch syndrome); type II serous (atrophic endometrium, p53 mutated, aggressive). Molecular classification (POLE-mutated, mismatch repair-deficient, p53-abnormal, no specific profile) is now used and in the 2023 FIGO staging.
- **Tamoxifen increases the risk of endometrial cancer because it acts as a partial oestrogen agonist on the endometrium** (an antagonist in breast); polyps, hyperplasia and cancer; any bleeding on tamoxifen needs assessment. Treatment: total hysterectomy with bilateral salpingo-oophorectomy, sentinel node staging; progestogen or LNG-IUS for atypical hyperplasia or grade 1 in young women who wish to keep fertility. Advanced or recurrent disease: chemotherapy (carboplatin-paclitaxel) with an anti-PD-1 antibody (dostarlimab or pembrolizumab), largest benefit in mismatch-repair-deficient tumours (RUBY, NRG-GY018, 2023); all endometrial cancers are tested for mismatch repair (Lynch screening).

Ovarian tumours

- **Epithelial (90% of malignant)**: serous (commonest; high-grade serous cancers often originate in the fallopian tube fimbria, p53 mutations, BRCA), mucinous (mimic GI; pseudomyxoma), endometrioid, clear cell (endometriosis), **Brenner (resembles transitional (urothelial) epithelium; usually benign)**.
- **Germ cell** (young women): **mature cystic teratoma (dermoid) is the commonest germ cell tumour and the commonest benign ovarian tumour** in the young; torsion is the commonest complication; malignant change in about 1% (squamous). **Immature teratoma**: under 20 years, usually unilateral, **graded 1-3 by the amount of immature neuroepithelium**; grade decides chemotherapy. Struma ovarii (thyroid tissue). **Dysgerminoma** (the commonest malignant germ cell tumour; LDH, placental alkaline phosphatase; radiosensitive, but fertility-sparing surgery with BEP chemotherapy is now standard; may arise in dysgenetic gonads with a Y chromosome, gonadoblastoma), **yolk sac tumour (endodermal sinus): alpha-fetoprotein, Schiller-Duval bodies**, embryonal and choriocarcinoma (hCG).
- **Functional cysts**: follicular (usually silent, resolve), **corpus luteum cyst (the one that bleeds and ruptures, causing haemoperitoneum in the luteal phase)**, theca lutein (with high hCG: mole, twins, ovulation induction).
- Sex cord-stromal: granulosa cell (inhibin, oestrogen, Call-Exner bodies, endometrial hyperplasia), Sertoli-Leydig (virilisation), fibroma (Meigs syndrome: ascites and right pleural effusion). **Krukenberg**: metastatic signet-ring cells, usually from the stomach.
- Markers: CA-125 (epithelial), AFP (yolk sac), hCG (choriocarcinoma, embryonal), LDH (dysgerminoma), inhibin (granulosa), CEA. **Risk of malignancy index = ultrasound score x menopausal status x CA-125**: 200 or more refers to a cancer centre. IOTA simple rules and O-RADS classify.
- **A simple unilocular thin-walled cyst under 5 cm in a premenopausal woman is almost always benign and needs only reassurance (RCOG: no follow-up under 5 cm; 5-7 cm yearly ultrasound; above 7 cm MRI or surgery).** After the menopause (RCOG 2016): a simple unilocular cyst under 5 cm with normal CA-125 is rescanned with CA-125 in 4-6 months and discharged if unchanged or smaller; a high RMI goes to the cancer centre.
- **FIGO 2014 staging**: I confined to the ovaries: IA one ovary, IB both, **IC1 surgical spill, IC2 capsule ruptured before surgery or tumour on the surface, IC3 malignant cells in the ascites or peritoneal washings**; II pelvic extension; III peritoneal metastasis outside the pelvis or retroperitoneal nodes (IIIA1 nodes, IIIA2 microscopic, IIIB up to 2 cm, IIIC over 2 cm; liver capsule included); IV distant (pleural effusion with positive cytology, liver parenchyma).
- Treatment: surgical staging and optimal cytoreduction (hysterectomy, bilateral salpingo-oophorectomy, omentectomy), carboplatin plus paclitaxel, bevacizumab, and **PARP inhibitor maintenance (olaparib, niraparib) in BRCA-mutated or HRD-positive disease**. Risk reduction: combined pill, bilateral salpingectomy, risk-reducing salpingo-oophorectomy in BRCA carriers (35-40 for BRCA1).

Uterovaginal prolapse

- Supports: **level I, the uterosacral-cardinal complex; the transverse cervical (cardinal or Mackenrodt) ligament is the chief support of the cervix and uterus; weakness of it is the main factor in prolapse**; level II, the paravaginal (arcus tendineus) attachments; level III, the perineal body. The **levator ani** (pubococcygeus, iliococcygeus, puborectalis) forms the pelvic floor, supplied mainly by direct branches of S3-S4 (the nerve to levator ani), with a contribution from the pudendal nerve (S2-S4).
- Risk factors: vaginal delivery and parity, age, menopause, obesity, chronic cough, constipation, connective tissue weakness. In Nepal, prolapse is a significant burden among young mothers, linked to heavy work soon after childbirth.
- **POP-Q staging**: 0 none; I more than 1 cm above the hymen; II within 1 cm of the hymen; III more than 1 cm beyond the hymen; IV complete eversion. “Third-degree” in older terms: the whole uterus outside the introitus (procidentia).
- Treatment: pelvic floor exercises, vaginal oestrogen, **ring pessary** (safe and effective for most). Surgery: vaginal hysterectomy with colporrhaphy (anterior, posterior) and vault suspension; Manchester (Fothergill) repair (long cervix, uterus preserved); sacrospinous fixation; sacrocolpopexy (abdominal or laparoscopic, with mesh: the best results for vault prolapse); **transvaginal mesh for prolapse has been withdrawn** (US FDA 2019; UK pause 2018) for pain, erosion and exposure; **Le Fort colpocleisis (partial vaginal closure) for an elderly, frail woman who is sexually inactive and unfit for major surgery**.

Infections, puerperium and lactation

Infections in pregnancy and in the genital tract

- **Asymptomatic bacteriuria** (growth of over 100,000 colonies/mL with no symptoms): **screen at booking and treat** in pregnancy, because the ureters dilate (progesterone and the enlarging uterus), urine flow slows and about 30% untreated progress to **acute pyelonephritis**, with risks of preterm labour and low birth weight. Commonest organism E. coli; nitrofurantoin (not near term), cefalexin or amoxicillin by sensitivity, for 5-7 days, with a test of cure. Pyelonephritis needs admission and IV antibiotics (ceftriaxone).
- **Pelvic inflammatory disease**: ascending infection from the cervix (Chlamydia trachomatis, Neisseria gonorrhoeae, anaerobes); lower abdominal pain, cervical motion

tenderness, discharge. Minimum criteria for treatment: uterine, adnexal or cervical motion tenderness. **Laparoscopy is the gold standard for diagnosis** (exam answer) but treatment is started on clinical grounds. Treat early: **ceftriaxone 500 mg IM once, then doxycycline and metronidazole for 14 days** (CDC 2021); remove an IUD only if there is no improvement in 48-72 hours. Complications: tubo-ovarian abscess, **chronic pelvic pain, tubal infertility and ectopic pregnancy** (infection destroys the tubal cilia and creates intraluminal adhesions, so the embryo is delayed and implants in the tube; the risk rises with each episode).

- **Genital tuberculosis** is secondary (lung or lymph nodes first) and spreads by blood; the **fallopian tubes are involved in nearly all cases (usually the ampulla)**, the endometrium next; presents with infertility, menstrual change or chronic pelvic pain; antituberculous drugs, IVF for infertility; Asherman syndrome after endometrial involvement.
- **Chlamydia**: uncomplicated cervicitis, **doxycycline 100 mg twice daily for 7 days** (CDC 2021); **azithromycin 1 g single dose in pregnancy** (doxycycline is avoided); NAAT is the test of choice.
- **Chorioamnionitis (intra-amniotic infection)**: fever 38 C or more with maternal or fetal tachycardia (fetal heart above 160-170), uterine tenderness, foul liquor, often after prolonged rupture of membranes; **IV broad-spectrum antibiotics (ampicillin with gentamicin) and delivery whatever the gestation** (caesarean only for obstetric reasons); tocolysis is contraindicated.
- **Fitz-Hugh-Curtis syndrome**: perihepatitis in PID (chlamydia or gonococcus) spreading along the paracolic gutters, with **right upper quadrant pain and "violin-string" adhesions between the liver capsule and the anterior abdominal wall**; liver function tests are normal.
- **Vaginal discharge** (more under Menstrual disorders): **trichomoniasis** (Trichomonas vaginalis, motile flagellates on the wet mount, frothy yellow-green discharge, pH above 4.5, often 5-6, strawberry cervix) is treated with **metronidazole** (CDC 2021: 500 mg twice daily for 7 days for women, safe in pregnancy), and the partner too; **bacterial vaginosis**: clue cells, pH above 4.5, fishy odour, metronidazole (also in pregnancy, when it is linked to preterm labour); candidiasis: curdy white discharge, a vulvar itch, pH normal, treated with clotrimazole pessaries or oral fluconazole (the oral drug is avoided in pregnancy).
- **Syphilis**: screen every woman at booking; **treat with benzathine penicillin G** (penicillin is the only drug that treats the fetus; desensitise if allergic); untreated, it causes stillbirth, hydrops and congenital syphilis. **HIV**: test at booking; start antiretroviral therapy for all pregnant women, whatever the CD4 count (WHO 2021 prefers a dolutegravir regimen); without treatment mother-to-child transmission is about 15-45% (including breastfeeding), and falls below 2% with treatment; give the infant prophylaxis; caesarean section before labour is planned only when the viral load is above 1,000 copies/mL near delivery (ACOG; BHIVA plans it from 400 copies/mL at 36 weeks), and WHO does not advise caesarean for HIV alone. **Hepatitis B**: screen; infants of HBsAg-positive mothers get hepatitis B vaccine and immunoglobulin within 12-24 hours of birth; tenofovir from 28 weeks when the HBV DNA is 200,000 IU/mL or more (WHO 2020/2024; WHO 2024 also where only HBeAg testing is available and it is positive); breastfeeding is not contraindicated. **Genital herpes**: a primary attack in the third trimester (within 6 weeks of delivery) or lesions at the onset of labour from a first episode are indications for caesarean section, since neonatal infection is far more likely after a primary than a recurrent attack; with a recurrence at term vaginal birth is acceptable (RCOG 2014) though ACOG advises caesarean when lesions are present; aciclovir suppression from 36 weeks. **Group B streptococcus**: intrapartum penicillin for carriers (see Neonatology).
- **Rubella, CMV, toxoplasmosis and Zika** infections affect the fetus (congenital anomalies); the live rubella vaccine is never given in pregnancy and pregnancy is avoided for 1 month after it. Rubella damages most in the first 12 weeks (cataract, deafness, PDA; see Physiology of pregnancy). **CMV is the commonest congenital infection** and the commonest non-genetic cause of sensorineural deafness (periventricular calcification). **Toxoplasmosis** (cat faeces, undercooked meat): transmission rises but fetal damage falls as pregnancy advances (chorioretinitis, hydrocephalus, diffuse intracranial calcification); spiramycin to prevent transmission, pyrimethamine with sulfadiazine and folinic acid once fetal infection is confirmed by amniotic fluid PCR. **Varicella** in the first 20 weeks can cause the fetal varicella syndrome; maternal varicella from 5 days before to 2 days after delivery endangers the newborn (give varicella-zoster immunoglobulin).

The puerperium

- The puerperium lasts **6 weeks** after delivery. **Involution**: the uterus weighs about 1 kg at delivery, the fundus is at the umbilicus on day 1, falling about 1 cm a day, and is not palpable abdominally by about **2 weeks**; weighs about 60-100 g by 6 weeks. **Lochia**: rubra (red, days 1-4), serosa (pink-brown, days 5-9), alba (yellow-white, to 2-6 weeks). **Subinvolution** (a large soft uterus, prolonged lochia) is caused by retained products, infection and fibroids.
- **Puerperal pyrexia** (the classic definition): a temperature of 38 C (100.4 F) or more on two occasions 24 hours apart, excluding the first 24 hours, within the first 10 days. **Puerperal sepsis** (WHO): infection of the genital tract from the rupture of membranes or labour to 42 days after delivery, with fever and one or more of pelvic pain, abnormal or foul discharge and delayed involution; **maternal sepsis** (WHO 2017) is organ dysfunction from infection in pregnancy, after abortion or within 42 days of delivery. **Endometritis is the commonest form** (risk highest after caesarean section, prolonged labour and ruptured membranes); fever, uterine tenderness, subinvolution and **foul-smelling lochia** on day 2-5. Organisms are polymicrobial (anaerobes, Gram-negatives, streptococci). **Treatment: IV broad-spectrum antibiotics covering anaerobes, for example clindamycin with gentamicin, or an amoxicillin-clavulanate or piperacillin-tazobactam regimen**, until she has been afebrile for 24-48 hours, with no oral course needed after (add ampicillin for enterococci if there is no response); remove retained products. Group A streptococcal sepsis can be fulminant. Other fever sources: urinary tract infection, wound infection, mastitis, breast engorgement, deep vein thrombosis.
- **Postpartum psychiatric disorders**: **blues** (days 3-5, tearful, in up to 80%, settles without treatment); **postnatal depression** (10-15%, screened with the Edinburgh Postnatal Depression Scale; SSRIs, sertraline the usual choice when breastfeeding, and psychological therapy; newer, the neurosteroids brexanolone IV, US FDA 2019, and oral zuranolone, US FDA

2023); **puerperal psychosis** (about 1-2 per 1,000, abrupt in the first 2 weeks, an emergency; higher risk with bipolar disorder).

- **Contraception after delivery**: see Contraception; ovulation can return as early as 4 weeks after delivery in a non-breastfeeding woman (before the first period), so contraception is started by 3 weeks.

Lactation

- Milk production needs **prolactin** (anterior pituitary, raised by suckling) and ejection needs **oxytocin** (posterior pituitary, the let-down reflex). Colostrum (the first 2-4 days) is rich in IgA, protein and lactoferrin; the milk 'comes in' on days 2-4 as progesterone falls after the placenta is delivered (lactogenesis II); transitional milk follows and mature milk is established by about 2 weeks. Early and exclusive breastfeeding for 6 months (WHO), with the baby attached well.
- **Lactational amenorrhoea**: suckling raises prolactin, which suppresses **pulsatile GnRH**, so FSH and LH stay too low for follicles to mature and ovulation is suppressed. **The lactational amenorrhoea method** is over 98% effective if the baby is **under 6 months, the mother amenorrhoeic and fully or nearly fully breastfeeding**.
- **Mastitis**: usually Staphylococcus aureus entering through a cracked nipple, 2-4 weeks postpartum; a hot, red, tender wedge of breast with fever. **Continue breastfeeding or expressing**, give flucloxacillin (or cefalexin), and drain an abscess by needle aspiration under ultrasound. Engorgement and blocked ducts settle with frequent feeds; current advice (Academy of Breastfeeding Medicine 2022) is to feed as usual rather than pump extra or massage hard, with ice and an NSAID, and antibiotics only when infection is likely. Suppress lactation (when needed after loss) with a **cabergoline** single dose rather than bromocriptine.
- Sheehan syndrome presents with failure to lactate after a severe postpartum haemorrhage (see Third stage).

Sources

RCOG Green-top 29 (obstetric anal sphincter injury, 2015); ASCCP risk-based management consensus (2019); Dutta (genital tuberculosis, inversion, GTN). Williams Obstetrics; Dutta's Obstetrics and Gynaecology; Berek and Novak's Gynecology; Shaw's Textbook of Gynaecology; Robbins Pathology; Katzung and KD Tripathi (drugs); RCOG Green-top guidelines (pre-eclampsia, shoulder dystocia, cord prolapse, obstetric cholestasis, ectopic, GTN, ovarian cysts); ACOG practice bulletins (hypertension 2020, PPH, labour management 2014); WHO guidelines (abortion care 2022, PPH 2012/2017/2018 uterotonics, PPH first-response bundle 2023, antenatal care 2016, intrapartum care 2018, labour care guide 2020, preterm birth 2022, cervical cancer screening 2021, HPV vaccination 2022, HIV 2021, contraceptive eligibility criteria); WHO-FIGO-ICM consolidated PPH guideline (October 2025); Nepal Ministry of Health and Population, National Medical Standard for Maternal and Newborn Care (2020); WHO Nepal on the 2025 HPV campaign; ESC 2025 (cardiovascular disease in pregnancy); ESHRE 2022 (endometriosis, recurrent pregnancy loss) and 2024 (POI); RCOG Green-top 43 (cholestasis, 2022), 17 (recurrent miscarriage, 2023), 38 (GTD, 2020); NICE NG126 (ectopic and miscarriage, 2019/2021), NG133 (hypertension, 2019), DG49 (PlGF tests, 2022); ACOG clinical practice update on Rh immune globulin (2024); CDC STI treatment guidelines 2021; FSRH emergency contraception; IADPSG 2010 / WHO 2013 (GDM); ESC 2018 and 2025 (pregnancy and heart disease); FIGO staging (cervix 2018, ovary 2014, endometrium 2023); ESHRE and international PCOS guideline 2023; ASRM; Muluki Criminal Code 2074 and Right to Safe Motherhood and Reproductive Health Act 2075; First Aid Step 1 2022. CDC STI treatment guidelines 2021 (PID, trichomoniasis, syphilis); WHO consolidated HIV guidelines 2021; ACOG Committee Opinion 723 (2017, imaging in pregnancy); NICE NG207 (induction of labour, 2021); WHO recommendations on postnatal care (2022); Nepal Ministry of Health and Population Safe Motherhood programme pages. Review additions: WHO recommendations on induction of labour (2018); WHO statement on maternal sepsis (2017); WHO hepatitis B guidelines (2020, 2024); BHIVA pregnancy guideline; RCOG Green-top on genital herpes in pregnancy (2014); Academy of Breastfeeding Medicine protocol 36 on mastitis (2022); US FDA approvals of brexanolone (2019) and zuranolone (2023).