this & that

06

OBSTETRIC QUICK GUIDES · IF THIS, THEN THAT

NO.



Physiological Changes of Pregnancy

& what's normal vs not

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Normal values & red flags

Verified against ACOG · SMFM · RCOG · SOGC — October 2026

Physiological changes of pregnancy

At a glance: the numbers to remember

+30–50%	Hb <11 g/dL	>72 µmol/L	$PaCO_2$ ≥40	Plt <100
cardiac output, from 5–8 wk	anaemia in T1 and T3 (ACOG); <10.5 in T2	creatinine (>0.8 mg/dL) is already borderline	mmHg in pregnancy means CO_2 retention	×10⁹/L: think beyond gestational thrombocytopenia

Where societies disagree, each position carries the society name; follow your local protocol. Values are for singleton pregnancies; twins exaggerate most changes (cardiac output about 20% higher again). Laboratory ranges vary by assay: use your laboratory's pregnancy-specific ranges when it has them.

How to use this guide

- Pregnancy changes almost every reference range. A value that is normal outside pregnancy can be abnormal in it (creatinine 85 µmol/L, $PaCO_2$ 40 mmHg), and the reverse (ALP 200 U/L, WBC 14 ×10⁹/L).
- Each section lists what is **normal**, what to **review**, and what to **investigate now**. Green rows: reassure. Amber: check. Coral: act.
- Most changes start in the first 6–8 weeks, are largely in place by the end of the first trimester (Dewhurst), and resolve by 6–12 weeks postpartum.

01 The whole picture

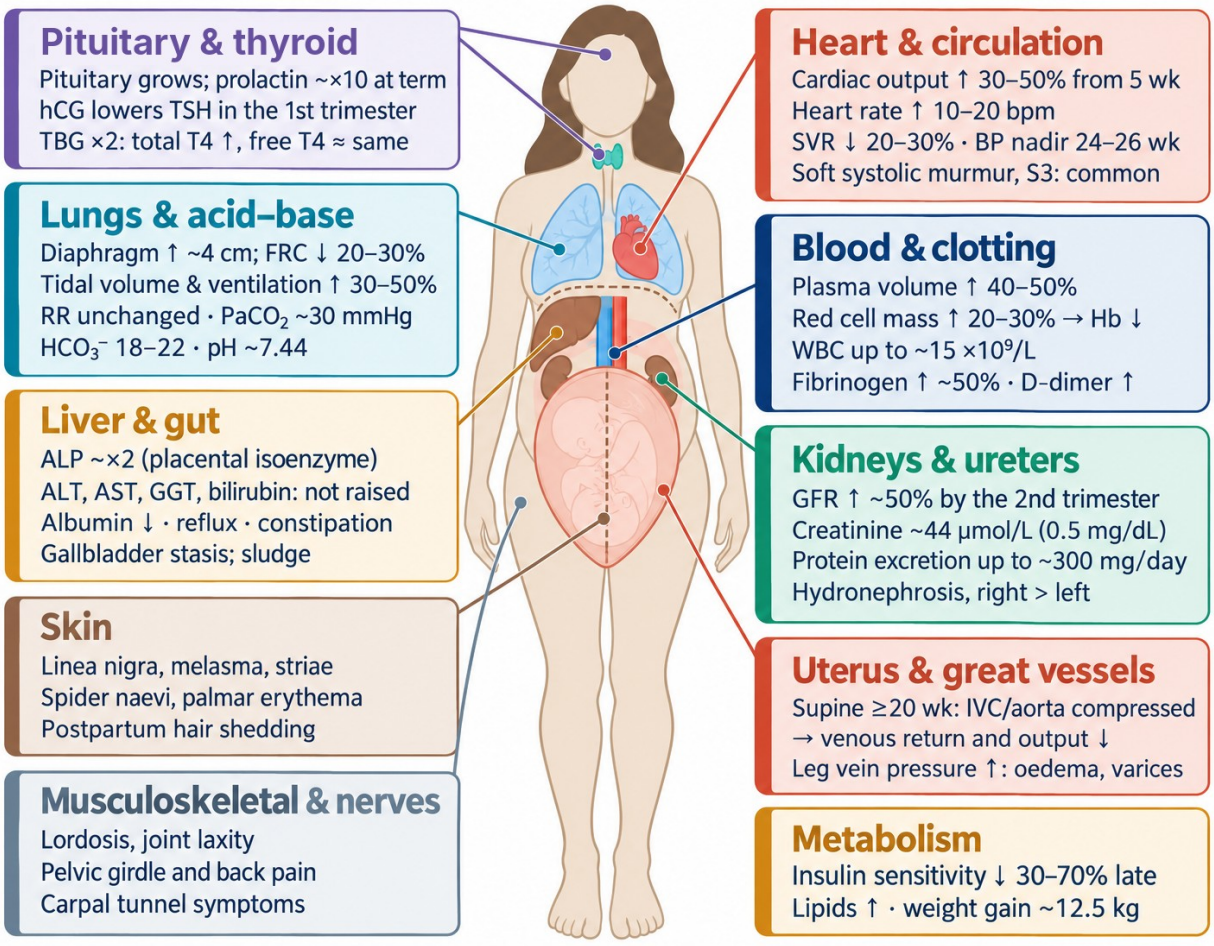


Figure 1. *Main adaptations by system. Sources: Williams 26e Ch. 4; Dewhurst 9e Ch. 1; ESC 2025.*

02 How the numbers move across pregnancy

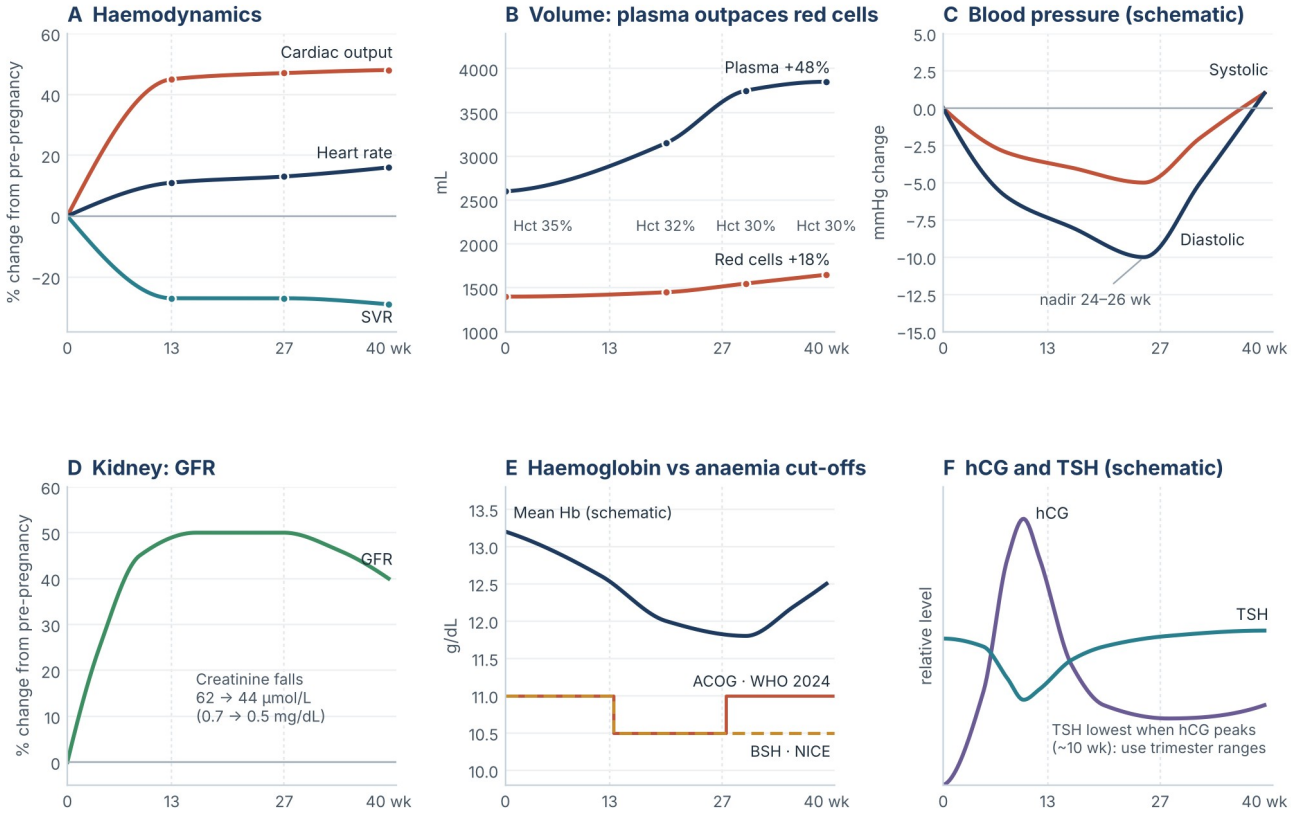


Figure 2. *A: % change at the end of each trimester (Dewhurst Table 1.1). B: plasma volume and red cell mass (Dewhurst Table 12.1). D: GFR (Williams; MFM EBG). C, E and F are schematic; cut-offs in E are ACOG PB 233, WHO 2024, BSH 2020 and NICE NG201.*

Two patterns explain most of what follows. **Dilution**: plasma volume rises more than red cell mass or albumin, so concentrations fall (Hb, albumin, total calcium). **Hyperfiltration**: GFR rises by about half, so filtered substances fall in blood (creatinine, urea, urate) and spill into urine (glucose, protein, amino acids).

03 Heart & circulation

Parameter	Change in normal pregnancy	Clinical meaning
Cardiac output	↑ 30–50%, from 5–8 wk; near-maximal by end of T1; up to a further third in labour	Women with fixed-output lesions (mitral or aortic stenosis) decompensate in T2, labour and just after birth
Heart rate	↑ 10–20 bpm	Resting HR <90 is usual; 90–120 needs review; >120 needs evaluation (MFM EBG)
Systemic vascular resistance	↓ 20–30% from 6 wk (Clark: −21% at term)	Drives the fall in BP and the rise in output
Blood pressure	Falls from 6–7 wk; nadir 24–26 wk; diastolic falls more; back to baseline by term	A first-trimester BP of 135/85 may hide chronic hypertension; rising BP after 28 wk is expected only up to pre-pregnancy values
CVP, wedge pressure	Unchanged	Normal filling pressures with a lower colloid osmotic pressure (−14%) → pulmonary oedema with less fluid
Heart size	LV mass ↑ 30–35%; chambers enlarge slightly; EF unchanged; small pericardial effusion	Larger cardiac shadow on CXR; resolves by 3 months postpartum
ECG	QRS axis shifts left 15–20°; Q in II, III, aVF; flat or inverted T in III, aVF, V1–V3; PR ~20 ms shorter	Do not call these ischaemia without symptoms or troponin rise

Parameter	Change in normal pregnancy	Clinical meaning
Heart sounds	Loud split S1; S3 common; soft systolic flow murmur in most; venous hum, mammary souffle	Any diastolic murmur, S4 or loud systolic murmur → echo
Natriuretic peptides	BNP and NT-proBNP stay in the non-pregnant range (median BNP <20 pg/mL)	Normal NT-proBNP has strong negative predictive value for heart failure (ESC 2025)
Troponin	No pregnancy reference range established (ESC 2025)	Interpret with ECG and symptoms; do not test routinely
Veins	Femoral venous pressure ↑ (8 → 24 mmHg supine at term)	Ankle oedema, varicose veins, vulval varices, haemorrhoids, VTE risk

	NORMAL IN PREGNANCY	CONCERNING · review	NEEDS EVALUATION · today
Fatigue	Mild	Mild to moderate	Severe
Breathlessness	On heavy exertion only	On moderate exertion	At rest or minimal exertion; orthopnoea or PND
Palpitations	Rare	Occasional, no other symptoms	Frequent, or with presyncope/syncope
Chest pain	Reflux-type, settles with treatment	Atypical	At rest or on minimal exertion
Heart rate	<90 bpm	90–120 bpm	>120 bpm
Systolic BP	90–140 mmHg	140–160 mmHg	>160, or <90 with symptoms
Neck veins	Not distended	—	JVP ≥2 cm above clavicle
Heart sounds	Soft S3, no symptoms	—	S3 with symptoms, or S4
Murmur	Soft systolic	—	Loud systolic, or ANY diastolic
Lungs	Clear	—	Crackles or wheeze
Oedema	Mild, ankles, evenings	Moderate	Severe, or one leg

Figure 3. *Cardiorespiratory findings: normal, concerning or needing evaluation. Adapted from MFM EBG 4e Table 2.1 (one-sided leg swelling added for DVT).*

IF	THEN
Breathless on exertion, palpitations, tiredness, ankle oedema, soft systolic murmur	Expected. Examine, check Hb, reassure. Recheck if it changes.
Resting HR 100–120, or SBP 140–159	• Not explained by pregnancy alone: look for anaemia, infection, thyroid, bleeding, pain, dehydration, pre-eclampsia • ACOG PB 212 tier: HR ≥110 or SBP ≥140 → work up
HR ≥120, SBP ≥160, RR ≥30, SpO_2 ≤94%, breathless at rest, orthopnoea, chest pain or syncope	• **Not physiological.** Same-day senior review: ECG, NT-proBNP, echo, CXR; VTE pathway if suspected • 25% or more of maternal deaths could be prevented if heart disease were considered for these symptoms (MFM EBG)
Any diastolic murmur, S4, loud systolic murmur, raised JVP, crackles	Echocardiogram. Do not label as a flow murmur.

IF	THEN
Supine from ~20 wk (or uterus at or above the umbilicus)	• The uterus compresses the IVC ± aorta: cardiac output falls; ~8–10% become hypotensive • Turning from back to left side raises output by ~20% at 26–30 wk (Williams) • Examine, monitor and transfer in a left lateral tilt
Maternal collapse ≥20 wk	• **Continuous manual left uterine displacement** (tilt 15–30° only if needed on a firm surface) • IV access above the diaphragm; standard ACLS drugs and doses (AHA) • Prepare for resuscitative delivery at once; **delivery within 5 min** of arrest (decide at 4 min: RCOG GTG 56) • Remove fetal monitors; stop magnesium and give calcium if on $MgSO_4$
Immediately after birth in a woman with heart disease	Autotransfusion from the contracted uterus and mobilised fluid raise preload: highest-risk window for pulmonary oedema. Monitor closely for 24–72 h.

04 Breathing & blood gases

IF	THEN
Anatomy	• Diaphragm rises ~4 cm; subcostal angle widens; chest circumference +6 cm • FRC ↓ 20–30% (400–700 mL); total lung capacity almost unchanged
Ventilation	• Tidal volume and minute ventilation ↑ 30–50%; **respiratory rate unchanged** • Progesterone resets the CO_2 set-point: chronic compensated respiratory alkalosis • O_2 consumption ↑ ~20% (40–60% in labour)
Spirometry	FEV_1 and peak flow are **not** reduced by pregnancy. A fall means asthma or another lung disease.
Breathless on exertion, "air hunger", normal SpO_2 and exam	Physiological dyspnoea (common, starts early, does not limit normal activity). Reassure; check Hb.
RR ≥24 at rest	Respiratory rate does not rise in normal pregnancy: look for infection, PE, heart failure, sepsis or acidosis.
SpO_2 <95% on air	Not physiological. ABG, CXR, ECG; consider PE, pneumonia, pulmonary oedema.
$PaCO_2$ 35–40 mmHg in an unwell pregnant woman	**Relative CO_2 retention** (normal is ~26–32). She is tiring: escalate early; consider HDU/ICU (MFM EBG; Williams).
Apnoea, induction of anaesthesia or airway management	Low FRC + high O_2 use → she desaturates fast. Pre-oxygenate; expect airway oedema and reflux; aspiration risk rises in labour and after opioids.

Arterial blood gas	Non-pregnant	1st trimester	3rd trimester
pH	7.38–7.42	7.42–7.46	7.39–7.45
$PaCO_2$	38–42 mmHg (5.1–5.6 kPa)	28–29 mmHg (3.7–3.9 kPa)	25–33 mmHg (3.3–4.4 kPa)
PaO_2	90–100 mmHg	93–100 mmHg (MFM: ~105)	92–107 mmHg
HCO_3^-	22–26 mmol/L	~18 mmol/L	16–22 mmol/L

Sources: Williams 26e Appendix I; MFM EBG 4e Table 42.5 (Hegewald 2011). No society guideline publishes pregnancy ABG ranges.

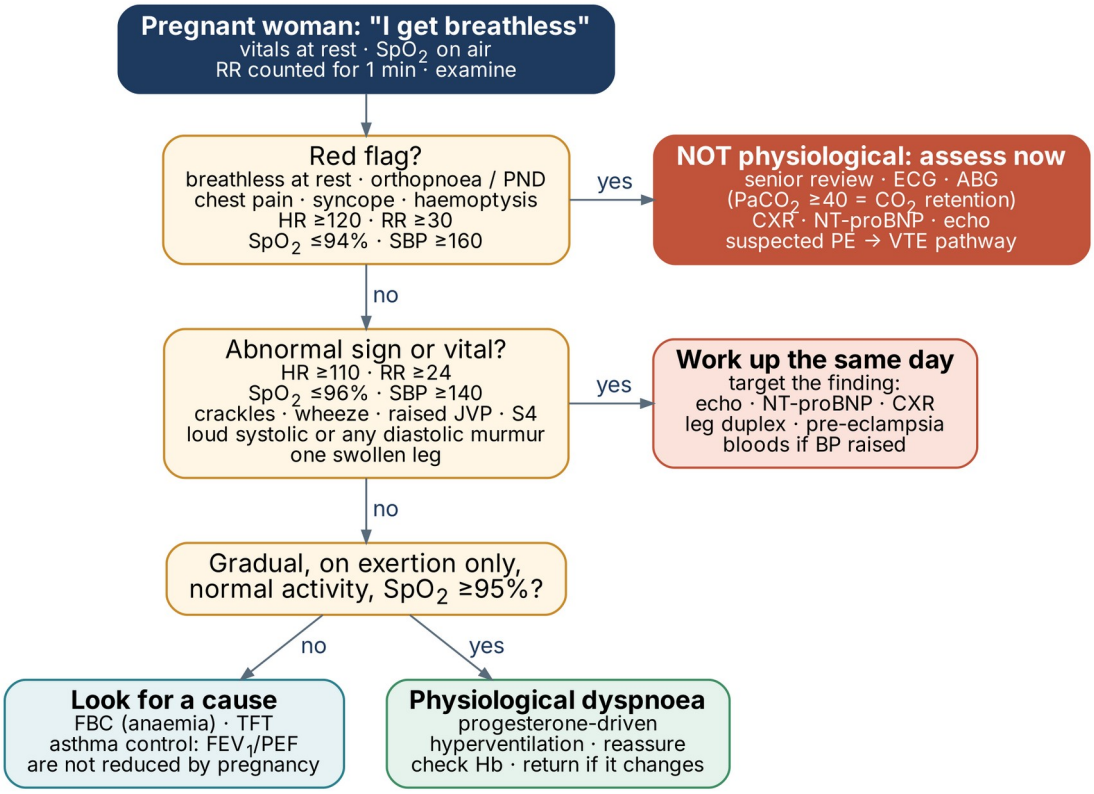


Figure 4. *Breathlessness in pregnancy: physiological or not? Vital-sign tiers from ACOG PB 212 (via secondary sources); exam findings from MFM EBG 4e.*

05 Blood & clotting

IF	THEN
Hb falls slightly (mean ~12.5 g/dL at term)	Dilution: plasma volume ↑ 40–50%, red cell mass ↑ 20–30%. MCV rises 4–6 fL; it should not fall.
Hb below the cut-off (see table)	• **Anaemia, not dilution.** Iron deficiency causes about 75% • Check ferritin: **<30 µg/L confirms iron deficiency** (ACOG, BSH); CRP if ferritin seems high • MCV <80 fL → iron deficiency or thalassaemia trait (check Hb electrophoresis); MCV >100 → folate/B12
Iron needs	About 1000 mg over pregnancy (500 mg for extra red cells, 300 mg to fetus and placenta, 200 mg losses); most is needed after 20 wk (6–7 mg/day).
WBC up to ~15 ×10⁹/L (neutrophils)	Normal. In labour and the first days postpartum ≥25 ×10⁹/L can be normal. Left shift and toxic granulation can also be physiological (Dewhurst): judge infection on the patient, not the count.
Platelets 100–149 ×10⁹/L, well, no bleeding history, T2–T3	Usually **gestational thrombocytopenia** (ACOG PB 207). Check BP, urine protein, LFTs and a film; repeat each trimester; resolves 1–2 months postpartum.
Platelets <100 ×10⁹/L, or falling	• More suggestive of ITP (ACOG PB 207); exclude pre-eclampsia/HELLP, TTP/HUS, DIC, AFLP • Film, LFTs, LDH, haptoglobin, coagulation, fibrinogen • Neuraxial is low-risk ≥70 ×10⁹/L if stable with no other coagulopathy (ACOG/SOAP); UK: >75 and not falling (AAGBI/OAA)

IF	THEN
Clotting factors and fibrinogen	• Factors VII, VIII, X, vWF ↑; fibrinogen ↑ ~50% (term 3.0–7.0 g/L); protein S ↓; antithrombin ↓ slightly • aPTT and PT shorten slightly • A fibrinogen below 3 g/L at term is below the pregnancy range
D-dimer raised	• Expected; rises through pregnancy (T3 up to 1.7 µg/mL) • **RCOG GTG 37b:** do not use D-dimer to investigate acute VTE • ACOG endorses ATS: not to exclude PE · ESC 2025: may be used within the pregnancy-adapted YEARS algorithm
Thrombophilia screen requested in pregnancy	Free protein S falls to 20–65% and functional activity to 16–42% in T3, and APC resistance rises: low results are expected. Defer testing to ≥6–12 wk postpartum where possible.
ESR raised (up to ~70 mm/h in T3)	Useless as a marker in pregnancy (fibrinogen and globulin rise). Use CRP; CRP ≤15 mg/L (1.5 mg/dL) in 95% of non-labouring women (Williams).

Anaemia cut-offs by society (Hb, g/L)

Source	1st trimester	2nd trimester	3rd trimester	Postpartum	Iron
ACOG PB 233 (2021)	<110 (Hct <33%)	<105 (Hct <32%)	<110 (Hct <33%)	—	Low-dose iron from T1; ferritin <30 = deficiency; CBC in T1 and at 24–28 wk
BSH 2020 · NICE NG201	<110	<105	<105	<100	Oral 40–80 mg elemental iron daily; recheck Hb at 2–3 wk (expect ~20 g/L rise in 3–4 wk); FBC at booking and 28 wk
WHO 2024	<110	<105	<110	—	WHO 2016 ANC: 30–60 mg iron + 400 µg folic acid daily for all; severe anaemia <70

USPSTF (2024): insufficient evidence for routine screening or supplementation in asymptomatic pregnant people. SOGC published a new iron-deficiency guideline (No. 469) in July 2026; its numbers were not checked for this volume.

06 Kidneys & urinary tract

IF	THEN
GFR and renal plasma flow	• GFR ↑ ~25% within 2 wk of conception and ~50% by the start of T2; may fall 15–20% near term • Renal plasma flow ↑ up to 80% in T1 • Kidneys ~1 cm longer
Creatinine 35–70 µmol/L (0.4–0.8 mg/dL)	Normal. Mean falls from ~62 to ~44 µmol/L (0.7 → 0.5 mg/dL).
Creatinine >72 µmol/L (>0.8 mg/dL)	Already borderline (Williams). ≥80 µmol/L (≥0.9 mg/dL) suggests renal disease: repeat, urine PCR, BP, renal ultrasound.
Creatinine ≥90 µmol/L (NICE) or >97 µmol/L / >1.1 mg/dL or doubling (ACOG)	Meets the renal criterion for pre-eclampsia with hypertension; otherwise investigate for AKI or CKD.
Urea and urate low	Normal (urea T3 ~1–4 mmol/L). Urate falls early then rises in late pregnancy; a rise alone does not diagnose pre-eclampsia.

IF	THEN
Protein excretion up to ~150–260 mg/24 h	Normal (upper 95% limit ~260 mg/day; Dewhurst accepts 200 mg in late pregnancy). Albumin excretion stays low (<30 mg/day).
Protein ≥300 mg/24 h or PCR ≥30 mg/mmol (0.3 mg/mg)	Significant proteinuria. With new hypertension → pre-eclampsia pathway. Without: isolated proteinuria (up to 15%); repeat and refer if persistent.
Glycosuria	• Common: filtered glucose exceeds tubular reabsorption (1 in 6 women; up to half if tested often) • Not diagnostic, but NICE: consider testing for GDM if 2+ once or 1+ twice
Haematuria	Not physiological. Send urine culture; consider stones and renal causes.
Dilated renal pelvis and ureter on scan	• Physiological hydronephrosis: **right-sided in 86%**; mild dilatation in >90% • Treat as obstruction only with pain, infection, rising creatinine or a dilated ureter below the pelvic brim
Frequency, nocturia, stress incontinence	Normal (nocturia ~80% in T3; incontinence up to ~40% in T3). Consider incontinence in the differential of ruptured membranes.
24-h urine collection	Dilated tract retains urine: hydrate, lie her lateral for 1 h at the start and end of the collection; prefer spot PCR.
Sodium ~4–5 mmol/L lower; osmolality ~10 mOsm/kg lower	Normal reset of thirst and ADH thresholds. Na <130 mmol/L needs a cause.

07 Liver & gut

IF	THEN
ALP up to ~230 U/L in T3	Normal: placental isoenzyme (about double). Not a marker of cholestasis in pregnancy.
ALT, AST, GGT or bilirubin above the non-pregnant upper limit	• **Never physiological.** Pregnancy ranges are the same or lower (T3 ALT 2–25, AST 4–32, GGT 3–26 U/L) • Think ICP, pre-eclampsia/HELLP, AFLP, hyperemesis, viral hepatitis, gallstones, drugs
Itch without rash (palms, soles), especially T3	Measure bile acids and LFTs. **ICP:** RCOG ≥19 µmol/L non-fasting; SMFM: >10 µmol/L often used. Normal T3 upper limit ~11 µmol/L (Williams).
Albumin 25–35 g/L	Normal dilution (T3 23–42 g/L). Lowers total calcium and some drug binding.
Spider naevi, palmar erythema	Normal (oestrogen). Do not use them as signs of liver disease in pregnancy.
Heartburn, constipation, haemorrhoids	Normal: lower oesophageal sphincter tone ↓, slower gut transit, venous pressure ↑. Treat symptoms.
Gastric emptying	Unchanged in pregnancy, but **delayed in labour and after opioids**: aspiration risk at general anaesthesia.
Gallbladder	Volume ↑ ~50% and emptying slows: sludge or stones in ~8%. Biliary colic is common; investigate fever, jaundice or deranged LFTs.
Right-sided abdominal pain in T2–T3	The appendix is displaced upward and lateral, sometimes to the right flank. Signs are blunted; lower your threshold for imaging.

IF	THEN
Amylase normal, lipase higher than non-pregnant range	Lipase reference range rises (T3 41–112 U/L, Williams). Diagnose pancreatitis on clinical picture plus a clear rise.

08 Thyroid, glucose & other hormones

Thyroid

IF	THEN
TSH low in T1 with normal free T4, well woman	Usually physiological: hCG stimulates the thyroid (peak ~10 wk). Repeat in T2; check TRAb only if clinically hyperthyroid or free T4 high.
Total T4/T3 high	Expected: TBG doubles. Use free T4 with trimester-specific ranges.
Interpreting TSH	• Use laboratory, trimester-specific ranges (ATA 2026, ACOG PB 223) • No local range: ATA 2026 → **0.1–4.0 mU/L in T1 and T2**; non-pregnant range in T3 • ETA 2014 (older): upper limits 2.5 (T1), 3.0 (T2), 3.5 (T3) mU/L
TSH above the pregnancy range	Repeat a mildly abnormal result before treating; on levothyroxine, aim TSH <2.5 mU/L and expect a 25–50% dose increase (ATA 2026).
Goitre	Pregnancy enlarges the thyroid only slightly (12 → 15 mL). A visible goitre needs evaluation.
Iodine	Needs rise (GFR clearance ↑ 30–50%, fetal supply). ATA 2026: iodide 150 µg/day supplement from preconception to lactation (target intake 250 µg/day; avoid >500 µg/day).
Screening	Risk-based testing, not universal screening (ATA 2026).

Glucose, lipids and weight

IF	THEN
Fasting glucose lower, post-meal glucose higher	Normal: insulin sensitivity falls 30–70% by late pregnancy (placental hormones). This is why GDM appears after mid-pregnancy.
Screening timing	Universal GDM screening at 24–28 wk. ACOG 2024 update: no routine early GDM screening; test early for pregestational diabetes if at risk.
Fasting, vomiting or illness	"Accelerated starvation": ketosis appears quickly with fasting (Williams). Check ketones in women who are vomiting or not eating.
Cholesterol and triglycerides high	Normal (T3 cholesterol ~5.7–9.0, triglycerides ~1.5–5.1 mmol/L). Do not screen or treat lipids in pregnancy unless severe hypertriglyceridaemia is suspected (pancreatitis risk).
Weight gain	• Average ~12.5 kg; IOM 2009 targets by pre-pregnancy BMI (ACOG CO 548): • <18.5: 12.5–18 kg · 18.5–24.9: 11.5–16 kg · 25–29.9: 7–11.5 kg · ≥30: 5–9 kg

Other hormones and minerals

IF	THEN
Prolactin very high (~10× at term)	Normal; do not measure in pregnancy. Pituitary enlarges up to ~135% (up to 12 mm on MRI just after birth).

IF	THEN
Headache with visual field loss	Not physiological: think pre-eclampsia, macroadenoma growth, apoplexy, venous sinus thrombosis. Urgent review ± MRI.
Cortisol, ACTH, renin, aldosterone high	Normal. Screening tests for Cushing syndrome and primary aldosteronism are unreliable in pregnancy: involve endocrinology.
Total calcium low	Expected (albumin ↓). Ionised calcium is unchanged: use ionised or albumin-corrected values. 1,25-vitamin D doubles; intestinal absorption doubles.
Magnesium	Total and ionised levels fall slightly (T3 down to ~0.45 mmol/L). Relevant when monitoring $MgSO_4$ therapy.

09 Skin, joints, eyes & the rest

IF	THEN
Linea nigra, melasma, darker areolae and genital skin	Normal hyperpigmentation (up to 90%); fades after birth. Advise sun protection for melasma.
Striae gravidarum	Normal (abdomen ~70% of first pregnancies). Itching striae alone are not ICP, but check bile acids if itch is generalised or palmar.
Rash with itch	Not physiological: consider pemphigoid gestationis, polymorphic eruption, atopic eruption; dermatology review.
Hair shedding in the months after birth	Telogen effluvium: self-limiting. Check ferritin and TSH if marked.
Low back and pelvic girdle pain, lordosis	Normal (joint laxity, posture). Red flags: neurological deficit, bladder or bowel change, fever, night pain.
Hand numbness or tingling	Carpal tunnel symptoms are common (oedema, posture) and usually resolve after birth.
Contact-lens intolerance, slight blurring	Corneal oedema and lower intraocular pressure: normal. New visual disturbance with headache or high BP → pre-eclampsia work-up.
Poor sleep, forgetfulness	Common, especially in T3 and the first months postpartum. Ask about mood: sleep loss can feed postpartum depression.
Thick white vaginal discharge; red, velvety cervix that bleeds on contact	• Normal: more cervical mucus; cervical eversion (columnar epithelium) • Itch, odour or offensive discharge → swabs (candida is more common in pregnancy) • Bleeding ≥20 wk: scan for placental site **before** any digital exam
Painless irregular tightenings	Braxton Hicks contractions: normal. Regular painful contractions or cervical change → preterm labour pathway (No. 01).

10 Vital signs & early warning

IF	THEN
Heart rate	Rises 10–20 bpm. Resting HR 90–120 deserves a reason (MFM EBG); ≥110–120 is a trigger (see below).

IF	THEN
Blood pressure	Lowest at 24–26 wk. Hypertension threshold is unchanged: ≥140/90 on two readings. A low BP (SBP <90) with symptoms is not normal.
Respiratory rate	Unchanged by pregnancy (normal 12–20). Counted, not estimated.
SpO_2	≥95% on air. Lower is abnormal at any gestation.
Temperature	Pregnancy does not cause fever, and its absence does not exclude sepsis: in one series of maternal sepsis deaths, a quarter were never febrile (MFM EBG).

Escalation tools

Tool	Triggers
Maternal Early Warning Criteria (US; Mhyre 2014)	Any one: SBP <90 or >160 · DBP >100 · HR <50 or >120 · RR <10 or >30 · SpO_2 <95% · urine <35 mL/h for ≥2 h · agitation, confusion or unresponsiveness · pre-eclampsia with non-remitting headache or breathlessness
National MEWS (England 2024)	Aggregate score. Scores 0 (normal band): RR 9–21 · SpO_2 ≥95% · HR 71–112 (antenatal) · SBP 101–135 · DBP 62–88. Score 2–4: review within 30 min; 5–7: senior within 15 min; ≥8: immediate senior, consultant and anaesthetist. Use your printed chart for temperature bands
Sepsis screening (SMFM #67, 2023)	qSOFA, SOFA and SIRS are **not validated** in pregnancy; their thresholds overlap normal physiology. No single tool alone. Lactate >2 mmol/L can be normal in labour
Obstetric qSOFA (SOMANZ; MFM EBG)	1 point each: SBP ≤90 · RR ≥25 · altered mentation
CMQCC sepsis step 1 (US)	Any 2: temp <36 or ≥38 °C · HR >110 · RR >24 · WBC >15 or <4 ×10³/L or >10% bands → then look for organ injury

11 Reference ranges by trimester

Ranges from Williams 26e Appendix I (pooled studies; some with and some without iron supplements), converted to SI units. Use your own laboratory's pregnancy ranges where available.

Test (unit)	Non-pregnant	1st trimester	2nd trimester	3rd trimester
Haematology & coagulation				
Hb (g/L)	120–158	116–139	97–148	95–150
WBC (×10³/L)	3.5–9.1	5.7–13.6	5.6–14.8	5.9–16.9
Neutrophils (×10³/L)	1.4–4.6	3.6–10.1	3.8–12.3	3.9–13.1
Platelets (×10³/L)	165–415	174–391	155–409	146–429
MCV (fL)	79–93	81–96	82–97	81–99
Ferritin (µg/L)	10–150	6–130	2–230	0–116
Fibrinogen (g/L)	2.3–5.0	2.4–5.1	2.9–5.4	3.0–7.0
D-dimer (µg/mL)	0.22–0.74	0.05–0.95	0.32–1.29	0.13–1.7
aPTT (s)	26.3–39.4	23.0–38.9	22.9–38.1	22.6–35.0
PT (s)	12.7–15.4	9.7–13.5	9.5–13.4	9.6–12.9
Protein S, free (%)	70–140	34–133	19–113	20–65
Factor VIII (%)	50–150	90–210	97–312	143–353

Test (unit)	Non-pregnant	1st trimester	2nd trimester	3rd trimester
ESR (mm/h)	0–20	4–57	7–47	13–70
CRP (mg/L)	0.2–3.0	—	0.4–20.3	0.4–8.1

Test (unit)	Non-pregnant	1st trimester	2nd trimester	3rd trimester
Kidney & electrolytes				
Creatinine (µmol/L)	44–80	35–62	35–71	35–80
Urea (mmol/L)	2.5–7.1	2.5–4.3	1.1–4.6	1.1–3.9
Urate (µmol/L)	149–333	119–250	143–291	184–375
Sodium (mmol/L)	136–146	133–148	129–148	130–148
Potassium (mmol/L)	3.5–5.0	3.6–5.0	3.3–5.0	3.3–5.1
Bicarbonate (mmol/L)	22–30	20–24	20–24	20–24
Osmolality (mOsm/kg)	275–295	275–280	276–289	278–280
GFR (mL/min)	106–132	131–166	135–170	117–182
Urine protein (mg/24 h)	<150	19–141	47–186	46–185
Liver				
ALT (U/L)	7–41	3–30	2–33	2–25
AST (U/L)	12–38	3–23	3–33	4–32
GGT (U/L)	9–58	2–23	4–22	3–26
ALP (U/L)	33–96	17–88	25–126	38–229
Bilirubin, total (µmol/L)	5–22	2–7	2–14	2–19
Albumin (g/L)	41–53	31–51	26–45	23–42
Bile acids (µmol/L)	0.3–4.8	0–4.9	0–9.1	0–11.3
LDH (U/L)	115–221	78–433	80–447	82–524
Lipase (U/L)	3–43	21–76	26–100	41–112

Test (unit)	Non-pregnant	1st trimester	2nd trimester	3rd trimester
Endocrine & metabolic				
TSH (mU/L)	0.34–4.25	0.60–3.40	0.37–3.60	0.38–4.04
Free T4 (pmol/L)	10.3–21.9	10.3–15.4	7.7–12.9	6.4–10.3
Cortisol (nmol/L)	up to 690	193–524	276–1159	331–1380
Prolactin (µg/L)	0–20	36–213	110–330	137–372
HbA1c (%)	4–6	4–6	4–6	4–7
Calcium, total (mmol/L)	2.17–2.54	2.20–2.64	2.05–2.25	2.05–2.42
Calcium, ionised (mmol/L)	1.12–1.32	1.12–1.27	1.10–1.25	1.10–1.32
Magnesium (mmol/L)	0.62–0.95	0.66–0.91	0.62–0.91	0.45–0.91
Cholesterol, total (mmol/L)	<5.2	3.6–5.4	4.6–7.7	5.7–9.0
Triglycerides (mmol/L)	<1.7	0.45–1.80	0.85–4.31	1.48–5.11

Test (unit)	Non-pregnant	1st trimester	2nd trimester	3rd trimester
Cardiac (mean ± SD)				
BNP (pg/mL)	22 ± 10	22 ± 10	32 ± 15	31 ± 21
NT-proBNP (pg/mL)	50 ± 26	60 ± 45	60 ± 40	43 ± 34

Free T4 falls in later pregnancy partly because immunoassays are affected by high TBG and low albumin; rely on method-specific ranges.

12 Do not

- Use non-pregnant reference ranges for creatinine, TSH, free T4, ALP, WBC, fibrinogen or blood gases.
- Reassure about a creatinine of 80–90 µmol/L, a $PaCO_2$ of 40 mmHg or a fibrinogen of 2 g/L at term: each is abnormal in pregnancy.
- Attribute breathlessness at rest, orthopnoea, syncope, chest pain at rest, RR ≥24, SpO_2 <95% or a diastolic murmur to pregnancy.
- Call an Hb below the trimester cut-off "physiological dilution".
- Explain a raised ALT, AST, GGT, bilirubin or bile acid level as normal pregnancy; only ALP rises.
- Diagnose or exclude infection from the white count alone, or exclude sepsis because there is no fever.
- Use D-dimer to exclude VTE (RCOG), or unmodified qSOFA/SIRS to screen for sepsis.
- Lay a woman beyond ~20 wk flat on her back for examination, monitoring, transfer or CPR.
- Measure prolactin, lipids, renin/aldosterone or protein S in pregnancy and treat the "abnormal" result.
- Call right-sided hydronephrosis obstruction without pain, infection or a rising creatinine.

13 Where the guidelines differ

Topic	ACOG / SMFM (USA)	RCOG / NICE / BSH (UK)	Others
Anaemia (Hb, g/L)	T1 <110 · T2 <105 · T3 <110	T1 <110 · T2–T3 <105 · postpartum <100	WHO 2024: as ACOG; SOGC No. 469 (2026) new
Routine iron	Low-dose iron from T1 (ACOG); USPSTF: insufficient evidence	Treat deficiency: 40–80 mg elemental iron daily (BSH)	WHO: 30–60 mg + folic acid 400 µg daily for all
TSH without local range	Trimester-specific ranges (PB 223)	NICE NG145 does not cover pregnancy	ATA 2026: 0.1–4.0 mU/L in T1–T2 · ETA 2014: ≤2.5 / 3.0 / 3.5
Bile acids for ICP	>10 µmol/L often used (SMFM #53)	≥19 µmol/L non-fasting (GTG 43)	—
Proteinuria	≥300 mg/24 h or PCR ≥0.3 mg/mg	PCR ≥30 mg/mmol or ACR ≥8 mg/mmol	SOGC 426: ≥0.3 g/day or PCR ≥30 mg/mmol
Creatinine in pre-eclampsia	>1.1 mg/dL (97 µmol/L) or doubling	≥90 µmol/L	SOGC 426: >90 µmol/L
Platelets in pre-eclampsia	<100 ×10⁹/L	<150 ×10⁹/L	—
Transaminases in pre-eclampsia	≥2× upper limit of normal	ALT or AST >40 IU/L	—
Platelets for neuraxial	≥70 ×10⁹/L if stable (PB 207; SOAP 2021)	>75 ×10⁹/L and not falling (AAGBI/OAA 2013)	—
D-dimer for VTE	ACOG endorses ATS: not to exclude PE	Do not test (GTG 37b)	ESC 2025: usable with pregnancy-adapted YEARS
Early warning	Single-parameter triggers (MEWC)	Aggregate National MEWS (2024)	SOMANZ obstetric qSOFA for sepsis

14 Abbreviations

Abbreviation	Meaning	Abbreviation	Meaning
Organisations and documents			
AAGBI	Association of Anaesthetists of Great Britain and Ireland	**ACOG**	American College of Obstetricians and Gynecologists
AHA	American Heart Association	**ANC**	Antenatal care
ATA	American Thyroid Association	**ATS**	American Thoracic Society
BSH	British Society for Haematology	**CMQCC**	California Maternal Quality Care Collaborative
CO	Committee Opinion (ACOG)	**EBG**	Evidence Based Guidelines (Berghella)
ECC	Emergency Cardiovascular Care	**ESC**	European Society of Cardiology
ETA	European Thyroid Association	**GTG**	Green-top Guideline (RCOG)
IOM	Institute of Medicine (US)	**MFM**	Maternal-Fetal Medicine
NG	NICE guideline	**NHS**	National Health Service (UK)
NICE	National Institute for Health and Care Excellence	**OAA**	Obstetric Anaesthetists' Association
PB	Practice Bulletin (ACOG)	**RA-UK**	Regional Anaesthesia UK
RCOG	Royal College of Obstetricians and Gynaecologists	**SMFM**	Society for Maternal-Fetal Medicine
SOAP	Society for Obstetric Anesthesia and Perinatology	**SOGC**	Society of Obstetricians and Gynaecologists of Canada
SOMANZ	Society of Obstetric Medicine of Australia and New Zealand	**USPSTF**	US Preventive Services Task Force
WHO	World Health Organization		
Heart, circulation and breathing			
ABG	Arterial blood gas	**ACLS**	Advanced cardiac life support
BNP	B-type natriuretic peptide	**BP**	Blood pressure
CPR	Cardiopulmonary resuscitation	**CVP**	Central venous pressure
CXR	Chest X-ray	**DBP**	Diastolic blood pressure
ECG	Electrocardiogram	**EF**	Ejection fraction
FEV_1	Forced expiratory volume in 1 second	**FRC**	Functional residual capacity
HCO_3^-	Bicarbonate	**HR**	Heart rate
IVC	Inferior vena cava	**JVP**	Jugular venous pressure
LV	Left ventricle / left ventricular	**NT-proBNP**	N-terminal pro-B-type natriuretic peptide
$PaCO_2$	Arterial partial pressure of carbon dioxide	**PaO_2**	Arterial partial pressure of oxygen
PE	Pulmonary embolism	**PEF**	Peak expiratory flow
PND	Paroxysmal nocturnal dyspnoea	**PR, QRS**	ECG intervals and complex
RR	Respiratory rate	**S3, S4**	Third and fourth heart sounds
SBP	Systolic blood pressure	**SpO_2**	Oxygen saturation by pulse oximetry
SVR	Systemic vascular resistance		

Abbreviation	Meaning	Abbreviation	Meaning
Blood and clotting			
APC	Activated protein C	aPTT	Activated partial thromboplastin time
CBC / FBC	Complete / full blood count	CRP	C-reactive protein
DIC	Disseminated intravascular coagulation	DVT	Deep vein thrombosis
ESR	Erythrocyte sedimentation rate	Hb, Hct	Haemoglobin, haematocrit
HELLP	Haemolysis, elevated liver enzymes, low platelets	HUS	Haemolytic uraemic syndrome
ITP	Immune thrombocytopenia	LDH	Lactate dehydrogenase
MCV	Mean cell volume	PT	Prothrombin time
TTP	Thrombotic thrombocytopenic purpura	VTE	Venous thromboembolism
vWF	von Willebrand factor	WBC	White blood cell count
Kidney, liver and hormones			
ACR	Albumin:creatinine ratio	ACTH	Adrenocorticotropic hormone
ADH	Antidiuretic hormone (vasopressin)	AFLP	Acute fatty liver of pregnancy
AKI	Acute kidney injury	ALP	Alkaline phosphatase
ALT	Alanine aminotransferase	AST	Aspartate aminotransferase
CKD	Chronic kidney disease	GDM	Gestational diabetes mellitus
GFR	Glomerular filtration rate	GGT	Gamma-glutamyl transferase
HbA1c	Glycated haemoglobin	hCG	Human chorionic gonadotrophin
ICP	Intrahepatic cholestasis of pregnancy	LFTs	Liver function tests
$MgSO_4$	Magnesium sulphate	PCR	Protein:creatinine ratio (urine)
T3, T4	Triiodothyronine, thyroxine	TBG	Thyroxine-binding globulin
TFT	Thyroid function tests	TRAb	TSH-receptor antibodies
TSH	Thyroid-stimulating hormone		
Scores and general			
BMI	Body mass index	HDU / ICU	High-dependency / intensive care unit
IU	International units	IV	Intravenous
MEWC	Maternal Early Warning Criteria	MEWS	Maternity Early Warning Score
MRI	Magnetic resonance imaging	SD	Standard deviation
SI	International System of Units	SIRS	Systemic inflammatory response syndrome
SOFA / qSOFA	(Quick) Sequential Organ Failure Assessment	T1, T2, T3	First, second, third trimester
wk	Weeks of gestation		

15 Sources

Textbooks

- Cunningham FG et al. Williams Obstetrics, 26th ed. Ch. 4 Maternal Physiology; Appendix I Serum and Blood Constituents (2022).
- Edmonds DK et al (eds). Dewhurst's Textbook of Obstetrics & Gynaecology, 9th ed. Ch. 1 Maternal Physiology; Ch. 10 Liver and Endocrine Diseases; Ch. 12 Haematological Disorders.

- Berghella V (ed). Maternal-Fetal Evidence Based Guidelines, 4th ed. Ch. 2 Cardiac Disease (Table 2.1); Ch. 6 Thyroid; Ch. 14 Anaemia; Ch. 17 Renal Disease; Ch. 30 VTE; Ch. 42 Critical Care (Tables 42.5, 42.9).

Guidelines checked (October 2026)

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- SOGC Guideline 426, Hypertensive Disorders of Pregnancy (2022); Guideline 469, Iron Deficiency and Iron Deficiency Anaemia (2026).
- ATA 2026 Guidelines for Thyroid Disease in Preconception, Pregnancy and Postpartum (replace ATA 2017); ETA 2014 Subclinical Hypothyroidism in Pregnancy.
- ESC 2025 Guidelines for Cardiovascular Disease and Pregnancy. WHO Guideline on Haemoglobin Cutoffs to Define Anaemia (2024); WHO Antenatal Care Recommendations (2016).

Decision aid only: it does not replace clinical judgement or local protocols. Verify drug doses against your formulary.