

# Maternal obesity in the UK: findings from a national project

Executive Summary and Key Recommendations

2010

United Kingdom



## CMACE Mission statement

Our aim is to improve the health of mothers, babies and children by carrying out confidential enquiries and other related work on a UK-wide basis and by widely disseminating the results.

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### Disclaimers

This work was undertaken by the Centre for Maternal and Child Enquiries (CMACE) as part of the CEMACH programme. The work was funded by the National Patient Safety Agency; the Department of Health, Social Services and Public Safety of Northern Ireland; NHS Quality Improvement Scotland (QIS); and the Channel Islands and Isle of Man. The views expressed in this publication are those of CMACE and not those of the funding bodies.

The recommendations contained in this report represent the view of CMACE and the Obesity in Pregnancy project External Advisory Group, which was arrived at after a careful consideration of the available evidence. The recommendations do not override healthcare professionals' individual responsibility to make appropriate decisions in the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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**Body Mass Index**

A large, semi-circular graphic of a BMI scale is overlaid on the page. The scale is labeled 'Body Mass Index' and 'METRIC'. It has numerical markings at 30, 35, 40, 45, and 50. The scale is divided into three main sections: 'OVERWEIGHT' (from 30 to 35), 'OBESE' (from 35 to 40), and 'OBESE METRIC' (from 40 to 50). There are arrows pointing to the right from the 30, 35, and 40 marks. The text 'WEIGHT' and '50kg' are also visible on the left side of the scale.

## Introduction

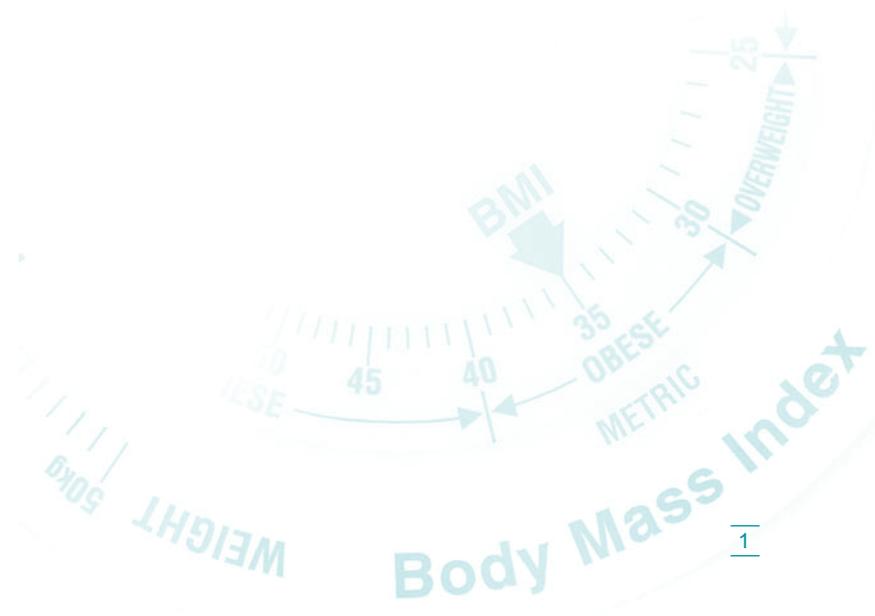
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In 2008, the Confidential Enquiry into Maternal and Child Health (CEMACH), now known as the Centre for Maternal and Child Enquiries (CMACE), commenced a 3-year UK-wide Obesity in Pregnancy project. The project was initiated in response to a number of factors. At the time, these included: i) growing evidence that obesity is associated with increased morbidity and mortality for both mother and baby, ii) evidence from the CEMACH 'Saving Mothers' Lives' report showed that women with obesity were over-represented among those who died of direct deaths compared to those who died of indirect deaths,<sup>1</sup> iii) unknown national and regional prevalence rates of maternal obesity, and iv) the need for a national clinical guideline for the care of women with obesity in pregnancy.

### The project included four main modules:

- The development of national standards of care based on evidence and formal consensus methods
- A national survey of maternity services for women with obesity
- A national cohort study of 5068 women with maternal obesity (BMI  $\geq 35$ ) who gave birth in the UK during March and April 2009
- A national clinical audit of maternity care received by 905 women with a BMI  $\geq 35$

The project has identified a number of key findings, which are outlined in this summary.



## Key findings

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### 1.1. Prevalence of Class II, Class III and super-morbid obesity in pregnancy

The UK prevalence of women with a known BMI  $\geq 35$  (Class II and Class III obesity) at any point in pregnancy, who give birth  $\geq 24+0$  weeks' gestation, is 4.99%. This translates into approximately 38,478 maternities each year in the UK. The prevalence of women with a pregnancy BMI  $\geq 40$  (Class III obesity) in the UK is 2.01%, while super-morbid obesity (BMI  $\geq 50$ ) affects 0.19% of all women giving birth\*.

The prevalence of maternal obesity varies between the UK nations and Crown Dependencies (Channel Islands and Isle of Man). Wales was found to have the highest overall prevalence of women with a pregnancy BMI  $\geq 35$ , with a rate of 6.5%, equivalent to 1 in 15 maternities. Wales had the highest rates of both Class II and Class III maternal obesity, while England had the lowest rates of maternal obesity. Super-morbid maternal obesity was not significantly different between UK nations.

### 1.2. Socio-demographic characteristics

An Index of Multiple Deprivation (IMD) score,<sup>2</sup> based on postcode of residence, was assessed in relation to quintiles of deprivation derived for the entire population of England. The most deprived quintiles were over-represented by the obese cohort compared to maternities in the general population. Thirty-four percent of pregnant women living in England with a BMI  $\geq 35$  were in the most deprived quintile, which compares to 27.6% for all maternities. These data support previously published findings that show social deprivation is associated with maternal obesity.<sup>3</sup>

Black and Minority Ethnic (BME) groups represented 14% of the cohort; BME groups represent 20% of the general maternity population. Women with a BMI  $\geq 35$  from BME groups were 3.5 times more likely to have type 2 diabetes and 1.6 times more likely to have gestational diabetes than White women with a BMI  $\geq 35$ . Even after controlling for diabetes, BME women were also more likely to have a caesarean section, have their baby before 37 weeks' gestation and to stay in hospital for longer after both vaginal deliveries and caesarean sections.

The proportion of women aged 35 years or more increased with each increasing BMI group, with 31% of women with super-morbid obesity aged  $\geq 35$  years. Age  $\geq 35$  was a risk factor for a number of co-morbidities among women in the cohort, including type 2 diabetes, gestational diabetes, pregnancy induced hypertension (PIH) and pre-eclampsia.

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\* Total number of women giving birth in the UK during March and April 2009 (denominator) was 769,740

### 1.3. Clinical characteristics

Among the cohort of women in the observational study, 1103 (21.8%) had at least one morbidity (a disease or medical condition), in addition to obesity, diagnosed prior to the pregnancy, and 1180 (23.3%) women had a condition diagnosed during the pregnancy. A total of 38% of women within the cohort had at least one co-morbidity diagnosed prior to and/or during pregnancy. The most frequently reported conditions were pregnancy-induced hypertension and gestational diabetes, which were diagnosed in 9% and 8% of the cohort of women with a BMI  $\geq 35$ , respectively. The prevalence of these conditions was higher among each incremental BMI category ( $P < 0.01$ ). Differences between BMI categories were also significant for the incidence of type 2 diabetes, pre-eclampsia and severe pre-eclampsia.

Ninety-eight percent of women with a BMI  $\geq 35$  gave birth in an obstetric unit. Under half of the women (47%) laboured spontaneously, 33% underwent an induction of labour and 20% had a caesarean section prior to labour. The spontaneous labour and induction rate in the general maternity population is 69% and 20%, respectively.<sup>4</sup> Among women with a BMI  $\geq 35$  who laboured prior to delivery, each unit increase in BMI was associated with a 3% increased risk of induction of labour. Six percent of women with singleton pregnancies gave birth prematurely ( $< 37$  weeks' gestation), which is similar to the preterm rate in the general population.

Only 55% of women with a BMI  $\geq 35$  had a spontaneous vaginal delivery without the use of instruments. Caesarean sections accounted for 37% of all singleton deliveries. This rate is substantially higher than the caesarean rate of 25% in the general maternity population in England.<sup>4</sup> Caesarean section was more common in each increasing BMI category, with 46% of women with a BMI  $\geq 50$  delivering this way. Planned caesarean sections (Grade 4) represented 45% of all caesarean deliveries within the cohort. The ratio of elective to emergency caesarean section did not differ between BMI categories; however, the planned caesarean rate is higher than the national average rate of 40% in England.<sup>4</sup> General anaesthesia was administered in 7.7% of all caesarean sections; this is also higher than the 5.5% rate in the general obstetric population.<sup>4</sup>

The incidence of primary postpartum haemorrhage (PPH) (defined as  $\geq 500\text{ml}$ <sup>5 6</sup>) was 38% for women with a BMI  $\geq 35$ . This is at least four times higher than the rate in the general obstetric population.<sup>4</sup>

Pre-eclampsia, birth weight  $> 4\text{kg}$ , and caesarean section were all risk factors for PPH. After controlling for these, each BMI unit increment in women with a BMI  $\geq 35$  was associated with a 2.6% increase in risk of PPH. The incidence of major PPH ( $> 1000\text{ml}$ ) was 5%. Low molecular weight heparin (LMWH) use in pregnancy was also associated with PPH; women receiving antenatal LMWH were 9.2 times more likely to have a major PPH than those not receiving LMWH in pregnancy. This differs from data in a systematic review of LMWH in pregnancy where low rates of PPH are encountered, raising the possibility of an interaction between LMWH use and obesity with regard to risk of PPH.<sup>7</sup>

Seventy-four percent of women having spontaneous vaginal births in the general maternity population spend one day or less in hospital.<sup>4</sup> The rate of 58% in women with a BMI  $\geq 35$  is much lower in comparison. Women with a BMI  $\geq 35$  were also more likely to stay in hospital for seven days or longer after childbirth compared to the general maternity population, even after adjusting for mode of delivery.<sup>4</sup>

#### 1.4. Poor pregnancy outcomes

The babies of women with a pregnancy BMI  $\geq 35$  have an increased risk of perinatal mortality compared with those of the general maternity population in the UK.<sup>8</sup> There were 43 stillbirths in the cohort (median gestation 37.1 weeks, range 24.6-42.3), corresponding to a rate of 8.6 stillbirths per 1000 singleton births. This rate is substantially higher than the general population rate of 3.9 per 1000 total births<sup>†</sup>, and supports other studies, which indicate that women with obesity are approximately twice as likely to have a stillborn baby as women with a healthy BMI.<sup>9,10</sup> The stillbirth rate increased with increasing BMI. BMI categories 35.00-39.99, 40.00-49.99 and  $\geq 50$  had stillbirth rates of 7.9, 8.8 and 15.8 per 1000 singleton births, respectively. Among women with a BMI  $\geq 35$ , each unit increase in BMI was associated with a 7% increased risk of stillbirth.

Intrapartum stillbirths accounted for 11.9% of the cohort's singleton stillbirths (1.0 per 1000 births). This is much higher than the rate in the general population (8.4%) in England, Wales and Northern Ireland (0.33 per 1000 births).<sup>8</sup>

Approximately 20% of the singleton babies were large for their gestational age (LGA), defined by weight  $\geq 90^{\text{th}}$  percentile for gestation, which is twice as high as expected in the general population of births. LGA babies were more common among each increasing BMI group, with one third of women with a BMI  $\geq 50$  having a LGA baby, compared to 16% born to women with a BMI 35-39.9. Women with diabetes were also more likely to have a LGA baby than women without diabetes (40% vs. 17%). There was an interaction between BMI group and diabetes status, and, although a greater proportion of women with diabetes had a LGA baby, the relationship between BMI and LGA was more pronounced among women without diabetes.

Neonatal unit admissions (within 48 hours of birth) correlated directly with maternal BMI. Among babies born at term (37-42 weeks' gestation), the neonatal unit admission rate was 4.2%, 5.9% and 9.9% for those born to mothers with a BMI 35-39.9, BMI 40-49.9 and BMI  $\geq 50$ , respectively. Babies born to mothers with a BMI  $\geq 50$  were almost twice as likely to be admitted to the neonatal unit as babies born to mothers with a BMI 35-39.9, even after adjusting for maternal age, parity, maternal diabetes and gestation at delivery.

<sup>†</sup> UK national stillbirth rate adjusted after removing terminations of pregnancy and babies born <24 weeks' gestation. This rate is lower than the rate published in the CMACE 2008 Perinatal Mortality Report, which included babies born <24 weeks' gestation.

## 1.5. Preconception care

The CMACE/RCOG Joint Guideline on the management of women with obesity in pregnancy (2010)<sup>11</sup> recommends that women of childbearing age with a BMI  $\geq 30$  should receive information and advice about the risks of obesity during pregnancy and childbirth, and they should be supported to lose weight before conception. In the organisational survey of all maternity units in the UK, only 12 (6%) obstetric units reported providing preconception care and advice to obese women. While this does not take into account advice given in primary care or in the community, this finding does highlight that appropriate preconception services provided by maternity units are not yet readily available to women with obesity.

Women with a BMI  $\geq 30$  wishing to become pregnant should be advised to take 5mg of folic acid supplementation daily, starting at least one month before conception and continuing during the first trimester of pregnancy, in order to reduce the risk of neural tube defects, which are more prevalent among women with obesity<sup>‡</sup>.<sup>11</sup>

The CMACE national clinical audit, which preceded the national recommendation for 5mg of folic acid supplementation in women with obesity, found that both the use and dosage of folic acid supplementation was poorly documented within maternity notes, particularly for the pre-pregnancy period. Folic acid use before pregnancy was documented in just over half of all audited cases. Of these, 71% of women had not taken folic acid, 21% had taken folic acid but the dosage had not been documented, 7% had supplemented with 400 micrograms and 1.4% was known to have supplemented with the recommended 5mg dose prior to pregnancy. This latter figure rose to 2.1% in the first trimester of pregnancy.

## 1.6. Clinical care during pregnancy

### 1.6.1. Measuring height, weight and calculating body mass index

Ninety-seven percent of all women reported to CMACE during the observational cohort study had an antenatal weight recorded, while 96% had both weight and height recorded, thereby allowing a calculation of BMI. The gestation at which the weight measures were recorded was known for 91% of the cohort. Of these, 85% had a weight recorded at booking, representing 77% of the study cohort. A further 3.4% had a weight recorded within two weeks of booking, 2.8% between two and four weeks of booking, and 6.5% >4 weeks from booking but before delivery. A small proportion of women (2.5%) had a pregnancy weight that was documented prior to the booking appointment.

### 1.6.2. Provision of information

Evidence of providing information about the risks associated with obesity in pregnancy was documented in fewer than one fifth of the cases audited. Information was more likely to be given to women with a BMI  $\geq 40$  compared to women with a BMI 35.00-39.99 (24% vs. 13%).

<sup>‡</sup> The Department of Health advise that all pregnant women (including those with a BMI  $>30$ ) take a folic acid supplement at the usual dose of 400 micrograms/day from before pregnancy until the 12<sup>th</sup> week of pregnancy.

### **1.6.3. Thromboprophylaxis**

The documentation of venous thromboembolism (VTE) risk at booking was poor, even for women identified as being at high risk, according to the RCOG Clinical Green-top Guideline No. 37.<sup>12</sup> Of the 14 women in the audit cohort who had a moderate or high risk of VTE, three had this risk noted at booking and six were offered LMWH antenatally. The RCOG guideline recommends that women identified as having a lower level of elevated risk, based on the presence of certain risk factors, should also be considered for LMWH. Of the 849 women identified in the lower level of elevated risk category, only 10% had VTE risk documented at booking and only 3.3% were offered LMWH. A further 15 women were prescribed low dose aspirin for thromboprophylaxis (which is not recommended for this purpose).

Eighty-five percent of women receiving antenatal LMWH were prescribed doses considered insufficient for their body weight according to guidelines that were current at the time of care.<sup>13</sup> Just 3% were prescribed a higher prophylactic dose. No women had documented evidence of a therapeutic dose of LMWH.

### **1.6.4. Antenatal anaesthetic review**

All women with a BMI  $\geq 40$  should have an antenatal consultation with an obstetric anaesthetist, so that potential difficulties can be identified, and an anaesthetic management plan for labour and delivery should be documented in the records.<sup>11</sup> Forty-five percent of women with a BMI  $\geq 40$  had a written anaesthetic management plan. A further 15% of women were offered a consultation but did not have a written plan, which was considered to indicate that the consultation did not take place.

### **1.6.5. Manual handling requirements and tissue viability issues**

Despite 53% of surveyed maternity units reporting that they use a risk assessment tool to assess the risk of pressure damage, only 10% of women with a BMI  $\geq 40$  whose notes were audited had a documented assessment for tissue viability. An assessment for manual handling requirements was documented in only 14% of cases with a BMI  $\geq 40$ .

## **1.7. Clinical care during labour and delivery**

It is recommended that an obstetrician and an anaesthetist both at Speciality Trainee year 6 (ST6) and above should be informed and available to care for women with a BMI  $\geq 40$  during labour and delivery, including attending any operative vaginal or abdominal delivery.<sup>11</sup> The clinical audit found that an obstetrician, of ST6 or above, attended 67% of instrumental vaginal and caesarean deliveries among women with a BMI  $\geq 40$ . The anaesthetist, also at ST6 or above, attended 61% of these deliveries.

## 1.8. Postpartum care and follow-up

### 1.8.1. Thromboprophylaxis

Postnatal thromboprophylaxis was underused, both in terms of it being offered and in terms of the duration for which it was prescribed. Women with a high or moderate risk of VTE should receive LMWH for six weeks after giving birth.<sup>11 12</sup> Of the fourteen women with a high or moderate risk, eight were prescribed LMWH. The duration of LMWH use was insufficient, in terms of the recommendations in the applicable guideline, in five cases and not documented in three cases. The RCOG Guideline No. 37 (2004) recommends LMWH for three to five days for women in the VTE lower 'at risk' category. Of the 784 women identified in this category, 49% were offered LMWH and 20% (n=158) received it for  $\geq 3$  days.

Women with a BMI  $\geq 40$  should be offered postpartum thromboprophylaxis, regardless of their mode of delivery. Postpartum LMWH was offered to 55% of women with a BMI  $\geq 40$ . Women having caesarean sections were much more likely to receive LMWH compared to women giving birth vaginally (94% vs. 30%) (caesarean section is recognised as a specific risk factor for VTE in addition to obesity).

### 1.8.2. Nutritional advice

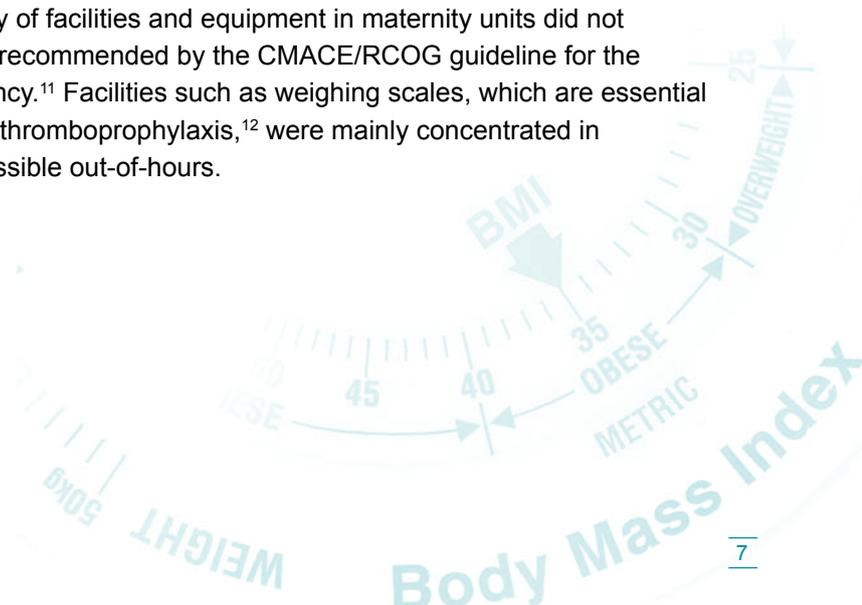
All women with a booking BMI  $\geq 30$  should continue to receive nutritional advice following childbirth from an appropriately trained professional, with a view to weight reduction.<sup>11</sup> However, documented evidence of a postnatal referral to a dietician or nutritionist was found for only 4% of women.

### 1.8.3. Follow-up tests for women with gestational diabetes

Evidence of a referral for a test of glucose tolerance within two months of giving birth was documented for two thirds of women with gestational diabetes mellitus (GDM). As this is a modifiable risk factor for long term health issues, it is important to emphasise the need for such screening after delivery.

## 1.9. Appropriate facilities and equipment in maternity units

The availability of appropriate equipment in the event of an unplanned admission to a maternity unit of a woman with super-morbid obesity was generally inadequate. Approximately two thirds of units in the UK reported not having immediate access to appropriate extra-wide wheelchairs, examination couches, trolleys or ward beds. Furthermore, the majority of facilities and equipment in maternity units did not have the minimum safe working load of 250kg recommended by the CMACE/RCOG guideline for the management of women with obesity in pregnancy.<sup>11</sup> Facilities such as weighing scales, which are essential to ensure correct doses of medication such as thromboprophylaxis,<sup>12</sup> were mainly concentrated in outpatient areas which may not be easily accessible out-of-hours.



## Key recommendations

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Key recommendations have been developed based on the main findings arising from this national project. These recommendations are proposals made by CMACE for an appropriate course of action to be taken by external organisations and/or individuals in relation to a specific area of health care. These comply with the CMACE recommendation policy, which aims to ensure a consistent and transparent approach to the development of recommendations, enabling stakeholders and users of CMACE reports to have a full understanding of, and confidence in, the process by which recommendations have been made. A copy of the policy is available from CMACE, and the process used to develop these recommendations is described in Chapter 3 of the full report.

### **Recommendation 1:** *Pre-pregnancy counselling*

Preconception counselling and support, both opportunistic and planned, should be provided for women of childbearing age with a BMI  $\geq 30$ . This advice and support should be available in both Primary care and Secondary care.

#### **Pre-pregnancy counselling should include:**

- Accurate height and weight measurement and BMI calculation
- Advice and support to lose weight prior to conception
- Consideration given to screening for type 2 diabetes
- Advice on appropriate supplementation prior to conception (5mg folic acid<sup>§</sup> and 10 $\mu$ g vitamin D), as recommended by NICE.<sup>14</sup>
- Provision of information about the risks of obesity in pregnancy and childbirth

Recommendation type: Good practice point

### **Recommendation 2:** *Folic acid supplementation*

Women with obesity have an increased risk of having a baby with congenital malformations, including neural tube defects.<sup>15</sup> Women with a BMI  $\geq 30$  wishing to become pregnant should be advised to take 5mg folic acid supplementation daily, starting at least one month before conception and continuing during the first trimester of pregnancy, as recommended by the joint CMACE/RCOG Guideline on the management of women with obesity in pregnancy.<sup>11</sup>

Awareness of the importance of supplementing with high-dose folic acid should be raised at opportunistic times, even prior to a woman planning a pregnancy.

Folic acid use both before and during pregnancy should be documented in the antenatal notes. Women with a BMI  $\geq 30$  who are not taking 5mg folic acid supplementation daily at the time of booking should be advised to do so for the first trimester<sup>§</sup>.

Recommendation type: Clinical care and service provision

<sup>§</sup> The Department of Health advise that all pregnant women (including those with a BMI  $>30$ ) take a folic acid supplement at the usual dose of 400 micrograms/day from before pregnancy until the 12<sup>th</sup> week of pregnancy.

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**Recommendation 3: Antenatal care**

Obesity in pregnancy is associated with an increased risk of a number of pregnancy-related complications and adverse outcomes. Women with obesity should therefore receive routine care supplemented by specialist services and facilities that are specific to their needs. Specialist midwives, senior anaesthetic expertise and a review by a senior team in the antenatal clinic may be required.

Recommendation type: Clinical care and service provision

**Recommendation 4: Measuring height, weight and calculating body mass index**

All pregnant women should have their weight and height measured using appropriate equipment, and they should have their body mass index (BMI) calculated accurately at the antenatal booking visit, as recommended by the Joint CMAACE/RCOG Guideline on the management of women with obesity in pregnancy.<sup>11</sup> Measurements should be recorded in the handheld notes and electronic patient information system.

Maternal weight should be re-measured in the third trimester to allow appropriate plans to be made for equipment and personnel required during labour and delivery.

Re-measurement of weight on admission to delivery suite will facilitate dose calculation of drugs required during labour. A weight after delivery may also be necessary to guide dose calculation for women requiring postnatal medication (e.g. thromboprophylaxis). Weighing scales should be routinely accessible in all delivery settings to enable the assessment of weight.

Self-reported weights and heights should not be used as a substitute for accurate weight and BMI assessment.

Recommendation type: Clinical care and service provision



**Recommendation 5: Information giving during pregnancy**

All pregnant women with a booking BMI  $\geq 30$  should be provided with accurate and accessible information about the risks associated with obesity in pregnancy and how these risks may be minimised. This is also recommended in the Joint CMACE/RCOG Guideline on the management of women with obesity in pregnancy.<sup>11</sup> Women should be given the opportunity to discuss this information with health professionals who have been trained in the management of maternal obesity.

The aim is to provide appropriate information sensitively, which empowers the woman to engage actively with health professionals and the services available to them.

**Relevant information should include:**

- The importance of healthy eating and appropriate exercise during pregnancy for the management of weight gain
- The increased risk of hypertensive disorders, gestational diabetes and fetal macrosomia requiring an increased level of maternal and fetal monitoring
- The potential for poor ultrasound visualisation of the baby and consequent difficulties in fetal surveillance and screening for anomalies
- The increased risk of induction of labour
- The potential for intrapartum complications, including difficulty with fetal monitoring, anaesthesia and caesarean section which would require senior obstetric and anaesthetic involvement and an antenatal anaesthetic assessment, and potential for emergency caesarean section
- The need to prioritise the safety of the mother at all times
- The importance of breastfeeding and opportunities to receive additional breastfeeding support.

Nutritional advice by an appropriately trained professional may be useful early in the pregnancy.

Recommendation type: Good practice point

### Recommendation 6: *Surveillance and screening*

Women with obesity have an increased risk of gestational diabetes mellitus, pre-eclampsia and fetal abnormalities, and they should have surveillance and screening according to existing guidance.<sup>16 17</sup>

The Pre-eclampsia Community Guideline<sup>16</sup> outlines appropriate surveillance and recommends:

- Women with a booking BMI  $\geq 35$  who also have at least one additional risk factor for pre-eclampsia should have referral early in pregnancy for specialist input to care.

#### Additional risk factors include:

- first pregnancy
- $\geq 10$  years since last baby
- $\geq 40$  years of age
- multiple pregnancy
- previous pre-eclampsia
- family history of pre-eclampsia
- diastolic BP  $\geq 80$ mmHg at booking
- proteinuria  $\geq 1+$  on more than one occasion or  $\geq 0.3$ g/24 hours
- certain underlying medical conditions such as antiphospholipid antibodies or pre-existing hypertension, renal disease or diabetes.

- Women with a booking BMI  $\geq 35$  with no additional risk factor are suitable for community monitoring for pre-eclampsia at a minimum of 3-weekly intervals between 24 and 32 weeks' gestation, and 2-weekly intervals from 32 weeks to delivery.

The NICE Clinical Guideline No. 63 (Diabetes in Pregnancy)<sup>17</sup> recommends that women with a BMI  $\geq 30$  have a 2-hour 75g oral glucose tolerance test (OGTT) at 24-28 weeks, using the criteria defined by the World Health Organisation.

Recommendation type: Clinical care and service provision



**Recommendation 7: Anaesthesia in pregnancy and labour**

Pregnant women with a booking BMI  $\geq 40$  should have an antenatal anaesthetic consultation with an obstetric anaesthetist, as recommended by the Joint CMACE/RCOG Guideline on the management of women with obesity in pregnancy.<sup>11</sup> An anaesthetic consultation should allow potential difficulties with venous access, regional or general anaesthesia to be identified and anticipated.

Women with a BMI  $< 40$  with anticipated problems relating to co-morbidities, airway management, vascular access and regional anaesthetic techniques may also require an antenatal anaesthetic consultation.

Maternity services may decide to use a lower BMI threshold, taking into consideration the local prevalence of maternal obesity.

Consideration should be given to the timing of an epidural, particularly for women with a BMI  $\geq 40$ .<sup>18 19</sup>

Recommendation type: Clinical care and service provision

**Recommendation 8: Thromboembolism and thromboprophylaxis**

Health professionals must be aware that women are at risk of thromboembolism from the very beginning of pregnancy, and that this risk increases significantly for women with obesity.

At booking, a full risk and needs assessment must be undertaken and documented clearly in the maternity notes. Women with a BMI  $\geq 30$  should be assessed throughout pregnancy for the risk of thromboembolism.

Antenatal and postnatal thromboprophylaxis should be considered in accordance with the RCOG Clinical Green-top Guideline No. 37.<sup>12</sup> The RCOG Clinical Green-top Guideline No. 37 advises that:

- A woman with a BMI  $\geq 30$  who also has two or more additional risk factors for thromboembolism should be considered for prophylactic LMWH antenatally. This should begin as early in pregnancy as practical.
- All women receiving LMWH antenatally should usually continue prophylactic doses of LMWH until six weeks postpartum, but a postnatal risk assessment should be made.
- All women with a BMI  $\geq 40$  should be offered postnatal thromboprophylaxis regardless of their mode of delivery.
- Women with a booking BMI  $\geq 30$  requiring pharmacological thromboprophylaxis must be prescribed doses appropriate for their current weight:<sup>12</sup>

Weight (kg)	Doses
91-130	60 mg Enoxaparin; 7,500 units Dalteparin; 7,000 units Tinzaparin daily
131-170	80 mg Enoxaparin; 10,000 units Dalteparin; 9,000 units Tinzaparin daily
>170	0.6 mg/kg/day Enoxaparin; 75 units/kg/day Dalteparin; 75 units/kg/day Tinzaparin

Recommendation type: Clinical care and service provision

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**Recommendation 9: Place and mode of birth**

The risk of complications and adverse pregnancy-related outcomes increases with increasing BMI. Women with a BMI  $\geq 35$  should give birth in a consultant-led obstetric unit with appropriate neonatal services, as recommended by the NICE Clinical Guideline No. 55 (Intrapartum Care)<sup>20</sup> and Joint CMACE/RCOG Guideline on the management of women with obesity in pregnancy,<sup>11</sup> so that immediate intervention is available in the event of intrapartum and postpartum complications and emergencies. An individual risk assessment regarding planned place of birth for women with a booking BMI 30-34.9 should be performed.

On admission for delivery, all women with a BMI  $\geq 40$  should be assessed by midwives, obstetricians and anaesthetists to identify any extra staff, equipment and facilities that may be required during childbirth. These requirements need to be prepared in anticipation of the need for emergency operative delivery.

To minimise the risk of complications, venous access should be established early on in labour, and an obstetrician and an anaesthetist at Speciality Trainee year 6 and above, or with equivalent experience in a non-training post, should be informed and available for the care of women with a BMI  $\geq 40$  during labour and delivery.

Women with obesity require an individual assessment regarding the best mode of delivery. This assessment should take in to account previous pregnancies, pregnancy complications and co-morbid conditions, in view of the risk of labour complications requiring emergency caesarean section with anaesthetic and surgical challenges associated with increased morbidity.

The decision for mode of delivery should therefore be taken only after careful consideration of the individual circumstances and in conjunction with the full multidisciplinary team and the woman herself. In the absence of obstetric or medical indications, labour and vaginal delivery should be encouraged for women with obesity.

Attempts should be made as soon as possible to initiate breastfeeding, regardless of mode of delivery or place of birth.

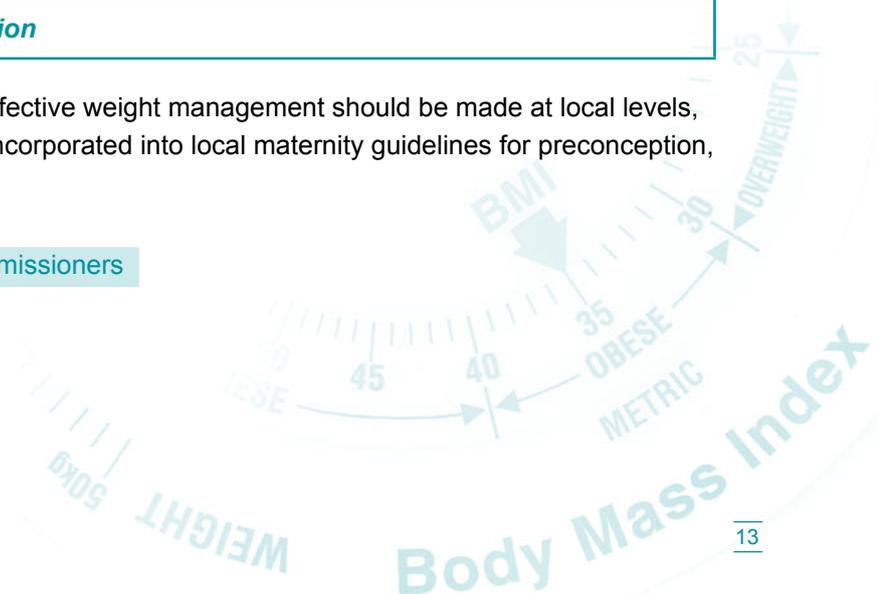
All plans should be clearly documented in the maternity notes.

Recommendation type: Clinical care and service provision

**Recommendation 10: Service organisation**

Links with existing public health services for effective weight management should be made at local levels, and pathways for referral into these services incorporated into local maternity guidelines for preconception, antenatal and postnatal care.

Recommendation type: Providers and/or commissioners



**Recommendation 11:** *Areas for further research*

**Further research is required in the following areas:**

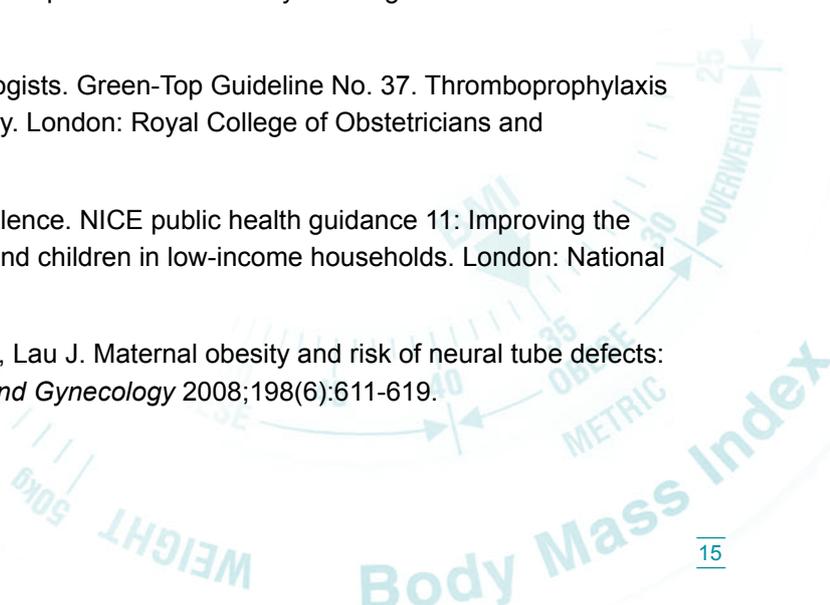
- Effective communication of risks associated with obesity
- Weight management and behavioural change regarding diet and exercise
- Optimal weight gain during pregnancy for women in different BMI categories
- Effective interventions for weight management during pregnancy and after pregnancy
- Causes of stillbirth in women with obesity
- Factors predicting optimal timing and mode of delivery
- Optimal way to deliver specialist services.

Recommendation type: Further research

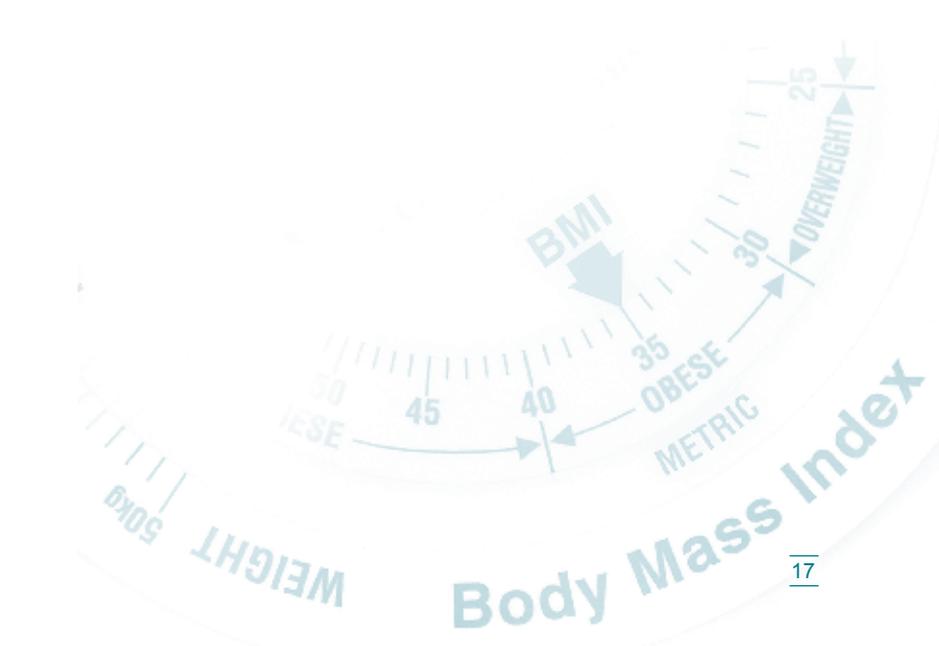
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