

Weight Management in pregnancy (BMI<18.5 & >30mg/kg ²)		
Related National Guidance	<p>Care of Women with Obesity in Pregnancy. RCOG Green-top Guideline No. 72. November 2018.</p> <p>Weight management before, during and after pregnancy. NICE Public health guideline [PH27] Published: 28 July 2010.</p>	
E-library number	CG 1010	
Version number	V5	
Purpose	To plan the management of women with a body mass index (BMI) >30 kg/m ² in pregnancy, with the aim to reduce morbidity and mortality risk in both mothers and babies.	
Primary Specialty	Obstetrics	
Related Specialties	-	
Specialty Clinical Guideline Lead	Mr Stephen Keay – Clinical Director Stephen.Keay@uhcw.nhs.uk	
Authors	Lead Author:	Dr Vandana Dhingra, Consultant Obstetrician Vandana.Dhingra@uhcw.nhs.uk
	Reviewer(s):	Dr Murthy Narasimha, Consultant Physician Murthy.Narasimmha@uhcw.nhs.uk Dr John Elton, Consultant Anaesthetist John.Elton@uhcw.nhs.uk Lucy Miller, Specialist Pharmacist Lucy.Miller@uhcw.nhs.uk Rachel Harrison, Public Health Midwife Rachel.Harrison@uhcw.nhs.uk
Approving Forums	Obstetrics and Gynaecology QIPS	
Approval Dates	QIPS	25/05/2023
	MMC	N/A
	Other	N/A
Review Date	25/05/2026	
Keywords	Obesity , Raised BMI, BMI > 30, weight management in pregnancy	



We **Care.** We **Achieve.** We **Innovate.**

Clinical guideline content: Clinical Guidelines assist in decision-making; they do not replace clinical judgement. Regardless of the strength of evidence, it remains the responsibility of the clinician to interpret the application of the clinical guidance to local circumstances and the needs and wishes of the individual patient. Where variations of any kind do occur, it is important to document the variations and the reason for them in the patient's health record. If in doubt, seek senior advice.

Please note: The following systems have been replaced by the trust Electronic Patient Record system (EPR). If any of these systems are identified within the document, please substitute them for the appropriate EPR alternative system and refer to relevant corresponding EPR procedures.

1. Opera (theatres)
2. Centricity (Critical Care)
3. Wardview
4. Extramed
5. CRRS
6. VitalPack
7. Adastra (CUTC)
8. K2 (maternity portal replaced by PPUK)
9. i.PM
10. Athena (Maternity)
11. SCIT App (replaced by camera capture)

Please contact EPREnquiries@uhcw.nhs.uk if you have any questions about the systems listed or the EPR system introduced in their place.

On review of this document please ensure the systems listed are removed from the text and replaced with the relevant EPR system and process.

Equality and Diversity Statement: Throughout its activities, the Trust will seek to treat all people equally and fairly. This includes those seeking and using the services, employees and potential employees. No-one will receive less favourable treatment on the grounds of sex/gender (including Trans People), disability, marital status, race/colour/ethnicity/nationally, sexual orientation, age, social status, their trade union activities, religion/beliefs or caring responsibilities nor will they be disadvantaged by conditions or requirements which cannot be shown to be justifiable. All staff, whether part time, full-time, temporary, job share or volunteer; service users and partners will be treated fairly and with dignity and respect.

Rationale

This guideline is in line with RCOG Green-top Guideline No. 72 and NICE PH27.



Dissemination and related guidance

On notification of upload to eLibrary, obstetric staff will be notified via QIPS and email circulation.

Related Guidance

[CG 1005 Thromboprophylaxis in pregnancy](#)

[CG 991 Intrapartum fetal surveillance](#)

[CG 993 Shoulder dystocia and early suspected brachial plexus injury](#)

[CG 970 Operative Vaginal Delivery](#)

[CG 2065 Dating Ultrasound Guideline](#)

[CG 172 Caesarean Section](#) (due for update)

[CG 989 Management of Vaginal Births After Caesarean Sections \(VBAC\)](#)

[CG 1078 Clinical risk assessment during the antenatal and intrapartum period](#)

[CG 1015 Hypertensive disorders in pregnancy](#)

[CG 1838 Management of Wounds including The Wound Care Product Formulary](#)

OPER-POL-008-10 [Handling and Moving Policy](#)

- Enhanced recovery after caesarean section guideline
- CG 630 [Recovery of Women Following General or Regional Anaesthesia in Obstetrics guideline](#)

Training

Midwives/maternity health care workers/obstetricians:

- Moving and handling training - at induction and then annually according to maternity TNA.
- Fetal surveillance – at induction and then annually according to maternity TNA.
- Management of thromboembolic disease - at induction and then annually according to maternity TNA.
- Management of shoulder dystocia - at induction and then annually according to maternity TNA.
- Tissue viability update – Use of ASKIN tool at induction and then according to individual needs
- Essential care pathway for health care workers – as part of UHCW NHS Trust health care worker training programme.

Patient Information

- Patient's guide to preventing pressure ulcers (bedsores) during labour
- Being overweight and pregnant – Achieving a healthy and safe birth.
- Healthy eating (BDA leaflet)
- Enhanced recovery after caesarean section patient information leaflet
- Caesarean section patient information leaflet



Audit & Monitoring			
Audit title	Audit Lead	Monitoring method and frequency	Committee responsible
<ul style="list-style-type: none"> • Calculation and documentation of body mass index (BMI) in the electronic patient information system • Requirement that all women with a BMI >30 should be advised to book for maternity team-based care • Requirement that all women with a BMI >35 should be advised to deliver in an obstetric led unit • Requirement that all women with a BMI >40 have an antenatal consultation with an obstetric anaesthetist & management plan for labour and delivery should be discussed • Requirement that all women with a BMI >30 have a documented antenatal consultation with an appropriately trained professional to discuss possible intrapartum complications • Requirement to assess the availability of equipment in all care settings for women with a high BMI • Requirement that all women with a BMI >40 have an individual documented assessment in the third trimester of pregnancy by an appropriately trained professional to determine manual handling requirements for childbirth and consider tissue viability issues 	Louisa Talbott	2 yearly audits	Obstetrics & Gynaecology Audit Meeting
Changes from previous version			
Date	Updated information		
June 2022	Transferred to new template. Removal/consolidation of appendices and additional references to related Trust CG added. Reduced frequency of weighing patients. ANC and scan frequency updated to 32, 36, and 40 weeks in line with national guidance.		



Contents

Definitions	6
Introduction	8
Scope	10
Roles and Responsibilities	10
Clinical guidance	11
Pre-pregnancy	11
Women who have undergone bariatric surgery	11
Women with a BMI \leq 18.5	12
Antenatal Care	13
Booking	13
Management plan in pregnancy	14
Pregnancy post-bariatric surgery	16
Labour & Delivery	17
Operative Delivery	18
Caesarean Section	18
Postnatal Care	19
Appendices	20
References	20



Definitions

Body mass index (BMI) is the most common assessment of obesity combining the patient's height (in meters) and weight (in kilograms) in the following equation:

$$\text{Body Mass Index (BMI)} = \frac{kg}{m^2}$$

Adults with a BMI >30 kg/m² are considered to be obese; The Institute of Medicine⁽⁵⁾, World Health Organisation, and National Institute of Health and Clinical Excellence⁽⁴⁾ have grouped obesity into different classifications as shown in the table 1 below.

Table 1. Classification of Obesity

Classification	BMI (kg/m ²)
Underweight	<18.5
Healthy weight	18.5–24.9
Overweight	25–29.9
Obesity I (mild)	30–34.9
Obesity II (moderate)	35–39.9
Obesity III (severe)	≥40



We **Care**. We **Achieve**. We **Innovate**.

Abbreviations

BDA	British Dietetic Association
BP	Blood Pressure
CS	Caesarean Section
FBC	Full Blood Count
FSE	Fetal Scalp Electrode
GA	General Anaesthetic
GDM	Gestational Diabetes Mellitus
GP	General Practitioner
GTT	Glucose Tolerance Test
HDU	High Dependency Care
IA	Intermittent Auscultation
IOL	Induction of Labour
IUGR	Intrauterine Growth Restriction
KG	Kilograms
LMWH	Low Molecular Weight Heparin
MG	Micrograms
NICE	National Institute for Clinical Excellence
NICU	Neonatal Intensive Care Unit
OD	Once Daily
PE	Pre-Eclampsia
RCOG	Royal College of Obstetricians and Gynaecologists
RCM	Royal College of Midwives
SFH	Symphysis Fundal Height
TNA	Training Needs Analysis
UHCW	University Hospital Coventry & Warwickshire
USS	Ultrasound Scan
UTI	Urinary Tract Infection
VBAC	Vaginal Birth After Caesarean Section
VTE	Venous Thromboembolism
WHO	World Health Organisation

We Care. We Achieve. We Innovate.

Introduction

Obesity is a growing problem in pregnancy and is associated with an increased incidence of both maternal and fetal risks. ^(6,7)

Maternal risks include ⁽⁷⁻¹⁶⁾

- Infertility
- Miscarriage
- Increased morbidity & mortality
- Insulin resistance & gestational diabetes
- Hypertension, pre-eclampsia toxaemia & eclampsia
- Poor wound healing & tissue breakdown
- Need for induction of labour and caesarean section both elective and emergency
- Prolonged/dysfunctional Labour
- Difficult abdominal palpation of fetus
- Difficult transabdominal fetal monitoring
- Postpartum haemorrhage
- Postnatal infection
- Deep vein thrombosis and pulmonary embolism
- Mental health problems – antenatal and postpartum depression
- Reduced rates of breastfeeding
- Urinary tract infection
- Sleep apnoea and complications
- Difficult / delayed /failed regional anaesthetic blockade
- Difficult airway maintenance
- Increased risk of failed endotracheal intubation
- Difficult venous access
- Increased risk of ICU admission
- Difficult blood pressure assessment.

Increased risks to baby include ^(7-9, 17-20)

- Mortality – still birth and neonatal death increase 2-3 times.
- Fetal birth defects, especially Neural tube defects
- Fetal macrosomia associated with shoulder dystocia
- Birth injury



We Care. We Achieve. We Innovate.

- Placental insufficiency & small for gestational age
- Potential difficulties in estimating fetal size and fetal cardiac monitoring
- Obesity & metabolic disorders in childhood and later life
- Difficult ultrasound scanning hence limitations of interventions if needed
- Increased neonatal ICU admission

Other risks include moving and handling injuries to mother and staff.

Appropriate monitoring and management during pregnancy is vital to improving the outcome for both mother and baby.

Risks of obesity in infants and prevention via the promotion of breastfeeding (30-35)

Infants of obese mothers have an increased risk of becoming obese in childhood and breastfeeding protects against obesity. A World Health Organisation (WHO) meta-analysis found that breastfeeding was associated with a reduction in the chances of a child becoming obese by up to 25% . Overweight and obese women are more likely to be delivered by caesarean section thereby altering the microbiome of the infant which in itself gives an increased risk of obesity . Protection against overweight and obesity through breastfeeding is dose dependent with longer exclusivity and duration conferring greater protection . Appetite peptides and hormones such as ghrelin, leptin and adiponectin in human milk help the infant to register satiety and self-regulate intake . Human milk is also rich in Bifidobacteria, which have been shown to be present to a lesser extent in the gut of obese children. In addition, children who are breastfed seem to have more favourable food preferences, eating more fruit and vegetables as compared to those who are formula fed . Infant formula induces different hormonal responses in babies, causing a greater insulin response which leads to fat deposition and increased adiposity . Maternal obesity is associated with delayed onset of lactation, physical difficulties with positioning the baby at the breast, reduced breastfeeding rates and shorter breastfeeding duration .



Scope

This document outlines the agreed policy and service description for the management of women with a body mass index (BMI) < 18.5 and >30 kg/m² for all health care professionals involved in women's health.

Roles and Responsibilities

- a) Obstetric & anaesthetic doctors – clinical risk assessment and diagnosis and implementation of clinical guideline.
- b) Midwives – implementation of clinical guideline.
- c) Modern Matrons – to check that all appropriate equipment is available – especially delivery beds, weighing scales, and wheelchairs.
- d) Ultrasound department – increased requirements for ultrasound scanning.
- e) Theatre teams – awareness of clinical problems.
- f) Intensive care – awareness of potential increased requirement for intensive care facilities.
- g) All staff involved in moving and handling – safe handling and provision of appropriate equipment.



We Care. We Achieve. We Innovate.

Clinical guidance

Planning for women with obesity in pregnancy is essential. It is important that all women are given respect and treated as an individual.

Pre-pregnancy

Women of childbearing age with a BMI 30 kg/m^2 or greater should receive information and advice about the risks of obesity during pregnancy and childbirth, and be supported to lose weight before conception and between pregnancies in line with NICE CG189.⁽⁴⁾ All women considering pregnancy should have the opportunity to optimise their weight before becoming pregnant.

Pre-pregnancy counselling for women with a BMI $>35 \text{ kg/m}^2$ is recommended in subfertility, recurrent miscarriage, and diabetic clinics.

Women with a BMI 30 kg/m^2 or greater wishing to become pregnant should be advised to take supplementation with folic acid PO 5mg once daily, starting at least 1 month before conception and continuing during the first trimester of pregnancy. Women should be advised to commence Vitamin D as colecalciferol 10 micrograms (400 units) daily upon becoming pregnant.

Women should be given advice on how to use Healthy Start vouchers, if eligible, to increase fruit and vegetable intake, and to obtain Health Start vitamins for women, which contain the recommended 10 micrograms vitamin D.

Referral to a dietician and diabetes screening should also be undertaken.⁽²⁾

Women who have undergone bariatric surgery

Increasing numbers of women have undergone bariatric surgery and are becoming pregnant. Owing to rapid weight loss post bariatric surgery women are routinely advised to avoid pregnancy for 12–18 months. However, not all women will adhere to this advice.⁽²²⁻²⁵⁾ All women who have undergone bariatric surgery should be referred to the specialist raised BMI Obstetric clinic.



Women with a BMI \leq 18.5

Women with a BMI \leq 18.5 must be referred for consultant led care. In addition, identify if any of the following are present

- psychological issues (consider complex care referral)
- alcohol and substance abuse (consider substance misuse referral)
- disturbed eating behaviour
- smoking

If any of the above are present refer to consultant led care and specialist services as appropriate (i.e. Complex Care team, Substance Misuse, Smoking Cessation, Dietetics and safeguarding).

Women with a BMI of 18.5 and below will be:

- Referred to the dietician for advice on appropriate nutrition.
- Book serial growth scans from 32 weeks until birth
- Assessed for tissue viability (mobility, handling and equipment requirements)
- Have a tissue viability risk assessment undertaken as per the ASKIN tool and if the score identifies that the woman is at risk of developing a pressure area, then a pressure area assessment and management plan will be instigated. This will be fully documented in the healthcare records

For women with a BMI below 18.5 careful moving and positioning will be necessary during labour and birth to protect pressure areas and bony prominences. If appropriate women will be encouraged to keep as mobile and active as possible to promote normality and prevent pressure areas developing. Extra care must be taken when using the lithotomy position for either birth or suturing to prevent nerve damage.



Antenatal Care

Booking

- BMI should be calculated at the booking visit and recorded in the patient's medical record. This includes measuring the woman's height and weighing the mother to ensure her BMI is correctly calculated. Women with a BMI 30.0–34.9 kg/m² should receive maternity team based care while those with a BMI >35 kg/m² should receive consultant lead care, and BMI >40 should be booked under the specialist raised BMI obstetric clinic.) Women with a BMI of <18.5 must be referred for consultant led care.
- Routine booking investigations and oral glucose tolerance test (OGTT) should be offered at 26–28 weeks for any lady with a BMI >30 kg/m². *Refer to UHCW CG 1011 Diabetes in Pregnancy.*
- Dietary advice should be offered by the community midwife and provide women with healthy eating and exercise leaflet, 'Being Overweight and Pregnant – Achieving a Healthy and Safe Birth' (available on eLibrary). Offer referral to a community weight loss management organisation (see Appendix 9)
- Assess patient's mental health. Obese women are more likely to have low self esteem and have a higher incidence of mental health issues than their non-obese counterparts both antepartum and postnatal depression.⁽²⁴⁾ There are also associations between mental health and subsequent obesity.^(24,25) Consider referral to perinatal mental health team if required, and monitor mental health through pregnancy.
- Commence raised BMI pathway (appendices 1,2& 3) and low BMI pathway for women with a BMI <18.5 (Appendix 4 & 5)
- Women with a BMI >35 are unsuitable for monitoring of growth by Symphysis Fundal Height (SFH) measurement alone, and must have serial growth scans from 32 weeks gestation every 4 weeks and until delivery (Saving Babies Lives, 2019).
- All women should receive information in early pregnancy from their midwives on the protective effects of breastfeeding for their babies. These conversations should be repeated at least twice during the pregnancy as recommended by the Unicef Baby Friendly Initiative. This will help to ensure

We Care. We Achieve. We Innovate.

women and their families have sufficient information and understanding to make an informed decision on how to feed their baby. This is especially important for women with the increased risk factors associated with raised BMI. Information should also be given on the benefits of antenatal expression of colostrum³⁷

At all antenatal visits

1. Record blood pressure (BP) using the correct sized cuff (see appendix 6) by measuring the mid-arm circumference at each visit.

A cuff which is too small will over-estimate the blood pressure. Record cuff size used in patient's notes.

2. Urine dipstick.
3. Risk assessment at every visit to identify new risks and manage appropriately.
4. Update pathway and VTE scoring.
5. Conversations as per BFI initiative to support promotion of breastfeeding

Management plan in pregnancy

An individualised management plan should be discussed and documented in the patient's notes; Commence the care pathway for low/ raised BMI.

It should include:

1. Discussions regarding raised BMI and the associated complications to both mother and baby.
2. Discuss weight management in pregnancy and offer additional information regarding healthy eating and exercise, and provide leaflet/online resource. Referral to a dietician should be offered, if required.
3. Offer **folic acid** PO 5mg once daily, continued during the first trimester of pregnancy.
4. Do not weigh women repeatedly during pregnancy as a matter of routine. Women with a BMI >30kg/m² should be reweighed at least once in the 3rd trimester. Midwives should encourage women to lose weight after pregnancy.



5. Pre-eclampsia prophylaxis: If no contraindications, commence both:
 - a. **Aspirin** PO 150mg once daily, until delivery.
 - b. **Adcal D3** 1 tablet once daily, until delivery.
 - c. *Refer to UHCW CG 1015 Hypertensive Disorders in Pregnancy.*
6. **Venous thromboembolism (VTE) risk assessment** should be carried out according to *UHCW CG 1005 Thromboprophylaxis in Pregnancy*.
Obesity is a pre-existing risk factor for VTE – score is based upon BMI at booking:⁽²¹⁾
 - a. Patients with BMI >30 kg/m² VTE risk score = 1
 - b. Patients with BMI >40 kg/m² VTE risk score = 2

Please remember to dose pharmacological thromboprophylaxis appropriately according to the patient's weight at booking. Anti-Xa level monitoring is recommended in patients weighing >90kg. Refer to CG 1005 for further details including dosing.

7. BMI >40 kg/m² should be referred to the **high-risk anaesthetic** clinic for an appointment after 28 weeks gestation, ideally, and earlier in BMI >50 kg/m².

This is because adequate regional or general anaesthesia is difficult in these patients and in a Category 1 LSCS, a decision to delivery time of 30 minutes may not be achievable. If, after anaesthetic review, it is felt that a decision to delivery time is not realistically achievable, a delivery plan should be discussed between the obstetrician, anaesthetist, and the patient.

It is important to discuss the risks and benefits of an elective LSCS versus a potential category 1 emergency caesarean section.

8. Women with a booking BMI >40 kg/m², for whom moving and handling are likely to prove unusually difficult, should have a **moving and handling risk assessment** carried out in the third trimester of pregnancy to determine any requirements for labour and birth.

Clear communication of manual handling requirements should occur between the labour and theatre suites when women are in early labour.

Requirement for **specialist equipment** should be assessed and documented in the manual handling assessment



9. Arrange growth scans: If BMI is $\geq 35 \text{ kg/m}^2$, serial growth scans from 32 weeks gestation, every 4 weeks until delivery.

10. **Oral glucose tolerance test (OGTT)** should be undertaken to assess for gestational diabetes (GDM).

GTT is not appropriate for women with previous bariatric surgery due to the risk of dumping syndrome. In this case, contact the diabetic team for home blood glucose monitoring +/- HbA1c measurement.

If the woman is identified as having diabetes, she should be referred to the multidisciplinary diabetes antenatal clinic.

Pregnancy post-bariatric surgery

Women who have undergone bariatric surgery may have a reduced ability to absorb nutrients from oral intake dependent on the type of bariatric surgery procedure. Numerous types of bariatric surgery are available including a Gastric Band, Sleeve Gastrectomy and Gastric Bypass.

All pregnancies can be complicated by hyperemesis however having a reduced stomach volume already predisposes these women to vomiting/regurgitation and so those who have undergone bariatric surgery may experience particularly severe symptoms.⁽²³⁾ Those presenting with hyperemesis should be referred to the dieticians and bariatric nurses to ensure they receive sufficient nutrition at this time.

Consideration can be given to deflating a gastric band if one is in place in 1ml intervals until no restriction is achieved.⁽²²⁾ There is currently no gold standard pathway with regard to complete gastric band deflation during pregnancy.⁽²¹⁾

Women, as part of preconception care, are advised to avoid vitamin and mineral preparations which contain vitamin A in the retinol form in the first 12 weeks of pregnancy. Supplements containing retinol may increase the teratogenic risk especially in the first trimester. Bariatric patients are usually on A-Z complete supplements which usually contain high doses of Vitamin A. There are vitamin and mineral supplements containing no vitamin A which are specifically aimed at preconception and pregnancy e.g. Pregnacare®, Seven Seas Pregnancy® and Centrum Pregnancy Care®.

Patients who become pregnant following bariatric surgery should undergo nutritional



screening every trimester. This should include ferritin, folate, vitamin B12, calcium and fat soluble vitamins.

Do not assume that due to raised BMI weight loss is not an issue as many patients with a raised BMI are already malnourished.⁽³⁰⁻³³⁾ Healthy eating should be the aim of all visits.

Labour & Delivery

1. All women with a BMI $>40 \text{ kg/m}^2$ should be scanned on admission to confirm the presentation of the baby and they should be delivered on labour ward.

Consideration for midwife-led care on Lucina Birth Centre can be made in conjunction with Lucina lead /consultant midwife after the manual handling assessment has been done.

2. The patient's notes should be reviewed for discussions regarding delivery; manual-handling assessment should be completed (this can be found in the hospital notes) and high-risk anaesthetic review (BMI $>40 \text{ kg/m}^2$).
3. The shift leader should ensure all appropriate equipment is in place for delivery.
4. For women presenting in labour with a BMI $>40 \text{ kg/m}^2$ the labour ward consultant and anaesthetist should be informed to allow a discussion regarding risk.
5. All women with a BMI $>40 \text{ kg/m}^2$ must have a large bore (16 gauge) cannula sited early in labour, and a blood sample taken for FBC and Group and Save.
6. For all women with a BMI $>40 \text{ kg/m}^2$, thigh-length graduated elastic compression stocking should be recommended.

If the appropriate size is not available Flowtron® boots or an intermittent pneumatic compression device should be used if immobile.

Mobility during labour is encouraged.

7. Early epidural should be considered, especially if difficult epidural or spinal is anticipated. Use of ultrasound to identify anatomy is recommended.
8. Oral omeprazole PO 20mg should be given twice daily during labour for all women with a BMI $>40 \text{ kg/m}^2$, in case of emergency LSCS.
9. Fetal surveillance should be undertaken during induction and labour. In cases where external monitoring is difficult, a fetal scalp electrode should be used unless there is a contraindication.



10. Skin care should be undertaken especially in those with prolonged labours. If concerns regarding skin integrity are raised, tissue viability should be contacted.
11. Although active management of the third stage of labour is advised for all women, the increased risk of PPH in those with a BMI greater than 30 kg/m² makes this even more important.

Operative Delivery

- For all women with a BMI >45 kg/m², the most senior doctor available should undertake all operative births in theatre. If the consultant is not onsite, they should be informed if an operative delivery is planned. The anaesthetic consultant should be informed if an operative delivery is planned in theatre.
- Please see the equipment guide (appendix 7) to identify specialist equipment based on the weight of the patient.

Caesarean Section

1. At the time of booking an elective caesarean section, a manual handling assessment should have been undertaken. This will help guide which specialist equipment is required in theatre (the paperwork is in ANC).
2. For women with a BMI >45 kg/m², a consultant obstetrician or senior registrar should be present unless an emergency.

It should be noted that the abdominal wall anatomy may be distorted due to a large panniculus which may displace the umbilicus inferiorly. Two assistants should be present to retract the abdominal wall and expose the operating field. Cell salvage is recommended.

3. Devices for improving the surgical field include the *TRAXI* abdominal wall sheet and the *Alexis O Ring* internal retractor and are available in a dedicated equipment box.
4. Care should be taken as to where the transverse incision should be made. Surgical site infection and wound complication rates are higher in obese women irrespective of the type or site of incision.⁽²⁶⁾ It is advisable to avoid the area directly below the panniculus as this increases post op wound infection rates. A transverse incision is made higher up in the abdomen.
5. Where a midline incision is required over a lower transverse incision, it should be



noted that there is a higher rate of dehiscence, hernia formation and post op-pain.⁽²⁶⁾

6. Haemostasis is essential and electro-diathermy (handheld for entry) is ideal for use during abdominal incision followed by achieving early haemostasis in the pelvis.
7. A drain should be considered at the discretion of the surgeon.
8. Women undergoing caesarean section who have more than 2 cm subcutaneous fat should have suturing of the subcutaneous tissue space in order to reduce the risk of wound infection and wound separation
9. Closure of the rectus sheath is best undertaken using looped PDS owing to a longer half-life than Vicryl.⁽²⁷⁾
10. A PICO dressing should be used to dress the wound.
11. Routine vaginal toilet at end of operation to reduce infection.
12. Ensure the VTE scoring is undertaken and appropriate thromboprophylaxis is prescribed as per guideline *UHCW CG 1005 Thromboprophylaxis in Pregnancy*.

Postnatal Care

Explain to the patient what the plan is for her care and why it is important.

- Early mobilisation, hydration and appropriate use of TEDS and LMWH will reduce the incidence of VTE.
- Ensure documentation with regards to VTE compliance, especially if a patient is declining an intervention.
- Ensure adequate analgesia is offered to facilitate early mobilisation.
- Encourage breastfeeding; obese patients have lower rates of breastfeeding however it will assist in postnatal weight loss.
- After birth prolonged skin to skin contact should be encouraged for all babies.
- If women wish to breastfeed skilled support with positioning is likely to be needed to optimise attachment at the breast. Frequent breastfeeds and prolonged skin contact will stimulate lactation. Ongoing feeding support should be offered by midwives, the Infant feeding team and Health Visitors.



- Daily medical review if a drain is in place and tissue viability assessment if there are concerns regarding tissue breakdown.
- Negative pressure dressing to remain for seven days post-delivery. Community midwife to remove dressing on day 7 and inspect the wound site for signs of infection.
- Offer contraception and follow the local guidelines
- Any wound not covered by a negative pressure dressing, should be examined on the day of discharge by a clinician to look for signs of infection.
- Women should be informed that weight loss between pregnancies reduces the risk of stillbirth, hypertensive complications and fetal macrosomia. Weight loss increases the chances of successful vaginal birth after caesarean (VBAC) section.

Appendices

Appendix 1. Raised BMI antenatal pathway (for BMI >30 kg/m²).

Appendix 2. Raised BMI (30-39.9 kg/m²) Antenatal Care Pathway Checklist

Appendix 3. Raised BMI >40 kg/m² Antenatal Care Pathway Checklist

Appendix 4 Low BMI pathway for BMI <18.5

Appendix 5 Low BMI checklist for BMI <18.5

Appendix 6 Blood pressure cuff size guide

Appendix 7 Specialist bariatric equipment

Appendix 8 UHCW Weight Management Pathway

Appendix 9 UHCW Community Lifestyle Programmes & Dietetic Referral Pathway

References

1. K Denison FC, Aedla NR, Keag O, Hor K, Reynolds RM, Milne A, Diamond A, on behalf of the Royal College of Obstetricians and Gynaecologists. Care of Women with Obesity in Pregnancy. Green-top Guideline No. 72. BJOG 2018.



2. National Institute of Health and Care Excellence. Weight management before, during and after pregnancy [PH27]. 28 July 2010.
3. National Institute of Health and Care Excellence. Antenatal Care [NG201]. Published: 19 August 2021.
4. National Institute of Health and Care Excellence. Obesity: identification, assessment and management. Clinical guideline [CG189] Published: 27 November 2014.
5. Institute of Medicine (Subcommittees on Nutritional Status and Weight Gain During Pregnancy and Dietary Intake and Nutrient Supplements During Pregnancy, Committee on Nutritional Status During Pregnancy and Lactation, Food and Nutrition Board) Nutrition During Pregnancy: Part I, Weight Gain; Part II, Nutrient Supplements. Washington, DC: National Academy Press; 1990.
6. Knight M, Nair M, Tuffnell D, Kenyon S, Shakespeare J, Brocklehurst P, Kurinczuk JJ (Eds.) on behalf of MBRRACE-UK. Saving Lives, Improving Mothers' Care - Surveillance of maternal deaths in the UK 2012-14 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2009-14. Oxford: National Perinatal Epidemiology Unit, University of Oxford 2016.
7. Lim CC, Mahmood T. Obesity in pregnancy. Best Practice & Research Clinical Obstetrics & Gynaecology. 2015;29(3):309-19.
8. Lutsiv O, Mah J, Beyene J, McDonald SD. The effects of morbid obesity on maternal and neonatal health outcomes: a systematic review and meta-analyses. Obesity reviews : an official journal of the International Association for the Study of Obesity. 2015;16(7):531-46.
9. Mamun, A. A., Mannan, M. and Doi, S. A. R. (2014), Gestational weight gain in relation to offspring obesity over the life course: a systematic review and bias-adjusted meta-analysis. Obes Rev, 15: 338–347. doi:10.1111/obr.12132.
10. Louis J, Auckley D, Miladinovic B, Shepherd A, Mencin P, Kumar D, et al. Perinatal Outcomes Associated With Obstructive Sleep Apnea in Obese Pregnant Women. Obstetrics and gynecology. 2012;120(5):http://10.1097/AOG.0b013e31826eb9d8.
11. Marchi, J., Berg, M., Dencker, A., Olander, E. K. and Begley, C. (2015), Risks associated with obesity in pregnancy, for the mother and baby: a systematic review of reviews. Obes Rev, 16: 621–638. doi:10.1111/obr.12288.



12. Usha Kiran TS, Hemmadi S, Bethel J, Evans J. Outcome of pregnancy in a woman with an increased body mass index. *BJOG: an International Journal of Obstetrics and Gynaecology*. 2005;112(6):768-72.
13. Dresner M, Brocklesby J, Bamber J. Audit of the influence of body mass index on the performance of epidural analgesia in labour and the subsequent mode of delivery. *BJOG: an international journal of obstetrics and gynaecology*. 2006;113(10):1178-81.
14. Saravanakumar K, Rao SG, Cooper GM. The challenges of obesity and obstetric anaesthesia. *Curr Opin Obstet Gynecol*. 2006;18(6):631-5.
15. Sebire NJ, Jolly M, Harris JP, Wadsworth J, Joffe M, Beard RW, et al. Maternal obesity and pregnancy outcome: a study of 287,213 pregnancies in London. *International Journal of obesity and related metabolic disorders: Journal of the International Association for the Study of Obesity*. 2001;25(8):1175-82.
16. Amir LH, Donath S. A systematic review of maternal obesity and breastfeeding intention, initiation and duration. *BMC pregnancy and childbirth*. 2007;7:9.
17. Meehan S, Beck CR, Mair-Jenkins J, Leonardi-Bee J, Puleston R. Maternal obesity and infant mortality: a meta-analysis. *Pediatrics*. 2014;133(5):863-71.
18. Gaudet L, Ferraro ZM, Wen SW, Walker M. Maternal obesity and occurrence of fetal macrosomia: a systematic review and meta-analysis. *BioMed research international*. 2014;2014:640291.
19. Boney CM, Verma A, Tucker R, Vohr BR. Metabolic syndrome in childhood: association with birth weight, maternal obesity, and gestational diabetes mellitus. *Pediatrics*. 2005;115(3):e290-6.
20. Gaillard R. Maternal obesity during pregnancy and cardiovascular development and disease in the offspring. *European Journal of Epidemiology*. 2015;30:1141-52.
21. Nelson-Piercy C, MacCallum P, Mackillop L, on behalf of The Royal College of Obstetricians and Gynaecology. Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium. Green-top Guideline No. 37a. April 2015.
22. Martin LF, Finigan KM, Nolan TE. Pregnancy after adjustable gastric banding. *Obstetrics and gynecology*. 2000;95(6 Pt 1):927-30.
23. Wittgrove AC, Jester L, Wittgrove P, Clark GW. Pregnancy following gastric bypass for morbid obesity. *Obesity surgery*. 1998;8(4):461-4; discussion 5-6.
24. Kjaer MM, Nilas L. Pregnancy after bariatric surgery – a review of benefits and



- risks. *Acta obstetricia et gynecologica Scandinavica*. 2013;92(3):264-71.
25. Spanier BW, Dijkgraaf MG, Bruno MJ. Epidemiology, aetiology and outcome of acute and chronic pancreatitis: An update. *Best practice & research Clinical gastroenterology*. 2008;22(1):45-63.
 26. Brown SR, Tiernan J. Transverse versus midline incisions for abdominal surgery. *Cochrane Database of Systematic Reviews*. 2005(4).
 27. Bourne RB, Bitar H, Andreae PR, Martin LM, Finlay JB, Marquis F. In-vivo comparison of four absorbable sutures: Vicryl, Dexon Plus, Maxon and PDS. *Canadian journal of surgery Journal canadien de chirurgie*. 1988;31(1):43-5.
 28. NHS England. Saving Babies' Lives Version Two: A care bundle for reducing perinatal mortality (2019).
 29. BMI: preventing ill health and premature death in black, Asian and other minority ethnic groups. Public health guideline [PH46] July 2013
 30. The WHO European Childhood Obesity Surveillance Initiative COSI 2015/2017) Association between characteristics at birth, breastfeeding and obesity in 22 countries:
 31. Vu K., et al. From birth to overweight to atopic disease: Multiple and common pathways of the gut microbiota. *Gastroenterology* 2020 DOI:<https://doi.org/10.1053/j.gastro.2020.08.053>
 32. Spatz DL, Preventing obesity starts with breastfeeding. *J Perinatal Neonatal Nursing* 2014;28(1):41-50)
 33. Savino F. et al. Breastmilk hormones and their protective effect on obesity. *International Journal Pediatric Endocrinology et al.*, 2009;327505).
 34. Oddy WH, Smith GJ, Jacoby P. A possible strategy for developing a model to account for attrition bias in a longitudinal cohort to investigate associations between exclusive breastfeeding and overweight and obesity at 20 years. *Ann Nutr Metab*. 2014;65((2-3)):234–5.)
 35. Horta BL, Victora CG. Geneva: World Health Organization; 2013. Long-term effects of breastfeeding - A Systematic Review).
 36. Ramussen K Chapter 20: Maternal obesity and the outcome of breastfeeding. In Hale T, Hartman P. Hale and Hartmans textbook of Human Lactation. Amarillo, TX:Hale Publishing,2007b:387-402)
 37. Forster, D. et al. Diabetes and Antenatal Milk Expressing (DAME). *Lancet*,

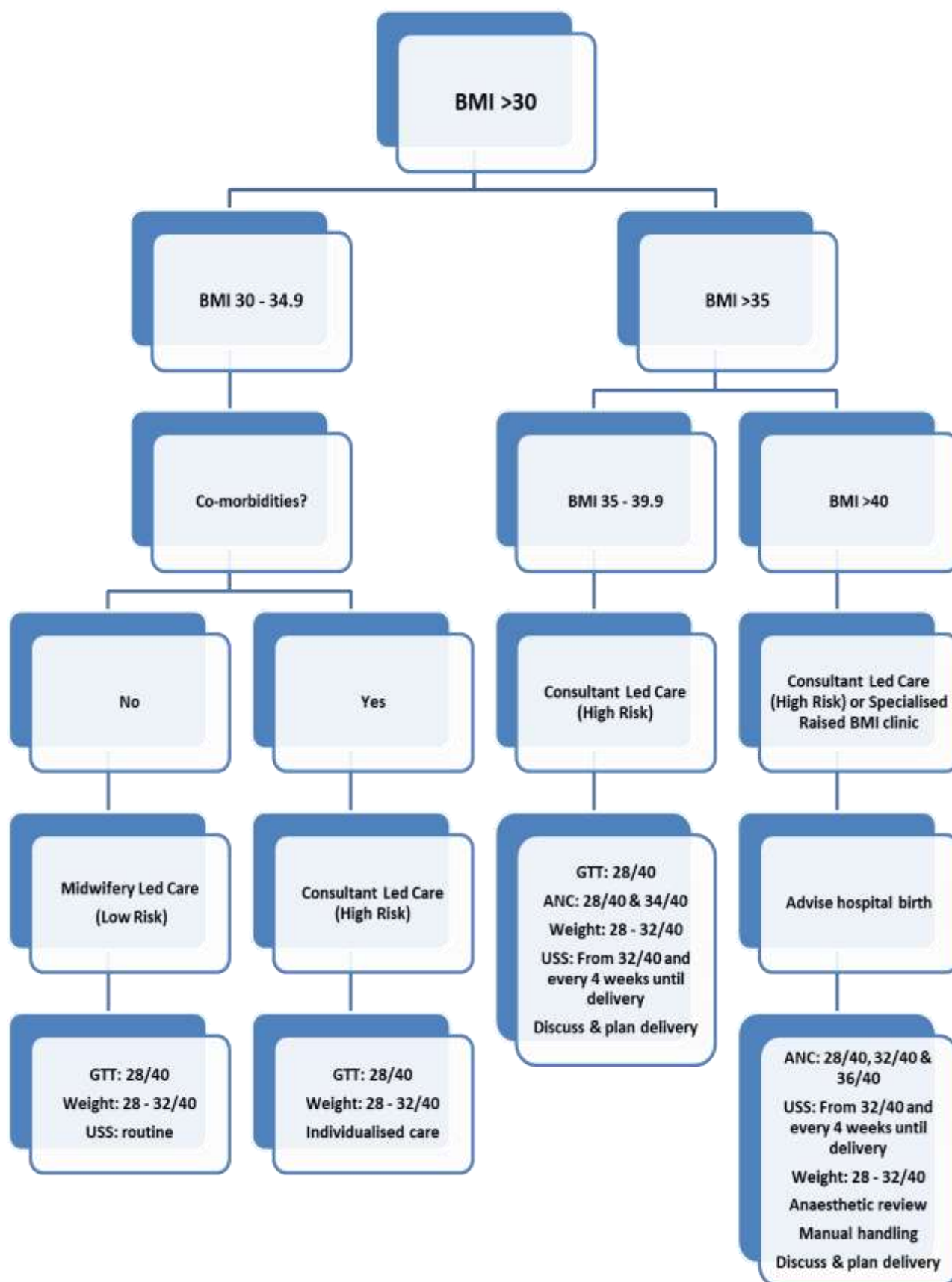


2017;389 (10085)):2204-2213

38. Denison, F., Aedla, N., Keag, O., Hor, K., Reynolds, R., Milne, A. and Diamond, A., (2018). Care of Women with Obesity in Pregnancy. BJOG: An International Journal of Obstetrics & Gynaecology, 126(3), pp.e62-e106.
39. Royal College of Obstetricians and Gynaecologists, (2015). Reducing the Risk of Venous Thromboembolism during Pregnancy and the Puerperium No. 37a. London: RCOG, p.24 and p.36.
40. National Institute for Health and Care Excellence, (2015). Diabetes in pregnancy: management from preconception to the postnatal period. London: NICE.
41. Slater, C., Morris, L., Ellison, J. and Syed, A., (2017). Nutrition in Pregnancy Following Bariatric Surgery. Nutrients, 9(12).
42. National Institute for Health and Care Excellence, (2017). Dyspepsia - pregnancy-associated: Omeprazole. London: NICE.



Appendix 1. Raised BMI antenatal pathway (for BMI >30 kg/m²).



Appendix 2 Raised BMI (30-39.9 kg/m²) Antenatal Care Pathway Checklist

Raised BMI 30–39.9 kg/m²

Store with patient's notes at booking appointment. Tick, sign, and date, to evidence when action is complete.

Gestation	Plan		✓	Sign/date
By 12/40	1. Height and weight at booking. 2. Calculate BMI accurately and record in notes. 3. Offer folic acid PO 5mg (pre-conceptually until 12/40) 4. Advise vitamin D PO 10 micrograms (until delivery, and continue if breastfeeding) 5. Offer dietary advice 6. Book OGTT at 26 weeks 7. Healthy eating & exercise leaflets 8. Being overweight and pregnant leaflet 9. Complete VTE scoring. 10. Check criteria for aspirin PO 150mg OD until delivery (and Adcal D3 PO 1 tablet OD until delivery)			
	BMI 30-34.9	BMI 35.0-39.9 kg/m²		
	Midwife or GP antenatal care	Refer for consultant-led care. Advise hospital birth.		
12-14/40		Consultant appointment 1. Discuss antenatal, intrapartum and postnatal risks associated with raised BMI in pregnancy. 2. Individualised plan to support the prevention of excessive weight gain in pregnancy.		
20/40	Anomaly scan	Anomaly scan		
28/40	Check GTT result Check weight	<ul style="list-style-type: none"> • Antenatal clinic • Recheck weight • Check GTT result • Blood pressure assessment • VTE risk assessment 		
32/40	Community Midwife appt.	<ul style="list-style-type: none"> • Scan and antenatal clinic • Check weight • Recalculate BMI 		
36/40 and 40/40		<ul style="list-style-type: none"> • Scan and antenatal clinic • Blood pressure assessment • Document and discuss obstetric plan for delivery 		

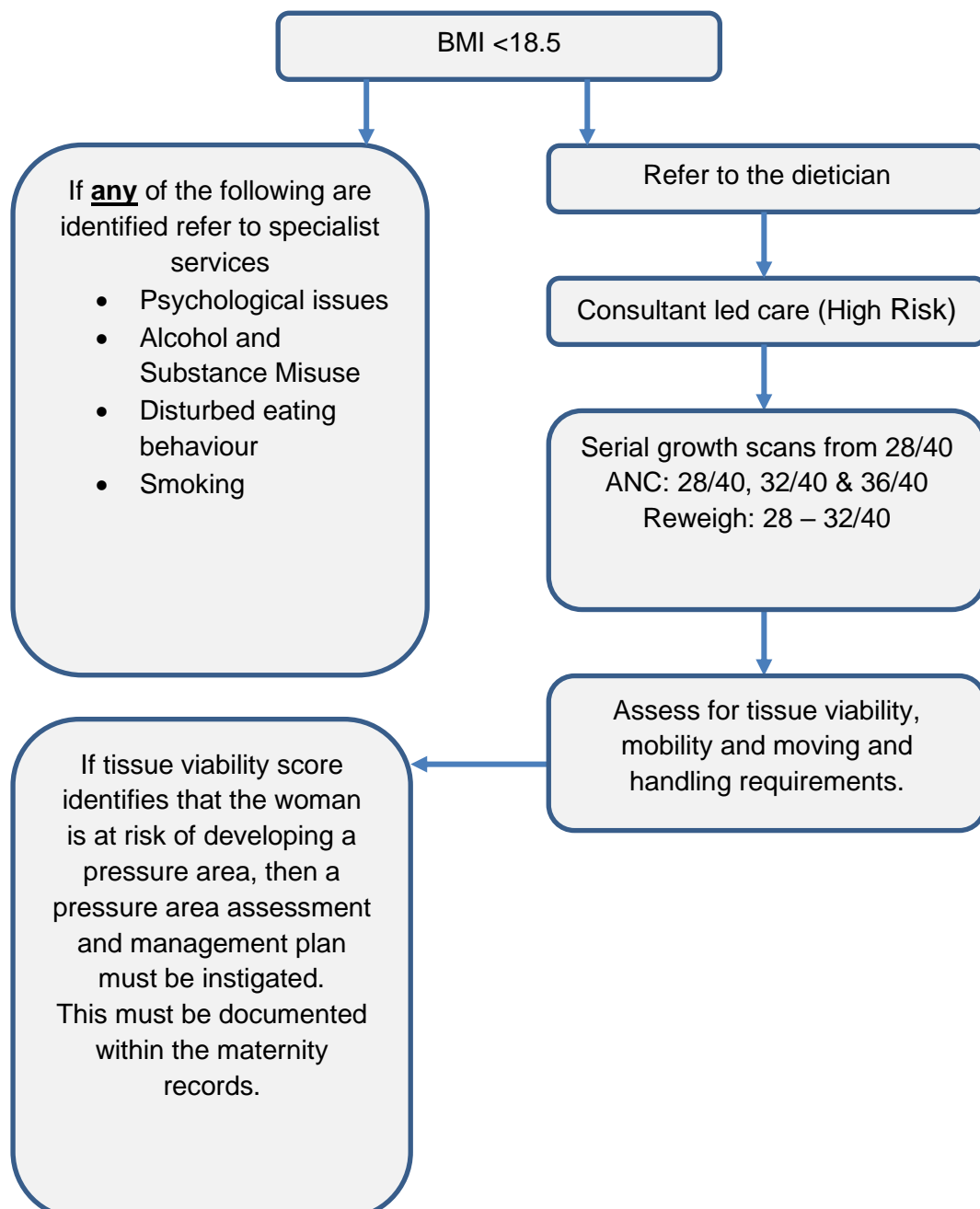
Appendix 3 : Raised BMI >40 kg/m² Antenatal Care Pathway Checklist

Raised BMI >40 kg/m²

Store with patient's notes at booking appointment.
Tick, sign, and date, to evidence when action is complete.

Gestation	Plan	✓	Sign/date
By 12/40	<ol style="list-style-type: none"> 1. Height and weight at booking. 2. Calculate BMI accurately and record in notes. 3. Offer folic acid PO 5mg (pre-conceptually until 12/40) 4. Advise vitamin D PO 10 micrograms (until delivery, and continue if breastfeeding) 5. Offer dietary advice 6. Book OGTT at 26 weeks 7. Healthy eating & exercise leaflets 8. Being overweight and pregnant leaflet 		
12-14/40	<p>Refer to the Specialist Raised BMI Obstetric Clinic</p> <ol style="list-style-type: none"> 9. Complete VTE risk assessment scoring. 10. Check criteria for aspirin PO 150mg OD until delivery (and Adcal D3 PO 1 tablet OD until delivery) 11. Referral to complex anaesthetic clinic. 12. Manual handling assessment commenced. 13. Advise hospital birth. 14. Discuss antenatal, intrapartum and postnatal risks associated with raised BMI in pregnancy. 15. Individualised plan to support the prevention of excessive weight gain in pregnancy. 		
20/40	Anomaly scan		
28/40	<ul style="list-style-type: none"> • Antenatal clinic • Check weight and re-calculate BMI • VTE risk assessment and prescribe LMWH if required • Check GTT result • Blood pressure assessment 		
32/40	<ul style="list-style-type: none"> • Scan and antenatal clinic • Blood pressure assessment • Document and discuss obstetric plan for delivery 		
36/40 and 40/40	<ul style="list-style-type: none"> • Scan and antenatal clinic • Blood pressure assessment • Assessment and completion of moving and handling • Check anaesthetic plan in patients HCR 		

Appendix 4 : Low BMI pathway for BMI <18.5



Appendix 5 : Low BMI checklist for BMI <18.5

Gestation	Plan	✓	Sign/date
By 12/40	<ol style="list-style-type: none"> 1. Height and weight at booking 2. Calculate BMI accurately and record in notes 3. Folic Acid 400mcg (pre conceptually to 12 weeks) 4. Vitamin D 10 mg (till delivery and continue if breastfeeding) 5. Offer dietary Advice 6. Healthy eating leaflets 7. Complete VTE scoring 8. Refer for Consultant Led Care 		
12 - 14/40	<ul style="list-style-type: none"> • Consultant appointment • Discuss antenatal, intrapartum and postnatal risks associated with a low BMI in pregnancy. • Individualised plan to support pregnancy. 		
20/40	Anomaly scan		
28/40	<ol style="list-style-type: none"> 1. Scan and antenatal clinic 2. Check weight 3. Blood pressure assessment 		
32/40	<ol style="list-style-type: none"> 1. Scan and antenatal clinic 2. Blood pressure assessment 3. Document and discuss obstetric plan for delivery 		
36/40	<ol style="list-style-type: none"> 1. Scan and antenatal clinic 2. Blood pressure assessment 3. Document and discuss obstetric plan for delivery 		
40/40	<ol style="list-style-type: none"> 1. Scan and antenatal clinic 2. Blood pressure assessment 3. Document and discuss obstetric plan for delivery 		

Appendix 6. Blood pressure cuff size guide



Image source: <https://www.hospitalsstore.com/nibp-cuff-single-tube-nylon-material-nibp-cuffs-blood-pressure-monitor-cuff/>

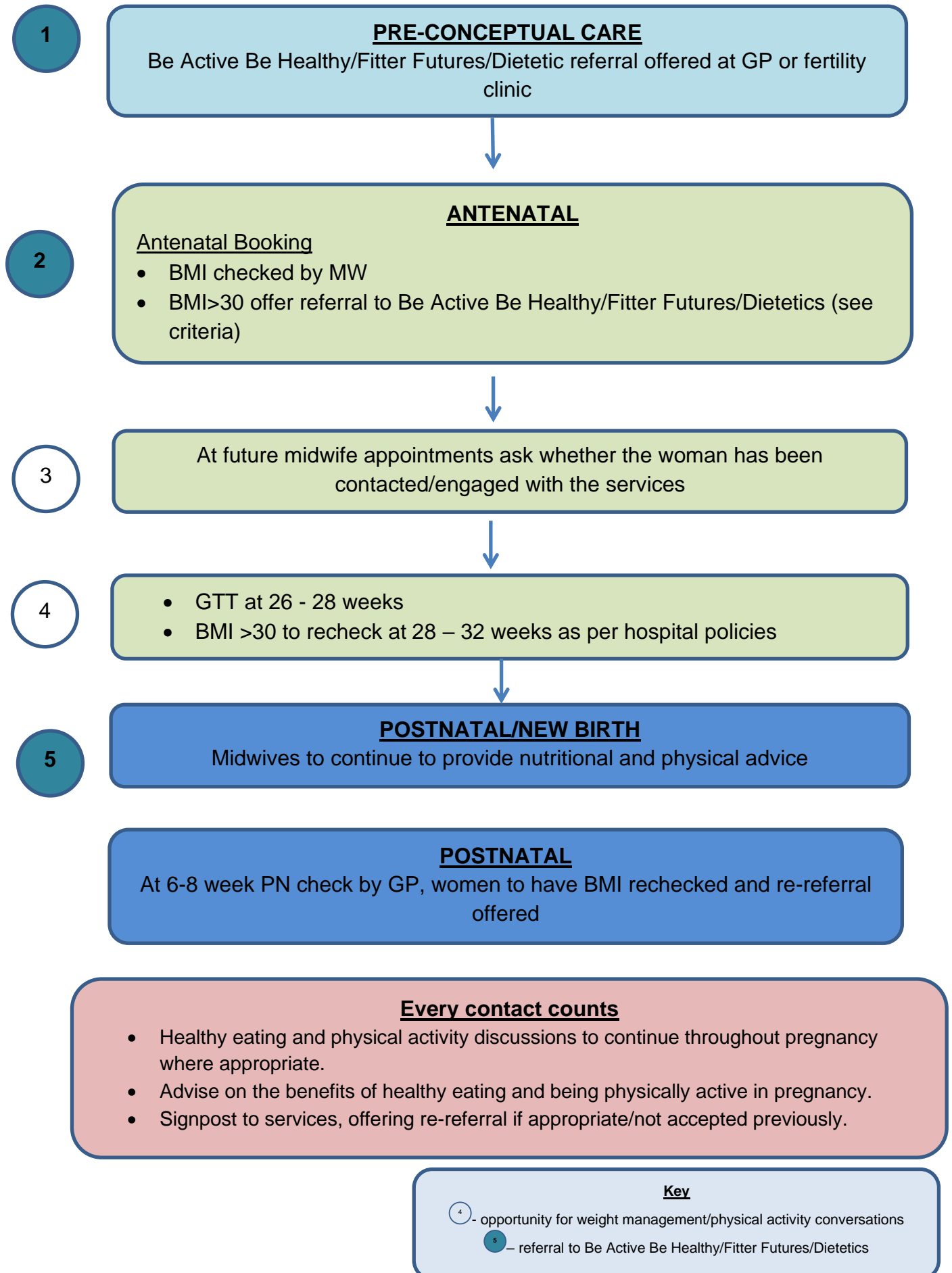
Cuff	Size	Limb range	
		Inches	Centimeters
Infant	7	3.5 to 5.5	9 to 14
Child	9	5.1 to 7.6	13 to 19.5
Small adult	10	7.4 to 10.6	19 to 27
Adult	11	9 to 15.7	23 to 40
Large adult	12	13.3 to 19.6	34 to 50
Thigh	13	15.7 to 25.9	40 to 66

Appendix 7. Specialist bariatric equipment

There is a range of bariatric equipment available which can be used to facilitate safe care for women who require it.

Equipment	Use	Weight limit	Location
Theatre Table 1 (BETASTAR)	Operation	280 kg	Theatre 1
Theatre Table 2 (ALPHAMAXX)	Operation	450 kg	Theatre 2
Theatre table extensions X2	Patients who require a larger table	N/A	Theatre & additional in main theatres
Moving and handling hover mattress	Facilitates safe moving and handling of larger patients.	BMI > 45	1 on labour ward, 1 in main theatres
Alexis Retractor	Retract tissue around the incision, freeing up the assistants hands.	N/A	Raised BMI box in theatre
Traxi Panniculus Retractor	Retract tissue around the incision, freeing up the assistant's hands.	BMI >40 kg/m ²	Raised BMI box in theatre
Traxi Panniculus Retractor Extension	Extends the Traxi	BMI >50 kg/m ²	Raised BMI box in theatre
Long Instruments	Operative use in deeper field	N/A	Raised BMI box in theatre
Large Doynes Retractor	Retraction of large tissue	N/A	Raised BMI box in theater
XL Flowtrons	VTE deterrent	N/A	Raised BMI box in theatre
XL Gown	NA	N/A	Main theatres
Large wheelchair	NA	N/A	Labour Ward
Quattro mattress	Pressure sore deterrent	N/A	Order from equipment library

Appendix 8. UHCW Weight Management Pathway



Appendix 9. UHCW Community Lifestyle Programmes & Dietetic Referral Pathway

UHCW Referral Options

Be Active Be Healthy Bump & Me – Criteria

- Physical activity and nutrition support on referral for BMI of 30+

Be Active Be Healthy Bump & Me - Online Ante Natal Exercise Class

- Stay active during pregnancy. Suitable for any fitness levels, with exercises adapted to suit all stages of trimester

Be Active Be Healthy - Nutrition for Life

A 7-week online programme to support with healthy eating habits for life

Be Active Be Healthy – Postnatally

- Following the postnatal check there is opportunity to join Buggy Workout and referral to Adult Healthy Lifestyle Services for further support.
- **See online <https://hlscoventry.org/>**

**** Please e-mail PH MW /CMW team for more information**

UHCW DIETETIC REFERRAL CRITERIA

BMI 30 or BMI >28 AND any of the following conditions:

- Type1 Diabetes
- Type 2 Diabetes
- Cardiovascular disease (10% risk of CVD in next 10 years)
- Hypertension
- Polycystic Ovary Syndrome (PCOS)
- Unsuitable for group education or Fitter futures/Be Active Be Healthy such as house bound, learning difficulties, mental health concerns, language barriers, group sessions have been previously unsuccessful.
- **PLEASE REFER THROUGH CRRS**