Essentials of Preeclampsia

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UK Maternal Cardiology Society

British Cardiovascular Society

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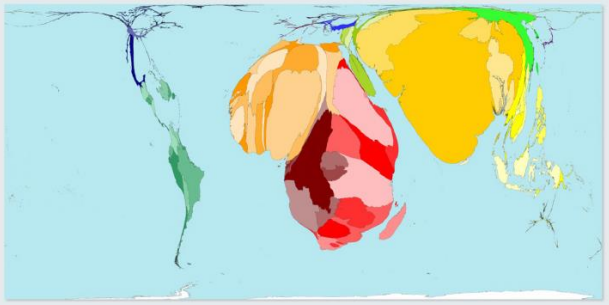
MBRRACE-UK
Mothers and Babies: Reducing Risk through Audits and Confidential Enquiries across the UK

Maternal mortality rates

per 100,000 maternities

	2000-02	2003-05	2006-08	2009-11	2012-14	2015-17	2018-20
All Direct and Indirect deaths	13.07	13.95	11.39	10.63	8.54	9.16	10.90
Pre-eclampsia and eclampsia	0.70	0.85	0.83	0.42	0.08	0.22	0.38

The Burden of Pre-eclampsia is in Low Income Countries



Definitions

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Chronic Hypertension

Hypertension that is present at the **booking visit** or **before 20 we**eks' gestation, or if the woman is already taking **antihypertensive medication** when starting maternity care. It can be **primary** (essential) or **secondary** in aetiology.

Gestational Hypertension OR Pregnancy Induced Hypertension

New hypertension presenting **after 20 weeks** of pregnancy without significant proteinuria.

>140 mm Hg systolic or
>90 mm Hg diastolic

White Coat Hypertension

Elevated BP in clinic
>140/90
Normal BP at home
<135/85

Webster K, Fishburn S, Maresh M, Findlay S C, Chappell L C. Diagnosis and management of hypertension in pregnancy: summary of updated NICE guidance *BMJ* 2019; 366 :l5119

www.nice.org.uk/guidance/CG107

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Definitions – Pre-Eclampsia
International Society for the Study of Hypertension in Pregnancy

eclampsia is gestational hypertension accompanied by one or more of the following new-onset conditions at or after 20 weeks' gestation:

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Proteinuria*

Significant proteinuria is > 300mg protein in a 24-hr urine collection
OR
>30mg/ml in a spot urinary PCR

Other maternal organ dysfunction, including:

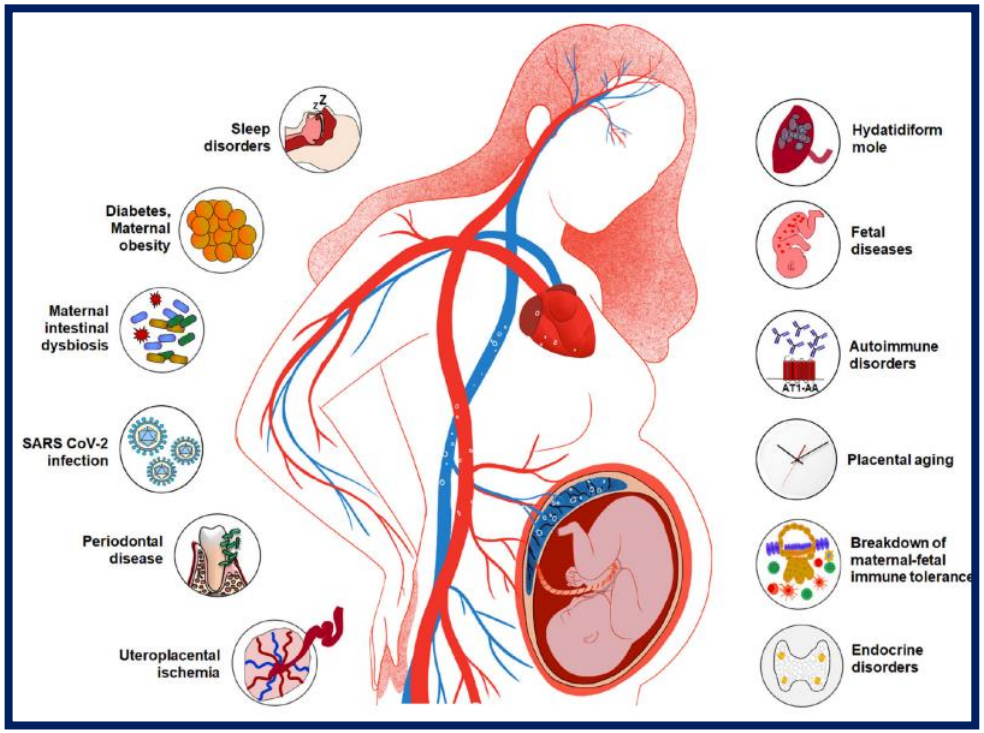
- Acute **Kidney** Injury (creatinine ≥90 µmol/L, or doubling of serum creatinine in absence of renal disease)
- **Liver** involvement (elevated transaminases with or without right upper quadrant or epigastric abdominal pain)
- **Neurological** complications (examples include eclampsia, altered mental status, visual disturbance, stroke, clonus, headaches)
- **Haematological** complications (thrombocytopenia – platelet count below 150,000/µL, disseminated intravascular coagulation, haemolysis)

Uteroplacental dysfunction (such as **fetal growth restriction**, abnormal **umbilical artery doppler** wave form analysis, or **stillbirth**)

***NOT needed for the diagnosis of pre-eclampsia**

Brown, M. *et al.* (2018) "187. the hypertensive disorders of pregnancy: ISSHP classification, Diagnosis & Management Recommendations for International Practice," *Pregnancy Hypertension*, 13.

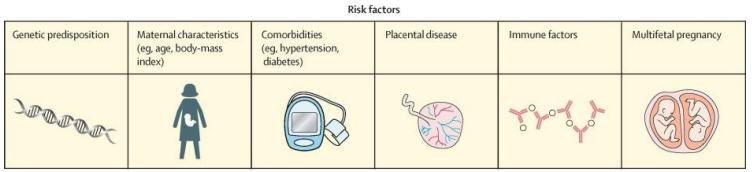
Multiple aetiologies implicated in PET

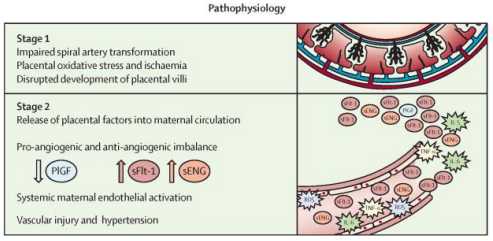


Jung et al 2022

Hypertensive disorders in pregnancy
New tests

Result	Classification	Interpretation
PlGF <12 pg/ml	Test positive – highly abnormal	Increased risk for preterm delivery
PlGF [3]12 pg/ml and <100 pg/ml	Test positive - abnormal	Increased risk for preterm delivery
PlGF [3] 100 pg/ml*	Test negative - normal	Unlikely to progress to delivery within 14 days of the test





Multiorgan dysfunction

		Symptoms	Signs	Investigations	Complications
	Neurological	Headache and visual disturbances	Brisk reflexes and clonus	..	Eclampsia, posterior reversible encephalopathy syndrome, and intracranial haemorrhage
	Renal	..	..	Proteinuria and raised serum creatinine	Acute kidney injury
	Hepatological	Epigastric pain	Right upper quadrant tenderness	Elevated serum liver enzymes	Hepatic haematoma or rupture
	Haematological	..	Dark brown urine and petechiae	Low platelets, abnormal clotting tests, and haemolysis	Coagulopathy
	Uteroplacental and fetal	Vaginal bleeding and reduced fetal movements	Hard uterus and reduced fundal height	Fetal growth restriction	Placental abruption and intrauterine fetal death
	Cardiorespiratory	Breathlessness, chest pain, and confusion	Tachypnoea	Decreased oxygen saturation and diastolic dysfunction	Pulmonary oedema

Jones-Muhammad 2019
Metoki1 et al 2022
Butalia et al 2018
Chappell et al 2021

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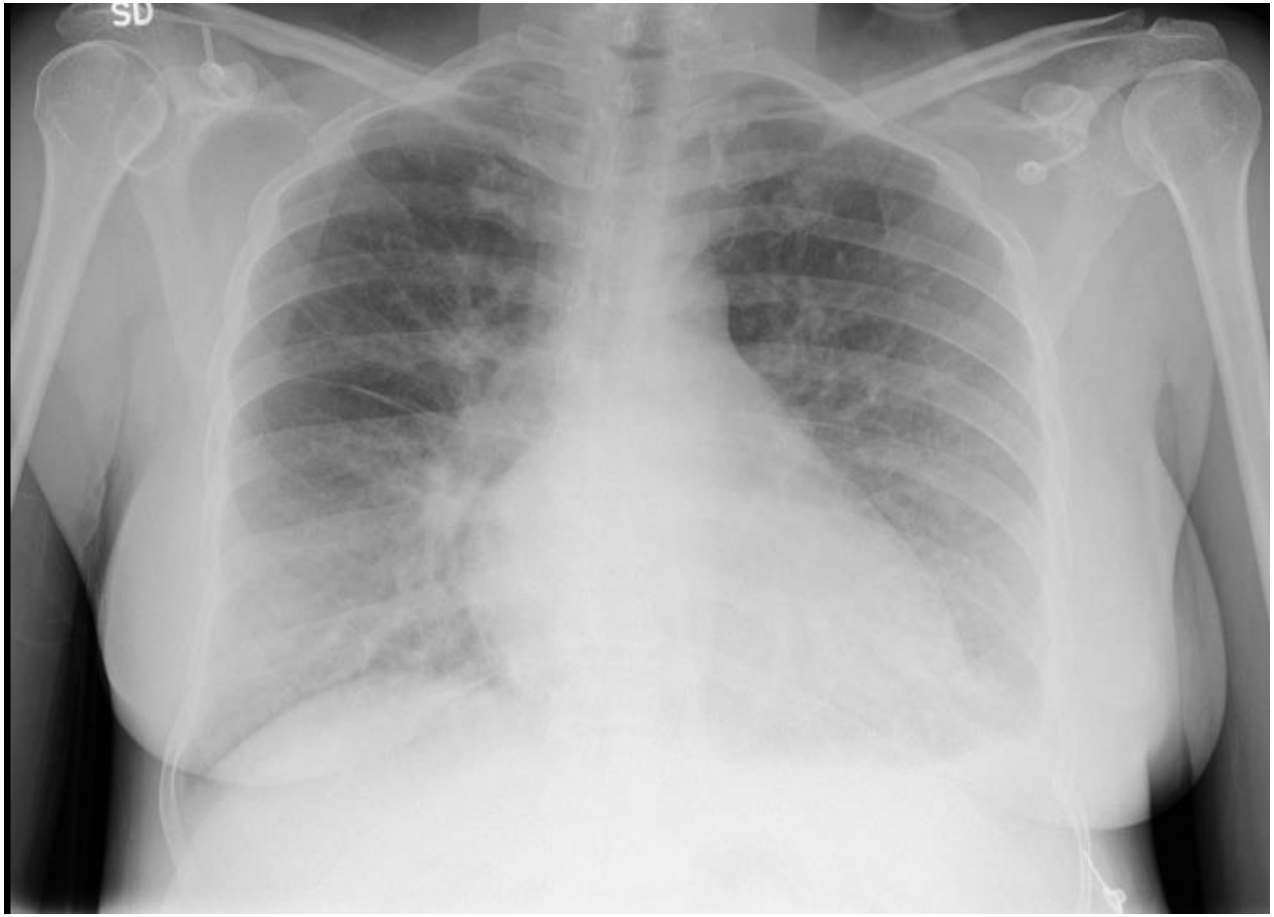
Case 1

45 year old admitted at 29 weeks with pre-eclampsia

She became suddenly breathless and orthopnoeic and unable to complete sentences.

Next step.....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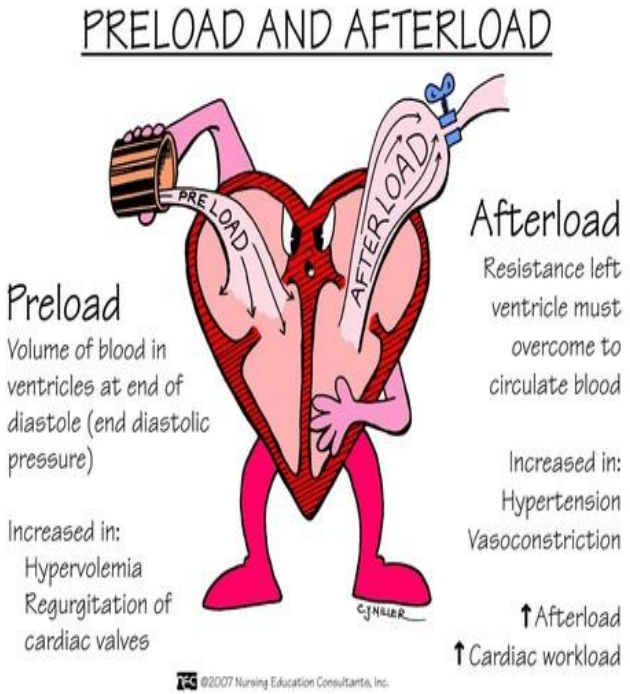
Pathophysiology

Key pathophysiology:

1. Pulmonary congestion increases
2. Oxygen saturation decreases
3. Myocardial oxygen supply decreased.
4. Further ischaemia and further impaired cardiac performance
5. Pulmonary vasoconstriction increases the right ventricular pressure
6. LV function impaired further due to reduced filling
7. Profound circulatory insufficiency results in metabolic acidosis...further jeopardises cardiac performance



Goals of Treatment

Maintain oxygenation and ventilation with clearance of pulmonary oedema

HOW??

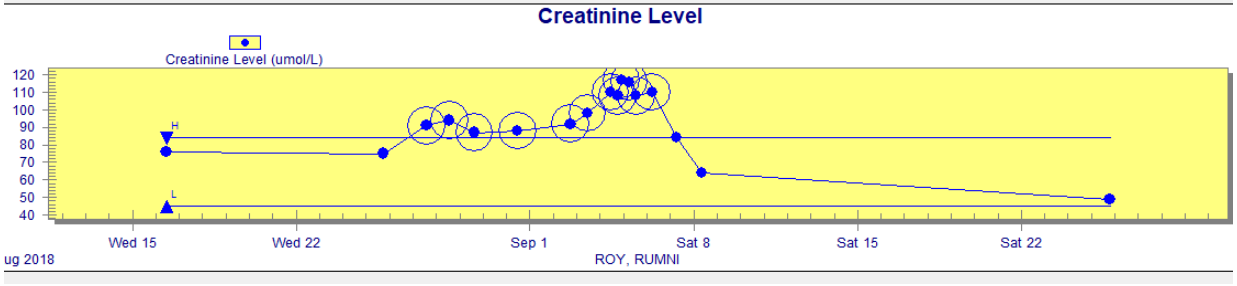
- Reduce LV afterload – Vasodilate (GTN, Diamorphine, Furosemide) & CPAP
- Reduce LV preload – Diuresis (Furosemide) and CPAP
- Reduce/Prevent ischaemia – Oxygenate
- Reduce worsening sympathetic drive – Oxygenate, Ventilate, Treat Anxiety

Management:

1. Oxygen and Call for help – Senior MDT
2. ABCDE
3. Ix's = ABG, CXR, ECG, Echo, CTG, Fluid Balance, UO/Catheter
4. GTN Infusion (50mg/50ml at 1-2ml/hr and titrate to BP) plus Diamorphne.
5. Furosemide (40-80mg IV) and Reduce Aortocaval compression
6. High flow oxygen, NIV or intubate and ventilate.

****Transfer to appropriate location****

- Stabilised and delivered by emergency caesarean with fetal steroid and maternal MgSO4
- Epidural analgesia
- Anaesthesia for caesarean section-can cause systemic hypotension (10%) and must be carefully titrated
- Invasive BP monitoring
- ~~Caution with intravenous fluids~~



Case 2

34 week Primip

Developed severe headaches and whilst making her way into hospital, had a witnessed generalized tonic-clonic seizure in a taxi.

On arrival to hospital, she was found to be confused and agitated, hypertensive (BP 163/112mmHg)

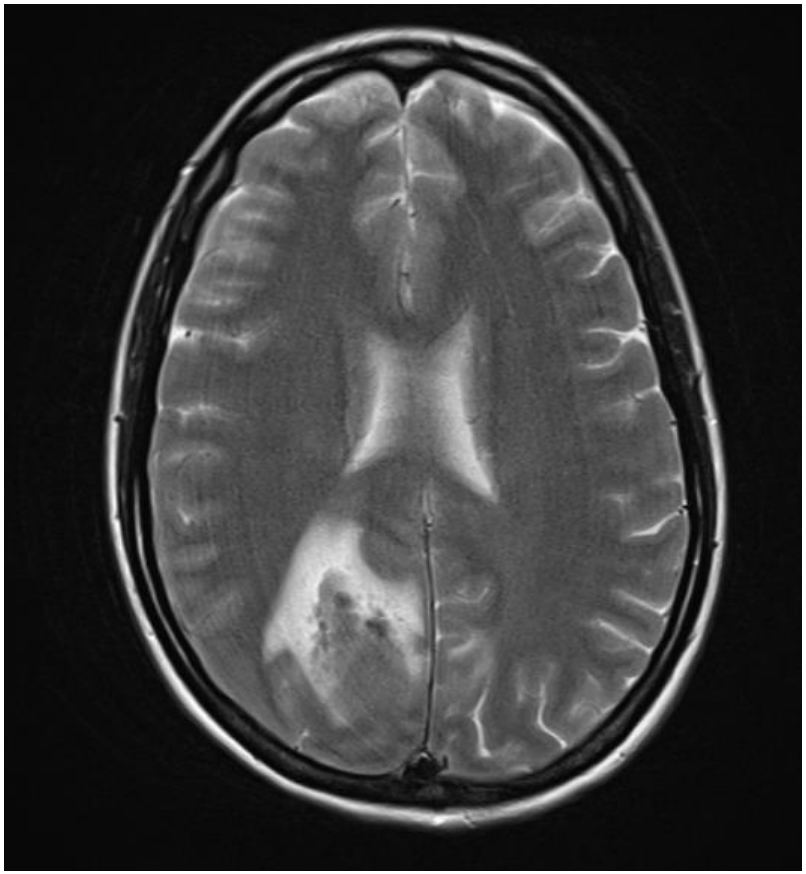
Further seizures.

Case 2

Anti-hypertensives and magnesium sulphate commenced.

Due to extreme agitation and ongoing seizure activity, an emergency Caesarean section was performed.

Well post operatively with some cognitive impairment (now fully resolved) and mild deficit in Lt hand finger extension (3/5 and 4+/5).



MRI head scan

Hypertensive encephalopathy & right parietal lobe haemorrhage

CT and MRI of brain consistent with hypertensive encephalopathy and right parietal lobe haemorrhage.

BP well controlled on amlodpine

Medically fit for discharge.

Key Clinical Tips

Magnesium

- For/prevent eclampsia
- Fetal neuroprotection
- Fulminant PET
- Bolus & than an infusion
- Use ½ infusion dose &check Mg level if AKI present

Drugs

Acute Phase

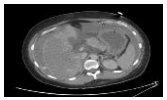
- IV labetaolol/Hydralazine
- PO nifedpine/labetalol

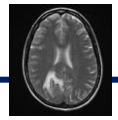
Postpartum

- Amlodipine, enalopril, doxazosin etc
- Avoid ARB

Major severe maternal morbidity

- **Eclampsia**
- **Pulmonary oedema**
- Acute kidney injury
- HELLP syndrome (haemolysis, elevated liver enzymes, low platelets)
- Disseminated intravascular coagulation (DIC)
- **Cerebral haemorrhage**
- Cortical blindness





Jones-Muhammad 2019
Metoki1 et al 2022
Helpern et al 2019
Butalia et al 2018

Future Pregnancies

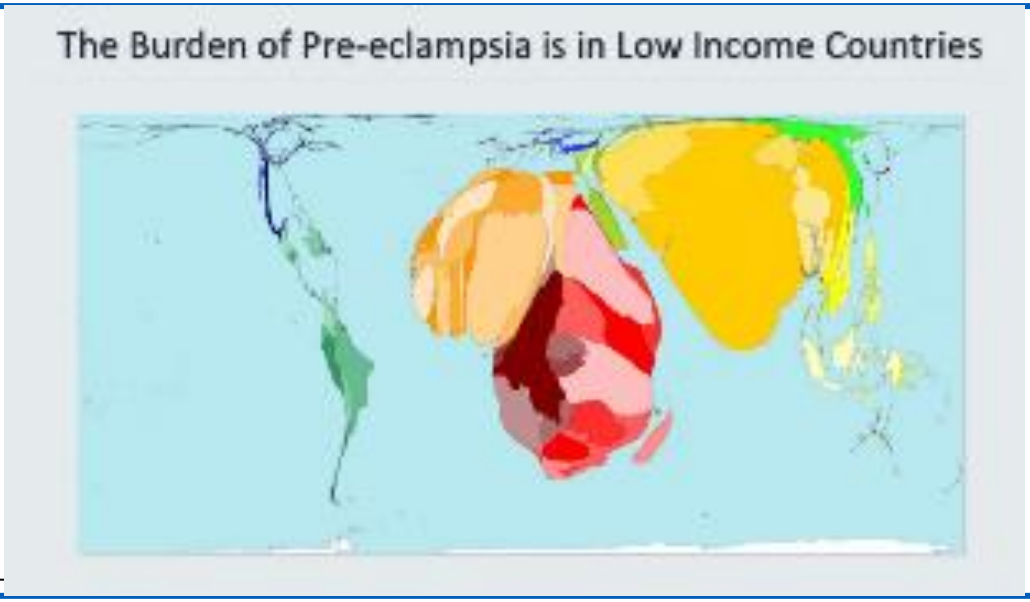
1% risk of recurrence of eclampsia

20-33% risk of recurrence of preeclampsia

Summary

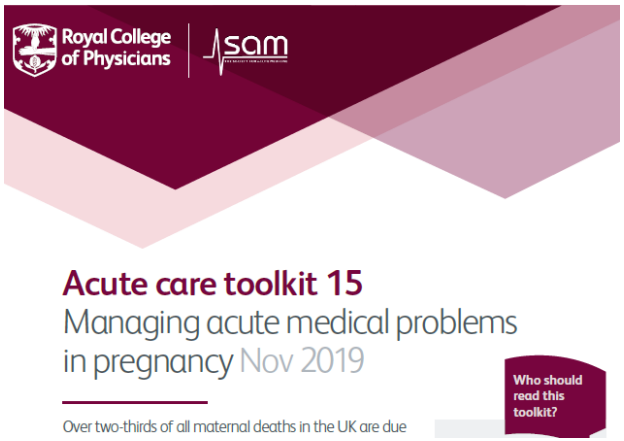
- Define evidence-based precision prevention strategies
- Early recognition

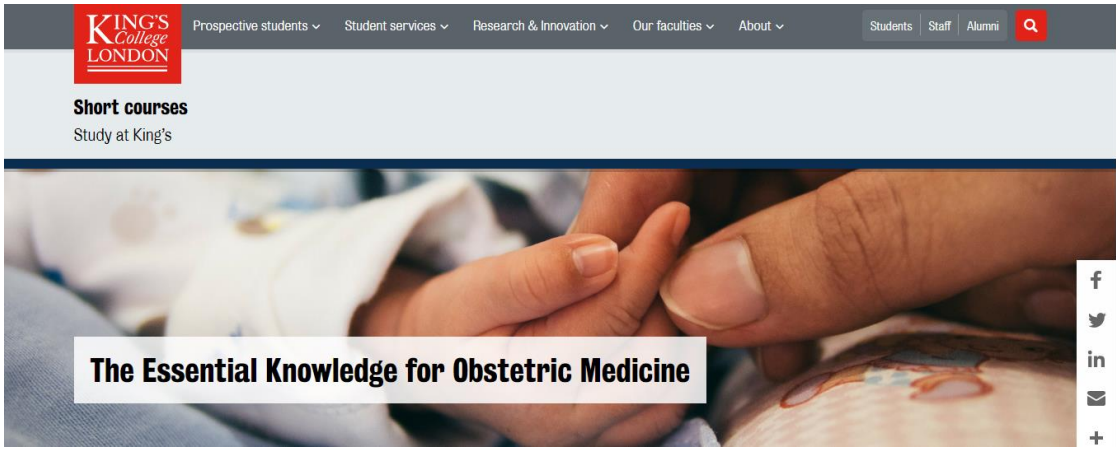
Reflections



Thank you for listening

eLfH package





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