Q19 Describe the cardiovascular changes during pregnancy (Sept 2013, Q4 Sept 2010)

There are multiple cardiovascular changes that occur during pregnancy and these vary according to trimester. The post-partum period also involves significant changes. All percentages listed imply that number above normal pre-pregnancy values.

	CARDIAC CHANGES	**SYSTEMIC CHANGES**	**OTHER**
FIRST TRIMESTER	- HR ↑ 17%-20% - Stroke volume ↑ 20-30% - Cardiac output starts to increase by week 5, ↑40-45% by end of first trimester (due to increased venous return due to venodilatation and increased intravascular volume. A large proportion of this increased CO is directed to the placenta)	- TPR ↓ 30% (mediated by progesterone, prostaglandins and down regulation of alpha receptors) - Systolic and diastolic BP ↓ 10% - Maternal plasma volume ↑ 45% (mediated by increased activity of the RAAS), with red cell mass ↑20% (mediated by an increase in EPO) → hence dilutional anaemia of pregnancy	- ↑blood flow to breasts, GIT and skin (combination of hormonal input, vasodilatation and increase in CO)
SECOND TRIMESTER		- TPR ↓ further 5%	- Aortocaval compression syndrome from 20 weeks causing hypotension and decreased uterine perfusion (hence left lateral positioning)
THIRD TRIMESTER	- HR ↑ up to 25% above normal - CO peak ↑ of 50% weeks 32-36 then decreases slightly		
LABOUR	- CO ↑ up to 45% during the expulsive phase - Immediately post delivery CO is 60-80% above normal due to autotranfusion	- Autotransfusion of 300ml of blood from uterus during each contraction - Maternal systolic and diastolic pressures ↑ 10-20mmHg during each contraction	
POST DELIVERY	- CO and BP return to normal values by 2 weeks post delivery		