

### Physiological Changes in Pregnancy: Review

	Changes in Pregnancy	Notes
Plasma volume	Increased (50%)	To fill vascular bed and maintain blood pressure
Red Blood Cells	Increased (25-30%)	Reduces O <sub>2</sub> carrying capacity Haemodilution
Cardiac output Heart rate	Increased (40%) Increased 15-20bpm	This increase helped by ↑ heart rate to maintain tissue perfusion and BP because of vasodilation
Vascular resistance	Reduces	Progesterone effects causing vasodilation, Pooling of blood, BP will reduce but increased blood volume reduces impact
Blood Pressure	↓ 2 <sup>nd</sup> trimester, progesterone effects =vasodilation and reduced peripheral resistance	Important for measuring blood pressure Postural hypotension Physiological changes dangerous if superimposed on existing disease where haemodynamics already compromised
Respiratory Rate	Increased O <sub>2</sub> consumption increased (20%) due to increasing metabolic needs of mother and fetus	Altered by hormonal and biochemical changes plus the enlarging uterus. Muscles in thoracic region relax, chest broadens, tidal volume improves. Breaths deeper Ligaments between ribs relax increasing rib elasticity. Reduced airway resistance facilitates greater air flow. Increase of 50% in air vol/min. This causes mild respiratory alkalosis – essential for gas exchange across placenta. Progesterone acts as respiratory stimulant. Small degree of breathlessness in pregnancy physiological but after birth unusual. Could be presenting symptom for pulmonary oedema, pulmonary embolism, pneumonia, anaemia. >20 serious
O <sub>2</sub> saturation	96-98%, rarely 100%	98-99% O <sub>2</sub> breathed in carried by Hb in blood
Temperature	Progesterone and ↑ basal metabolic rate (BMR) Increase heat generated by 30-35%	Heat loss mechanisms compensate but still increase of about 0.5°C. Increasing temp, increases o <sub>2</sub> demands and ↑ HR
Urinary system changes	Increase in size in kidneys especially glomerulus. Glomerular filtration rate increases (50%) by end of first trimester Functional capacity of kidneys increase Ureters and renal pelvis dilate Can get backflow of urine from bladder to ureters Pressure effects on bladder tone. Reabsorption by nephron impaired resulting in glycosuria	To cope with increased blood flow.  Progesterone effects  Increased risk of infections due to pressure effects or pooling  Also more likely to retain sodium Altered values and interpretation of blood results

1) Heidemann, B.H., McClure, J.H., 2003. Changes in maternal physiology during pregnancy. BJA CEPD Rev. 3, 65–68. 2) Johnson, R., Taylor, W., 2016. Skills for Midwifery Practice, Fourth. ed. Elsevier. 3) Soma-Pillay, P., Catherine, N.-P., Tolppanen, H., Mebazaa, A., Tolppanen, H., Mebazaa, A., 2016. Physiological changes in pregnancy. Cardiovasc. J. Afr. 27, 89–94.