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Appendix 1.1 UK Maternal Deaths – Causes and Risk Factors

Number of deaths from consecutive UK confidential enquiries into maternal mortality

<table>
<thead>
<tr>
<th>Type of Cause of Death</th>
<th>Triennial Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIRECT CAUSES (up to 42 days postpartum)</td>
<td></td>
</tr>
<tr>
<td>Thrombosis and thrombo-embolism</td>
<td>48</td>
</tr>
<tr>
<td>Hypertensive disease of pregnancy</td>
<td>20</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>12</td>
</tr>
<tr>
<td>Amniotic fluid embolism</td>
<td>17</td>
</tr>
<tr>
<td>Ectopic pregnancy</td>
<td>12</td>
</tr>
<tr>
<td>Spontaneous miscarriage</td>
<td>2</td>
</tr>
<tr>
<td>Legal termination of pregnancy</td>
<td>1</td>
</tr>
<tr>
<td>Other early pregnancy deaths</td>
<td>0</td>
</tr>
<tr>
<td>Genital tract sepsis</td>
<td>14</td>
</tr>
<tr>
<td>Genital tract trauma</td>
<td>5</td>
</tr>
<tr>
<td>Fatty liver</td>
<td>2</td>
</tr>
<tr>
<td>Anaesthetic</td>
<td>1</td>
</tr>
<tr>
<td>Other direct causes</td>
<td>0</td>
</tr>
<tr>
<td>Total number of direct deaths</td>
<td>134</td>
</tr>
<tr>
<td>INDIRECT CAUSES (up to 42 days postpartum)</td>
<td></td>
</tr>
<tr>
<td>Cardiac</td>
<td>39</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>9</td>
</tr>
<tr>
<td>Other indirect causes</td>
<td>86</td>
</tr>
<tr>
<td>Indirect malignancies</td>
<td>N/A</td>
</tr>
<tr>
<td>Total number of indirect deaths</td>
<td>134</td>
</tr>
<tr>
<td>COINCIDENTAL DEATHS</td>
<td></td>
</tr>
<tr>
<td>LATE DEATHS (42–365 days postpartum)</td>
<td></td>
</tr>
<tr>
<td>Direct causes</td>
<td>4</td>
</tr>
<tr>
<td>Indirect causes</td>
<td>32</td>
</tr>
<tr>
<td>Coincidental</td>
<td>36</td>
</tr>
<tr>
<td>Total number of late deaths</td>
<td>72</td>
</tr>
<tr>
<td>Total of all deaths</td>
<td>376</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Factor</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social disadvantage</td>
<td>20 times more likely to die</td>
</tr>
<tr>
<td>Poor communities</td>
<td>45% higher death rate</td>
</tr>
<tr>
<td>Minority ethnic groups</td>
<td>3 times more likely to die</td>
</tr>
<tr>
<td>Black African women (especially newly arrived and asylum seekers)</td>
<td>7 times more likely to die</td>
</tr>
<tr>
<td>Late booking or poor attendance</td>
<td>20% of direct and indirect maternal deaths</td>
</tr>
<tr>
<td>Obesity</td>
<td>35% of the women who died in 2000–02*</td>
</tr>
<tr>
<td>Substance abuse</td>
<td>8% of the women who died in 2000–02**</td>
</tr>
<tr>
<td>Domestic violence</td>
<td>14% of the women who died in 2000–02***</td>
</tr>
</tbody>
</table>

* This table is not repeated in the 2003–05 report, where over 50% of the women who died were either overweight or obese, with 15% being morbidly obese having a BMI of 35 or above.
** 11% had problems with substance abuse, again showing an increase³.
*** The incidence remained static at 14% for domestic violence.

Reproduced from the sixth¹,² and seventh³ reports of the Confidential Enquiries into Maternal Death, with the permission of the Royal College of Obstetricians and Gynaecologists, and from CEMACH.
Appendix 1.2 UK Maternal Deaths by Type of Antenatal Care and Place of Delivery

Maternal death by type of antenatal care, United Kingdom 2003–05

<table>
<thead>
<tr>
<th>Type of Antenatal Care</th>
<th>Classification of Death</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Direct n</td>
</tr>
<tr>
<td>Team-based or ‘shared’ care</td>
<td>54</td>
</tr>
<tr>
<td>Consultant-led unit only</td>
<td>15</td>
</tr>
<tr>
<td>Midwife only</td>
<td>11</td>
</tr>
<tr>
<td>Midwife and GP</td>
<td>5</td>
</tr>
<tr>
<td>Death before booking or after miscarriage or ToP</td>
<td>22</td>
</tr>
<tr>
<td>Unaware of pregnancy</td>
<td>5</td>
</tr>
<tr>
<td>Suboptimal antenatal care:</td>
<td></td>
</tr>
<tr>
<td>• Concealed pregnancy</td>
<td>3</td>
</tr>
<tr>
<td>• No antenatal care</td>
<td>4</td>
</tr>
<tr>
<td>• Late booking/poor attender</td>
<td>11</td>
</tr>
<tr>
<td>Not stated</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>132</td>
</tr>
</tbody>
</table>

Source: Table 1.4 from the CEMACH Report ‘Saving Mothers’ Lives’ 2003-05

Maternal death by place of delivery, United Kingdom 1994–2005

<table>
<thead>
<tr>
<th>Venue</th>
<th>Triennial Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultant-led Obstetric Unit</td>
<td>152</td>
</tr>
<tr>
<td>Stand alone GP/midwife-led birth centre</td>
<td>1</td>
</tr>
<tr>
<td>Accident and Emergency Department</td>
<td>12</td>
</tr>
<tr>
<td>Intensive Care Unit</td>
<td>2</td>
</tr>
<tr>
<td>Hospital other</td>
<td>0</td>
</tr>
<tr>
<td>Home</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>169</td>
</tr>
</tbody>
</table>

Source: Table 22.9 from the CEMACH Report ‘Why Mothers Die 2000–2002’
Table 1.6 from the CEMACH Report ‘Saving Mothers’ Lives 2003–05

Adapted and reproduced from the sixth and seventh reports of the Confidential Enquiries into Maternal Death, with the permission of the Royal College of Obstetricians and Gynaecologists, and from CEMACH.
### Appendix 1.3 Daily Vitamin and Mineral Dietary Intake for Pregnancy and Lactation

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>RDA (Recommended Daily Dietary Amount/Allowance)*</th>
<th>Sources*</th>
<th>Overdose2</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong></td>
<td><strong>Retinol</strong></td>
<td>Pregnant 2700–8000 IU3, Lactation 3–4000 IU3,4</td>
<td>Liver, fish liver oil, green leafy vegetables, carrots, yellow fruits, egg yolks, enriched margarine, milk products</td>
<td>A fat soluble vitamin which accumulates in the body2. Overdose in pregnancy can be dangerous3. 8000 IU is the maximum dose. High doses may be teratogenic3. Pregnant women should not take supplements, and should avoid eating liver3.</td>
</tr>
<tr>
<td><strong>B1</strong></td>
<td><strong>Thiamine</strong></td>
<td>Pregnancy 1.5 mg3, Lactation 1.6 mg3</td>
<td>Yeast products, liver, rice, wholemeal products, peanuts, pork, milk</td>
<td>A water-soluble vitamin that is excreted in urine, so overdose unlikely2.</td>
</tr>
<tr>
<td><strong>B2</strong></td>
<td><strong>Riboflavin</strong></td>
<td>Pregnancy 2.2 mg3, Lactation 2.1 mg3</td>
<td>Yeast products, milk, liver, fish, cheese, green leafy vegetables</td>
<td>A water-soluble vitamin that is excreted in urine, no danger of overdose.</td>
</tr>
<tr>
<td><strong>B6</strong></td>
<td><strong>Pyridoxine</strong></td>
<td>Pregnancy 2.2 µg3, Lactation 2.6 µg3</td>
<td>Fish, liver, beef, pork, milk and cheese</td>
<td>A water-soluble vitamin that is excreted in urine, no danger of overdose.</td>
</tr>
<tr>
<td><strong>B12</strong></td>
<td><strong>Cobalamin</strong></td>
<td>Pregnancy 2.2 µg, Lactation 2.6 µg3</td>
<td>Citrus fruits, berries, tomatoes, cauliflower, green leafy vegetables, peppers</td>
<td>Large doses can cause diarrhoea. Excessive doses, ≥1000 mg, might damage DNA.</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td><strong>Ascorbic Acid</strong></td>
<td>Pregnancy 70 mg3, Lactation 95 mg3</td>
<td>80% from sunlight 20% from cod liver oil, sardines, herrings, salmon, tuna, and milk products</td>
<td>A fat-soluble vitamin which accumulates in the body2. High doses are teratogenic in animals3. Australia advocates daily sunlight exposure 15 min to prevent deficiency5; no data for the UK.</td>
</tr>
<tr>
<td><strong>D</strong></td>
<td><strong>Pregnancy 400 IU3, Lactation 400 IU3</strong></td>
<td>Egg yolks, wholemeal products, beans, vegetable oil, broccoli, sprouts, spinach</td>
<td>80% from sunlight 20% from cod liver oil, sardines, herrings, salmon, tuna, and milk products</td>
<td>A fat-soluble vitamin which accumulates in the body2. High doses are teratogenic in animals3. Essential for production of erythrocytes and other body cells. Use in periconception period reduces risk of neural tube defects.</td>
</tr>
<tr>
<td><strong>E</strong></td>
<td><strong>Tocopherol</strong></td>
<td>Pregnancy 10 mg3, Lactation 12 mg3</td>
<td>Liver, yeast products, egg yolk, carrots, melon, apricots, avocado, beans, whole wheat, green leafy vegetables</td>
<td>A fat-soluble vitamin with a slight risk of overdose.</td>
</tr>
<tr>
<td>Folic Acid</td>
<td>Pre-conception 0.4 mg3, Pregnancy 0.4 mg3, Lactation 0.28 mg3</td>
<td>Liver, yeast products, egg yolk, carrots, melon, apricots, avocado, beans, whole wheat, green leafy vegetables</td>
<td>A fat-soluble vitamin that is excreted in urine, so no danger of overdose. Essential for production of erythrocytes and other body cells. Use in periconception period reduces risk of neural tube defects.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Mineral</th>
<th>RDA</th>
<th>Sources*</th>
<th>Overdose2</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>Pregnancy 1000 mg4, Lactation 1000 mg5</td>
<td>Dairy products and green leafy vegetables</td>
<td>High doses lead to hypertension, headaches, renal or gall bladder stones2.</td>
<td></td>
</tr>
<tr>
<td>Iron</td>
<td>Pregnancy 27 mg4, Lactation 9 mg6</td>
<td>Red meat, oily fish, egg yolk, green leafy vegetables, dried apricots, nuts, wholegrain foods</td>
<td>Iron accumulates in the body. High doses lead to nausea and constipation and can be fatal. Deficiency leads to anaemia. Best taken with folic acid to aid absorption.</td>
<td></td>
</tr>
<tr>
<td>Magnesium</td>
<td>Pregnancy 350 mg4, Lactation 310 mg5</td>
<td>Green leafy vegetables, wholegrain foods, nuts</td>
<td>High dose causes diarrhoea.</td>
<td></td>
</tr>
<tr>
<td>Zinc</td>
<td>Pregnancy 11 mg4, Lactation 12 mg4</td>
<td>Meat, shellfish, milk, brown rice and wholegrain foods</td>
<td>High dose results in nausea and vomiting.</td>
<td></td>
</tr>
</tbody>
</table>

* RDA figures are based on the USA National Academy of Sciences Recommendations3,4.
** This figure is lower in the UK, and the exact dosage is debated in the midwifery press.
Appendix 2 Dermatoses Specific to Pregnancy

Any blistering rash in pregnancy requires urgent referral for a medical opinion.

Intrahepatic cholestasis of pregnancy (see Chapter 10)

- Onset is usually in the third trimester
- Initially pruritus may be localised, e.g. palms and soles, but later more generalised
- There are no skin lesions just excoriations
- The condition resolves after delivery
- Obstetric cholestasis (OC) occurs occasionally in some patients postpartum if given the combined oral contraceptive pill

Treatment: emollients and topical antipruritic agents, such as 0.5% menthol in aqueous cream. Further management of OC is discussed in Chapter 10.

Polymorphic eruption of pregnancy

(Pruritic urticarial papules and plaques of pregnancy) (PUPP)

- Occurs in 1:200 pregnancies, is the commonest rash peculiar to pregnancy and is of unknown course
- It usually occurs in the third trimester in the abdominal striae and spares the umbilicus
- A variety of lesions occur:
  - urticarial papules
  - plaques
  - polycyclic lesions, sometimes with small vesicles
- The rash is itchy and usually spreads but rarely involves the palms, soles or face
- It disappears one week after delivery and there is no risk for mother or baby
- Recurrence with subsequent pregnancies is unusual

Treatment: symptomatic, with emollients, topical steroid creams and, if severe, oral prednisolone.

Pemphigoid gestationis

This is a rare autoimmune blistering disease occurring in 1:50,000 pregnancies. It starts in the second or third trimester (occasionally postpartum) with pruritic urticarial-like lesions, often around the umbilicus.

- May progress to become more generalised and bullous
- Involvement of the palms, soles of the feet and face may occur

- Occasionally improves in late pregnancy or ‘flares’ after delivery
- In some cases the rash recurs with menstruation or the combined OCP
- Occasionally there are transient bullous lesions in the baby
- Referral to the dermatology department is necessary for a skin biopsy to confirm the diagnosis and for further management

Treatment: high dose steroids or, if steroid resistant, ciclosporin and/or plasmapheresis may be necessary.

Prurigo of pregnancy

- This can occur during any trimester and its cause is unknown
- There is an increased risk if the woman has a history of atopy
- The rash consists of itchy papules and nodules on the extensor surfaces of the limbs and sometimes on the abdomen
- There is no adverse effect for the mother or baby

Treatment: symptomatic with medium potency steroid creams, oral antihistamines and protective bandages.

Pruritic folliculitis of pregnancy

This occurs from 16–40 weeks of pregnancy with follicular papules and sterile pustules which are widely distributed. The cause is unknown and it will resolve within three weeks postpartum. There is no risk to mother or baby.

Treatment: topical steroids, benzoyl peroxide, UVB phototherapy.

Impetigo herpetiformis

This is a rare skin condition and some dermatologists regard it as pustular psoriasis in pregnancy.

- There are erythematous patches with sterile pustules at the edges
- The patients are unwell, with fever, malaise and diarrhoea and vomiting
- There is significant risk to the mother of tetany, seizures and hepatic and renal impairment
- There is also a high risk of stillbirth
- These patients require urgent dermatology referral for diagnosis

Treatment: high dose steroids and early-timed delivery.
Appendix 3.1 British Hypertension Society’s Blood Pressure Measurement Recommendations

WITH MERCURY BLOOD PRESSURE MONITORS

- The patient should be seated for at least five minutes, relaxed and not moving or speaking
- The arm must be supported at the level of the heart
- Ensure no tight clothing constricts the arm
- Place the cuff on neatly, with the centre of the bladder over the brachial artery
- The bladder should encircle at least 80% of the arm (but not more than 100%)
- The column of mercury must be vertical, and at observer’s eye level
- Estimate the systolic pressure beforehand:
  - palpate the brachial artery
  - inflate cuff until pulsation disappears
  - deflate cuff
  - estimate systolic pressure
- Then inflate to 30 mmHg above the estimated systolic level needed to occlude the pulse
- Place the stethoscope diaphragm over the brachial artery and deflate at a rate of 2–3 mm/sec until you hear regular tapping sounds
- Measure systolic (first sound) and diastolic (disappearance) to the nearest 2 mmHg

WITH ELECTRONIC BLOOD PRESSURE MONITORS

- The patient should be seated for at least 5 minutes, relaxed and not moving or speaking
- The arm must be supported at the level of the heart
- Ensure no tight clothing constricts the arm
- Place the cuff on neatly, with the centre of the bladder over the brachial artery
- The bladder should encircle at least 80% of the arm (but not more than 100%)
- Most monitors allow manual blood pressure setting selection where you chose the appropriate setting; other monitors will automatically inflate and re-inflate to the next setting if required
- Repeat three times and record measurement as displayed
- Initially test blood pressure in both arms, and use arm with highest reading for subsequent measurement

### Cuff Sizes

<table>
<thead>
<tr>
<th>Cuff Sizes</th>
<th>Width (cm)</th>
<th>Length (cm)</th>
<th>Bladder width and length (cm)</th>
<th>Arm circumference (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small adult/child</td>
<td>10–12</td>
<td>18–24</td>
<td>12 × 18</td>
<td>&lt;23</td>
</tr>
<tr>
<td>Standard adult</td>
<td>12–13</td>
<td>23–35</td>
<td>12 × 26</td>
<td>&lt;33</td>
</tr>
<tr>
<td>Large adult</td>
<td>12–16</td>
<td>35–40</td>
<td>12 × 40</td>
<td>&lt;50</td>
</tr>
<tr>
<td>Adult thigh cuff</td>
<td>20</td>
<td>42</td>
<td>&lt;53</td>
<td></td>
</tr>
</tbody>
</table>

### Points to Note

- The date of next servicing should be clearly marked on the sphygmomanometer (six monthly)
- All maintenance necessitating handling of mercury should be conducted by the manufacturer or specialised service units
- Aneroid manometers tend to deteriorate and need regular checking
- In many instances aneroid monitors cannot be corrected accurately, therefore they should not be used as a substitute for mercury sphygmomanometers

Points to Note

- If checking against a mercury sphygmomanometer the blood pressure may differ slightly between devices
- It is good practice to occasionally check the monitor against a mercury sphygmomanometer or another validated device
- It is important to have a monitor calibrated according to the manufacturer's instructions

NB: A4-size colour posters of both of these columns can be downloaded from the BHS website as www.bhsoc/bp_monitors/BLOOD_PRESSURE_1784a.pdf
www.bhsoc/bp_monitors/BLOOD_PRESSURE_1784b.pdf

Reproduced with kind permission of the British Hypertension Society.
## Appendix 3.2 Blood Pressure Devices for Use in Pregnancy and Obesity

This section outlines blood pressure measuring devices that have been tested according to the revised BHS protocol (1993) and/or the International Protocol and/or the AAMI Protocol, that have met the British Hypertension Society’s criteria and that are currently available in the UK\(^1\). To meet these criteria, devices must achieve a minimum B grade for both systolic and diastolic measurements for the revised BHS protocol or pass the accepted criteria of the International Protocol or the AAMI Protocol\(^1\). The references for each of these protocols can be found on the Publications page of the British Hypertension Society’s website, www.bhsoc.org/Blood_pressure_Publications.stm.

Further details, including links to distributors, can be found on www.bhsoc.org/bp_monitors/special.stm.

### Pregnancy and Pre-eclampsia

<table>
<thead>
<tr>
<th>Device</th>
<th>Microlife 3BTO-A (2)(^2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Validated for use in pregnancy and pre-eclampsia</td>
</tr>
<tr>
<td></td>
<td>BHS A/B</td>
</tr>
</tbody>
</table>

**Cuff Sizes**
- Standard Adult – 22–32 cm
- Large adult – 32–42 cm

These cuffs are included for accurate blood pressure measurement in pregnancy as weight and arm circumference increase.

**Weight**
430 g

**Dimensions**
180 × 114 × 75 mm

**Batteries**
Uses 4 × AA batteries
Mains adaptor also available

### Obese Adults and the Elderly

<table>
<thead>
<tr>
<th>Device</th>
<th>Omron 637-IT(^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>Validated for use in obese adults and the elderly</td>
</tr>
<tr>
<td></td>
<td>International protocol</td>
</tr>
</tbody>
</table>

**Cuff Size**
Fits 13.5–21.5 cm

**Weight**
165 g

**Dimensions**
79 × 66.5 × 38 cm

**Batteries**
2 × AAA alkaline batteries

Reproduced with kind permission of the British Hypertension Society.
Appendix 4.1 Glossary of Cardiac Terms

Afterload: the amount of resistance to ejection of blood from a ventricle.
Anuria: urine output of less than 50 ml per 24 hours.
Atrial fibrillation: the normal regular rhythm of the heartbeat is lost and replaced by an irregular rhythm which may be episodic (paroxysmal atrial fibrillation) or persistent. The loss of normal atrial contraction produces a risk of clot formation in the atria. Anticoagulation and drugs to slow the heart rate are required.
Cardiac failure: heart failure; cardiac output insufficient to meet the demands of the body resulting in shortness of breath, pulmonary oedema, peripheral oedema and tiredness.
Cardiac output (CO): the amount of blood pumped out of the heart in one minute.
Cardioversion: the procedure of applying electrical shock to the chest to change an abnormal heartbeat into a normal one.
Compliance: the elasticity or amount of ‘give’ when blood enters the ventricle.
Congestive heart failure (CHF): a fluid overload condition (congestion) that may or may not be caused by HF; often an acute presentation of HF with increased amount of fluid in the blood vessels.
Contractility: the force of ventricular contraction; related to the number and state of myocardial cells.
Diastolic heart failure: the inability of the heart to pump sufficiently because of an alteration in the ability of the heart to fill; current term used to describe a type of HF.
Dyspnoea on exertion (DOE): shortness of breath that occurs with exertion.
Ejection fraction (EF): percent of blood volume in the ventricles at the end of diastole that is ejected during systole; a measurement of contractility.
Electrical cardioversion: used to shock the heart back into normal rhythm. If this procedure is necessary, it is carried out under general anaesthesia.
Heart failure (HF): the inability of the heart to pump sufficient blood to meet the needs of the tissues for oxygen and nutrients; signs and symptoms of pulmonary and systemic congestion may or may not be present.
Ischaemia: inability to supply adequate oxygen leading to tissue damage or death.
Left-sided heart failure (left ventricular failure): inability of the left ventricle to fill or pump (empty) sufficient blood to the pulmonary circulation.
Oliguria: diminished urine output; less than 400 ml per 24 hours.
Orthopnoea: shortness of breath when lying flat.
Paroxysmal nocturnal dyspnoea (PND): shortness of breath that occurs suddenly during sleep.
Pericardiocentesis: procedure that involves surgically entering the pericardial sac, usually with a needle.
Pericardiotomy: surgically-created opening of the pericardium.
Pre-load: the amount of myocardial stretch just before systole caused by the pressure created by the volume of blood within a ventricle.
Pulmonary hypertension: elevated blood pressure in the pulmonary arteries from constriction; causes problems with the blood flow in the lungs, and makes the heart work harder. If left untreated, this can lead to heart failure.
Pulmonary oedema: abnormal accumulation of fluid occurring in the interstitial spaces or in the alveoli of the lungs.
Pulseless electrical activity (PEA): condition in which electrical activity is present but there is not an adequate pulse or blood pressure because of ineffective cardiac contraction or circulating blood volume.
Pulsus paradoxus: systolic blood pressure that is more than 10 mmHg higher during exhalation than during inspiration; difference is normally less than 10 mmHg.
Right-sided heart failure (right ventricular failure): inability of the right ventricle to fill or pump (empty) sufficient blood to the pulmonary circulation.
Stroke volume (SV): amount of blood pumped out of the ventricle with each contraction.
Systolic heart failure: inability of the heart to pump sufficiently because of an alteration in the ability of the heart to contract; current term used to describe a type of heart failure (HF).
Thermo-dilution: method of determining cardiac output that involves injecting fluid into the pulmonary artery catheter. A thermistor measures the difference between the temperature of the fluid and the temperature of the blood ejected from the ventricle. Cardiac output is calculated from the change in temperature.
Thrombolytic therapy: Treatment to break up blood clots in the circulatory system.
Ventricular ejection fraction (see ejection fraction).

NB: Cardiac abbreviations are to be found within the glossary of abbreviations at the beginning of this book.
Appendix 4.2 New York Heart Association 1994
Classification of Heart Disease

Classification of Functional Capacity and Objective Assessment

In 1928 the New York Heart Association published a classification of patients with cardiac disease based on clinical severity and prognosis. This classification has been updated in seven subsequent editions of Nomenclature and Criteria for Diagnosis of Diseases of the Heart and Great Vessels (Little, Brown & Co.). The ninth edition, revised by the Criteria Committee of the American Heart Association, New York City Affiliate, was released on 4th March 1994. The new classifications are summarised below.

<table>
<thead>
<tr>
<th>Class</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Patients with cardiac disease but without resulting limitation of physical activity. Ordinary physical activity does not cause undue fatigue, palpitation, dyspnoea or anginal pain.</td>
</tr>
<tr>
<td>II</td>
<td>Patients with cardiac disease resulting in slight limitation of physical activity. They are comfortable at rest. Ordinary physical activity results in fatigue, palpitation, dyspnoea or anginal pain.</td>
</tr>
<tr>
<td>III</td>
<td>Patients with cardiac disease resulting in marked limitation of physical activity. They are comfortable at rest. Less than ordinary activity causes fatigue, palpitation, dyspnoea or anginal pain.</td>
</tr>
<tr>
<td>IV</td>
<td>Patients with cardiac disease resulting in inability to carry on any physical activity without discomfort. Symptoms of heart failure or the anginal syndrome may be present even at rest. If any physical activity is undertaken, discomfort increases.</td>
</tr>
</tbody>
</table>

Objective Assessment

A. No objective evidence of cardiovascular disease
B. Objective evidence of minimal cardiovascular disease
C. Objective evidence of moderately severe cardiovascular disease
D. Objective evidence of severe cardiovascular disease

Examples

- A patient with minimal or no symptoms but a large pressure gradient across the aortic valve or severe obstruction of the left main coronary artery is classified: Function Capacity I, Objective Assessment D
- A patient with severe anginal syndrome but angiographically normal coronary arteries is classified: Function Capacity IV, Objective Assessment A

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Appendix 4.3 Drugs for Cardiac Disease – An Overview for Midwives

This table is to give the midwife an overview of cardiac drug use and the implications for pregnancy. These drugs are prescribed, by a doctor, if the expected benefit to the mother outweighs any effect upon the fetus (see legend).

<table>
<thead>
<tr>
<th>Type of Drug</th>
<th>Name</th>
<th>Risk</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Diuretics to reduce fluid retention</strong></td>
<td>Amiloride</td>
<td>B</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Bumetanide</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Chlorothiazide</td>
<td>C</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Frusemide/Furosemide</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Spironolactone</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>ACE inhibitors to lower BP and treat heart failure</strong></td>
<td>Captopril</td>
<td>C</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Enalapril</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Lisinopril</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Losartan</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Ramipril</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Valsartan</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Beta-blockers to reduce frequency/force of the heartbeat, treat heart failure, lower BP</strong></td>
<td>Atenolol</td>
<td>D</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Carvedilol</td>
<td>C</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Metoprolol</td>
<td>C</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Nadolol</td>
<td>C</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Propranolol</td>
<td>C</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Sotalol</td>
<td>B</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Nitrates to dilate coronary arteries</strong></td>
<td>Glyceryl trinitrate/ nitroglycerin</td>
<td>B</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Isosorbide mono-/dinitrate</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Anti-arrhythmics to steady an irregular heartbeat</strong></td>
<td>Adenosine</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Amiodarone</td>
<td>D</td>
<td>Contra-indicated&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Bretylium</td>
<td>C</td>
<td>Hold breast-feeding&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Digoxin/digitalis</td>
<td>C</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Disopyramide</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Flecainide</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Verapamil</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Anticoagulants</strong></td>
<td>Aspirin – low dose</td>
<td>Safe&lt;sup&gt;2&lt;/sup&gt;</td>
<td>Safe&lt;sup&gt;2&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Aspirin – standard</td>
<td>C</td>
<td>Use with caution&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Heparin</td>
<td>C</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Dalteparin</td>
<td>B</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Enoxaparin</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Warfarin</td>
<td>D or X</td>
<td>Compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Antihypertensives to lower blood pressure</strong></td>
<td>Doxazosin</td>
<td>C</td>
<td>Potential toxicity&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Methyldopa</td>
<td>B</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Nifedipine</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Nicardipine</td>
<td>C</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Others to treat pulmonary hypertension</strong></td>
<td>Prostacycline/epoprostenol</td>
<td>B</td>
<td>Probably compatible&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Sildenafil (Viagra; Revatio)</td>
<td>No data</td>
<td>No data</td>
</tr>
<tr>
<td></td>
<td>Bosentan</td>
<td>X</td>
<td>Contra-indicated&lt;sup&gt;1&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Key: Pregnancy risk factors<sup>1</sup>: A = Little or no risk (human studies)<sup>1</sup>; B = Little risk (animal studies)<sup>2</sup>; C = Some adverse effects (animal studies); used if benefit outweighs risk<sup>3</sup>; D = Positive evidence of risk (human studies); used with serious conditions<sup>1</sup>; X = Risk outweighs possible benefits, contra-indicated in pregnancy<sup>2</sup>.

Midwives: Mothers should be advised to continue with existing medication until a doctor with experience of prescribing such medications in pregnancy has been consulted, because sudden cessation of any medication without careful thought for substitution can be associated with adverse feto-maternal outcome.

Doctors: This simple table cannot address factors for prescribing, and a more authoritative source must be used, e.g. British National Formulary, latest issue from the BMA, or on-line www.bnf.org.; Briggs, G.G., Freeman, R.K. and Yaffe, S.J. (2005) Drugs in Pregnancy and Lactation, 7<sup>th</sup> Ed. USA; Lippincott.
Appendix 5  Asthma in Pregnancy: An Information Leaflet for Pregnant Women

Congratulations on your pregnancy!
The maternal medicine clinic aims to make your pregnancy as problem-free as possible. We try to ensure that you receive the best possible care for your pregnancy and asthma in one location, and to reduce the stress of appointments in several different places. Occasionally we may need to refer you to see a chest consultant.

Naturally you may be a little worried about how your asthma may affect your unborn baby. We hope to dispel some of your common concerns with this leaflet. If this leaflet does not answer all your questions, please ask us and we will try to find out for you.

Asthma is a common condition. Approximately 5% of pregnant women suffer from asthma. We know that approximately one third will see no change in their condition during pregnancy, one third will improve and one third may get worse. It is difficult to predict which category you will fall into.

Will my asthma affect my unborn baby?
It is important that your asthma is well controlled. As you will know, your baby relies on you for his/her supply of oxygen. You are ‘breathing for two’. If you are unwell with asthma, your baby may not receive sufficient oxygen and your baby’s growth may be affected.

Is it safe to take my asthma medications during pregnancy?
Yes. One of the common concerns of pregnant women with asthma is whether the medication they take for their asthma will affect their baby. There are no known harmful effects from inhaled relievers (e.g. Ventolin, Serevent and Bricanyl) or inhaled steroids (Becotide, Pulmicort or Flixotide). It is therefore safe to take them.

If you need oral steroids (prednisolone) regularly to control your asthma, then you should take them. The benefits of well-controlled asthma outweigh any risk. There is known to be minimal effect with using them. Some of the newer drugs, such as Singular, are untested in pregnancy. However, it is far more harmful to have poorly controlled asthma. Your medications are designed to help you. By keeping you well, they help your baby to develop normally.

What can I safely use for pain relief in labour?
Most drugs are safe to use in labour for most women, but discuss what is on offer and make an informed decision.

You may like to talk to one of our consultant anaesthetists, particularly if your asthma is difficult to control. They will discuss the options with you. They will also discuss your options should the need for a caesarean section arise. An epidural or spinal anaesthetic is generally the safest option for all women, but especially for women with breathing problems.

Will my asthma become worse in labour?
This is rare, but please do not forget to bring all your normal medication in with you when you come to hospital. It may help to keep a reliever (blue inhaler) packed in your suitcase ready for coming in.

Can I labour in a Home from Home room?
This will depend upon how bad your asthma is. It also depends on how well controlled it is during your pregnancy and at time of labour. Discuss this with your midwife, but remember, nothing is written in stone and circumstances or decisions can change. Obviously if you are unwell at the time of labour we will need to monitor the condition of you and your baby closely – and then Home from Home would not be an option.

Will it be safe to breast-feed my baby?
Breast-feeding is the recommended method of feeding for all women, particularly if you suffer from allergies. Recent research shows that children who are breast-fed for the first four months of life are less likely to wheeze at six years of age. The amounts of inhaled drugs and even oral steroids that enter breast milk are extremely small. If you are taking theophylline it may be better if you take it after feeding your baby, to minimise side effects.

What advice should I seek from a professional?
We aim to see all women with moderate or severe asthma in the maternal medicine clinic at booking, then at 28 and 36 weeks of pregnancy. We would also see any asthmatic woman whose condition worsened during pregnancy. Examples of circumstances when you should seek advice include any one of the following:

- Worsening symptoms where you use your reliever more than four times a day
- Your reliever is not working, or it works for less than four hours
- Being awakened at night by asthma symptoms
- Shortness of breath on exertion
- Persistent cough
- Peak flow below 60% of your normal best

Who should I contact?
Speak to your community midwife, practice nurse or GP. Ask them to refer you to the maternal medicine clinic, or telephone the clinic directly and ask to speak to a midwife.

Important telephone numbers are ……………

Finally
Don’t forget that smoking is harmful to you and your inborn baby, so we advise you to stop. For advice please telephone ……………………

On the whole your pregnancy should be problem-free. We will work together to make sure it stays that way, but please contact us if you have any concerns.

The Maternal Medicine Team

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Appendix 6 Replacement of Renal Function by Dialysis

In medicine, dialysis is a method of replacing renal function that has been lost due to either acute or chronic renal failure. Dialysis works on the principle of diffusion of low molecular weight solutes down a concentration gradient across a semi-permeable membrane. Fluid can be removed by exerting a hydrostatic or osmotic gradient across the membrane. Blood is present on one side of the semi-permeable membrane and dialysis fluid on the other.

The concentration of undesired solutes, such as potassium, in the dialysis fluid is low and a buffer is also present to facilitate the removal of metabolic acid. There are two types of dialysis.

HAEMODIALYSIS (HD)

During haemodialysis the patient’s blood is pumped by machine through a filter (dialyser) containing a semi-permeable membrane with a large surface area. A physiological dialysis fluid (dialysate), is pumped on the other side of the semi-permeable membrane in the opposite direction. Excess water and metabolic waste products are cleared from the blood by the processes of diffusion, convection and ultrafiltration.

To prevent the blood from clotting whilst circulating through the machine, a low dose of heparin is infused into the blood tubing.

Normally a patient will receive haemodialysis three times per week, for approximately four hours at a time. Some dialysis patients pass no urine at all, and fluid intake is usually restricted to only 500 ml per day (equivalent to daily insensible losses through breathing, sweating, etc.), plus the amount of the previous days urinary output. Otherwise, in between dialyses this fluid will accumulate in the body causing ‘overload’, hypertension and pulmonary oedema.

There are other dietary restrictions such as potassium, which if elevated will cause cardiac arrhythmias, and phosphate which can accumulate and lead to renal bone disease and extravascular calcification.

Access to the vascular system is required for haemodialysis by:

- Insertion of a dual lumen catheter (VasCath) into a major vein
- Arterio-venous fistula: surgical procedure to join together an artery and a vein, usually at the wrist; blood from the artery then flows directly into the vein, the increased pressure causes the vein to thicken and dilate
  - Arterio-venous graft (synthetic such as Gore-Tex®), again between the artery and a vein, just beneath the skin

It is very important not to cannulate, or take blood, or blood pressure on the arm with the graft or the fistula, as this may cause unnecessary damage to it.

PERITONEAL DIALYSIS (PD)

With PD, the peritoneal membrane serves as a semi-permeable membrane and its blood supply provides blood flow. After the insertion of a soft plastic tube into the peritoneal cavity, dialysis fluid (usually ~2 l), is infused. The fluid is left to dwell in the peritoneal cavity, dialysis occurs and the fluid is then drained out and discarded. Fresh fluid is instilled back into the peritoneal cavity and the cycle is repeated.

Most commonly patients perform four exchanges per day, at breakfast, lunch, teatime, and bedtime, and the fluid remains in the abdomen for approximately four hours between exchanges. This is called continuous ambulatory peritoneal dialysis (CAPD). Another alternative is to use a machine that automatically cycles the fluid exchanges in and out of the peritoneal cavity continuously overnight whilst the patient sleeps. This is called automated peritoneal dialysis (APD).

The composition of the dialysis fluid is similar to that used for haemodialysis. The major difference is that PD fluid contains high concentrations of glucose to enable the removal of fluid from the patient by osmosis. Therefore, for example, a patient may instil in 2 l of fluid and then later drain out 2.5 l of fluid.

The PD fluid is prepared with different glucose concentrations so that the amount of fluid removal can, to some degree, be tailored to individual patient requirements. Because this fluid is warm and sugary, there is a high chance of infection. This may result in PD peritonitis, a painful and potentially serious complication of treatment. Scrupulous hygiene is therefore required when changing the bags.

Dietary restrictions are less rigorous for PD patients because dialysis is occurring constantly. Patients must avoid constipation, as this will restrict the draining out of the dialysis fluid.
Appendix 7 Diabetes Mellitus

CRITERIA FOR THE DIAGNOSIS OF DIABETES MELLITUS

The 1999 WHO Revised Criteria for Glucose Intolerance:

- Diabetes mellitus requires symptoms of hyperglycaemia and a fasting venous plasma glucose concentration ≥7.0 mmol/l and/or random venous plasma glucose ≥11.1 mmol/l
- Otherwise an oral glucose tolerance test is required:

<table>
<thead>
<tr>
<th>Test</th>
<th>Venous Plasma Glucose Concentration (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes mellitus</td>
<td>Fasting ≥7.0, 2 hr ≥11.1</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td>Fasting &lt;7.0, 2 hr ≥7.8 and &lt;11.1</td>
</tr>
<tr>
<td>Increased fasting glucose</td>
<td>Fasting ≥6.1 and &lt;7.0, 2 hr &lt;7.8</td>
</tr>
</tbody>
</table>

SUGGESTED REGIMEN FOR MANAGEMENT OF DIABETES DURING LABOUR

The target capillary blood glucose should be within the range of 4–8mol/l.

*Once the woman is in established labour insert an iv cannula and infuse:*

- Line 1: 5% D-glucose + 10 mmol potassium chloride 500 ml at 100 ml/hour
- Line 2: 0.9% sodium chloride 49.5 ml + human soluble insulin (50 IU) via a syringe driver
- Titrate the rate of infusion against capillary blood glucose level according to the scale below
- Give parallel infusions through a Y-connector; avoid 3-way taps
- Monitor glucose hourly during labour
- All results to be charted by the midwife

<table>
<thead>
<tr>
<th>Capillary Blood Glucose Concentration (mmol/L)</th>
<th>Insulin Infusion Rate (IU/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;3.5</td>
<td>Stop infusion and recheck blood glucose in 20 minutes <em>Inform doctor</em></td>
</tr>
<tr>
<td>3.5–4</td>
<td>0.5</td>
</tr>
<tr>
<td>4.1–7</td>
<td>1.0</td>
</tr>
<tr>
<td>7.1–11</td>
<td>2.0</td>
</tr>
<tr>
<td>11.1–14</td>
<td>3.0</td>
</tr>
<tr>
<td>14.1–17</td>
<td>4.0</td>
</tr>
<tr>
<td>&gt;17</td>
<td>8.0</td>
</tr>
</tbody>
</table>

- After delivery continue infusion until woman is able to eat and drink
- Subcutaneous insulin must be given 30 minutes before the infusion is stopped

FEATURES OF THE METABOLIC SYNDROME

Abnormal glucose tolerance (type 2 diabetes or IGT) plus two or more of the following:

- Insulin resistance
- Central obesity
  - body mass index >30 kg/m²
  - waist:hip ratio >0.85 (females)
- Hypertension: BP >160/90 mmHg
- Dyslipidaemia
  - fasting triglycerides >1.7 mmol/l
  - HDL-cholesterol <1.0 mmol/l (females)
- Microalbuminuria
- Albumin:creatinine ratio >3.5 (females)
### Appendix 8.1 Drugs Used for Neurological Conditions

<table>
<thead>
<tr>
<th>Drug Name</th>
<th>Possible Side Effects</th>
<th>Potential Effects on Fetus</th>
<th>Rate of Major Congenital Malformation (MCM) (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbamazepine</td>
<td>Acne, hirsutism, dizziness, double vision, headaches, decreased appetite, aplastic anaemia, thrombocytopenia, erythrocytopenia, leucocytopenia, hypotension, vitamin K deficiency and folate deficiency</td>
<td>• Neural tube defects&lt;br&gt;• Craniofacial defects&lt;br&gt;• Digital defects&lt;br&gt;• Cardiac malformations&lt;br&gt;• Developmental delay</td>
<td>2.2¹</td>
</tr>
<tr>
<td>Phenytoin</td>
<td>Slurred speech, ataxia, insomnia, twitching, nausea, vomiting, constipation, rash with fever, gingival hyperplasia, megaloblastic anaemia, vitamin K deficiency, hypocalcaemia, folate deficiency and systemic lupus erythematosus</td>
<td>• Craniofacial, limb and digital abnormalities&lt;br&gt;• Hernias&lt;br&gt;• IUGR&lt;br&gt;• Development delay&lt;br&gt;• Congenital heart defects&lt;br&gt;• Orofacial clefts</td>
<td>3.7¹</td>
</tr>
<tr>
<td>Sodium valproate</td>
<td>Ataxia, tremors, sedation, increased weight gain, gastric irritation, liver dysfunction, pancreatitis, rash, hair loss, thrombocytopenia, folate deficiency, and vitamin K deficiency</td>
<td>• Fetal valproate syndrome, facial dysmorphia, impaired psychomotor development&lt;br&gt;• Neural tube defects&lt;br&gt;• Digital defects&lt;br&gt;• Urogenital defects</td>
<td>6.2¹</td>
</tr>
<tr>
<td>Lamotrigine</td>
<td>Rashes, fever, malaise, drowsiness, hepatic dysfunction, dizziness</td>
<td></td>
<td>3.2¹</td>
</tr>
<tr>
<td>Benzodiazepine</td>
<td>–</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>Topiramate</td>
<td>–</td>
<td></td>
<td>–</td>
</tr>
<tr>
<td>Gabapentin</td>
<td>–</td>
<td></td>
<td>3.2¹</td>
</tr>
<tr>
<td>Levetiracetam</td>
<td>Drowsiness, asthenia, dizziness</td>
<td></td>
<td>Insufficient data</td>
</tr>
<tr>
<td>Primidone</td>
<td>Extreme sedation, vitamins D and K deficiencies</td>
<td>• Dysmorphic face&lt;br&gt;• Digital abnormalities&lt;br&gt;• Hypoplastic fingernails</td>
<td>Insufficient data</td>
</tr>
</tbody>
</table>

**Midwives:** Mothers should be advised to continue with existing medication until a doctor with experience of prescribing such medications in pregnancy has been consulted, because sudden cessation of any medication without careful thought for substitution can be associated with a poor pregnancy outcome.

**Doctors:** This simple table cannot address factors for prescribing, and a more authoritative source must be used. e.g.: Briggs, G.G., Freeman, R.K. and Yaffe, S.J. (2005) Drugs in Pregnancy and Lactation, 7th Ed. USA; Lippincott.

Appendix 8.2 Advice for Epileptic Women with Babies

Advice for epileptic women with babies, if the seizures are not well controlled:

- Avoid excessive tiredness; share care of baby at night to avoid becoming fatigued
- When feeding the baby, ensure you are sitting safely with a back rest
- Consider feeding on the floor
- Use high chair in lowest setting in safe surroundings, making sure it cannot be knocked over
- Dress and change baby on floor to prevent falling
- Use a buggy/pram with brakes preferably that initiate when you release the handle
- Bath the baby when support is available
- Bath baby in shallow water
- Use safety gates
## Appendix 9.1 Pain Therapy Ladder for Pregnancy

### Step 3

- **Methadone**
  - Use: Long-term pain management
  - Risk Factor: B (or D with prolonged use, or high doses at term)

- **Morphine**
  - Use: Intravenous patient controlled analgesia or a combination of slow- and rapid-release oral preparations for acute short-term interventions
  - Risk Factor: C

### Step 2

- **Orphenadrine**
  - Dose: 50 mg, three times daily
  - Use: Skeletal muscle spasm
  - Risk Factor: C

- **Mexiletene**
  - Dose: 50–100 mg initially, increasing to 360 mg controlled release once daily, then twice daily
  - Use: Neuropathic pain
  - Risk Factor: C
  - Caution: Nausea (take with food), test blood levels

- **Amitriptyline**
  - Dose: 10–50 mg *nocte*
  - Use: Neuropathic pain, visceral spasm, headache prophylaxis/treatment
  - Risk Factor: C

- **Diclofenac**
  - Dose: 75 mg once daily (second trimester only)
  - Use: Musculoskeletal pain and headache
  - Risk Factor: B (D in third trimester)
  - Caution: Oligohydramnios

### Step 1

- **Paracetamol**
  - Dose: 1 g 4 hourly
  - Use: Mild to moderate pain

**Local Pharmacotherapy**
- Local anaesthetics

**Non Pharmacological Therapies**
- e.g., heat, physiotherapy, TENS, acupuncture, hypnotherapy

---

**Risk to Fetus Key**:
- **A** = little or no risk (human studies); **B** = little risk (animal studies); **C** = some adverse effects (animal studies); used if benefit outweighs risk; **D** = positive evidence of risk (human studies); used with serious conditions; **X** = risk outweighs possible benefits, contraindicated in pregnancy.
Appendix 9.2 Biochemical Changes in Hypovitaminosis D

The diagnosis of vitamin D deficiency is relatively easily made by biochemical tests that should be available from most laboratories. The diagnosis of osteomalacia is traditionally made on bone biopsy but this is very rarely necessary now as calcidiol and related biochemical measures (see below) are widely available.

The biochemical measures used and changes seen in low vitamin D are:

- **Serum calcidiol (25-(OH) Vit D):** vitamin D deficient <25 nmol/l, insufficient <50 nmol/l
- **Serum total adjusted calcium (corrected for variation in serum albumin level):** normal range 2.10–2.60 mmol/l; newborn up to 2.90 mmol/l; serum calcium may often be normal but if low, parenthesise may occur and in neonates significant risk of fits remain
- **Serum phosphate (PO₄):** adult normal range 0.80–1.40; up to 4 weeks 3.1 mmol/l; neonates and infants 0.80–2.40 mmol/l; characteristically low but may be normal
- **Total serum alkaline phosphatase:** will be raised and indicates deficiency of some severity. The normal range of alkaline phosphates varies in different health localities and this needs to be checked from each laboratory and should be provided on the result form. The placenta also produces alkaline phosphatase, which would be detectable in the mother’s blood in the third trimester of pregnancy and for a few days after delivery
  - for assessment of vitamin D deficiency and osteomalacia a bone-specific alkaline phosphatase measurement may be needed
  - in moderate and severe vitamin D deficiency the bone alkaline phosphatase would typically be raised and indicates vitamin D deficiency of some severity and duration
  - non-pregnant adult range 40–130 IU/l; up to 4 weeks 400 IU/l; up to 12 years 350 IU/l
- **Serum parathyroid hormone level (PTH):** see your institution’s own laboratory reference range. Our range is 1.6–7.5 pmol/l; raised parathyroid hormone level in the presence of vitamin D deficiency is very supportive of a diagnosis

- The earliest changes would be low 25-(OH) Vit D level followed by a raised PTH and in advanced cases other biochemical changes follow

These normal ranges quoted are from our local laboratory. Each locality should check its own normal ranges.
Appendix 10.1 Reflux Treatment Guidelines for Over-the-Counter Medications

Non-alarm Symptoms
- Asthma
- Chronic cough
- Chronic hoarseness
- Nausea and vomiting
- Unexplained chest pain

Alarm Symptoms
- Dysphagia
- Frequent vomiting
- GI bleeding
- Weight loss

Refer for urgent diagnostic evaluation

Typical Symptoms
- Heartburn
- Regurgitation

Lifestyle and dietary modifications

Non-alarm Symptoms

Refer for diagnostic evaluation

Recurrent/intermittent symptoms
- Over-the-counter antacids as required, BUT in pregnancy prefer calcium- or magnesium-containing antacids

Relief

Recurrent symptoms
- Over-the-counter magnesium- or calcium-containing antacids/H2RA

Relief

Recurrent symptoms

Seek medical advice

Source:
Appendix 10.2 Reflux Treatment Guidelines for Prescribed Medications in Non-pregnancy

If a woman becomes pregnant whilst on this regimen the midwife should refer her to a doctor so that a risk–benefit analysis can be made for continuation or alteration of treatment.

Source:
Appendix 10.3 Rome II Diagnostic Criteria for Irritable Bowel Syndrome

The Rome II diagnostic criteria for irritable bowel syndrome were developed by the Committee on Functional Bowel Disorders and Functional Abdominal Pain, Multinational Working Teams to Develop Diagnostic Criteria for Functional Gastrointestinal Disorders (Rome II). The four-year collaboration arrived at an international consensus for symptom-based diagnostic standards.

### Diagnostic Criteria for Irritable Bowel Syndrome

<table>
<thead>
<tr>
<th>Twelve weeks or more, not necessarily consecutive, in the past twelve months of abdominal discomfort or pain that has two out of three features:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Relieved with defecation</td>
</tr>
<tr>
<td>2. Onset associated with a change in frequency of stool</td>
</tr>
<tr>
<td>3. Onset associated with a change in form (appearance) of stool</td>
</tr>
</tbody>
</table>

NB: There is an absence of structural or metabolic abnormalities to explain the symptoms.

### Symptoms that Cumulatively Support the Diagnosis of Irritable Bowel Syndrome

- Abnormal stool frequency (>3 bowel movements per day or <3 bowel movements per week)
- Abnormal stool form (lumpy/hard or loose/watery stool) more than one quarter of defecations
- Abnormal stool passage (straining, urgency or feeling of incomplete evacuation) more than one quarter of defecations
- Passage of mucus more than one quarter of defecations
- Bloating or feeling of abdominal distension more than one quarter of days

Source:
Appendix 11 Drugs for Autoimmune Disease – An Overview for Midwives

This table is to give the midwife an overview of autoimmune drug use at different pregnancy stages. These drugs are prescribed, by a doctor, in pregnancy, if the expected benefit to the mother outweighs any effect upon the fetus.

<table>
<thead>
<tr>
<th>Type of Drug</th>
<th>Name</th>
<th>RISK</th>
<th>Breast-feeding</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-steroidal Anti-inflammatory Drugs to control symptoms</td>
<td>Aspirin – low dose</td>
<td>Safe</td>
<td>Safe</td>
<td>Aspirin does not cross the placenta, and single use is considered safe in breast-feeding.(^1,2,3,4,5) Regular use with children is associated with Reye’s syndrome.(^6) Regular NSAID use in third trimester is associated with fetal: – ductus arteriosus constriction(^7) – impaired renal function(^7) Breast-feeding prior to a maternal dose minimises infant exposure(^7)</td>
</tr>
<tr>
<td></td>
<td>Aspirin – standard</td>
<td>C</td>
<td>Potential toxicity Use with caution</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ibuprofen (Brufen, Nurofen)</td>
<td>B</td>
<td>Compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Naproxen (Naprosyn)</td>
<td>B</td>
<td>Probably compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indomethacin (Indinomod)</td>
<td>B</td>
<td>Probably compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Phenylacetic acid (Diclofenac)</td>
<td>B</td>
<td>Probably compatible</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ketocid (Ketoprofen)</td>
<td>B</td>
<td>Probably compatible</td>
<td></td>
</tr>
<tr>
<td>Disease-modifying Anti-rheumatic Drugs to modify disease</td>
<td>Azathioprine (Imuran)</td>
<td>D</td>
<td>Potential toxicity Human/animal data suggest risk</td>
<td>Transplant patients continue use(^3) Pregnancy dosage (\leq 2) mg/kg/day(^2) Evidence is emerging for breast-feeding use based on a risk–benefit analysis(^6,7)</td>
</tr>
<tr>
<td></td>
<td>Ciclosporin (Neoral)</td>
<td>C</td>
<td>Potential toxicity Use in pregnancy to be supervised by specialist clinic Present in breast milk(^1,2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gold (Myocrisin, Ridaura)</td>
<td>C</td>
<td>Probably compatible</td>
<td>Prolonged elimination time in breast milk(^2)</td>
</tr>
<tr>
<td></td>
<td>Hydroxychloroquine (Plaquenil)</td>
<td>C</td>
<td>Compatible</td>
<td>Use in pregnancy to be supervised by specialist clinic(^2)</td>
</tr>
<tr>
<td></td>
<td>Leflunomide (Arava)</td>
<td>X</td>
<td>Potential toxicity Contraindicated</td>
<td>Pregnancy should not be attempted until plasma level (\leq 0.02) mg/l(^4,5)</td>
</tr>
<tr>
<td></td>
<td>Methotrexate (Maxtrex)</td>
<td>X</td>
<td>Toxicity reported Contraindicated</td>
<td>Avoid pregnancy for (\geq 3) months after ceasing treatment(^3) Folate supplements required throughout pregnancy(^4)</td>
</tr>
<tr>
<td></td>
<td>Penicillamine (Distamine)</td>
<td>D</td>
<td>Potential toxicity Limited risk data Fetal anomalies found in rodents(^4) Continue use in second and third trimesters with Wilson’s disease(^2,4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sulfasalazine (Salazopyrin)</td>
<td>B</td>
<td>Limited data Use with caution</td>
<td>Theoretical risk of neonatal haemolysis, so folate supplements are required(^1,3,4,5)</td>
</tr>
<tr>
<td>Tumour Necrosis Factor to inhibit immune response</td>
<td>Etanercept (Enbrel)</td>
<td>B</td>
<td>Limited data Probably compatible</td>
<td>Limited data so most advise avoidance or caution with use in pregnancy</td>
</tr>
<tr>
<td></td>
<td>Infliximab (Remicade)</td>
<td>C</td>
<td>Limited data Contraindicated</td>
<td>Avoid pregnancy for (\geq 6) months after ceasing treatment(^1,3,4,5) Manufacturer advises against use in breast-feeding(^2)</td>
</tr>
<tr>
<td>Steroids to reduce inflammation</td>
<td>Prednisolone (Deltacortril)</td>
<td>C</td>
<td>Compatible</td>
<td>Neonate unaffected if maternal dose (&lt;40) mg daily Benefit usually outweighs risk(^1)</td>
</tr>
<tr>
<td>Vasodilators</td>
<td>Nifedipine (Adalat)</td>
<td>C</td>
<td>Limited data Probably compatible</td>
<td>Modified release version is preferred in pregnancy(^9) Antenatal exposure is not grounds for invasive prenatal screening(^9)</td>
</tr>
</tbody>
</table>

Key: A = little or no risk (human studies); B = little risk (animal studies); C = some adverse effects (animal studies); used if benefit outweighs risk\(^2\); D = positive evidence of risk (human studies); used with serious conditions; X = risk outweighs possible benefits, contraindicated in pregnancy.

Midwives: Mothers should be advised to continue with existing medication until a doctor with experience of prescribing such medications in pregnancy has been consulted, because sudden cessation of any medication without careful thought for substitution can be associated with a poor pregnancy outcome. This especially applies to mothers with renal transplants, and also sudden cessation of DMARDs resulting in lupus ‘flare’ and pregnancy loss.

### Appendix 12.1 The ABC of Hepatitis

<table>
<thead>
<tr>
<th>Hepatitis A (HAV)</th>
<th>Hepatitis B (HBV)</th>
<th>Hepatitis C (HCV)</th>
<th>Hepatitis D (HDV)</th>
<th>Hepatitis E (HEV)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What is it?</strong></td>
<td>HAV is a virus that causes inflammation of the liver. It does not lead to chronic disease.</td>
<td>HBV is a virus that causes inflammation of the liver. It can cause liver cell damage, leading to cirrhosis and cancer.</td>
<td>HCV is a virus that causes inflammation of the liver. It can cause liver cell damage, leading to cirrhosis and cancer.</td>
<td>HDV is a virus that causes inflammation of the liver. It only infects those persons with HBV.</td>
</tr>
<tr>
<td><strong>Incubation Period</strong></td>
<td>2–7 weeks Average 4 weeks</td>
<td>6–23 weeks Average 17 weeks</td>
<td>2–25 weeks Average 7–9 wks</td>
<td>2–8 weeks Average 7–9 wks</td>
</tr>
<tr>
<td><strong>How is it Spread?</strong></td>
<td>Transmitted by faecal/oral (anal/oral sex) route, contact or ingestion of contaminated food and water.</td>
<td>Contact with infected blood, seminal fluid, vaginal secretions, contaminated needles, including tattoo and body-piercing tools. Infected mother to newborn.</td>
<td>Contact with infected blood, contaminated needles, including tattoo and body-piercing tools. Sexually transmitted.</td>
<td>Contact with infected blood, contaminated needles, including tattoo and body-piercing tools.</td>
</tr>
<tr>
<td><strong>Symptoms</strong></td>
<td>Children may have none. Adults usually have light stools, dark urine, fatigue, fever, nausea, vomiting, abdominal pain and jaundice.</td>
<td>May have none. Some persons have mild flu-like symptoms, dark urine, light stools, jaundice, fatigue and fever.</td>
<td>Same as HBV</td>
<td>Same as HBV</td>
</tr>
<tr>
<td><strong>Treatment of Chronic Disease</strong></td>
<td>Not applicable</td>
<td>Interferon, entecavir, lamivudine, telbivudine, and adefovir dipivoxil control replication of the virus with varying success.</td>
<td>Pegylated interferon with ribavirin with varying success.</td>
<td>Interferon with varying success.</td>
</tr>
<tr>
<td><strong>Vaccine</strong></td>
<td>Two doses of vaccine to anyone over one year of age.</td>
<td>Three doses may be given to persons of any age.</td>
<td>None</td>
<td>HBV vaccine prevents HDV infection.</td>
</tr>
<tr>
<td><strong>Who is at Risk?</strong></td>
<td>Household or sexual contact with an infected person or living in an area with HAV outbreak. Travellers to developing countries, persons engaging in anal/oral sex and injection drug users.</td>
<td>Infants born to infected mother, having sex with an infected person or multiple partners, injection drug users, emergency responders, healthcare workers, persons engaging in anal/oral sex, and haemodialysis patients.</td>
<td>Blood transfusion recipients before 1992, healthcare workers, injection drug users, haemodialysis patients, infants born to infected mother, multiple sex partners.</td>
<td>Injection drug users, persons engaging in anal/oral sex and those having sex with an HDV infected patient.</td>
</tr>
<tr>
<td><strong>Prevention</strong></td>
<td>Vaccination. Immune globulin within two weeks of exposure. Use soaps and water after going to the toilet. Use household bleach (10 parts water to 1 part bleach) on surfaces contaminated with faeces, such as changing tables. Safer sex.</td>
<td>Vaccination provides protection for 20 plus years. Hepatitis B immune globulin within one week of exposure. Clean up infected blood with household bleach and wear protective gloves. Do not share razors, toothbrushes, or needles. Safer sex.</td>
<td>Clean up spilled blood with household bleach. Wear gloves when touching blood. Do not share razors, toothbrushes, or needles with anyone. Safer sex.</td>
<td>Hepatitis B vaccine to prevent HBV /HDV infection. Safer sex.</td>
</tr>
</tbody>
</table>
## Appendix 12.2 Other Infectious Viral Diseases

<table>
<thead>
<tr>
<th>General Details</th>
<th>Symptoms and Signs</th>
<th>Fetal Risks</th>
<th>Trimester of Risk</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Rubella</strong></td>
<td>RNA togavirus known as German measles</td>
<td>May be symptomless</td>
<td>Congenital defects:</td>
<td>First trimester mainly:</td>
</tr>
<tr>
<td></td>
<td>Most UK women are vaccinated, hence protected from infection</td>
<td>May present with:</td>
<td>• Ocular defects (e.g. cataracts)</td>
<td>nearly all pregnancies are affected if acquired in the first 10 weeks</td>
</tr>
<tr>
<td></td>
<td>IP – up to 21 days (typically 7–10 days)</td>
<td>• Macular rash (spreads from ears and face)</td>
<td>• Sensorineural hearing impairment</td>
<td>13–16 weeks:</td>
</tr>
<tr>
<td></td>
<td>Infective from seven days before rash to seven days after rash</td>
<td>• Mild febrile illness</td>
<td>• Cardiac abnormalities (e.g. patent ductus arteriosus)</td>
<td>Less risk, mainly sensorineural deafness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pharyngitis</td>
<td>• Hepatosplenomegaly</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Lymphadenopathy</td>
<td>• Jaundice</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Arthritis</td>
<td>• Thrombocytopenic purpura</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Low birth weight</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Mental retardation</td>
<td></td>
</tr>
<tr>
<td><strong>Human parvovirus</strong></td>
<td>B19</td>
<td>Often symptomless</td>
<td>Fetal infection is usually benign and self-limiting</td>
<td>Risk to fetus is in the first 20 weeks only</td>
</tr>
<tr>
<td></td>
<td>DNA virus</td>
<td>In children:</td>
<td></td>
<td>The interval between infection and development of hydrops fetalis is 2–7 weeks, with an average of 5 weeks</td>
</tr>
<tr>
<td></td>
<td>Causes erythema infectiosum, also known as fifth disease or slapped cheek syndrome</td>
<td>• Febrile illness</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP – 4–20 days</td>
<td>• Maculopapular rash (causing flushing of cheeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infective mainly before symptoms arise</td>
<td>Adult women are particularly likely to complain of arthralgia or arthritis which may last a couple of weeks and predominantly affects the peripheral joints</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Infection gives life-long immunity; 50–60% adults immune</td>
<td>Outbreaks occur and can last for several months</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cytomegalovirus (CMV)</strong></td>
<td>DNA virus; member of the herpes family</td>
<td>Often symptomless</td>
<td>Most commonly asymptomatic infection with no long-term sequelae</td>
<td>All trimesters</td>
</tr>
<tr>
<td></td>
<td>Reactivation and reinfection are common</td>
<td>In children:</td>
<td>Associations include:</td>
<td>Most infected fetuses not affected</td>
</tr>
<tr>
<td></td>
<td>The virus can be transmitted:</td>
<td>• Febrile illness</td>
<td>• Mental retardation</td>
<td>About 5–10% of infected newborns are symptomatic at birth</td>
</tr>
<tr>
<td></td>
<td>• transplacentally intrapartum (by exposure to virus in cervix)</td>
<td>• Maculopapular rash (causing flushing of cheeks)</td>
<td>• Microcephaly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• postnatally (in breast milk)</td>
<td>It may cause hepatitis or other abnormal liver function</td>
<td>• Hepatosplenomegaly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Cross infection (especially from other babies in nurseries)</td>
<td>It causes a more severe and widespread disease in immunosuppressed patients</td>
<td>• Jaundice</td>
<td></td>
</tr>
<tr>
<td><strong>Measles</strong></td>
<td>RNA virus; paramyxovirus</td>
<td>Usually a self-limiting illness in children with:</td>
<td>Most commonly associated with congenital abnormalities</td>
<td>Throughout pregnancy</td>
</tr>
<tr>
<td></td>
<td>IP – 10–14 days</td>
<td>• Fever</td>
<td>Newborn delivered to a woman with active disease may develop severe neonatal measles</td>
<td>Treat pyrexia aggressively, e.g. with paracetamol and cold sponging, and be alert for signs of pre-term labour</td>
</tr>
<tr>
<td></td>
<td>Immunity life long</td>
<td>• Hepatitis</td>
<td>Maternal pyrexia may precipitate premature delivery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well-established vaccination programme</td>
<td>• Cough</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NB: Vaccine contraindicated in pregnancy</td>
<td>More severe illness in adults with possible complications of:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Pneumonia</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Hepatitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Encephalitis</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

IP = incubation period
## Appendix 12.3 Other Infectious Bacterial Diseases

<table>
<thead>
<tr>
<th>General Details</th>
<th>Symptoms and Signs</th>
<th>Fetal Risks</th>
<th>Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syphilis</td>
<td>Characterised by stage:</td>
<td>70–100% of fetuses will be infected if the woman has untreated primary syphilis in pregnancy; one third of these fetuses will die intra-utero</td>
<td>All pregnant women should be screened for syphilis at the initial antenatal visit.</td>
</tr>
<tr>
<td>Caused by the spirochaete Treponema pallidum</td>
<td>Primary syphilis</td>
<td>Congenital syphilis Early features include skin lesions, e.g. rash, raised moist mucocutaneous lesions, ‘snuffles’, periostitis, hepatosplenomegaly, lymphadenopathy, osteochondritis.</td>
<td>Those that screen positive should be managed by genitourinary physicians, obstetricians and midwives and treatment needs to be commenced promptly.</td>
</tr>
<tr>
<td>Incubation period 10–90 days</td>
<td>Secondary syphilis</td>
<td>Late features include interstitial keratitis, deafness and characteristic facial features, e.g. Hutchinson’s incisor, mulberry molar, frontal bossing, short maxilla, saddlenose deformity and protuberance of the mandible.</td>
<td>First line treatment: im procaine penicillin G for 10 days (erythromycin or azithromycin if penicillin allergy – treatment of baby needed if either of these are used).</td>
</tr>
<tr>
<td>Classified as congenital or acquired</td>
<td>Widely spread maculopapular rash</td>
<td>Congenital TB is rare however it is more common if the woman has had miliary TB and is associated with increased neonatal mortality.</td>
<td>All babies of women treated for syphilis, either in pregnancy or in the past, should have paediatric follow-up for evidence of congenital syphilis, and serology performed.</td>
</tr>
<tr>
<td></td>
<td>Condylomata lata (wart-like genital lesions)</td>
<td>Delays in diagnosis can result in an increase in prematurity, low birth weight and perinatal mortality.</td>
<td>Clinical infection is diagnosed by detecting acid-fast bacilli in sputum or evidence on chest X-ray.</td>
</tr>
<tr>
<td></td>
<td>Late syphilis</td>
<td>If the woman is diagnosed and treated early the outcome is good.</td>
<td>Any woman with symptoms suggestive of TB should be screened or if there has been prolonged close contact with newly-diagnosed infectious TB.</td>
</tr>
<tr>
<td></td>
<td>Gummatous lesions which may affect respiratory tract, skin, bones, joints</td>
<td>Aim to diagnose and treat women prior to pregnancy. If detected in pregnancy treatment should be started without delay and coordinated by the local TB specialist and is likely to require six months of treatment.</td>
<td>Clinical infection is diagnosed by detecting acid-fast bacilli in sputum or evidence on chest X-ray.</td>
</tr>
<tr>
<td></td>
<td>Possible cardiac and CNS (neurosyphilis) complications</td>
<td>It is rarely necessary to separate the neonate at delivery, if the infant has been exposed to infectious TB then it will require treatment. The neonatologist and TB specialist should be involved.</td>
<td>Any woman with symptoms suggestive of TB should be screened or if there has been prolonged close contact with newly-diagnosed infectious TB.</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>Infection often subclinical. Approximately 5% of newly-infected people develop clinically-active disease. This is more likely if immunosuppressed or at the extremes of life. HIV is a significant risk factor for TB and complicates management. Active TB normally manifests as pulmonary TB. The symptoms and signs include malaise, night-sweats, productive cough and haemoptysis, however it may be asymptomatic. Miliary TB occurs when the bacilli invade blood vessels and disseminate to multiple organs. This is rare but more common if immunosuppressed.</td>
<td>There is no increase in congenital malformations or fetal damage when rifampicin, isoniazid, ethambutol and pyrazinamide are used. Streptomycin, however, has been shown to cause fetal sensorineural deafness when used at any stage in pregnancy and must therefore be avoided.</td>
<td>Clinical infection is diagnosed by detecting acid-fast bacilli in sputum or evidence on chest X-ray.</td>
</tr>
<tr>
<td>Caused by Mycobacterium tuberculosis</td>
<td></td>
<td>Congenital TB is rare however it is more common if the woman has had miliary TB and is associated with increased neonatal mortality.</td>
<td>Any woman with symptoms suggestive of TB should be screened or if there has been prolonged close contact with newly-diagnosed infectious TB.</td>
</tr>
<tr>
<td>and, rarely, Mycobacterium bovis</td>
<td></td>
<td>Delays in diagnosis can result in an increase in prematurity, low birth weight and perinatal mortality.</td>
<td>Clinical infection is diagnosed by detecting acid-fast bacilli in sputum or evidence on chest X-ray.</td>
</tr>
<tr>
<td>Transmission is by respiratory droplets, however M. bovis is acquired by ingestion of contaminated milk</td>
<td></td>
<td>If the woman is diagnosed and treated early the outcome is good.</td>
<td>Any woman with symptoms suggestive of TB should be screened or if there has been prolonged close contact with newly-diagnosed infectious TB.</td>
</tr>
<tr>
<td>Seen as acid-alcohol fast bacilli in a Ziehl-Neelsen stain</td>
<td></td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
<td>Clinical infection is diagnosed by detecting acid-fast bacilli in sputum or evidence on chest X-ray.</td>
</tr>
<tr>
<td>Group B Streptococcus (GBS)</td>
<td>Normal commensal of female genital tract – carried in up to about 25% of mothers in the lower genital tract or rectum. Can be associated with septic abortion, puerperal or gynaecological sepsis. May cause infection in elderly or immunosuppressed patients.</td>
<td>Vast majority of babies born to mothers who carry GBS are not infected. Pre-term babies however are more at risk. If affected, may have: Early onset GBS infection Occurs within the first seven days of life and affects approximately one baby per 2000 live births. Symptoms include temperature instability, poor feeding, irritability, and respiratory distress. Late onset GBS infection Less common than early onset GBS disease, typically presents with fever and meningitis and occurs after days seven from delivery but within the first few months of life. GBS is not associated with congenital abnormalities.</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
<tr>
<td>Lancefield Group B Streptococcus Gram-positive coccus</td>
<td></td>
<td>If GBS is detected in pregnancy, antenatal treatment is not recommended, however consideration for intrapartum antibiotics should be given.</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Risk factors for neonatal GBS include prematurity, prolonged ruptured membranes (&gt;18 hrs) and intrapartum fever.</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intrapartum antibiotics should be offered to all women with a previous baby affected by GBS².</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If GBS is detected in urine then the woman should be treated antenatally and intrapartum antibiotics should be offered. The antibiotic of choice is intravenous penicillin and clindamycin if allergic to penicillin.</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Any baby showing signs of GBS disease should be treated promptly with appropriate antibiotics.</td>
<td>Routine screening for GBS carrier state is not recommended in the UK at present.</td>
</tr>
</tbody>
</table>
Appendix 13  Body Mass Index

WORLD HEALTH ORGANISATION – BODY MASS INDEX

The Body Mass Index (BMI) is assessed by calculating the woman’s weight in kilograms divided by the square of her height in metres (kg/m²).

<table>
<thead>
<tr>
<th>Body Mass Index Range</th>
<th>Classification</th>
<th>Risk of Associated Comorbidities¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.5</td>
<td>Underweight</td>
<td>Low risk, but at increased risk of other medical problems</td>
</tr>
<tr>
<td>18.5–24.9</td>
<td>Normal weight</td>
<td>Average</td>
</tr>
<tr>
<td>25.0–29.9</td>
<td>Overweight</td>
<td>Mildly increased</td>
</tr>
<tr>
<td>30.0–39.9</td>
<td>Obesity</td>
<td>High</td>
</tr>
<tr>
<td>40.0</td>
<td>Extreme Obesity</td>
<td>Very high</td>
</tr>
</tbody>
</table>
MIDWIFERY RESPONSIBILITY

Midwives are responsible for the administration and recording of a number of blood products. It is essential to locate and review local policies and practice guidelines, and also be aware of national policies for this practice.

The risk of transmitting infective agents via blood products cannot be excluded, therefore blood products and blood transfusion are only used when absolutely necessary and all other options, such as intravenous iron, have been tried. Hence, the old-fashioned practice of ‘postpartum top-up transfusions’ is inappropriate unless there is cardiac compromise or risk of serious bleeding.

Women should, where feasible, be given verbal and written information about blood products, and this should include when anti-D is advocated. Counselling about options and risk should be given by a health professional with knowledge and experience in this field. This ensures every effort has been made to help mothers and their partners make a balanced and informed decision, knowing the relative risks and benefits. This counselling and giving of information should be recorded in the case notes.1

See http://www.blood.co.uk/pages/e34patnt.html

The counselling can be reinforced with additional information in the form of patient information leaflets. Mothers can be made aware of credible websites and reputable self-help groups.

Some women may decline products or blood transfusion, and this important issue is addressed in Chapter one. Appendix 14.2 also has a care plan for women who are Jehovah’s witnesses and wish to decline blood products or blood transfusion.

Midwives should also ensure they know how adverse reactions may present, who to inform and how they are managed. This information is collected and published by SHOT – Serious Hazards of Transfusion (www.shotuk.org). The most common incidents include errors at the bedside2.

A midwife should have a sound understanding of the blood products on which she is giving advice, and which she might administer.

The common blood products a midwife is likely to encounter are described below.

BLOOD PRODUCTS

The following are blood and blood products for administration which a midwife is likely to encounter. Other products may be given in the care of a pregnant woman with a specific condition. If unfamiliar, the midwife should ask for further information about this product and its administration from the prescriber.

All blood-derived products are organised and supplied by the blood transfusion services who can give expert and detailed advice.

Red Blood Cells

**Packed red cells**

This is the core blood cell most commonly administered in obstetrics. Each unit is prepared from whole blood collected into an anticoagulant solution. Each unit is about 250 ml and has a haematocrit of 55–80% (normal haematocrit 35–50%).

- All units produced in the UK are leucocyte depleted as this has been shown to reduce viral and possibly prion transmission
- Red cells may be irradiated (for immunodeficient women) or CMV (cytomegalovirus) negative for immunosuppressed women and neonates
- Packed cells are indicated for women with symptomatic anaemia who require rapid alleviation of symptoms or women with Hb <7 g/dl in whom blood loss is a significant risk
- Also given for major blood loss when initial measures including volume expansion and cell salvage have been used
- Adverse reactions include:
  - raised temperature
  - rigors
  - allergic reaction (rashes, reduced BP)
  - haemolysis
- More severe, rarer, reactions include:
  - transfusion related acute lung injury (TRALI)
  - graft versus host disease (GVH)
- In the longer term RBC antibody formation and viral infection (hepatitis, CMV, HIV, CJD) may occur

Whole blood

Whole blood is now rarely used, but may be available in specific circumstances for resuscitation.

- Administration would be in conjunction with blood bank and the haematology services
- Red blood cell preparations such as these have a shelf life of approximately 35 days stored at the appropriate temperature
- Transfusion must be started within 30 minutes of removal from the fridge and completed within four hours
- Blood can be requested in different forms depending upon urgency:
  - uncrossmatched O negative
  - group specific (~30 minutes)
  - full cross-match (45–60 minutes)

Platelets

In obstetrics, platelet transfusion is most likely to be seen either in the acute situation of haemorrhage, disseminated intravascular coagulopathy (DIC) or in a woman with ITP and evidence of impaired haemostasis. Also given prophylactically in a woman with a platelet count of less than 10,000 at risk of bleeding.

- Most of the platelet units used in maternity care will be concentrates from whole blood
- Can be stored for up to 5 days at room temperature but must be continually agitated to prevent clumping
- It is usual to use ABO and Rh compatible platelets
- Side effects include:
  - temperature and rigors in 1% (rising to 30% in those who have had multiple platelet transfusions)

See http://www.blood.co.uk/pages/e34patnt.html

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- Side effects include:
  - temperature and rigors in 1% (rising to 30% in those who have had multiple platelet transfusions)
Appendix 14.1 Blood and Blood Products for Midwives

- risk of viral transmission (higher than for red cells because platelets are pooled from a number of donors)
- allergic reaction
- Pay close attention to surgical and obstetric causes of bleeding as part of the decision to transfuse platelets

**Plasma Products**

**Intravenous immunoglobulin (IVIg)**
This may be given to women with a falling platelet count in immune thrombocytopenic purpura (ITP), prevention of fetal bleeding in feto-maternal alloimmune thrombocytopenia (FMAIT) and other immunologically based disorders. The dose is weight- and condition-based and is usually given once per week or two weeks. Infusion takes several hours.

- This is again a pooled plasma product associated with a small risk of infection transmission
- Headache and malaise are also reported
- Alternatives should be carefully considered before the use of IVIg because of monetary and convenience costs and side effects, as well as the risks of blood products

**Cryoprecipitate**
The main use of cryoprecipitates in obstetrics is replacement of fibrinogen and factors XII and VIII in massive haemorrhage, to complement transfusion of more than eight units of blood (red cell transfusion is poor in clotting factors), and as part of the management of DIC.

- It is prepared from a single rather than a multiple donation and is 20–40 ml/unit
- It is stored at $-30^\circ$ C for up to 12 months and must be thawed to body temperature before use
- ABO compatible units should be used

**Fresh frozen plasma (FFP)**
This again is produced from a single donation. It is also used as an adjunct to massive transfusion and in the management of DIC. Each bag contains all the clotting factors, albumin and gamma globulin. It must be used immediately after thawing, and in maternity care should be Rhesus compatible.

**Anti-D**
Anti-D is a pooled plasma product, which is usually used for prevention of formation of anti-D antibodies. While there are no recorded cases of infection or prion transmission it must be remembered, and patients told, that it is a blood product.
Appendix 14.2 Hospital Information
Services for Jehovah’s Witnesses
Care Plan for Women in Labour Refusing a Blood Transfusion

A pregnant woman who is a Jehovah’s Witness might present this care plan to a midwife or doctor at an antenatal visit, and also when admitted to delivery suite, and ask for one copy to be kept in her obstetric notes. This care plan must be discussed with the most senior clinician on duty. In addition, midwives and other clinicians should refer to the policies of their own institution in relation to mothers who refused blood products and blood transfusion.

CARE PLAN FOR WOMEN IN LABOUR
REFUSING A BLOOD TRANSFUSION

As referred to in the RCOG News (October 2000) and the MOET course manual 2003 of the Royal College of Obstetricians and Gynaecologists

This document has been prepared as an aid for medical staff and midwives who are managing a Jehovah’s Witness or other patient who refuses a blood transfusion and is at risk of, or experiencing, postpartum haemorrhage. We urge clinicians to plan in advance for blood loss, which includes correction of antenatal anaemia (see: ‘Management of postpartum anaemia,’ second bullet point, italicised note). This should be discussed with the patient in keeping with her wishes that blood or blood products will not be used. Readiness to act promptly to prevent or stop bleeding is paramount.

- Consider booking high-risk patients into a unit with promptly to prevent or stop bleeding is paramount.
- All such patients should have the third stage of labour actively managed with oxytocic drugs together with early cord clamping and controlled cord traction after placental separation.
- Do not leave the patient alone for the first hour after delivery

Risk Factors Predisposing to Postpartum Haemorrhage

If the patient has any of the risk factors below, an iv infusion of oxytocin (Syntocinon) should be considered after delivery of the baby:

- Previous history of bleeding, ante- or postpartum haemorrhage
- Prolonged labour (especially when augmented with oxytocin)
- Abnormal placentation
- Large baby (>3.5 kg) and/or polyhydramnios
- Increased maternal age (>40 years)
- Fibroids/myomectomy scars
- More than 3 children

- Maternal obesity
- Multiple pregnancy

Management of Active Haemorrhage

First steps:

- Involve obstetric, anaesthetic and haematology consultants
- Establish iv colloid infusion, e.g. Gelofusine
- Give oxytocic drugs first, then exclude retained products of conception or trauma (this could save time)
- Proceed with bimanual uterine compression
- Give oxygen
- Catheterise and monitor urine output
- Consider CVP line
- Aortic compression against the spine, using a fist just above the umbilicus, may buy time in an emergency
- Slow but persistent blood loss requires action
- Anticipate coagulation problems
- Keep patient fully informed

Proceed with following strategies if bleeding continues:

- Ergometrine with oxytocin (Syntometrine) marginally more effective than oxytocin alone. If patient is hypertensive, use oxytocin 10 U (not 5 U) by slow iv injection (in PPH, benefits of the higher dose outweigh the risks)
- Cariprost (Hemabate) 250 μg/ml im, can be repeated after 15 minutes. Direct intra-myometrial injection is faster (less hazardous at open operation). If not available use 1–2 Gemeprost pessaries in the uterus.
- Oral misoprostol (Cytotec 200 μg tablets) (prostaglandin E₁ analogue), 600 μg (3 tablets). Use when unresponsive to oxytocin and ergometrine. Intrauterine misoprostol 800 μg (4 tablets), has been successfully used when refractory to oxytocin, ergometrine and also to carboprost. Recanal misoprostol 800 or 1000 μg (5 tablets), rapid absorption and control of haemorrhage reported when unresponsive to oxytocin and ergometrine; avoids problems associated with oral administration.
- Misoprostol does not cause hypertensorn.
- Recombinant factor VIIa (rFVIIa; NovoSeven) 90 μg/kg, provides site-specific thrombin generation. Increasingly used to treat uncontrollable haemorrhage successfully, for example: in placenta accreta/percreta, ruptured uterus, uterine atony and HELLP syndrome (in seven of these cases bleeding was controlled even in the presence of DIC, despite the failure of all conventional therapies, including packing of pelvis, arterial ligation and hysterectomy). Expert advice on this drug will be available from the local Haemophilia Comprehensive Care Centre or Novo Nordisk 24-hour medical advice line (0845 600 5055; emergency UK-wide delivery available). Some hospitals now hold a small stock of factor VIIa to avoid delivery delay.
- Aprotinin (Trasylol), 2,000,000 U followed by 500,000 U/h or tranexamic acid (Cyklokapron), 1 g iv tds; both are anti-fibrinolytic agents, well established for controlling haemorrhage. Additionally, consider iv vitamin K.
• Intrauterine balloon tamponade: stomach balloon of a Sengstaken-Blakemore tube used to control PPH in 14 of 16 cases, including bleeding from an atonic uterus in nine cases\textsuperscript{21,22}. Rüsch urological balloon catheter also used\textsuperscript{23}. Consider having a purpose-designed 500 ml tamponade balloon available (J-SOS-100500-Bakri. Cook [UK] Ltd. tel. 01462 473100)\textsuperscript{24}. Balloon tamponade is able to indicate if bleeding will stop (as measured via catheter drainage shaft; the ‘tamponade test’), thus avoiding unnecessary surgery\textsuperscript{21}. Systematic uterine packing also an option\textsuperscript{25}.

• B-Lynch brace suture\textsuperscript{26,27}. Simple suture technique to control massive haemorrhage. Can be combined with intrauterine balloon catheter if bleeding persists\textsuperscript{28}. (NB: prophylactic insertion of this suture has been used in high-risk caesarean section\textsuperscript{29}.)

• Embolisation/ligation of internal iliac arteries, or embolisation/bilateral mass ligation of uterine vessels\textsuperscript{27,30}.

• Blood salvage may be life-saving if substantial blood-loss anticipated\textsuperscript{1,31}. Check if acceptable to patient. Used at caesarean section in at least 400 reported cases, without complications of amniotic fluid embolism or coagulopathy\textsuperscript{32}. A cell saver with leucocyte depletion filter together with separate suction (one for amniotic fluid and one for blood salvage) minimises amniotic fluid contamination\textsuperscript{32,33}.

• Hysterectomy: subtotal hysterectomy can be just as effective, also quicker and safer\textsuperscript{34}. Clamp uterine arteries as early as possible.

Management of Postpartum Anaemia

• For severe anaemia give oxygen and use recombinant human erythropoietin (rHuEPO, NeoRecormon or Eprex) 300 IU/kg (not 50 U) × 3 weekly subcutaneously or iv without delay, for accelerated haemoglobin recovery\textsuperscript{5,36,37}. Augment with iron, vitamin B\textsubscript{12} and folic acid.

• Iron supplementation essential with EPO. Oral iron is too slow and unreliable, use iv iron sucrose (Venofer) by drip infusion or slow iv bolus (200 mg × 3 weekly)\textsuperscript{35,36}. This drug is rarely associated with anaphylaxis. (NB: Optimisation of antenatal haemoglobin essential. When unresponsive to oral iron, iron sucrose can be efficacious in reversing iron deficiency\textsuperscript{38,39}. The addition of EPO (which does not cross the placenta and is reportedly safely used in pregnancy) enhances the response\textsuperscript{29,31,38,40}. Suggested dosages of EPO and iron as above, but × 2 weekly\textsuperscript{41}.)

• Consider elective ventilation in the ICU. Use microsampling techniques (such as HemoCue haemoglobin analyser).

• Hyperbaric oxygen therapy is an option in life-threatening anaemia due to PPH\textsuperscript{41} – tel 0151 648 8000 (24-hrs) for available centres.

This document reflects current clinical and scientific knowledge and is subject to change. The strategies are not intended as an exclusive guide to treatment. Good clinical judgement, taking into account individual circumstances, may require adjustments.

#Reviewed by consultants in obstetrics and gynaecology, anaesthesia and haematology (including experts in haemostasis).

**Recommendation to Mothers:** You have two copies of this document, one of which should be placed in your obstetric notes (usually a folder in which your antenatal workup records are kept). It should be discussed with the most senior clinician at the antenatal visit. The other copy should be presented to the obstetrician on admission to the maternity/labour ward for delivery of the baby.
Appendix 14.3 Protocol for Community Management of Anaemia in Pregnancy*

- **Hb <10.5 g/dl**
  - Asymptomatic/minimal symptoms: <34 wks and Hb >7.0 g/dl
  - Symptomatic: >34 wks or Hb <7.0

**Start Pregaday 1 tablet bd**

**Trial of iron tablet Pregaday 1 tablet daily. Advise to take with orange juice 1 hour before food. Also give dietary advice. Dietary sheets are available from the Nutrition and Dietetic Service**

**If Hb rising**
- Continue supplements

**If Hb not rising, or intolerance, or poor compliance**

**Repeat Hb after 2 weeks**

**Assess patient. Confirm dietary iron deficiency as cause**

- **Yes**
  - Refer to haematology/obstetric clinic for further management

- **No** – investigate for other causes

**Determine compliance/intolerance**
- Encourage, check and control dietary measures.

**If tolerance good, increase iron tablets ‘Pregaday’ to 1 tab bd and recheck FBC in 1–2 weeks**

**If intolerant, try alternatives with lower iron preparations**

**If still intolerant, give CosmoFer as per protocol**

* Clinical protocol used for University Hospitals of Leicester, adapted and used with permission
Appendix 14.4 Management Plan for Sickle Cell Crisis – A Worked Example

PATIENT DETAILS:  DIAGNOSIS:
Mrs. YYYY XXXXXX  Sickle β thalassaemia
Unit Number: 11111  Pregnant
                       Gestational diabetes

BACKGROUND:
4 crises requiring treatment in hospital
2001 severe crisis and chest syndrome following dehydration. Required exchange transfusion.
2004 postpartum splenic sequestration and widespread splenic infarction.
NB: Sibling died with sickle crisis.

BASELINE RESULTS:
Hb 8.7 g/dl
Hb El Hb F + A + S Hb F 19% Hb S 68%
Blood Group B Positive  No atypical antibodies
Husband’s Hb El normal

MANAGEMENT PLAN FOR SICKLE CRISIS
- Admit to haematology ward if <26/40 pregnant
- Admit to delivery suite if >26/40
- Make sure both haematology and obstetric teams are informed

ANALGESIA
- Diclofenac 50 mg orally stat, then tds for a maximum of 2 days
  - Regular paracetamol
  - For moderate to severe pain:
    1. Loading dose 100 μg/kg iv/im morphine sulphate
    2. Followed by 50 μg/kg im after 15 minutes if pain is not controlled

WARNING Risk of opiate toxicity – monitor respiratory rate and state of consciousness every 15–30 min

IV FLUIDS
- 500 ml 4-hourly (fluids may need to be warmed through a blood warmer)
  - Careful monitoring of fluid balance

BLOOD TESTS
- FBC
- U&E
- Group and Save

Consider exchange transfusion:
- If chest syndrome, pre-eclampsia or severe crisis
- Discuss with consultant haematologist first
- Ensure that blood products, if used, are Rhesus genotyped, Kell neg and sickle neg

MICROBIOLOGY
- Blood cultures, throat swab, MSU, sputum cultures if available

OTHER INVESTIGATIONS
- Chest X-ray only if there is a suspicion of chest syndrome

OTHER MEDICATIONS
- Continue penicillin prophylaxis
- Add amoxicillin 500 mg tds if febrile
- Continue folic acid 5 mg once daily

REASSESS
- Investigations
- Response to pain relief
- Evidence of infection

MONITOR FOR
- Evidence of chest/girdle syndrome (severe pain unrelieved by analgesia, hypoxia)
- Shadowing on chest X-ray
- Evidence of splenic/hepatic sequestration – precipitate fall in Hb, circulatory failure
- Evidence of pre-eclampsia – hypertension, proteinuria, oedema

NB: If these conditions arise, the woman needs urgent exchange transfusion and consider transfer to ITU

Contact:
- Lead Haematologist
- Obstetrician for Obstetric Haematology
- Lead for Haemoglobinopathies

Clinical protocol used for University Hospitals of Leicester, adapted and used with permission
## Appendix 15.1 Wells Prediction Rule for Clinical Assessment of Deep Vein Thrombosis

### Clinical Feature Score

<table>
<thead>
<tr>
<th>Clinical Feature</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active cancer (patient receiving treatment for cancer within the previous six months or currently receiving palliative treatment)</td>
<td>1</td>
</tr>
<tr>
<td>Paralysis, paresis or recent plaster immobilisation of the lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>Recently bedridden for three days or more or major surgery within the previous four weeks</td>
<td>1</td>
</tr>
<tr>
<td>Localised tenderness along the distribution of the deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>Entire leg swollen</td>
<td>1</td>
</tr>
<tr>
<td>Calf swelling – circumference at least 3 cm larger than that on the asymptomatic side when measured 10 cm below tibial tuberosity</td>
<td>1</td>
</tr>
<tr>
<td>Pitting oedema confined to the symptomatic leg</td>
<td>1</td>
</tr>
<tr>
<td>Collateral superficial veins (non-varicose)</td>
<td>-2</td>
</tr>
<tr>
<td>Alternative diagnosis at least as likely as deep vein thrombosis</td>
<td></td>
</tr>
</tbody>
</table>

**Total Score**

**Scoring:** Add all the scores to get the total. In patients with symptoms in both legs, use the scores for the more symptomatic leg.

### Interpretation of Total Score

| Probability of DVT is low          | <1   |
| Probability of DVT is moderate     | 1 or 2 |
| Probability of DVT is high         | >2   |

Reproduced with permission of the Lancet.
Appendix 15.2 Risk Factors\textsuperscript{a} for Venous Thrombo-embolism in Pregnancy and the Puerperium\textsuperscript{1}

**Pre-existing**
- Previous VTE
- Congenital Thrombophilia
  - Antithrombin deficiency
  - Protein C deficiency
  - Protein S deficiency
  - Factor V Leiden
  - Prothrombin gene variant
- Antiphospholipid syndrome
- Age over 35 years
- Obesity (BMI > 30 kg/m\textsuperscript{2}) either pre-pregnancy or pregnancy
- Parity > 4
- Gross varicose veins
- Paraplegia
- Sickle cell disease
- Inflammatory disorders, e.g., inflammatory bowel disease
- Some medical disorders, e.g., nephrotic syndrome, certain cardiac diseases
- Myeloproliferative disorders, e.g., essential thrombocythaemia, polycythaemia vera

**New onset or transient\textsuperscript{b}**
- Surgical procedure in pregnancy or puerperium, e.g., evacuation of retained products of conception, postpartum sterilisation
- Hyperemesis
- Dehydration
- Ovarian hyperstimulation syndrome
- Severe infection, e.g., pyelonephritis
- Immobility (> 4 days bed rest)
- Pre-eclampsia
- Excessive blood loss
- Long-haul travel
- Prolonged labour
- Midcavity instrumental delivery
- Immobility after delivery

**Legend**
\textsuperscript{a} Although these are all accepted as thrombo-embolic risk factors, with many of them there are few data to support the degree of increased risk.
\textsuperscript{b} These risk factors are potentially reversible and may develop or resolve at later stages in gestation than the initial risk assessment. Therefore ongoing individual risk assessment is important.

Reproduced from RCOG Guideline No. 37, with the permission of the Royal College of Obstetricians and Gynaecologists.
Appendix 16.1 Sudden Unexpected Deaths in Infancy 1993–1996: Contributory Factors Involving Carers

Below is a result of analysis in five English health regions of all post perinatal deaths (7–365 days of life).

<table>
<thead>
<tr>
<th>Area of Concern</th>
<th>Instances</th>
<th>SIDS</th>
<th>Explained Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 346</td>
<td>%</td>
<td>n = 71</td>
</tr>
<tr>
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<td>1.2</td>
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<td>Use of services</td>
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<td></td>
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<td>(total)</td>
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<tr>
<td>Late booking at antenatal clinic</td>
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<td>2</td>
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<tr>
<td>Refusal to use services or accept advice</td>
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<td>4.3</td>
<td>2</td>
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<tr>
<td>Failure to give medication/other treatment</td>
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<td>1</td>
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<tr>
<td>Failure to recognise illness or seek advice</td>
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<td>2.3</td>
<td>7</td>
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<tr>
<td>Refusal of hospital for baby</td>
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<td>0</td>
<td>1</td>
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<tr>
<td>Taking baby out of hospital against advice</td>
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<td>Incorrect resuscitation</td>
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</tbody>
</table>

The shaded areas pertain directly to subjects discussed in this book.
Appendix 16.2 Neonatal Abstinence Syndrome

Neonatal abstinence syndrome (NAS) is a condition that results from antenatal exposure to opiates, and presents post-delivery when the exposure ceases.

**OPIATE EXPOSURE**

Opioid receptors are found throughout the central nervous system and other peripheral sites, where they mediate analgesia and have a range of other functions.

Long-term exposure to opiates results in CNS adaptation to the presence of the drug, leading to the development of tolerance. Increased amounts of the drug are required to achieve the same physical effects. In acute opiate withdrawal, such as following childbirth, specific physical symptoms are experienced that involve the central nervous system, respiratory system, gastrointestinal system and vasomotor system. These are mainly due to the decrease in the production of endogenous opioids and a rebound increase in noradrenergic activity.

**OPIATE WITHDRAWAL**

Opiate withdrawal is characterised by a generalised hyperactive state with symptoms of anxiety, enhanced startle and altered sleep pattern.

<table>
<thead>
<tr>
<th>Signs and Symptoms of Opiate Withdrawal</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Central Nervous System</strong></td>
</tr>
<tr>
<td>• Hyperactivity</td>
</tr>
<tr>
<td>• Hyper-irritability – excessive crying, high-pitched cry</td>
</tr>
<tr>
<td>• Increased muscle tone</td>
</tr>
<tr>
<td>• Exaggerated reflexes</td>
</tr>
<tr>
<td>• Tremors</td>
</tr>
<tr>
<td>• Sneezing</td>
</tr>
<tr>
<td>• Hiccoughs</td>
</tr>
<tr>
<td>• Yawning</td>
</tr>
<tr>
<td>• Short, restless sleep pattern</td>
</tr>
<tr>
<td>• Pyrexia</td>
</tr>
<tr>
<td><strong>Respiratory System</strong></td>
</tr>
<tr>
<td>• Tachypnoea</td>
</tr>
<tr>
<td>• Excess secretions</td>
</tr>
<tr>
<td>• Stuffy nose</td>
</tr>
<tr>
<td><strong>Gastrointestinal</strong></td>
</tr>
<tr>
<td>• Disorganised, vigorous sucking</td>
</tr>
<tr>
<td>• Vomiting, posseting</td>
</tr>
<tr>
<td>• Sensitive gag</td>
</tr>
<tr>
<td>• Hyperphagia</td>
</tr>
<tr>
<td>• Diarrhoea</td>
</tr>
<tr>
<td>• Abdominal cramps</td>
</tr>
<tr>
<td>• Drooling</td>
</tr>
<tr>
<td><strong>Vasomotor</strong></td>
</tr>
<tr>
<td>• Flushing</td>
</tr>
<tr>
<td>• Sweating</td>
</tr>
<tr>
<td>• Sudden pallor</td>
</tr>
</tbody>
</table>

Withdrawal symptoms vary greatly from one baby to another. Symptoms depend on:

- The type of drug used
- Amount of drug used
- The route of administration
- When the last dose was taken by the mother
- Whether other drugs were used in conjunction with the main drug of choice

Withdrawal symptoms usually occur within 24–48 hours after birth. Methadone has a longer half-life and withdrawal symptoms may not present until 72 hours. Symptoms may be further delayed with polydrug use, especially benzodiazepine use.

**MANAGEMENT OF MINOR SYMPTOMS**

It is important to ensure other medical causes are considered in the assessment of symptoms that are causing concern, e.g. raised temperature may be due to infection.

- Encourage parents to cuddle/gently rock baby
- Kangaroo care, skin to skin (if appropriate) can be soothing
- Prevent overheating
- Maintain calm atmosphere, with dim lighting and keep noise to a minimum
- Breast-feeding may assist with minimising withdrawal symptoms
- The use of a dummy may help comfort the baby

**INDICATIONS FOR PHARMACOLOGICAL MANAGEMENT**

Pharmacological management is indicated if the baby is unable to feed and sleep sufficiently with the above supportive measures.

If the baby develops diarrhoea and/or vomiting resulting in dehydration or unacceptable weight loss, or develops seizures, then pharmacological treatment should be commenced promptly.
Appendix 17 Treatment Guidance for Antenatal and Postnatal Psychiatric Disorders

MANAGEMENT OF DEPRESSION

When choosing an antidepressant for pregnant or breast-feeding women, prescribers should, while bearing in mind that the safety of these drugs is not well understood, take into account that:

- Tricyclic antidepressants, such as amitriptyline, imipramine and nortriptyline, have lower known risks during pregnancy than other antidepressants
- Most tricyclic antidepressants have a higher fatal toxicity index than selective serotonin reuptake inhibitors (SSRI)
- Fluoxetine is the SSRI with the lowest known risk during pregnancy
- Imipramine, nortriptyline and sertraline are present in breast milk at relatively low levels
- Citalopram and fluoxetine are present in breast milk at relatively high levels
- SSRI taken after 20 weeks’ gestation may be associated with an increased risk of persistent pulmonary hypertension in the neonate
- Paroxetine taken in the first trimester may be associated with fetal heart defects
- Venlafaxine may be associated with increased risk of high blood pressure at high doses, higher toxicity in overdose than SSRI and some tricyclic antidepressants, and increased difficulty in withdrawal
- All antidepressants carry the risk of withdrawal or toxicity in neonates; in most cases the effects are mild and self-limiting

For a woman who develops mild or moderate depression during pregnancy or the postnatal period, the following should be considered:

- Self-help strategies (guided self-help, computerised cognitive behavioural therapy or exercise)
- Non-directive counselling delivered at home (listening visits)
- Brief cognitive behavioural therapy or interpersonal psychotherapy
Appendix 18 Advice to Patients on Coping with Cancer Symptoms and Side Effects

The following is an excerpt from the Cancerbackup website, www.cancerbackup.org.uk, accessed May 2007. Health professionals are advised to direct patients and relatives to this reliable source of credible information.

FATIGUE

Fatigue means feeling excessively tired or exhausted all or most of the time. The tiredness is not relieved by rest and can affect you physically, psychologically and emotionally. People who have fatigue have no energy and find it difficult to do simple, everyday things that people usually take for granted. Coping with fatigue can be addressed by:

Diet

- Keep a diary of what and when you eat daily
- Try to take advantage of the times when your appetite is best
- Drink plenty of liquids
- If your taste changes, try new foods, or eat the foods that taste best to you
- Ask for any leaflets that are available which give dietary advice
- You can also ask your doctor to refer you to a dietician, who can give you helpful ideas

Exercise

It is important to try and exercise a little if you can, even when you are unwell. Research has found that exercise may actually help the symptoms of fatigue. The problem is that while too much exercise might make you tired, so can too little, so it’s important to find your own level. A good balance between being active and getting plenty of rest is best. The physiotherapist at the hospital may be able to advise you about what would suit you. General rules are:

- Regular, light exercise such as walking has been shown to reduce fatigue as well as nausea and vomiting, and can help some people to sleep better
- Plan some activity or light exercise into your day
- If exercise is impossible try to stay active in your daily routine
- Pay attention to how your body reacts to exercise: How did you sleep? How did you feel the next day?
- Drink plenty of fluids before, during and after exercise
- Perhaps keep a record of your activities to share with your doctor or nurse, so they can help monitor your progress
- It is important to find a balance between activity and rest, and exercise in a way that allows the muscles to recover after activity

Sleep

It’s very important to try and keep a normal sleeping routine when you are ill, even though your fatigue may make you feel like sleeping all the time. The following might be a useful guide:

1. Sleep just long enough Sleep as much as you need to feel refreshed and healthy during the following day, but not more than necessary. Limiting time in bed seems to produce better-quality sleep. Too much time in bed can lead to disturbed/shallow sleep.
2. Wake up at the same time every day A regular wake-up time in the morning seems to strengthen most people’s sleep routine and lead eventually to regular times of going to sleep.
3. Exercise regularly if you can A steady daily amount of exercise may help to deepen sleep over the long term.
4. Reduce noise Occasional loud noises, such as aircraft flying overhead, disturb sleep, even if you don’t remember the disturbance later. If your bedroom is noisy, you could mask some of the noise using a small electric fan, or you could use ear-plugs.
5. Keep a steady temperature in your bedroom Although a very warm room disturbs sleep, so does a very cold one. Room temperature should be comfortably warm.
6. Have a bedtime snack Hunger may disturb sleep. A light bedtime snack or a hot drink can help some to sleep better.
7. Avoid stimulants Many people who have problems sleeping are very sensitive to stimulants. It is best to avoid cola drinks, coffee, strong tea and chocolate for a few hours before bedtime.
8. Know how naps affect you Some people find that day-time naps help them sleep better at night, while others sleep less well after them. Find out what suits you best.
9. Limit your intake of alcohol Alcohol can help tense people to fall asleep more quickly, but the sleep tends to be broken. So avoid large amounts of alcohol near bedtime.
10. Know when to say ‘enough’ Rather than lying in bed tossing and turning you could get up and watch television or read a book. Wait until you feel tired again and then go back to bed. Audio tapes with stories can help you to sleep, and are stocked in most bookshops and libraries.

Lymphoedema

Lymphoedema can occur in the arm after breast cancer treatment to the armpit, or in the leg if cancer or its treatment affects nodes in the groin area or the pelvis. The affected arm or leg may become swollen, stiff, uncomfortable and awkward to move, making daily activities, such as dressing or washing, difficult. Lymphoedema can develop weeks, months or even years after cancer treatment and it is difficult to know who will be affected or how bad the lymphoedema will be.

It is not possible to replace lymph nodes that have been removed or lymphatic vessels that have been damaged. Once lymphoedema has developed it cannot be cured permanently. However, it can usually be reduced and controlled.

Lymphoedema may cause the following symptoms in the affected area:

- A feeling of fullness or heaviness
- Tightness and stretching of the skin swelling
- Reduced movement of the joints
- Thickening and dryness of the skin
- Discomfort and/or pain

You may first realise you have swelling because clothing, shoes or jewellery (such as rings or watches) feel tighter than usual.
Occasionally, in more severe lymphoedema, the skin may become broken and the colourless lymph fluid can leak out onto the surface. This is known as lymphorrhoea (pronounced ‘lim-for-ria’). This happens when too much fluid builds up in the tissues or when the skin is damaged. However, it is important to remember that most people with lymphoedema only have mild symptoms.

**ASCITES**

Inside the abdomen is a membrane called the peritoneum, which has two layers. One layer lines the abdominal wall and the other layer covers the organs inside the abdominal cavity. The peritoneum produces a fluid that acts as a lubricant and allows the abdominal organs to glide smoothly over one another. Sometimes too much of this fluid can build up between the two layers and this is called ascites.

The symptoms of ascites can be very distressing. The abdomen becomes very swollen and distended, which can be uncomfortable or painful. It can also cause difficulty in getting comfortable, sitting up or walking. It can make you feel very tired (lethargic) and breathless. It may cause feelings of sickness (nausea) or make you sick (vomiting). You may also suffer indigestion and a reduced appetite.

In order to relieve symptoms, the treatment of ascites involves slowing the build-up of the fluid and putting a tube into the abdomen to drain it (known as paracentesis). Ascites can build up again and drainage may need to be carried out more than once.

**PAIN**

Not everyone with cancer has pain, but approximately 3 in 10 people who are having treatment will have pain. When the cancer is advanced, around 7 in 10 people will have pain.

**Physical Causes**

Pain may occur for a number of reasons:

- A cancer may press on the tissues around it, or on a nerve.
- Infection can cause pain, by creating inflammation in the affected part of the body.
- Damage to tissues following surgery or radiotherapy may lead to pain.
- A cancer may spread from its original (primary) place in the body to form other tumours (secondaries or metastases). These may cause pain, especially in the bones.
- Sometimes, pain can seem to occur in parts of the body far away from the cancer that is causing it. This is called referred pain.

Understandably, someone with cancer may assume that a new ache or pain means that their cancer has come back, or is getting worse, or that the cancer has spread, but this is not always the case.

**Emotions and Pain**

Emotions such as fear, anxiety, depression and tiredness can make your pain worse. This does not mean that cancer pain is ‘all in the mind’.

**Social Effects on Pain**

Sometimes pain can be made worse by other social or work related things happening in your life which cause you stress (for example, friends avoiding you).

**Treatment for Pain**

International guidelines set out the types of painkillers that are most effective for different levels of pain. This is known as the analgesic ladder:

1. **Mild pain** – mild painkillers or anti-inflammatory drugs (e.g. paracetamol or ibuprofen)
2. **Moderate pain** – weak opioid painkillers (e.g. codeine)
3. **Severe pain** – strong opioid painkillers (e.g. morphine)

Often, painkillers from two different groups will be used at the same time, as they work in different ways. Other drugs that help to control pain, such as bisphosphonates and steroids, can also be used alongside the painkillers.

**ALOPECIA**

Cancer treatments such as chemotherapy and radiotherapy can make your hair fall out. There are many ways of dealing with this. You may not mind your bald head, but if you do want to cover up there are many types of wigs or hairpieces, hats, turbans or scarves that you can use.

**FERTILITY PROBLEMS**

**Protecting Your Fertility**

Many women who are concerned that their cancer treatment may cause infertility are advised to store either embryos (fertilised eggs) or eggs, before their treatment starts. Embryos and unfertilised eggs are usually frozen for up to ten years, although in some situations this can be extended until the woman reaches 55.

Your doctor or nurse can discuss the possibility of infertility and the collection and storage of eggs or embryos with you and refer you to a fertility clinic. Sometimes the NHS will pay for storage of the eggs or embryos, but some health authorities will not.

**Collection and Storage of Eggs**

The whole process takes 3–4 weeks and involves stimulating the ovaries to produce more eggs than normal. This is done by giving doses of the hormones GnRH, FSH and LH. A fourth hormone, called human chorionic gonadotrophin (HCG), is also used. Usually at least six eggs are collected, which will increase the chances of achieving a pregnancy.

Eggs are collected in one of two ways. Either an ultrasound-guided needle is passed through the wall of the vagina, or a small cut is made in the abdominal skin below the navel and a fine needle is inserted to remove the eggs. These procedures can be uncomfortable and painkilling drugs may be needed. A general anaesthetic may be used.

Some women need to start their cancer treatment straight away and it may not be possible to delay it in order to have the ovarian stimulation.

There is a risk with some cancers, such as breast cancer, that the hormones used in ovarian stimulation may also stimulate the cancer to grow. It therefore may not be advisable to have ovarian stimulation. Your doctors will be able to discuss this with you. It may be possible to collect one or two eggs without ovarian stimulation, although this reduces the chances of a successful pregnancy.
Using collected eggs

Once the eggs have been collected, they can either be frozen and stored, or fertilised using *in vitro* fertilisation (IVF) and then frozen. IVF involves putting the eggs and sperm together in a test tube in a laboratory for fertilisation to occur.

In order to fertilise the eggs to form an embryo, sperm from a partner will be needed. Both the woman and the man will need to sign a consent form and neither can use the embryos to start a pregnancy without the other’s permission. If a woman has no partner, sperm from an anonymous sperm donor can be used. When the embryos are needed, they are thawed and placed in the womb. Pregnancy rates are much lower, however, than from fresh embryo transfer. Freezing more embryos than are needed usually improves a woman’s chance of becoming pregnant.

Freezing Unfertilised Eggs

This is a newer process, which is much less successful. This method is still largely experimental at the moment. When the eggs are thawed they are fertilised by injecting a sperm into the egg. This is known as *intra-cytoplasmic sperm injection* (ICSI). The fertilised egg is then placed in the womb. ICSI is done to improve the chance of a pregnancy.

Ovarian Tissue Freezing

A newer technique is to take some ovarian tissue for freezing. It is thought that the ovarian tissue can be put back into the body at a later date and eggs can then be collected. This type of infertility treatment is still very experimental at the moment.

There are no guarantees of pregnancy with these treatments, as you will learn when discussing them at the fertility clinic. If you have not been able to store any eggs or embryos, or if you do not become pregnant by the above methods, it may be possible for you to become pregnant using eggs from another woman (donor eggs). If treatment has made you infertile but you manage to become pregnant by one of the above methods, it is likely that you will need to be given hormones to maintain the pregnancy. The hormones are usually given by injection.

Used with kind permission of Cancerbackup.

Cancerbackup is the UK’s leading cancer information charity, offering information, support and understanding to all those affected by cancer, through a comprehensive range of information available free direct to patients and families, as well as online at www.cancerbackup.org.uk, and via a freephone helpline, staffed by experienced cancer nurses: 0808 800 1234 (Mon–Fri, 9 am–8 pm).
# Appendices References

## Appendix 1.1 UK Maternal Deaths: Causes and Risk Factors


## appendix 1.2 UK Maternal Deaths by Type of Antenatal Care and Place of Delivery


## Appendix 1.3 Daily Vitamin and Mineral Dietary Intake for Pregnancy and Lactation


## Appendix 3.1 BHS Blood Pressure Measurement Recommendations


## Appendix 3.2 Blood Pressure Devices for Use in Pregnancy and Obesity


## Appendix 4.1 New York Heart Association 1994 Classification of Heart Disease


## Appendix 4.2 Drugs for Cardiac Disease – an Overview for Midwives

1. Briggs GG, Freeman RK and Yaffe SJ 2005 Drugs in Pregnancy and Lactation, 7th Ed. USA; Lippincott

## Appendix 5 Asthma in Pregnancy – an Information Leaflet for Pregnant Women

1. Smith J 2007 Asthma in Pregnancy: An Information Leaflet for Pregnant Women. Leicester; University Hospitals of Leicester NHS Trust

## Appendix 8.1 Drugs Used for Neurological Conditions


## Appendix 8.2 Advice for Epileptic Women with Babies

Appendix 9.1: Pain Therapy Ladder for Pregnancy
2. Briggs GG, Freeman RK and Yaffe SJ 2005 Drugs in Pregnancy and Lactation, 7th Ed. USA; Lippincott

Appendix 10.1. Reflux Treatment Guidelines for Over-The-Counter Medicines
1. Tytgat GN, Heading RC, Muller-Lissner S, et al. 2003 Contemporary understanding and management of reflux and constipation in the general population and pregnancy: a consensus meeting. Alimentary Pharmacology and Therapeutics, 18:291–301 Figure 2

Appendix 10.2. Reflux Treatment Guidelines for Prescribed Medicines in Non-Pregnancy
1. Tytgat GN, Heading RC, Muller-Lissner S, et al. 2003 Contemporary understanding and management of reflux and constipation in the general population and pregnancy: a consensus meeting. Alimentary Pharmacology and Therapeutics, 18:291–301 Figure 3

Appendix 10.3 Rome II Diagnostic Criteria for Irritable Bowel Syndrome

Appendix 11: Drugs for Autoimmune Disease – an Overview for Midwives
4. Weiner CP and Buhimschi C 2004 Drugs for Pregnant and Lactating Women. London; Churchill Livingstone
5. MIMS 2006 Monthly Index of Medical Specialties (November). London; Haymarket Medical Publications
9. NTIS 2006 Exposure to Nifedipine during Pregnancy. National Teratology Information Service, Regional Drug and Therapeutics Centre

Appendix 12.1. The ABC of Hepatitis

Appendices 12.2 and 12.3 Other Bacterial and Viral Infections
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