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TITLE: Antenatal Management of Pregnancy Following Bariatric Surgery

This guideline is to be used as a supplement to the [Antenatal Care Plan for Pregnancy Post Bariatric Surgery, see pg. 10.](#)

Contents

1.	Purpose	1
2.	Background.....	1
3.	Scope	3
4.	Definitions.....	3
5.	Procedure/Management	4
	Management of Hyperemesis.....	4
	Ultrasound.....	4
	Screening for Gestational Diabetes	4
	Weight Gain and Body Image.....	4
	Nutritional Screening and Supplementation.....	5
6.	Related Documentation	8
7.	References	8
	Antenatal Care Plan for Pregnancy Post Bariatric Surgery	10

1. Purpose

Pregnancies after bariatric surgery are considered high risk and should be managed by an obstetrician with support from the lead maternity carer (LMC) and/or General Practitioner (GP) with intensive input from a dietician who has experience in managing patients following bariatric surgery.

2. Background

Bariatric surgery is considered the most effective treatment for obesity where lifestyle modifications have failed and BMI is over 40kg/m².

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 1 of 10	

Bariatric surgery results in sustained loss of 15-25% of body weight and significant reductions in healthcare costs and co-morbidities such as diabetes, hypertension and some forms of malignancy.

After bariatric surgery, the risks of pre-eclampsia, gestational diabetes, macrosomia and other obesity-associated complications are reduced, but there is increasing evidence that pregnancies after bariatric procedures are at increased risk of fetal growth restriction and small-for-gestational-age infants. Nutritional deficiencies are common after bariatric surgery and the diagnosis of gestational diabetes/hyperglycaemia of pregnancy is impaired by altered glucose metabolism.

The risk of congenital abnormalities after bariatric surgery does not appear to be increased above the background population rate.

The results of the AURORA study, a multicentre prospective cohort study in Europe, are awaited. The study involves long-term follow-up for women undergoing bariatric surgery and their subsequent reproductive outcomes. It is hoped that information from this study will be used to produce guidelines and recommendations for reproductive care for women after bariatric surgery, based on robust evidence.

It is generally recommended that women who have had bariatric surgery should wait for 12 to 18 months before trying to conceive. This is to stabilise body weight after the expected initial rapid weight loss and to allow identification and correction of nutritional deficiencies that result from bariatric surgery. However, pregnancy earlier in the postoperative period is not an indication for termination of pregnancy, and the same recommendations for management during pregnancy should be followed.

It is important to identify the type of surgical procedure women have undergone so as to identify women at greatest risk of complications in pregnancy and arrange the necessary monitoring and investigations during pregnancy.

Bariatric surgery is either restrictive or malabsorptive or a combination of both;

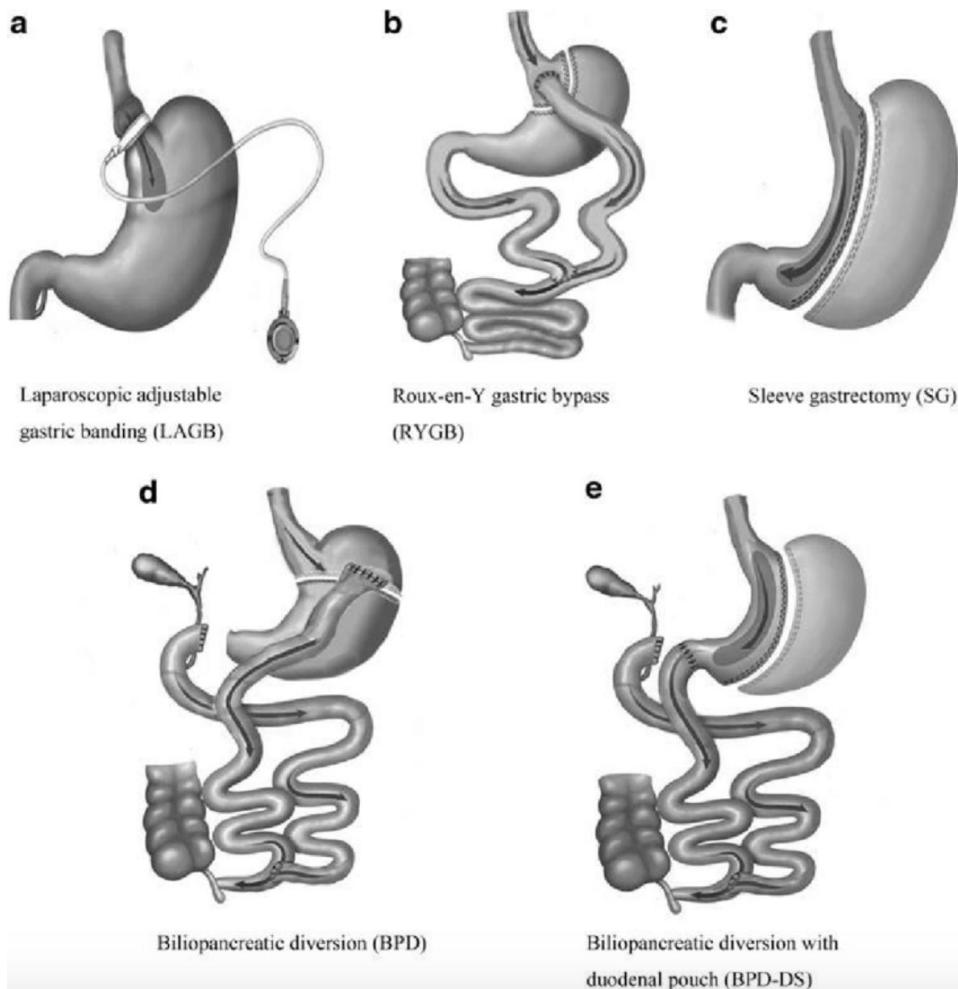
Restrictive: Laparoscopic adjustable gastric banding, sleeve gastrectomy, silastic ring gastroplasty, vertical banded gastroplasty

Malabsorptive: Biliopancreatic diversion without duodenal switch/pouch

Combination: Biliopancreatic diversion with duodenal switch, Roux-en-Y gastric bypass

Also see diagrams over page.

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 2 of 10	



Adapted from Mechanick JI, Kushner RF Sugerman HJ et al, 2009, Obesity; 17:s1-s70.

3. Scope

All Te Whatu Ora Lakes staff members (medical, nursing and midwifery) and Lead Maternity Carers who are providing care for pregnant women.

4. Definitions

- BMI Body Mass Index
- LMC Lead Maternity Carer
- GP General Practitioner
- OGTT Oral Glucose Tolerance Test
- SGA Small for Gestational Age

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 3 of 10	

5. Procedure/Management

Management of Hyperemesis

Specific to early pregnancy, pregnant women/people with an adjustable gastric band may need to have the band deflated or opened to reduce the frequency of vomiting and aid absorption of nutrients. This will need to be arranged with a bariatric surgeon. Vomiting in combination with a restrictive surgical procedure can be difficult to manage and patients may need intensive support during this time, including from a dietician.

Ultrasound

Dating, nuchal translucency and anatomy ultrasounds are recommended as per routine pregnancy care.

Serial growth ultrasounds (4-6 weekly) are recommended due to the increased risk of growth restriction. Schedule C of the Lakes SGA Pathway should be followed.

Screening for Gestational Diabetes

Recommend home glucose monitoring of fasting and one-hour postprandial blood glucose levels for one week, rather than OGTT.

Some procedures, particularly Roux-en-Y gastric bypass and sleeve gastrectomy, are associated with an exaggerated rise in plasma glucose after a glucose load, followed by significant hypoglycaemia at two hours. A large glucose load can also lead to “dumping syndrome”, characterised by hypotension, palpitations, tachycardia and syncope.

The altered response to a glucose load means that the standard 2 hour 75g OGTT is unreliable in women who have undergone bariatric surgery, particularly Roux-en-Y. There is no international consensus or guideline on how to screen these women for diabetes, but an HbA1c should be measured in the first trimester to exclude pre-existing diabetes, and measurement of fasting blood glucose levels and post-prandial glucose levels over a period of days is suggested as a screening regime for gestational diabetes.

Weight Gain and Body Image

Weight should be measured at each visit. Gestational weight gain should follow national guidelines and will depend up the booking BMI of the patient and whether the pregnancy is a singleton or multiple gestation. Consider using the ministry of health record card for Healthy Weight Gain in Pregnancy, available to print at:

<https://www.health.govt.nz/system/files/documents/publications/healthy-weight-gain-in-pregnancy-record-card-jun14.pdf>

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 4 of 10	

Booking BMI	Weight gain singleton	Weight gain multiple
<18.5	12.5-18kg	>25kg
18.5-24.9	11.5-16kg	17-25kg
25.0-29.9	7-11kg	14-23kg
>30	5-9kg	11-19kg
>40	<5kg	<11kg

Body image may be negatively impacted by the weight gain of pregnancy. A discussion around the expected physical changes during pregnancy and postpartum should be part of routine antenatal counselling, but careful attention should be paid to this issue for women who have had substantial weight loss from bariatric surgery and may be concerned about weight gain.

Nutritional Screening and Supplementation

There is not currently a multivitamin supplement specifically recommended for pregnant women after bariatric surgery. Chewable multivitamins are preferable as absorption of whole tablets can be impaired after bariatric surgery. Current recommendations therefore include a pregnancy-specific multivitamin, such as Elevit®, with additional calcium and iron as detailed below.

Serum levels of vitamins and minerals should be assessed at least each trimester as per the table below (see page 8).

All pregnant women who have undergone bariatric surgery should be referred to a dietician for specialist dietetic support.

- **Iron**

Ferritin and iron studies should be checked each trimester and supplementation up to 600mg daily adjusted to response, e.g. Ferro-tab 200mg 2-3 times daily. The addition of 100mg vitamin C (ascorbic acid) may further help absorption of iron. Avoid taking iron and calcium supplements at the same time.

Iron-deficiency anaemia is the commonest form of anaemia in pregnancy. For women who have undergone bariatric surgery, particularly where a malabsorptive procedure has been performed, rates of anaemia are high. This can be linked to a reduced caloric intake and poorer tolerance for red meat, reduction in acid production in the stomach and decreased bioavailability of dietary iron as well as to the enormous iron demands of pregnancy.

Iron supplementation for all pregnant women who have undergone bariatric surgery is therefore recommended, with guidelines varying from 45mg to 600mg of iron supplementation daily. One study suggested that the addition of ascorbic acid (vitamin C) increased the absorption of iron by 67%.

See Maternal Iron Optimisation Guideline – 1401933.

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 5 of 10	

- **Iodine**

As per routine pregnancy care, 150mcg Iodine daily is recommended for all pregnant and breastfeeding women.

There is no current evidence to support an increased iodine requirement after bariatric surgery.

- **Folate**

Folate supplementation should follow routine pregnancy recommendations, with screening in each trimester. Folic acid 800mcg daily is recommended or 5mg if previous neural tube defect, diabetes or booking BMI >30.

The incidence of folate deficiency after bariatric surgery is reported to be up to 40% and can result from both restrictive and malabsorptive procedures. However, since folate is absorbed throughout the small intestine, it is likely that deficiency is due to inadequate intake rather than malabsorption, and any deficiency can be easily corrected by oral supplementation.

- **Vitamin B12**

Serum B12 should be checked every trimester, and deficiency treated in the form of IM injection of vitamin B12 1mg, repeated up to every 12 weeks.

Deficiency of Vitamin B12 is common in pregnancies after bariatric surgery, with rates up to 53%. This is thought to be due to a reduction in the production of intrinsic factor and gastric acid, and from the bypass of the duodenum, where the majority of Vitamin B12 is absorbed. The data remains conflicting, but there is some evidence of an increased risk of preterm birth, recurrent miscarriage, IUGR, low birth weight infants, NTDs and impaired cognitive development.

- **Vitamin D**

Screen for deficiency at least once each trimester. Pregnancy multivitamins should contain 400-800IU. Women with additional pre-existing risk factors (e.g black race, veiled) should receive oral supplementation as well as measurement of serum levels during pregnancy- Cholecalciferol 1.25mg monthly is suggested.

The incidence of Vitamin D deficiency varies by surgical procedure but rates up to 70% are reported amongst post-operative pregnant patients.

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 6 of 10	

- **Calcium**

In addition to a prenatal vitamin, 1000mg calcium carbonate is recommended daily. Do not take at the same time as oral iron.

Calcium supplementation is associated with a reduction in the risk of hypertensive disorders and pre-term labour, particularly where dietary calcium intake is low. Hyperparathyroidism is common after bariatric surgery. High levels of parathyroid hormone can occur secondary to low serum calcium, and high levels of PTH will worsen Vitamin D deficiency and hypocalcaemia- PTH is therefore used as a marker for hypocalcaemia.

- **Protein**

60mg daily protein intake as part of a balanced diet is recommended for pregnant women after bariatric surgery.

Serum albumin should be checked each trimester to detect severe protein deficiency. Symptoms of protein deficiency include fatigue, weakness and hair loss but are relatively rare. Evidence of the detrimental effect of protein deficiency on pregnancy is limited and is restricted to fetal growth impairment.

- **Vitamin A**

Screen every trimester and treat deficiency with a multivitamin containing a maximum of 5000IU/day of beta-carotene.

The degree of vitamin A deficiency depends on the surgical procedure performed and stage of pregnancy. Vitamin A supplementation may help to reduce the risk of anaemia and also the risk of maternal night blindness. There are case reports of infantile blindness thought secondary to maternal Vitamin A deficiency. Beta-carotene is a provitamin and is converted to retinol (Vitamin A) at a rate of 1IU beta carotene to 0.3mcg retinol.

- **Vitamin K**

Screen each trimester and offer oral supplementation where levels are low. Lack of evidence for particular regime of supplementation. Consider oral supplementation depending on serum levels, starting at 2.5mg daily to a maximum of 25mg daily.

Case series' report deficiency rates of almost 70% in a post-bariatric surgical population, most notably in those who have undergone malabsorptive surgery. One case report exists of neonatal intra-cranial haemorrhage due to maternal Vitamin K deficiency after slippage of a laparoscopically placed gastric band.

There is no current evidence to screen for serum levels of magnesium, iodine or zinc.

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 7 of 10	

Serum Levels of Vitamins and Minerals Assessment Table

Deficiency	Laboratory test	Routine supplementation	Treatment if deficient or non-responsive to oral supplements
Protein	Albumin	60g/day in balanced diet	Protein supplements
Calcium	Calcium and parathyroid hormone	1000-1200mg/d calcium carbonate in addition to prenatal vitamin	
Folate	FBC, folate	800mcg/day in prenatal vitamin	Oral folate 1000mcg/day
Iron	FBC, serum iron, ferritin, TIBC	Ferrous sulphate 200mg BD-TDS, with Vitamin C in addition to prenatal vitamin	Parenteral iron
Vitamin A	Serum vitamin A	4000IU/d in prenatal vitamin as beta carotene	Supplementation should not exceed 5000IU/day
Vitamin B12	FBC, serum B12	4mcg/day in prenatal vitamin	1000mcg IM every 12 weeks
Vitamin D	25-hydroxy vitamin D	400-800 IU/day in prenatal vitamin	Calcitriol oral vitamin D 1000 IU/day

From: Mechanick JI, Youdim A, Jones DB, Timothy Garvey W, Hurley DL, Molly McMahon M, et al. Clinical practice guidelines for the perioperative Nutritional, metabolic, and nonsurgical support of the Bariatric Surgery patient—2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. Surg Obes Relat Dis. 2013;9(2):159–91.

6. Related Documentation

- Antenatal Care Plan for Pregnancy Post Bariatric Surgery
- Maternal Iron Optimisation (EDMS 1401933)
- Prevention, Detection and Management of the Small for Gestational Age (SGA) or Intrauterine Growth Restricted (IUGR) Fetus (EDMS 1561674)

7. References

- American College of Obstetricians and Gynaecologists. ACOG practice bulletin no. 105: bariatric surgery and pregnancy. Obstet Gynecol. 2009; 113(6):1405-13
- Busetto L, Dicker D, Azran C, Batterham RL, Farpour-Lambert N, Fried M, et al. Practical recommendations of the Obesity management task force of the European Association for the Study of Obesity for the post-Bariatric Surgical medical management. Obes Facts. 2018;10(6):597-632.
- Falcone V, Stopp T, Feichtinger M, Kiss H et. al. Pregnancy after bariatric surgery: a narrative literature review and discussion of impact on pregnancy management and outcome. BMC Pregnancy and childbirth. 2018 18:507

Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 8 of 10	

- Ministry of Health. 2006. Food and Nutrition Guidelines for Healthy Pregnant and Breastfeeding Women: A background paper. Wellington: Ministry of Health.
- Huerta S, Rogers LM, Li Z, et al. Vitamin A deficiency in a newborn resulting from maternal hypovitaminosis A after biliopancreatic diversion for the treatment of morbid obesity. *Am J Clin Nutr.* 2002;76:426–9.
- Van Mieghem T, Van Schoubroeck D, Depiere M, et al. Fetal cerebral haemorrhage caused by vitamin K deficiency after complicated bariatric surgery. *Obstet Gynecol.* 2008;112:434–6.
- Mechanick JI, Youdim A, Jones DB, Timothy Garvey W, Hurley DL, Molly McMahon M, et al. Clinical practice guidelines for the perioperative Nutritional, metabolic, and nonsurgical support of the Bariatric Surgery patient—2013 update: cosponsored by American Association of Clinical Endocrinologists, the Obesity Society, and American Society for Metabolic & Bariatric Surgery. *Surg Obes Relat Dis.* 2013;9(2):159–91.
- T. Dao, J. Kuhn, D. Ehmer, T. Fisher, and T. McCarty, “Pregnancy outcomes after gastric-bypass surgery,” *American Journal of Surgery*, vol. 192, no. 6, pp. 762–766, 2006.
- Adam S., Ammori B., Soran H., Syed A. A. Pregnancy after bariatric surgery: screening for gestational diabetes. *BMJ.* 2017;356:p. j533.
- A.Eerdeken, A.Debeer, G.Van Hoeyetal., “Maternal bariatric surgery: adverse outcomes in neonates,” *European Journal of Pediatrics*, vol. 169, no. 2, pp. 191–196, 2010
- Hallberg L, Hulthén L. Prediction of dietary iron absorption: an algorithm for calculating absorption and bioavailability of dietary iron. *The American Journal of Clinical Nutrition*, Vol 71(5), pp.1147-1160.

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Te Whatu Ora Lakes Maternity Service		Key Word(s): Antenatal, Bariatric Surgery		Document Number: 2679945	
Authorised by: Maternity CQI	Issue Date: October 2022	Review Date: October 2024	Version: 1	Page: 9 of 10	

MUST attach Patient Label Here
Please ensure you attach the correct patient label

Antenatal Care Plan for Pregnancy Post Bariatric Surgery

LMC:..... EDD:/...../..... Gravida:..... Parity:.....

Obstetric Consultant overseeing care:

Surgical Procedure:

Year and Location of surgery:

Pre-operative weight:kgs Booking Weight:.....kgs BMI:

Target Weight Gain for Pregnancy (Based on NZ MoH Guidelines):kgs

Referred to dietician? Yes No

Chosen daily multivitamin:.....

Chosen iron supplement:

Chosen calcium supplement:

Ultrasound Scans (as per schedule C of the SGA guideline)					
Dating	NT	Anatomy	32/40	37/40	40/40
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

In the event of detection of SGA/IUGR, the care plan should vary as per the Lakes SGA Guideline.

- In each Trimester, screen for the following:
- Albumin
 - B12
 - Calcium
 - Creatinine
 - Fasting glucose
 - Ferritin
 - Folate
 - Full blood count
 - HbA1c
 - Urea & electrolytes
 - Vitamin A
 - Vitamin K
 - 25-OH Vitamin D

1st Trimester Nutrient Assessment

Deficiency identified? Yes No

Action taken:.....

2nd Trimester Nutrient Assessment

Deficiency identified? Yes No

Action taken:.....

3rd Trimester Nutrient Assessment

Deficiency identified? Yes No

Action taken:.....

Diabetes Screening

HbA1c at booking:.....

24-28 weeks: 7 days of fasting and post prandial blood glucose measurements