

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

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.

	<b>CARDIAC CHANGES</b>	<b>SYSTEMIC CHANGES</b>	<b>OTHER</b>
<b>FIRST TRIMESTER</b>	<ul style="list-style-type: none"> <li>- HR ↑ 17%-20%</li> <li>- Stroke volume ↑ 20-30%</li> <li>- 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)</li> </ul>	<ul style="list-style-type: none"> <li>- TPR ↓ 30% (mediated by progesterone, prostaglandins and down regulation of alpha receptors)</li> <li>- Systolic and diastolic BP ↓ 10%</li> <li>- 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</li> </ul>	<ul style="list-style-type: none"> <li>- ↑ blood flow to breasts, GIT and skin (combination of hormonal input, vasodilatation and increase in CO)</li> </ul>
<b>SECOND TRIMESTER</b>		<ul style="list-style-type: none"> <li>- TPR ↓ further 5%</li> </ul>	<ul style="list-style-type: none"> <li>- Aortocaval compression syndrome from 20 weeks causing hypotension and decreased uterine perfusion (hence left lateral positioning)</li> </ul>
<b>THIRD TRIMESTER</b>	<ul style="list-style-type: none"> <li>- HR ↑ up to 25% above normal</li> <li>- CO peak ↑ of 50% weeks 32-36 then decreases slightly</li> </ul>		
<b>LABOUR</b>	<ul style="list-style-type: none"> <li>- CO ↑ up to 45% during the expulsive phase</li> <li>- Immediately post delivery CO is 60-80% above normal due to autotransfusion</li> </ul>	<ul style="list-style-type: none"> <li>- Autotransfusion of 300ml of blood from uterus during each contraction</li> <li>- Maternal systolic and diastolic pressures ↑ 10-20mmHg during each contraction</li> </ul>	
<b>POST DELIVERY</b>	<ul style="list-style-type: none"> <li>- CO and BP return to normal values by 2 weeks post delivery</li> </ul>		