Obstetrics for 4th year medical students
Antenatal care (ANC)
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LEARNING OBJECTIVES

- To understand the principles of routine antenatal care.
- To be aware of the rationale for, and purpose of, clinical investigations during each trimester.
- To differentiate normal pregnancy symptoms from potential underlying pathology.

Introduction

Every year there are an estimated 200 million pregnancies in the world. Each of these pregnancies is at risk for an adverse outcome for the woman and her infant. While risk cannot be totally eliminated, they can be reduced through effective, affordable, and acceptable maternity care. To be most effective, health care should begin early in pregnancy and continue at regular intervals

Definition:

The standard schedule of appointments, investigations and interventions offered to all pregnant women from healthcare services.

The purpose of antenatal care is:

An increasing number of women should be delivered in large units; selection of women should be improved for smaller consultant units and isolated GP units and home deliveries should be phased out further. It should be mandatory that all pregnant women be seen at least twice by a consultant obstetrician – preferably as soon as possible after the first visit to the GP in early pregnancy and again in late pregnancy.

The aims of antenatal care are:

- To optimize pregnancy outcomes for women and babies.
- To prevent, detect and manage those factors that adversely affect the health of mother and baby.
- To provide advice, reassurance, education and support for the woman and her family.
- To deal with the 'minor ailments' of pregnancy.
- To provide general health screening

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Principles of antenatal care

1. The basic principles of routine ANC are those of risk assessment and population screening.
1. Antenatal risk assessments aim to identify the level and frequency of care that the woman needs due to obstetric, medical, or social risk factors in her previous or current pregnancy.

This risk assessment should initially occur at the booking visit, and is repeated in the second and third trimesters, to ensure that the woman is receiving the appropriate care and to identify any need for changes in care when risks have been identified

Advice, reassurance and education

Pregnancy is a time of great uncertainty and stress and this is compounded by the many physical changes experienced by the woman during her pregnancy. Common symptoms include nausea, heartburn, constipation, shortness of breath, dizziness, swelling, backache, abdominal discomfort and headaches. Generally, these reflect physiological adaptations to pregnancy but may become

extremely debilitating for the pregnant woman. Occasionally they will represent the first presentation of a more serious problem. Information regarding smoking, alcohol consumption and the use of drugs (both legal and illegal) during pregnancy is extremely important. In some populations almost one-third of women smoke during pregnancy, despite its association with fetal growth restriction, preterm labour, placental abruption and intrauterine fetal death. A major role of antenatal care is to help women limit these harmful behaviors during pregnancy, for example by inclusion in smoking cessation programs. Alcohol or illegal substance misuse may require more specialized skills from support services including perinatal mental health teams.

First trimester

When a woman becomes pregnant one of the first interactions with the health services is known as the booking visit. At this point, or shortly afterwards, a midwife will take a detailed history, examine the woman and perform a series of routine investigations (with the woman's consent) in order that appropriate care can be offered. If **risk factors are identified** that may potentially impact on the pregnancy outcome, the midwife will access **specialized services** on behalf of the woman. This may mean referral to a hospital consultant obstetric clinic or other specialist services as appropriate. Medical or psychosocial issues raised at the booking visit may need to be explored in some depth.

Body mass index and weight assessment Height and weight should be measured at the booking visit, body mass index (BMI) calculated and assessed and women counselled accordingly. If the BMI is more than 35 kg/m^2 , it is recommended that the woman is reviewed by an obstetric consultant or other healthcare professional who can provide appropriate advice on the increased pregnancy risks and interventions to minimize excessive gestational weight gain. The Institute of Medicine have guidelines on recommended weight increase in pregnancy. For normal weight women (BMI 18.5–24.9 kg/m2) the recommended total weight gain in pregnancy is 11–16 kg (25–35 lb); for overweight women (BMI 25–29.9 kg/m2) 7–11 kg (15–25 lb); and for obese (≥30 kg/m2) women 5–9 kg (11–20 lb). Women with raised BMI should be counselled regarding appropriate weight in pregnancy and counselled regarding the risks. In general, the risks increase as BMI rises

Maternal complications

Antenatal

1-Difficalty in assessing growth and anatomy of fetus

2- Increase risk of GDM

3- Increase risk of hypertensive disorders (chronic hypertension ,gestational hypertension and preeclampsia)

4- Increase risk of VTE

Intrapartum

1-Difficulty with analgesia spinal , epidural and GA

2- Difficulty with monitoring of labor

3- Increase instrumental delivery and C/S rate

Postnatal

1-VTE

2-Wounds breakdown and infection

Postnatal depresion

Fetal complications

1- Increase congenital malformations, if BMI more than 40 NTD 3 times more than BMI less than 30

2- Macrosomia and its complications

3- Fetal growth resection and its complications

4- Miscarriage 20% more and increase to 1 in 4 (25%) if BMI more than 30

5- Still birth double the risk from 0.5 to 1%

General pregnancy dietary advice

The Royal College of Obstetricians and Gynecologists (RCOG) provides the following dietary advice for optimal weight control in pregnancy:

Nutrition:

- Do not eat for two;
- Maintain your normal portion size and try and avoid snacks.
- Eat fiber-rich foods such as oats, beans, grains, seeds, fruit and vegetables as well as whole grain bread, brown rice.

- ➢ Base your meals on starchy foods such as potatoes, bread, rice and pasta
- ➢ Restrict intake of fried food, drinks high in sugars, and foods high in fat and sugar.
- ➢ Eat at least five portions of a variety of fruit and vegetables each day
- ➢ Dieting in pregnancy is not recommended but controlling weight gain in pregnancy is advocated.

- ▪ **Daily oral iron and folic acid** supplementation with 30 mg to 60 mg of elemental iron and 400 µg (0.4 mg) of folic acid.
- ▪ **Intermittent oral iron and folic acid** supplementation with 120 mg of elemental iron and 2800 µg (2.8 mg) of folic acid once weekly is recommended for pregnant women to improve maternal and neonatal outcomes if daily iron is not acceptable due to side- effects, and in populations with an anaemia prevalence among pregnant women of less than 20%.

Daily calcium supplementation (1.5–2.0 g oral elemental calcium)

Vitamin D deficiency there are no data to support routine screening for vitamin D deficiency in pregnancy in terms of health benefits or cost effectiveness. Women thought to be at increased risk of vitamin D deficiency on the basis of skin colour or coverage, obesity, risk of pre-eclampsia or gastroenterological conditions limiting fat absorption may be screened, but this testing is expensive. Daily vitamin D supplementation with oral cholecalciferol or ergocalciferol is safe in pregnancy. All pregnant and breastfeeding women should be advised to take 10 µg of vitamin D supplements daily. Severe vitamin D deficiency in pregnancy results in increased risk of neonatal rickets In populations with low dietary calcium intake.

- ▪ **Vitamin A supplementation** is only recommended for pregnant women in areas where vitamin A deficiency is a severe public health problem, to prevent night blindness.
- ▪ **Vitamin C, D, E, B6 and zinc supplementations** are not recommended.
- ▪ **lowering daily caffeine** intake during pregnancy: For pregnant women with high daily caffeine intake (more than 300 mg per day), is recommended to reduce the risk of pregnancy loss and low-birth-weight neonates.

Smoking in pregnancy

is associated with increased risk of miscarriage, preterm premature rupture of membranes, preterm birth, small for gestational age (SGA), low birthweight, placental abruption, perinatal mortality and sudden infant death.

Systematic reviews show a reduction in smoking rates.

Alcohol

High intake of alcohol during the first trimester increases the risk of miscarriage and chronic use may lead to fetal alcohol spectrum disorder. women should avoid alcohol in pregnancy, but if they do drink alcohol, they should limit to (1–2 units, not more than twice a week/WHO).

Working

Most pregnant women can be reassured that it is safe to continue working during pregnancy. However, identification of potential occupational hazards (e.g., ionizing radiation).

Exercise

General exercise advice Aerobic and strength conditioning exercise in pregnancy is considered safe and beneficial. It may help recovery following delivery, reduce back and pelvic pain during pregnancy and contribute to overall wellness. The aim of exercise during pregnancy is to stay fit, rather than to reach peak fitness. Contact sports should be avoided and if the pregnant woman has any coexisting medical conditions, a more tailored exercise program may be needed. However, there are very few pregnant women for whom some exercise is not appropriate and health care professionals can encourage women to maintain walking, swimming and other forms of non-contact exercise. Pelvic floor exercises during pregnancy and immediately after birth may reduce the risk of urinary and faecal incontinence in the future. Following delivery, generally it is safe to resume exercise gradually as soon as the woman feels ready

The RCOG provides modified heart rate target zones for exercise in pregnancy.

These are age dependent and are as follows: women <20 years of age: target range 140–155 beats per minute (bpm); 20–29 years of age: 135–150 bpm; 30–39 years of age: 130–145 bpm; and >40 years of age: 125–140 bpm

Breastfeeding education Breastfeeding protects against diarrhea and common childhood illnesses such as pneumonia, and may also have longer-term health benefits for the mother and child, such as reducing the risk of obesity later in life. Breastfeeding has also been associated with a higher intelligence quotient (IQ) in children, although it is not clear whether this is a result of confounding.

The World Health Organization (WHO) recommends initiation of breastfeeding within an hour of birth, exclusive breastfeeding for the first 6 months of life and continued breastfeeding beyond 6 months and at least up to 2 years of age. Although evidence for interventions to promote breastfeeding are limited, a recent systematic review demonstrated that the greatest improvements in initiation and continuation of breastfeeding were seen when education was provided concurrently across the various settings including home, community and the health system. Baby-friendly hospital support in the health system was the most effective intervention to improve rates of any breastfeeding. As a result, early education in pregnancy about breastfeeding is advocated to improve uptake and engage pregnant women with breastfeeding services to allow them to be fully prepared

Travel

No clear evidence that air travel increases the risk of pregnancy complications such as preterm labor, rupture of membranes or abruption. Flights of more than 4 hours' duration are associated with a small increased risk of venous thrombosis, graduated elastic compression stockings for all women, and low-molecular-weight heparin (LMWH) for those with significant risk factors, are likely to be of benefit. Avoidance of air travel from 37 weeks' gestation in a singleton pregnancy and from 32 weeks' gestation if there are significant risk factors for preterm birth.

Schedule for appointments

1. **The First Antenatal appointment (Booking appointments).**
2. **Subsequent Antenatal appointments (Follow-up appointments).**

- Plan 10 routine antenatal appointments for nulliparous women.
- Plan 7 routine antenatal appointments for parous women.
- Offer additional or longer antenatal appointments if needed, depending on the woman's medical, social and emotional needs.

✶ **Booking appointment/first face to face appointment.10-12 weeks gestation**

If a woman books late in pregnancy, also ask about the reasons for the late booking because it may reveal social, psychological or medical issues that need to be addressed

Options for pregnancy care Following the booking visit. Provided that there are no contraindications to midwifery-led care (such as medical comorbidities or previous obstetric complications that may warrant consultant-led care), the options available for delivery include:
Home birth: according to the Birthplace Study, in England and Wales approximately 2% of women opt to deliver at home, cared for by a midwife. The advantages of home birth include familiar surroundings, no interruption of labour to go to hospital, no separation from other children or the woman's partner during or after birth, continuity of care and reduced interventions.
The disadvantages are that
45% of first time mothers (and 12% of multiparous mothers) planning home birth are transferred to hospital and a poor perinatal outcome occurs in approximately twice as many first time home birth mothers compared with first time mothers delivering in hospital
Other disadvantages include limited analgesic options (e.g. no epidurals are available)

Midwifery units or birth centres: these may be stand-alone where they are located on a separate site to hospital birth centres or adjacent to hospitals ('colocated') with access to obstetric, neonatal and anaesthetic care. Advantages of midwifery units may include continuity of care, fewer interventions and convenience of location. Disadvantages include transfer out to a hospital birth centre (40% nulliparous women and 10% of multiparous women) and limited access to certain analgesic options. There was no difference in the risk of adverse perinatal outcomes between midwifery units and hospital units (4.5 adverse perinatal events/1,000 births in freestanding midwifery unit vs. 4.7 events/1,000 in alongside midwifery unit vs. 5.3 events/1,000 in obstetric unit).
Hospital birth centre: in hospital birth centres midwives continue to provide care during labour but doctors are available should the need arise. There is direct access to obstetricians, anaesthetists and neonatologists. Disadvantages include lack of continuity of care and a greater likelihood of intervention (compared to midwifery units and home birth).

- **Taking a history** /Ask the woman about:

• Age, gravidity, parity.

• Occupation. Blood group and Rh
• **Confirmation of pregnancy**.
• **Dating of pregnancy**.

The pregnancy can be dated either by using the date of the first day of the **LMP** or by **Ultrasound scan**.

Menstrual EDD: It is customary to estimate the EDD by adding 7 days to the date of the last normal menstrual period and counting back 3 months (Negele's rule), If the cycle is longer than 28 days, add the difference between the cycle length and 28 to compensate.

This can be more easily determined by using **pregnancy calculators (wheels)**.

Dating by Ultrasound: In the late first trimester or early second trimester. Ideally between 10-14 weeks.

•Menstrual history.
•Past medical /surgical history.
•Past obstetric history.
•Previous gynecological history
•Family history and social history.
•Allergies.

History has a major impact on risk assessment.

Age: Women at extremes of reproductive ages are at increased risk of pregnancy complications like chromosomal abnormalities in elderly women

Racial origin: Special racial groups carry risks of medical conditions both genetic like thalassemia & sickle cell anemia or fibroids in African.

Past medical history: The disease & its treatment may adversely affect the pregnancy. Medications may be teratogenic or may alter fetal physiology, with increased risk of placental dysfunction, fetal growth restriction and/or PTL. Those with health problems are managed jointly by obstetricians and physicians in a "high-risk clinic".

Past obstetric history: Women with previous caesarean delivery need careful discussion about the mode of delivery in the current pregnancy.

Previous gynecological history: Of infertility, recurrent miscarriage and gynecologic surgery. **Family history**: Of thromboembolic disease, DM, mental handicap, hypertension, hereditary tendency & history of twins.

Social history:

• Smoking.
• Alcohol.
• Drug abuse.
• Her nutrition and diet, physical activity

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 Examinations and investigations

Full physical examination including:

• Height
• Weight
• BMI (important impact on mother and fetal outcome).
• Abnormal gait or deformity
• Blood pressure assessment
• Blood pressure falls by a small amount (a few mmHg) in the first trimester and increases to prepregnancy levels by the end of the second trimester.
• First trimester blood pressure assessment also allows the detection of previously unrecognized chronic hypertension; this enables early initiation of treatment including antihypertensive agents (to reduce episodes of severe hypertension in the mother) and low-dose aspirin, which improves maternal (reduced pre-eclampsia) and fetal (decreased perinatal mortality) outcomes in women with chronic hypertension.
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• CVS
• Respiratory system
• Breast examination
• Abdominal examination: scars, fundal height, masses, pain

• Pelvic examination: cervical cytology if indicated, vaginal examination.

 Investigations

 Maternal screen:

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1. Hematological

▪ **Blood group**, **Rh** and **Rhesus D antibodies**. repeated at 28 weeks'

Blood group A blood group is checked at booking to identify rhesus D-negative women so that they may be informed regarding the risks of rhesus isoimmunization and sensitization from a rhesus D-positive fetus. Anti-D is administered to rhesus D- negative women in instances of potential sensitizing events such as postchorionic villous sampling, amniocentesis or trauma to the maternal abdomen. The British Committee for Standards in Hematology recommends that following potentially sensitizing events, anti-D immunoglobulin should be administered as soon as possible and always within 72 hours of the event. In pregnancies less than 12 weeks' gestation, anti-D immunoglobulin prophylaxis is only indicated following

ectopic pregnancy, molar pregnancy, therapeutic termination of pregnancy and in cases of uterine bleeding where this is repeated, heavy or associated with abdominal pain. The minimum dose of anti-D should be 250 IU and a test for feto-maternal haemorrhage is not required. For potentially sensitizing events between 12 and 20 weeks' gestation, a minimum dose of 250 IU should be administered within 72 hours of the event and a test for feto-maternal haemorrhage is not required. Women who are rhesus D negative are now offered prophylactic anti-D administration at 28 weeks' gestation. Antenatal anti-D immunoglobulin prophylaxis using either a single large dose at 28 weeks' gestation or two doses, given at 28 and 34 weeks' gestation, achieves a significant reduction in the incidence of maternal sensitization to rhesus D due to occult sensitizing events. Rhesus D-negative women also receive anti-D postpartum once a baby is confirmed as being rhesus D positive on testing of a cord blood sample. Assessment of blood group in all pregnant women at 28 weeks' gestation also identifies those with other atypical antibodies so that appropriate monitoring can be put in place. Newer techniques such as non-invasive prenatal testing of maternal blood for fetal rhesus status (determined by analysis of cell-free fetal deoxyribonucleic acid [cffDNA]) may limit the need for anti-D prophylaxis to mothers whose fetuses are known to be rhesus D negetive. This is considered more reliable than testing a partner's blood group due to biological paternity not always being that of the assumed partner.

▪ **Complete blood count/CBC** for detection of anemia and its type

Anemia in pregnancy is defined as Hb <11 g/l in first trimester, <10.5 g/l in second and third trimesters and <10 g/l in the postpartum period.

The detection of anemia should prompt examination of the MCV to identify likely iron deficiency anemia (microcytic anemia) or folate or vitamin B12 deficiency (macrocytic anemia). Further investigations may include B12, folate or iron (ferritin) studies.

Appropriate treatment should be initiated. In accordance with the British Society for Hematology recommendations for anaemic women in pregnancy, a trial of oral iron should be considered as the first line management option, with an increment demonstrated at 2 weeks confirming a positive response. Women with known haemoglobinopathy should have serum ferritin checked and offered oral supplements if their ferritin level is <30 μg/l.

A FBC also allows the identification of low platelets, which may rarely represent de-novo immune thrombocytopaenic purpura. Gestational thrombocytopaenia (a fall in platelet count in pregnancy) rarely presents in the first trimester and is more commonly detected beyond 28 weeks' gestation. Hence a low platelet count in the first trimester warrants further investigation and haematological input; in many settings the threshold for referral is <100 × 10 9/l but individual maternity units may set their own criteria. A baseline platelet count is also useful later in pregnancy if there are concerns regarding conditions such as pre-eclampsia or haemolysis, elevated liver enzymes and low platelets (HELLP) syndrome, which may present with thrombocytopaenia.

- **Electrophoresis** (such as sickle cell diseases and thalassemia), although many women will be aware of their diagnosis prior to pregnancy and may have received preconception counselling. However, women may be unaware that they are carriers, then the father of the baby should be offered counselling and screening.

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Thalassaemia is a group of inherited blood disorders where the Hb is abnormal as a result of mutations in genes that code Hb. They are inherited in an autosomal recessive pattern. Although the thalassaemias can occur worldwide, the carrier rate is particularly common in people from Southeast Asia, and also affects those of Mediterranean, North African, Middle Eastern, Indian and Asian origin. A mutation that affects the alpha chain causes alpha-thalassemia and beta thalassaemia occurs as a result of a mutation in the beta chain. The alpha chains are produced by four genes, two on each chromosome 16, inherited as pairs. The severity of the condition depends on how many of those genes have been altered. If one gene is mutated, women are asymptomatic. If women carry two mutations (alpha-thalassaemia trait) they may have mild anaemia. Haemoglobin H disease occurs when an individual carries three mutated genes and will lead to chronic anaemia that requires regular blood transfusion. Alpha-thalassaemia major occurs when all four genes are mutated and is associated with a high incidence of intrauterine death. There are only two beta genes, one each on chromosome 11. The betathalassaemia phenotype can range from moderate to severe. Beta-thalassaemia major occurs when both beta genes are affected and affected individuals will require blood transfusions for the rest of their life. Beta-thalassaemia intermedia is the milder form of the condition and is non-transfusion dependent. Screening for thalassaemia in the UK is offered to all pregnant women at booking visit using the Family Origin Questionnaire (FOQ) and/or FBC results; those at high risk of having an affected fetus should be then referred to a fetal medicine unit to discuss the option of invasive confirmatory testing.
Sickle cell screen Similar to the other haemoglobinopathies, certain ethnic groups are at higher risk of carrying sickle cell trait. The carrier rate for sickle cell trait (HbAS) is approximately 1 in 10 among Afro-Caribbean people but as high as 1 in 4 in people from West Africa. The carrier frequency for haemoglobin C trait (HbAC) is approximately 1 in 30 but up to 1 in 6 in some groups (e.g. Ghanaians). HbSS (homozygous sickle cell disease) is the most serious form of the disease and these patients have chronic haemolytic anaemia and suffer from sickle cell crisis, which may be precipitated by infection. Women can also have the combination of HbS and another ß-globin variant such as HbSC. These individuals have slightly milder features than seen in HbSS but are still at risk of sickle cell crises. Partners of women with sickle cell disease or trait are offered screening early in pregnancy with the option of invasive testing to detect an affected fetus if both parents are carriers.

.Midstream urine culture /MSU
Urinalysis is performed every antenatal visit. **Urine is screened for Protein**/proteinuria (to detect renal disease or pre-eclampsia)
Persistent **glycosuria** (to detect pre-existing diabetes or gestational diabetes [GDM])
Nitrites (to detect urinary tract infections).
If nitrites are detected on urine dipstick testing, a MSU is sent for microscopy, culture and sensitivity to detect asymptomatic bacteria and appropriate treatment-initiated.
The booking visit to screen for asymptomatic bacteriuria (risk of preterm labor and pyelonephritis)

First trimester infection screen
Serological Screening Maternal infections screening enables potential intervention to reduce the risk to both mother and baby, and enables planning for appropriate specialist antenatal, intrapartum and postnatal care
Rubella For many years maternal immunity to rubella has been tested at booking visits in most countries. The national organization Public Health England has recently stopped routine testing for rubella (from April 2016) on the grounds that rubella infection levels in the UK are so low they are defined as eliminated by the WHO. Rubella infection in pregnancy is now very rare; the mumps,

measles, rubella (MMR) immunization programme has demonstrated that over 90% children aged up to 2 years had received at least one mumps, measles and rubella vaccination. As the screening test used can potentially give inaccurate results and cause unnecessary stress among women, the screening programme has been stopped. The majority of pregnant women are rubella immune and no further action is required. In instances where a woman is found not to be immune, she is advised to avoid contact with individuals known to be currently infected, and offered the combined MMR vaccination following delivery .

Syphilis is a sexually transmitted disease caused by transmission of Treponema pallidum, a spirochaete bacterium. In pregnancy it may cause miscarriage or stillbirth and can cause active disease in newborn infants if contracted antenatally. Between 2011 and 2012, there were 2,978 cases of syphilis diagnosed in the UK. Although diagnosis is rare in pregnancy, due to the increasing incidence of the disease and the fact that it may be safely treated with penicillin in pregnancy, women continue to be routinely screened for syphilis in pregnancy

Hepatitis B Hepatitis screening is performed in pregnancy to reduce infant infection; without preventive measures 90% of babies born to mothers with hepatitis B will contract the virus and develop chronic infection, which is associated with liver failure, cirrhosis and hepatocellular carcinoma. If a baby is born to a woman with active hepatitis B, then the infant should receive hepatitis B vaccine and one dose of hepatitis B immune globulin within the first 12 hours of life. This confers over 95% protection against chronic hepatitis B infection. The infant will need require additional doses of hepatitis B vaccine at 1 and 6 months of age. The test for screening for hepatitis B involves detection of hepatitis B surface antibody (HBsAb or anti-HBs). Detection of the antibody implies immunity to hepatitis B. Hepatitis B surface antigen (HBsAg) indicates the presence of hepatitis B in the blood. Hepatitis B core antibody (HBcAb or anti-HBc) indicates that a person may have been exposed to the hepatitis B virus .

Hepatitis C The National Institute for Health and Care Excellence (NICE) currently recommends that pregnant women should not be offered routine screening for hepatitis C virus because there is insufficient evidence to support its clinical and cost effectiveness. Screening for hepatitis C may be offered to women considered to be at high risk; this includes current or previous intravenous drug use and hepatitis B and/or human immunodeficiency virus (HIV) infection. The risk of transmitting the virus from mother to child is approximately 5%, but this increases significantly up to 36% if there is coinfection with HIV. Screening is performed by examining for hepatitis C virus immunoglobulin (Ig) G antibodies .

HIV The estimated HIV prevalence among pregnant women in the UK is 2 per 1,000. With appropriate interventions risk of transmission to the neonate is as low as 0.1%. Interventions to minimize vertical transmission include initiation of antiretroviral therapy (ART) by 24 weeks' gestation if naive to ART, planned elective caesarean section for those with viral load ≥400 HIV ribonucleic acid (RNA) copies/ml at 36 weeks' gestation and exclusive formula feeding from birth regardless of viral load and ART use. It is recommended that women who decline initial screening should be offered screening again at 28 weeks' gestation

Summary of booking investigations

Investigation	Indication
FBC	Hb, platelet, mean cell volume
MSU	Asymptomatic bacteriuria
Blood group and antibodies screening	Rhesus status and atypical antibodies
Haemoglobinopathy screening	Screening is based on FOQ and blood test result
Infection screening	Hepatitis Syphilis, HIV, (and Rubella status)
Dating scan and first trimester screening	Accurate pregnancy dating and provision of risk assessment for trisomy 21 .18 and 13 and identification of major congenital anomalies

Ultrasound for first trimester dating and screening

Accurate dating through first trimester ultrasound is key to
1-Avoiding issues later in pregnancy such as incorrect identification of growth restriction
2- Inadvertent induction of labour for postdates pregnancy.
3-Enables early identification of multifetal pregnancies,
4- Screening for trisomies and examination of the fetus for gross anomalies such as anencephaly and cystic hygromas.
The dating scan and first trimester screening is best performed between 11+3 and 13+6 weeks' gestation, when the crown–rump length (CRL) measures between 45 and 84 mm. From 14 and 20 weeks' gestation the head circumference is used to date the pregnancy. Beyond 20 weeks' gestation, the impact of genes and environmental factors can cause variability in fetal size. Dating a pregnancy by ultrasound scan therefore becomes progressively less accurate as the gestation advances. This is just one of the potential problems of 'late booking'.
First trimester screening currently involves:

1. Measurement of nuchal translucency (NT). The median and 95th centile for NT is 1.2 mm and 2.1 mm with a CRL of 45 mm, and 1.9 mm and 2.7 mm for a CRL of 84 mm.
2. Measurement of maternal free human chorionic gonadotrophin (β-hCG) and pregnancy-associated plasma protein-A (PAPP-A). In trisomy 21 pregnancies the concentration of free β-hCG is higher (around two multiples of median; MoM) and the concentration of PAPP-A is lower (approximately 0.5 MoM).
3. Maternal age.

Using an algorithm based on the above criteria the detection rate for trisomy 21 is approximately 90%. The false-positive rate can be reduced to 3% by additionally examining the nasal bone, ductus venosus flow and tricuspid flow and this gives a detection rate of approximately 95%.
Screening may also be performed in the second trimester between 14 and 20 weeks' gestation and consists exclusively of risk prediction using maternal biomarkers. The quadruple test measures maternal alpha-fetoprotein (AFP), hCG, unconjugated oestriol (uE3) and inhibin A and has an 80% detection with a 5% false-positive rate. Newer technologies including non-invasive prenatal testing are now available with reported sensitivities for detection of Down's syndrome of more than 99% with a screen-positive rate of less than 0.2%

All eligible pregnant women are offered first trimester combined test screening for Down's syndrome (T21), Edwards' syndrome (T18) and Patau's syndrome (T13).

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Give informations on recommended routine antenatal immunization.

Flu (influenza) shot.

- The flu shot is made from an inactivated virus, so it's safe for both you and your baby.
- Avoid the influenza nasal spray vaccine, which is made from a live virus.

whooping cough vaccination

in pregnancy, the body produces antibodies to protect against whooping cough. These antibodies pass to the baby giving them some protection until they're able to have their whooping cough vaccination at 8 weeks old.

Tetanus toxoid, diphtheria toxoid and acellular pertussis (Tdap) vaccine.

One dose of Tdap vaccine is recommended during each pregnancy to protect a newborn from whooping cough (pertussis), regardless of when was the last vaccination.
Ideally, the vaccine should be given **between 27 - 36 weeks** of pregnancy

immunization against -tetanus to prevent the risk for her and her fetus.

Also, it is important that every pregnant mother should receive a tetanus vaccination card with her first tetanus dose and keep it to record subsequent doses

COVID-19 Vaccination.

- Is strongly recommended.
- It should be offered to pregnant women at the same time as the rest of the population
- Pregnant women should be offered the Pfizer-BioNTech or Moderna vaccines unless they

have already had one dose of the Oxford-AstraZeneca vaccine, in which case they should complete the course with Oxford-AstraZeneca

- Vaccines can be given at any time in pregnancy.

Hepatitis B vaccine.

If the pregnant woman at increased risk of certain infections, such as health care provider HBV vaccine also might be recommended during pregnancy

Live vaccines should be avoided include

- BCG (vaccination against tuberculosis)
- MMR (measles, mumps and rubella)
- Oral polio (which forms part of the 5-in-1 vaccine given to infants)
- Oral typhoid
- yellow fever

 Identification of high-risk women

1. pre-eclampsia (PE)
2. gestational diabetes (GDM)
3. venous thromboembolism (VTE)
4. fetal growth restriction (FGR)
5. Preterm birth.

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. 1-Preeclampsia

women considered to be at high risk of pre-eclampsia should have low-dose aspirin (75 mg) treatment initiated early in pregnancy until delivery. Women considered to be high risk include:

- ➢ Hypertensive disease during a previous pregnancy.
- ➢ Chronic kidney disease.
- ➢ Autoimmune disease such as systemic lupus erythematosus or antiphospholipid syndrome.
- ➢ Type 1 or type 2 diabetes.
- ➢ Chronic hypertension.

Furthermore, women with two or more moderate risk factors for pre-eclampsia are also recommended to commence aspirin early in pregnancy until delivery. Moderate risk factors for the development of pre-eclampsia include:

Primiparity.
Advanced maternal age (>40 years).
Pregnancy interval of more than 10 years.
BMI ≥35 kg/m2 at booking visit.
Family history of pre-eclampsia.
Multifetal pregnancy.
Pregnancy interval of more than 10 years.
BMI ≥35 kg/m2 at booking visit.
Family history of pre-eclampsia.
Multifetal pregnancy.

All women should be screened at every antenatal visit for pre-eclampsia by measurement of blood pressure and urinalysis for protein

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2-Screening for GDM

Gestational diabetes

Universal screening for GDM is available in some countries including the USA and Australia. However, risk-based screening is advocated in the UK. GDM is diagnosed if a woman has a fasting plasma glucose level of 5.6 mmol/l or above, or a 2-hour plasma glucose level of 7.8 mmol/l or above.

Women who have had previous GDM should be offered a glucose tolerance test or random blood glucose in the first trimester, with the aim of detecting preexisting diabetes that may have developed since a preceding pregnancy

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Risk factors for GDM: women with previous gestational diabetes, previous macrosomia (≥4.5 kg), raised BMI (≥30 kg/m2), first-degree relative with diabetes or women of Asian, black Caribbean or Middle Eastern origin.

- **If risk factors are present**, the woman should be offered a 2-hour 75 g oral glucose tolerance test **(OGTT) at 24–28 weeks' gestation**.
- **Women with a previous history of GDM** should have an **OGTT at 16–18 weeks'** gestation. The test should be repeated at 24–28 weeks of pregnancy.

3-Risk factors for VTE

- Risk assessment should be done to all women in early pregnancy or pre-pregnancy.
- Previous history of VTE, single or recurrent episodes.
  Assessment is important to determine the pregnant at risk and the need for thromboprophylaxis (antepartum and post-partum or postpartum alone).
- Risk assessment should be repeated if the woman is admitted to hospital for any reason or develops other intercurrent problems.
- Risk assessment should be repeated again intrapartum or immediately postpartum.
- The risk of VTE should be discussed with women at risk
- Thrombophilia-associated VTE heritable thrombophilia and acquired thrombophilia (antiphospholipid syndrome)/APS.

4-Fetal growth restriction NICE guidelines recommend that symphysis–fundal height (SFH) measurements should be performed at every antenatal appointment from 24 weeks' gestation. Concerns that fetal growth may be slow, or has stopped altogether, should prompt ultrasound scanning.

5-Risk factors for preterm birth include:

- Previous preterm birth, late miscarriage, multifetal pregnancies and cervical surgery such as previous cone biopsy.
- These women may be offered serial cervical length screening with or without the use of fetal fibronectin to detect increased risk of preterm birth.

Note: no agreed screening protocol for preterm birth is available.

Managing complications and common problems

- heartburn
- nausea and vomiting
- pelvic girdle pain
- unexplained vaginal bleeding.

✶ Follow up appointments

First trimester

If the booking appointment occurs prior to 11 weeks' gestation, offer an additional appointment for ultrasound examination between 11 and 14 weeks

2

A11- 14-week appointment /Dating scan appointment Benefits of a dating scan:

- Accurate dating in women with irregular periods or not remember her LMP.
- Reduced incidence of induction of labor for prolonged pregnancy.

- Detection of fetal heart beat and rate.
- Measurement of nuchal translucency (NT) that maximize the potential for serum screening to detect fetal anomalies.
- Examination of the fetus for gross anomalies such as anencephaly and cystic hygromas
- Early detection of multifetal pregnancy.
- Detection of asymptomatic failed intrauterine pregnancy.

Second trimester

It includes multiple appointments, general points in all appointments:

Update the woman's antenatal records with details of history, test results, examination findings, medicines and discussions.

Identify whether the woman needs additional care.

1. 16-week gestation appointment (14-18 weeks) for all women should include:

- **Update the history (**in addition to booking history**)** Ask the woman about:
  - her general health and wellbeing
  - domestic abuse
  - mental health
- **Continue discussions** Discuss and give information on:
  - physical, emotional and relationship changes
  - support between partners
  - bonding with the baby and emotional attachment
  - results of any tests from previous appointment.
  - her birth preferences, their implications, their benefits and risks appointments.

- **Reassess the high-risk women**
- Reassess her risk of VTE, if she had any hospital admission or significant health event.
- Reassess the risk of pre-eclampsia and advise those at risk to take aspirin.

- **Repeat examinations and investigation (with important concern to these)**
  - **Blood pressure** measure
  - **A urine dipstick test** for proteinuria. since her last appointment.
  - **Fetal heart beat** FHB monitoring/by
- **Fetal doppler**/handheld ultrasound device (can detect FHB by 10-12 weeks)
- **A stethoscope**/detect FHB by 18-20 weeks but not always easy to detect FHB
- **Managing complications and common problems**.as above

Note: All other appointments have the same 16-week appointment assessment

2

18–20-week scan appointment/anomaly scan

- General measures as previous appointment

  Ask about first fetal movement.

  at this appointment Perform an ultrasound scan to:
  - **screen for fetal anomalies**
  - **determine placental location. (**If low lying another scan at 32 weeks)
  - Gestational age.
  - Amount of liquor.

If there is any abnormality refer to special unit/feto-maternal medicine specialist.

2. 25-week appointment (nulliparous women only)

- Same as above
- in this appointment:
- **Measure symphysis fundal height (SFH)** in women with a singleton pregnancy, unless the woman is having regular growth scans or SFH has been measured less than 2 weeks ago.

▪ Plot the measurement onto a growth chart.
▪ If there are concerns that SFH is either large or small for gestational age, further assessment is required and referral to fetal medicine specialist.

- **Discuss the baby's movements** with the woman. Advise her to contact maternity services at any time of day or night if she has any concerns about her baby's movements (notices reduced fetal movements).

Third trimester

3. 28-week appointment: the same as 2nd trimester

- **Update the history**
- **Continue discussion**
- **Repeat examination and investigation**
- **Managing common complications and problems in this appointment**

▪ full blood count, blood group and antibodies.
▪ Routine antenatal anti-D prophylaxis (RAADP) to rhesus-negative non sensitized women. RAADP can be administered by community midwives or at antenatal clinics. given in one of 3 regimens:(deep IM in deltoid muscle).

- two doses of anti-D immunoglobulin of 500 IU (one at 28 weeks and one at 34 weeks)
- two doses of anti-D immunoglobulin of 1000–1500 IU (one at 28 weeks and one at 34 weeks)
- a single dose of 1500 IU either at 28 weeks or between 28- and 30-weeks' gestation.

No evidence on difference between these regimens

▪ Advise the woman to avoid going to sleep on her back after 28 weeks of pregnancy.
▪ Measure symphysis fundal height (**SFH**) in **parous** women with a singleton pregnancy.

4. 31-week appointment:

Same as above

2

5. 34-week appointment

▪ Continue the discussions about preparing for labor and birth
▪ Recognizing active labor, and the postnatal period.
▪ Confirm the woman's birth preferences, discussing the implications, benefits and risks of all options.

6. 36-week appointment

At this appointment

▪ If you suspect a breech presentation based on abdominal palpation, perform an ultrasound scan to determine the presentation. If breech presentation is confirmed, discuss the different options and their benefits, risks and implications, including:

- external cephalic version (turning the baby so it is head down)
- breech vaginal birth
- elective caesarean birth.

▪ Give information on infant feeding, care of the new baby, vitamin K prophylaxis, newborn screening tests, and postnatal self-care

7. 38-week appointment

▪ Discuss prolonged pregnancy and options on how to manage this.
▪ All women should be offered information about the risks associated with pregnancies
▪ that last longer than 42 weeks.

- The information should cover:
  - the reasons for induction being offered
  - when, where and how induction could be carried out
  - the arrangements for pain relief
  - the alternative options if the woman chooses not to have induction of labor
  - the risks and benefits of induction of labor and induction methods
  - induction may not be successful and what the woman's options would be

8. 40-week appointment (nulliparous women only)

Discuss prolonged pregnancy and options on how to manage this.

9. 41-week appointment (for women who have not yet given birth)

- Women with uncomplicated pregnancies had a chance to go into spontaneous labor.
- Women with uncomplicated pregnancies should usually be offered induction of labor between 41^{+0} and 42^{+0} weeks to avoid the risks of prolonged pregnancy.
- The timing should be according to woman's preferences and local circumstances.
- If a woman chooses not to have induction of labor, her decision should be respected.
- From 42 weeks, women should be offered increased antenatal monitoring consisting of at least twice-weekly cardiotocography and ultrasound (maximum amniotic pool depth

Note

There is no consensus on the recommended 'routine' use of ultrasound in pregnancy. The majority of units offer dating scans (at end of first trimester) and anomaly scans (at around 20–22 weeks' gestation) but no further growth assessment unless clinically indicated. Some units offer an additional third trimester growth scan but this is still being evaluated in research studies.

KEY LEARNING POINTS

- ➢ Antenatal care improves pregnancy outcomes and a variety of models exist.
- ➢ There are key visits during the pregnancy when essential investigations or decisions are taken regarding antenatal care and delivery.
- ➢ Antenatal care should be seen as an opportunity for education, reassurance and screening for potential problems.
- ➢ Continued efforts should be made to improve the access to antenatal care for disadvantaged and minority groups.