

Putting NICE guidance into practice

Costing report: Obesity

Implementing the NICE guideline on obesity (CG189)

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This costing report accompanies [Obesity](#) (NICE clinical guideline 189)

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This report is written in the following context

This report represents the view of NICE, which was arrived at after careful consideration of the available data and through consulting with healthcare professionals. It should be read in conjunction with the NICE guideline. The report and template are implementation tools and focus on the recommendations that were considered to have a significant impact on national resource utilisation.

The cost and activity assessments in the report are estimates based on a number of assumptions. They provide an indication of the likely impact and are not absolute figures. Assumptions used in the report are based on assessment of the national average. Local practice may be different from this, and the template can be amended to reflect local practice.

Implementation of the guidance is the responsibility of local commissioners and/or providers. Commissioners and providers are reminded that it is their responsibility to implement the guidance, in their local context, in light of their duties to have due regard to the need to eliminate unlawful discrimination, advance equality of opportunity and foster good relations. Nothing in this costing tool should be interpreted in a way that would be inconsistent with compliance with those duties.

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Executive summary

This costing report looks at the resource impact of implementing the NICE guideline on [Obesity](#) in England.

The costing method adopted is outlined in appendix A; it uses the most accurate data available, was produced in conjunction with key clinicians, and was reviewed by clinical and financial professionals.

Obesity services (tiers 1–4) are commissioned in accordance with the criteria outlined in [Clinical Commissioning Policy: Complex and Specialised Obesity Surgery](#). NHS England is responsible for commissioning tier 4 services. Health-related services within tiers 1–3 are commissioned and funded by Clinical Commissioning Groups (CCGs). Population prevention, health promotion measures and strategies are funded from local authority budgets.

Primary, community-based, and secondary care services provide tier 3 and tier 4 (including surgery) services. Tier 1 and 2 are provided in primary care and community settings. In some areas, tier 2 services are also provided by the private and not-for-profit sectors.

Significant¹ resource-impact recommendations

The guideline is an update of NICE clinical guideline 43. Nine new recommendations have been developed focusing on 3 main areas: follow-up care packages after bariatric surgery; the role of bariatric surgery in managing recent-onset type 2 diabetes; and very-low-calorie diets, including their effectiveness and safety and effective management strategies for maintaining weight loss after such diets.

This report focuses on 5 new recommendations that are considered to have the greatest resource impact nationally, and therefore need the most

¹ The following impacts have been defined as significant:

- when the number of people affected by the guidance recommendations is estimated to be over 300 (equivalent to 1 person per 170,000; in practice, smaller populations may have no patients or possibly more than 1, particularly if it is a disease that runs in families and there is a cluster in an area)
- when initial costing work indicates that the national cost is more than £1 million (equivalent to £2000 per 100,000 population).

additional resources to implement or can potentially generate the biggest savings. They are:

- Provide a long-term multicomponent strategy to help the person maintain their weight after the use of a very-low-calorie diet. (See recommendation 1.4.1). [Recommendation 1.7.10].
- Offer an expedited assessment for bariatric surgery to people with a BMI of 35 or over who have recent-onset type 2 diabetes² as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). [Recommendation 1.11.1]
- Consider an assessment for bariatric surgery for people with a BMI of 30–34.9 who have recent-onset type 2 diabetes² as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). [Recommendation 1.11.2]
- Consider an assessment for bariatric surgery for people of Asian family origin who have recent-onset type 2 diabetes² at a lower BMI than other populations (see recommendation 1.2.8) as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent) [Recommendation 1.11.3]
- After discharge from bariatric surgery service follow-up, ensure that all people are offered at least annual monitoring of nutritional status and appropriate supplementation according to need following bariatric surgery, as part of a shared care model of chronic disease management. [Recommendation 1.12.2]

Clinical experts suggest that lowering the BMI criteria for people with type 2 diabetes for an assessment for bariatric surgery will increase demand for specialist weight management services (tier 3) and subsequently for specialised complex obesity services (tier 4), including surgery. Currently, tier 3 services are not comprehensively available across the country so funding may be needed to set up or expand the services.

²The GDG considered that recent-onset type 2 diabetes would include those people whose diagnosis has been made within a 10-year time frame.

The costing template has assessed the costs that apply only to the additional bariatric surgery procedures but not for tier 3 and 4 (non-surgical) services. Post-surgery costs (for example, complications of surgical obesity procedures, follow-up services, such as any plastic surgery that may be needed or counselling) and costs arising from the complications of nutritional deficiencies in people who do not comply with follow-up have also not been calculated. However, these costs are discussed in this costing report. Potential savings from bariatric surgery have not been included in the costing template because the savings per person will vary significantly. However, section 5.2.5, table 9, shows an estimate of the potential savings from needing less medication for type 2 diabetes. Based on the estimates, approximately £18.1 million could be saved over a 4-year period after surgery. Organisations are encouraged to assess potential costs or savings at a local level.

The cost impact assessment for NICE clinical guideline 43 looked at the recommendations that covered referrals to a paediatrician, pharmacological treatment with licensed drugs and obesity surgery for adults with a BMI of more than 50 kg/m². Other areas that were considered include providing appropriate training to relevant staff who work with both adults and children and for local authorities to work with local partners, such as the private and not-for-profit sectors, to create and manage more safe spaces for incidental and planned physical activity. These issues have not been included in this costing work as they were considered to be already embedded with current practice.

Net resource impact

The annual change in resource use arising from implementing the recommendations considered in the costing analysis is summarised below.

Cost of bariatric surgery for people who have recent-onset type 2 diabetes

Details	Number of procedures	Total cost (£000)
Current surgery		
People with a BMI of less than 30 ^a	0	0
People with a BMI of 30 to less than 35 ^b	0	0
People with a BMI of 35 and over ^b	2,410	12,473
Total	2,410	12,473
Future surgery		
People with a BMI of less than 30 ^a	187	967
People with a BMI of 30 to less than 35 ^b	2,948	15,256
People with a BMI of 35 and over ^b	4,820	24,940
Total	7,955	41,163
Cost impact	5,545	28,690
a. This refers to people of Asian family origin who have recent-onset type 2 diabetes and a BMI of less than 30.		
b. This refers to people in the general population who have recent-onset type 2 diabetes.		

Other costs

Commissioners and providers of tier 3 and 4 services should work together to ensure there is capacity within provider hospitals to manage the potential increase in demand for services. Tier 4 services may need additional investment for equipment such as specialised beds and trolleys, or to alter rooms or lifts within hospitals. There may also be a need for investment to cover a potential increase in activity, for example, in intensive care and high-dependence units.

Benefits and savings

Potential savings from bariatric surgery have not been included in the costing template because the savings per person will vary significantly. However, in general there are significant potential savings associated with bariatric surgery. For example, a budget impact analysis paper (Pollock, et al, 2013) reviewed for the guideline concluded that laparoscopic adjustable gastric banding (LAGB) showed cost savings of £91,300 (£913 per person) over

5 years in a closed cohort of 100 patients compared with standard medical management (SMM) for obesity. Although there would be high initial costs from surgery and associated surgical complications, the paper showed that these are more than offset by savings from:

- lower diabetes, asthma, and sleep apnoea medication costs (the largest saving from LAGB arose from the decreased use of diabetes medication in people experiencing remission of diabetes)
- lower incidence of diabetes complications.
- less contact with healthcare professionals and services.

Implementing the clinical guideline may result in the following savings and benefits:

- A reduction in weight in people who are overweight and obese. This can improve physical, psychological and social health. Evidence suggests that even a moderate weight loss of 5–10% of body weight in people who are obese is associated with important health benefits, particularly lowering of blood pressure and a lower risk of developing type 2 diabetes and coronary heart disease. For example, a 10 kg weight loss in people newly diagnosed as having diabetes may result in a 50% fall in fasting glucose (Swanton, 2008). More details of benefits likely to result from a 10 kg weight loss can be found in [Healthy weight, Healthy lives: A toolkit for developing local strategies](#).
- Improvement and remission of type 2 diabetes mellitus after bariatric surgery as it is an effective, long-term treatment to combat severe obesity and maintain weight loss. [The UK National Bariatric Surgery Registry \(2014\)](#) reported that there is good evidence from randomised controlled trials (RCTs) that surgery is superior to medical therapy in improving diabetes control and metabolic syndrome. Surgery lowers the number of hypoglycaemic medications needed, including some people no longer needing insulin. It also means many people go into remission, and markedly lowers the incidence of diabetes compared to matched patients not having surgery.

- The report further highlights that at 1 year post-operatively over 60% of people who were previously diabetic could be considered as no longer diabetic, and this proportion continued to increase for up to 3 years. At 3 years, 80% of people were classified as being in clinical remission. The table below shows an estimate of the potential savings from needing less medication for type 2 diabetes. See section 5.2.4 for further details.

Potential savings from needing less medication for type 2 diabetes because more people achieve remission^a

Time horizon	%	Year 1	Year 2	Year 3	Year 4	Year 5
Estimated number of people who have surgery each year ^b		5,545	5,545	5,545	5,545	5,545
Remission of type 2 diabetes						
No. of people 1 year after surgery	60	0	3,327	3,327	3,327	3,327
No. of people 2 years after surgery	65	0	0	3,604	3,604	3,604
No. of people 3 years after surgery	80	0	0	0	4,436	4,436
Total per year		0	3,327	6,931	11,367	11,367
Potential saving (£000)		0	1,825	3,804	6,238	6,238
a. Savings are expected to start from year 2 after surgery increasing annually over the 5-year planning period.						
b. See table 8, section 3 of this costing report.						

- A possible reduction in prevalence of type 2 diabetes (Daousi et al., 2006). This may also help lower downstream diagnosis and treatment costs associated with diabetes. For example, when treating diabetic foot ulcers the unit costs to be incurred or saved for the different tests used to investigate suspected diabetic foot infection and the treatments used to manage diabetic foot ulcers could range from £24 to £800 per person ([Costing statement](#), NICE Clinical guideline 119: Inpatient management of diabetic foot problems).
- Prevention of premature death and improvements in quality of life.

Local costing template

The costing template produced to support this guideline enables organisations in England, Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample

calculation using this template showed that additional costs of £48,000 could be incurred for a population of 100,000.

1 Introduction

1.1 *Supporting implementation*

1.1.1 The NICE clinical guideline on [Obesity](#) is supported by the following implementation tools:

- costing tools
 - a costing report; this document
 - a local costing template; a spreadsheet that can be used to estimate the local cost of implementation

1.2 *What is the aim of this report?*

1.2.1 This report provides estimates of the national cost impact arising from implementation of guidance on [Obesity](#) in England. These estimates are based on assumptions made about current practice and predictions of how current practice might change following implementation.

1.2.2 This report aims to help organisations plan for the financial implications of implementing NICE guidance.

1.2.3 This report does not reproduce the NICE guideline on [Obesity](#) and should be read in conjunction with it.

1.2.4 The costing template that accompanies this report is designed to help those assessing the resource impact at a local level in England, Wales or Northern Ireland.

1.3 *Epidemiology of obesity*

1.3.1 In 2012 around a quarter of adults (24% of men and 25% of women) were obese, including people who were morbidly obese. Overweight was more common than obesity, with 42% of men and 32% of women being overweight but not obese (Health Survey England (HSE), 2012).

- 1.3.2 Being overweight or obese is associated with an increased risk for a number of common causes of disease and death, including type 2 diabetes, cardiovascular disease, hypertension (high blood pressure), stroke and some cancers (HSE, 2012). In most people the condition is managed with lifestyle advice and medication, but in some people with obesity bariatric surgery has been used to help weight loss.
- 1.3.3 It has been suggested that resolution of type 2 diabetes may be an additional outcome of surgical treatment of morbid obesity. It is estimated that about 60% of people with type 2 diabetes achieve remission after Roux-en-Y gastric bypass surgery. It has also been suggested that [diabetes-related morbidity and mortality](#) is significantly lower after bariatric surgery and that the improvement in diabetes control is long-lasting.
- 1.3.4 The recorded prevalence of diabetes is approximately 2.8 million people in England ([Quality Outcomes Framework \(QOF\) 2013-14](#)). Of these about 90%³ (2.5 million) are estimated have type 2 diabetes.
- 1.3.5 Table 1 shows the number of people with type 2 diabetes based on the duration they have had the disease. Because the QOF data is not analysed by duration of the disease, the costing model used data from the [National Diabetes Audit](#) (NDA) 2012/13 to classify the QOF based data by duration of disease. See the obesity [Costing template](#) – supporting info – other worksheet.

³ [Diabetes UK, UK Diabetes Resource, Diabetes Symptoms, Diabetes Diet, Gestational Diabetes](#)

Table 1: Number of people with type 2 diabetes by duration of disease

Details	Number of people
Less than 1 year	261,173
1–4 years	751,329
5–9 years	766,203
10 years and over	744,899
Total	2,523,604
a. For more detail see Costing template – ‘Supporting info. – other’ worksheet (table 2).	

1.3.6 Approximately 33.3% of people with type 2 diabetes are overweight (a BMI of 25 to less than 30) and 52.5% are either obese or morbidly obese (a BMI of 30 and over). See table 2.

Table 2: Analysis of people with type 2 diabetes by BMI^a

Details/BMI range	Less than 25	25 to less than 30	30 to less than 35	35 to less than 40	40 and over	Total
Proportion (%)	14.21%	33.32%	28.87%	14.42%	9.18%	100%
Number of people	358,586	840,753	728,582	364,045	231,638	2,523,604
a. For more detail see Costing template - Supporting info. – other worksheet (table 3).						

1.4 Current service provision

1.4.1 Obesity (NICE guideline 43) made clinical recommendations for all managers and healthcare professionals providing NHS care on preventing and managing overweight and obesity.

1.4.2 A typical model for managing obesity is outlined in the NHS England [Clinical Commissioning Policy: Complex and Specialised Obesity Surgery](#) as follows:

- tier 4 – Specialised complex obesity services (including bariatric surgery)
- tier 3 – A primary/community care and secondary care based multidisciplinary team to provide an intensive level of input to patients.
- tier 2 – Primary care with community interventions

- tier 1 – Primary care and community advice.
- 1.4.3 Secondary prevention treatments for obesity include behaviour modification interventions such as diet, exercise and lifestyle, referral to specialist weight loss clinics, drug treatment, low-calorie and very-low-calorie diets, and behaviour modification therapies.
- 1.4.4 Surgery to help weight reduction may be considered when all other non-invasive measures have been tried but have not been successful, and the person has been adequately counselled and prepared for surgery.
- 1.4.5 Before the publication of the update to Obesity (NICE guideline 43), bariatric surgery was recommended for people with a BMI of 40 kg/m² or more, or between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes or high blood pressure) that could be improved if they lost weight.
- 1.4.6 The 2013 Royal College of Physicians report '[Action on obesity: comprehensive care for all](#)' identified that care provision remained varied around the UK and that the models used to manage weight differed. It further reported that access to surgery for obesity in some areas did not reflect the recommendations in Obesity (NICE guideline 43).
- 1.4.7 Obesity services (tiers 1–4) are commissioned in accordance with the criteria outlined in [Clinical Commissioning Policy: Complex and Specialised Obesity Surgery](#). NHS England is responsible for commissioning tier 4 services. Health-related services within tiers 1–3 are commissioned and funded by Clinical Commissioning Groups (CCGs). Population prevention/ health promotion measures and strategies are funded from local authority budgets.
- 1.4.8 NHS England published [Joined up clinical pathways for obesity](#) in March 2014, identifying commissioning arrangements for complex and specialised bariatric surgery. Based on the [Commissioning](#)

[Intentions 2015/16 for Prescribed Specialised Services](#) NHS

England has recommended to the Prescribed Services Advisory Group that surgery for morbid obesity currently commissioned by NHS England should in future be commissioned by clinical commissioning groups.

- 1.4.9 The updated guideline lowers the BMI threshold for people with recent-onset type 2 diabetes to be considered for an assessment for bariatric surgery (see section 3). There is no change for people with type 2 diabetes and BMI of 35 and over other than to expedite an assessment for bariatric surgery as long as they are having or will receive an assessment in a tier 3 service (or equivalent). Clinical experts suggest the change may increase the number of people using tier 3 and tier 4 services (including bariatric surgery).

2 Costing methodology

2.1 Process

- 2.1.1 We use a structured approach for costing clinical guidelines (see appendix A).
- 2.1.2 We have to make assumptions in the costing model. These are tested for reasonableness with members of the Guideline Development Group (GDG) and key clinical practitioners in the NHS.
- 2.1.3 Local users can assess local cost impact, using the costing template as a starting point, and update assumptions to reflect local circumstances.

2.2 Scope of the cost-impact analysis

- 2.2.1 The guideline offers best practice advice on obesity.
- 2.2.2 The guidance does not cover people of a healthy weight, pregnant women and children under 2 years old. Therefore, these issues are outside the scope of the costing work. Also the cost impact analysis

does not include bariatric surgery for children and young people aged up to 17 years old.

- 2.2.3 Clinical experts suggest that lowering the BMI criteria for people with type 2 diabetes for an assessment for bariatric surgery will increase demand for specialist weight management services (tier 3) and subsequently for specialised complex obesity services (tier 4), including surgery. Currently, tier 3 services are not comprehensively available across the country so funding may be needed to set up or expand these services.
- 2.2.4 The costing template has assessed the costs that apply only to the additional bariatric surgery procedures but not for tier 3 and tier 4 (non-surgical) services. Post-surgery costs (for example, complications of surgical obesity procedures, follow-up services such as any plastic surgery that may be needed or counselling) and costs arising from the complications of nutritional deficiencies in people who do not comply with follow-up have also not been calculated. However, these costs are discussed in this costing report. Potential savings from bariatric surgery have not been included in the costing template because the savings per person will vary significantly. Organisations are encouraged to assess these at a local level.
- 2.2.5 We worked with the GDG and other professionals to identify the recommendations that would have the most significant resource impact (see table 3). Costing work has focused on these recommendations.

Table 3: Recommendations with a significant resource impact

Recommendation	Recommendation number
Offer an expedited assessment for bariatric surgery to people with a BMI of 35 or over who have recent-onset type 2 diabetes ⁴ as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent)	1.11.1
Consider an assessment for bariatric surgery for people with a BMI of 30-34.9 who have recent-onset type 2 diabetes as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent).	1.11.2
Consider an assessment for bariatric surgery for people of Asian family origin who have recent-onset type 2 diabetes at a lower BMI than other populations (see recommendation 1.2.8) as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent)	1.11.3
After discharge from bariatric surgery service follow-up, ensure that all people are offered at least annual monitoring of nutritional status and appropriate supplementation according to need following bariatric surgery, as part of a shared care model of chronic disease management.	1.12.2
Provide a long-term multicomponent strategy to help the person maintain their weight after the use of a very-low-calorie diet.	1.7.10

2.2.6 Of the 9 new recommendations, 5 have been considered to have a significant resource impact and have been included in the costing model. Four of the recommendations have not been included in the model because they do not have a significant resource impact and are discussed in the table below.

Table 4: Recommendations without a significant resource impact

Recommendation	Cost impact to be considered at a local level
Do not routinely use very-low-calorie diets (800 kcal/day or less) to manage obesity (defined as BMI over 30). [Recommendation 1.7.7]	Very-low-calorie diets are not routinely used in practice so no costs or savings expected.
Only consider very-low-calorie diets, as part of a multicomponent weight management strategy, for people who are obese and who have a clinically-assessed need to rapidly lose weight (for example, people who need joint	Reflects current practice in the majority of cases, therefore no resource implications are expected.

⁴ The GDG considered that recent-onset type 2 diabetes would include those people whose diagnosis has been made within a 10-year time frame.

<p>replacement surgery or who are seeking fertility services). Ensure that:</p> <ul style="list-style-type: none"> • the diet is nutritionally complete • the diet is followed for a maximum of 12 weeks (continuously or intermittently) • the person following the diet is given ongoing clinical support. <p>[Recommendation 1.7.8]</p>	
<p>Before starting someone on a very-low-calorie diet as part of a multicomponent weight management strategy:</p> <ul style="list-style-type: none"> • Consider counselling and assess for eating disorders or other psychopathology to make sure the diet is appropriate for them. • Discuss the risks and benefits with them. • Tell them that this is not a long-term weight management strategy, and that regaining weight may happen and is not because of their own or their clinician's failure. • Discuss the reintroduction of food following a liquid diet with them. <p>[Recommendation 1.7.9]</p>	<p>Reflects current practice in the majority of cases, therefore no resource implications are expected.</p>
<p>Offer people who have had bariatric surgery a follow-up care package for a minimum of 2 years within the bariatric service. This should include:</p> <ul style="list-style-type: none"> • monitoring nutritional intake (including protein and vitamins) and mineral deficiencies • monitoring for comorbidities • medication review • dietary and nutritional assessment, advice and support • physical activity advice and support • psychological support tailored to the individual • information about professionally-led or peer-support groups. <p>[Recommendation 1.12.1]</p>	<p>Reflects current practice but with some variation in the local models of care. Costs to consider locally are for:</p> <ul style="list-style-type: none"> • a potential increase in appointments with healthcare professionals • extra visits (it is assumed that in the first year the person has 3 visits, and then in subsequent years the person has 1 follow-up visit per year) • follow-up after surgery (follow-up by a dietitian could cost about £31 per visit of 30-minutes duration, and follow-up by a surgical consultant could cost £33 for a 20-minute appointment with only a single visit needed; see table 5) • local variation as costs may be different in some areas, for example, an endocrinology outpatient clinic⁵ consultant-led follow-up attendance costs £93 (single professional follow-up) and £140 (multi-professional follow-up).

⁵ 2014/15 National Tariff Payment System: Annex 5A: National prices. 2014–15 tariff – outpatient attendances (WF01A – Follow up Attendance – Single Professional and WF02A Follow up Attendance – Multi Professional).

	<ul style="list-style-type: none"> • additional staff time to cater for increased demand, train or support other healthcare professionals in the use of psychological interventions as clinical experts suggest not all centres have access to appropriate psychological support. <p>There is potential for cost savings from fewer complications because of better follow-up. This may include treating comorbidities, investigating and treating medical and surgical complications (for example, hypoglycaemia, dumping syndrome), and when there are clear surgical or medical indications, addressing weight regain.</p>
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2.2.7 Table 5 shows costs for minimal follow-up visits based on the economic analysis carried out to inform the development of the guideline. See recommendation 1.12.1 in table 4.

Table 5: Total cost for minimal follow-up visits^a

Follow-up (years after surgery)	Cost per visit £	Supplements £	Blood tests £	Total cost £
1	£31	£124	£178	£333
2	£31	£124	£178	£333
3 onwards with dietitian	£8 to £31	£124	£178	£310 to £333
<p>a. Costs relate to visit undertaken by a dietitian. Curtis L. Unit costs of health and social care 2013. Canterbury: Personal Social Services Research Unit, University of Kent; 2013. Available from: http://www.pssru.ac.uk/project-pages/unit-costs/2013/</p>				

2.2.8 We have limited the consideration of costs and savings to direct costs to the NHS that will arise from implementation. We have not included consequences for the person, the private sector or the not-for-profit sector. If applicable, any realisable cost savings arising from a change in practice have been offset against the cost of implementing the change.

2.3 **General assumptions made**

- 2.3.1 The costing model is based on people with a BMI of 30 or more who have recent-onset type 2 diabetes. It also includes people of Asian family origin who have recent-onset type 2 diabetes at lower BMI levels than other populations (see table 2).
- 2.3.2 Table 6 shows details of the types of bariatric surgery available on the NHS and used in the costing model (National Bariatric Surgery Registry (NBSR, 2010)).

Table 6: Bariatric surgery by type of surgery^a

Type of surgery	%
Roux-en-Y gastric band	67%
Gastric band	21%
Sleeve gastrectomy	10%
Gastric balloon	2%

a. More details can be obtained from the [National Bariatric Surgery Registry: first registry report to March 2010](#).

- 2.3.3 It is assumed in the costing model that, following the implementation of this guideline, bariatric surgery will reflect the same pattern as in table 6. However, because of the benefits of Roux-en-Y gastric bypass surgery (see section 1.3.3) more of this type of surgery may be performed. This will be analysed in the sensitivity analysis and discussed in section 5.

2.4 **Basis of unit costs**

- 2.4.1 If a national tariff price or indicative price exists for an activity this has been used as the unit cost.
- 2.4.2 Using these prices ensures that the costs in the report are the costs to the NHS England of commissioning predicted changes in activity at the tariff price, but may not represent the actual costs to each trust of delivering the activity.

3 Significant resource-impact recommendations

3.1 *Recommendations on bariatric surgery for people with recent-onset type 2 diabetes*

- Offer an expedited assessment for bariatric surgery to people with a BMI of 35 or over who have recent-onset type 2 diabetes as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). [Recommendation 1.11.1]
- Consider an assessment for bariatric surgery for people with a BMI of 30–34.9 who have recent-onset type 2 diabetes as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). [Recommendation 1.11.2]
- Consider an assessment for bariatric surgery for people of Asian family origin who have recent-onset type 2 diabetes at a lower BMI than other populations (see recommendation 1.2.8) as long as they are also receiving or will receive assessment in a tier 3 service (or equivalent). [Recommendation 1.11.3]

Background

3.1.1 The epidemic of obesity and type 2 diabetes has been termed as ‘diabesity’. In most people the condition is managed with lifestyle advice and medication, but in some people with obesity bariatric surgery has been used to help weight loss. This often results in dramatic improvement in glycaemic control that may be partly independent of weight loss.

3.1.2 In people who are severely obese, it has been suggested that metabolic surgery may have the potential effect of putting diabetes into ‘remission’⁶ (Buse et al, 2009). This is particularly important as a potential ‘treatment’ option in those who have recent-onset type 2

⁶ ‘Remission’ of type 2 diabetes is often used as an outcome but there is controversy over the term as it is defined by hyperglycemia which may change over time.

diabetes (within 10 years), as it may be possible to intervene before the impact of diabetes causes long-term damage to other organs.

3.1.3 Because there is a lack of consistency in the commissioning of obesity services clinical experts suggest these recommendations may increase the number of people using tier 3 and tier 4 services, including surgery.

3.1.4 Table 7 shows the number of people with recent onset type 2 diabetes that are likely to be considered for an assessment for bariatric surgery. The table further analyses table 2, section 1.3.6, by the relevant recommendation.

Table 7: People to be considered for / offered an assessment for bariatric surgery

Details	Recommendation 1.11.3	Recommendation 1.11.2	Recommendation 1.11.1
Details/BMI range	Less than 30 ^a	30 to less than 35 ^b	35 and over ^c
Number of people eligible	845,327	513,524	419,854
<p>a. This refers to people of Asian family origin who are to be considered for an assessment for bariatric surgery.</p> <p>b. This refers to people in the general population who are to be considered for an assessment for bariatric surgery.</p> <p>c. This refers to people in the general population who are to be offered an assessment for bariatric surgery.</p>			

3.1.5 People with a BMI of 35 or over who have recent-onset type 2 diabetes are already covered under current practice. The recommendation relating to these people is about ensuring they do not spend an unnecessarily long time before being referred for an assessment for bariatric surgery. This may have implications on the capacity of services in meeting increased demands for an assessment for bariatric surgery and/or for surgery itself.

Assumptions made

3.1.6 Based on the QOF data approximately 1.8 million people have had type 2 diabetes for duration of up to 10 years. See section 1.3.5. It

has been assumed that the number of people who have had the disease for up to 10 years can also be classed as having recent onset type 2 diabetes.

- 3.1.7 In 2012/13, about 8,000 bariatric surgical procedures with a primary diagnosis of obesity and a main or secondary procedure of bariatric surgery were performed in England.
- 3.1.8 Approximately 30% of all bariatric surgical procedures performed over 2011-2013 were for adults with type 2 diabetes (NBSR, 2014). This is equivalent to 2410 procedures for 2012/13.
- 3.1.9 Based on current practice surgery is only recommended for people with a BMI of 40 kg/m² or more, or people with a BMI between 35 kg/m² and 40 kg/m² and other significant disease (for example, type 2 diabetes or high blood pressure) that could be improved if they lost weight. Therefore it is assumed that all 2,410 bariatric surgical procedures for obese people with type 2 diabetes performed in 2012/13 meet these criteria.
- 3.1.10 The costing model estimates the current number of surgical procedures performed for people with a BMI of 35 and over who have recent-onset type 2 diabetes to be 0.57% of the total population with recent onset type 2 diabetes and BMI 35 and over.
- 3.1.11 Based on clinical opinion, the model assumes 1.15% (2-fold increase from the current level) of people with a BMI of 35 and over who have recent-onset type 2 diabetes having surgery when the guidance is implemented. Linked to this increase are the potential improvements in the commissioning of obesity services and awareness of the benefits of bariatric surgery from implementing the updated guidance.
- 3.1.12 Based on clinical opinion, the model assumes 0.57% (2,948) people with a BMI of 30 to less than 35 who have recent-onset type 2 diabetes having bariatric surgery upon guidance

implementation. Approximately 47.5% of people who have recent-onset type 2 diabetes have a BMI of less than 30 (see table 5). The costing model assumes that the proportion of these who are of Asian family origin is equal to the proportion of people of Asian family origin in the general population. This is estimated to be 7.7%.

- 3.1.13 Based on clinical opinion, 0.29% (187) of people of Asian family origin with a BMI of less than 30 with type 2 diabetes may have bariatric surgery upon the guidance implementation.
- 3.1.14 The cost assessment does not include any costs for additional interventions to people who undergo obesity surgery but regain their weight (studies report 5–10% regaining weight within 2 years).
- 3.1.15 Weighted average unit costs have been used in the costing template and these have been based on the 2014/15 national tariff and activity obtained from the 2010/11 NHS trusts reference cost schedules. The healthcare resource groups used are FZ04A-B for sleeve gastrectomy, FZ05A-B for gastric band, FZ24A-C and FZ25A for gastric balloon. See the [costing template](#), supporting info-unit costs for further information.
- 3.1.16 The 2015/16 National tariff for obesity surgery is likely to change from the 2014/15 tariff used in this costing report. Organisations using the costing template from 2015/16 onwards will need to replace the tariffs used in this report with the final tariffs for that financial year onwards.

Cost summary

The net cost of bariatric surgery to people who have recent-onset type 2 diabetes and meet the criteria as per recommendations in section 3.1 is summarised in table 8 below.

Table 8: Cost of bariatric surgery: people who have recent-onset type 2 diabetes

Details	Current practice		Future practice		Change	
	Number of people	Cost (£000s)	Number of people	Cost (£000s)	Number of people	Cost (£000s)
People with a BMI of less than 30 ^a	0	0	187	967	187	967
People with a BMI of 30 to less than 35 ^b	0	0	2,948	15,256	2,948	15,256
People with a BMI of 35 and over ^b	2,410	12,473	4,820	24,940	2,410	12,467
Totals	2,410	12,473	7,955	41,263	5,545	28,690

a. This refers to people of Asian family origin who have recent-onset type 2 diabetes and a BMI of less than 30.

b. This refers to people in the general population who have recent-onset type 2 diabetes

3.2 *Providing a long-term multicomponent strategy to help the person maintain their weight after the use of a very-low-calorie diet. [Recommendation 1.7.10]*

Background

3.2.1 Clinicians and people wishing to lose weight may find the benefit offered by immediate and rapid weight loss when adhering to very-low-calorie diet (a maximum of 12 weeks continuously or intermittently with a low-calorie diet) attractive. Weight regain in people who have tried very-low-calorie diet may cause depression and perpetuate a sense of failure in those people who are trying to manage their weight. If weight increases following a very-low-calorie diet then this would also be undesirable for the person.

Potential costs

3.2.2 Clinical experts suggest that the recommendation may have a significant impact on resources involving the use of tier 3 and also non-surgical tier 4 services. Currently, tier 3 services are not comprehensively available across the country and clinical experts suggest funding may be needed to set up or expand existing services.

- 3.2.3 Costs to consider include setting up the services and providing the different parts of the service designed to support people in losing and maintaining weight. These may include lifestyle changes such as diet, exercise and behavioural change. Low-calorie and very-low-calorie diets, drug treatments, psychological support and specialist weight management programmes could also be included. Costs for these different interventions depend on how they are obtained.

3.3 *Follow-up care after discharge from bariatric surgery service [Recommendation 1.12.2]*

Background

- 3.3.1 People who have had bariatric surgery have different post-surgery needs. However, clinical opinion suggests that current practice in the UK is not consistent and, people are often lost to follow-up after bariatric surgery. An active level of follow-up care is necessary in order to provide people who have had surgery with different aspects of patient experience. There is real harm to the individual if nutritional deficiencies were not appropriately identified or managed in a timely manner.

Potential costs

- 3.3.2 Clinical experts suggest that the recommendation constitutes a new role and tier 3 services may need to be funded and commissioned to carry out this service. The services may need to draw up and agree protocols, advise on blood test results and see people with problems after discharge from bariatric surgery service follow-up.
- 3.3.3 The economic analysis to inform the guideline development assumed that after the initial 2 years, follow-up is likely to take place with either a dietitian, or with a GP within a locally agreed shared care protocol. These annual visits will take place for the remainder of the person's life.

3.3.4 Costs may include providing training to GPs and other healthcare professionals who may not have had relevant training to carry out nutritional assessments. There could also be a cost for additional GP and dietitian time to meet people who have had surgery for annual review. Based on the economic analysis developed to inform the guideline development, subsequent follow-up after the initial 2 years by a dietitian could cost £8 to £31 per visit lasting between 15 minutes to 1 hour. Also, the cost of the nutritional supplements a person may take during follow up is £124 per year (see table 5).

4 Benefits and savings

4.1.1 Potential savings from bariatric surgery have not been included in the costing template because the savings per person will vary significantly. However, in general there are significant potential savings that are associated with bariatric surgery. For example, a budget impact analysis paper (Pollock, et al, 2013) that was reviewed for the guideline concluded that laparoscopic adjustable gastric banding (LAGB) showed cost savings of £91,300 (£913 per person) over 5 years in a closed cohort of 100 patients compared with standard medical management (SMM) for obesity. Although there would be high initial costs from surgery and associated surgical complications the paper showed that these are more than offset by savings from:

- lower diabetes, asthma, and sleep apnoea medication costs (the largest saving from LAGB came from the decreased use of diabetes medication in people experiencing remission of diabetes)
- lower incidence of diabetes complications
- less contact with healthcare professionals and services.

4.1.2 Implementing the clinical guideline may result in the following savings and benefits:

- A reduction in weight in people who are overweight and obese. This can improve physical, psychological and social health. Evidence suggests that even a moderate weight loss of 5–10% of body weight in people who are obese is associated with important health benefits, particularly lowering of blood pressure and a lower risk of developing type 2 diabetes and coronary heart disease). For example, a 10 kg weight loss in people newly diagnosed as having diabetes may result in a 50% fall in fasting glucose (Swanton, 2008). More details of benefits likely to result from a 10 kg weight loss can be found in [Healthy weight, Healthy lives: A toolkit for developing local strategies](#).
- Improvement and remission of type 2 diabetes mellitus after bariatric surgery as it is an effective, long-term treatment to combat severe obesity and maintain weight loss. [The UK National Bariatric Surgery Registry \(2014\)](#) reported that there is good evidence from randomised controlled trials (RCTs) that surgery is better than medical therapy for improving diabetes control and metabolic syndrome. Surgery lowers the number of hypoglycaemic medications needed, including some people no longer needing insulin. It also means many people go into remission (normal HbA1c, normal fasting glucose, off all medication, relative risk) and markedly lowers the incidence of diabetes compared to matched patients not having surgery.
- The report further highlights that at 1 year post-operatively over 60% of people who were previously diabetic could be considered as no longer diabetic, and this proportion continued to increase for up to 3 years. At 3 years, 80% were classified as being in clinical remission. Section 5.2.5, table 9, shows an estimate of the potential savings from needing less medication for type 2 diabetes. Based on the estimates, approximately £18.1 million could be saved over a 4-year period after surgery.
- A possible reduction in prevalence of type 2 diabetes (Daousi et al, 2006). This may also help lower the downstream diagnosis

and treatment costs associated with diabetes. For example, for diabetic foot ulcers unit costs to be incurred or saved for the different tests used to investigate suspected diabetic foot infection and the treatments used to manage diabetic foot ulcers could range from £24 to £800 per person ([Costing statement](#), NICE Clinical guideline 119: Inpatient management of diabetic foot problems).

- Modest weight loss in people with diabetes may lead to a reduction in mortality and improvements in quality of life.
- Reduction in medication use because of follow-up monitoring.
- Improved psychological well-being because of follow-up monitoring.

5 Sensitivity analysis

5.1 Methodology

- 5.1.1 There are a number of assumptions in the model for which no empirical evidence exists; these are therefore subject to a degree of uncertainty.
- 5.1.2 Appropriate minimum and maximum values of variables were used in the sensitivity analysis to assess which variables have the biggest impact on the net cost or saving. This enables users to identify the significant cost drivers.
- 5.1.3 It is not possible to arrive at an overall range for total cost because the minimum or maximum of individual lines are unlikely to occur simultaneously. We undertook 1-way simple sensitivity analysis, altering each variable independently to identify those that have greatest impact on the calculated total cost.
- 5.1.4 Appendix B contains a table detailing all variables modified, and the key conclusions drawn are discussed below.

5.2 *Impact of sensitivity analysis on costs*

Surgery for people with a BMI of 35 and over

5.2.1 Varying the number of people with a BMI of 35 and over who have surgery from a minimum of 1.0% to a maximum of 1.28% will increase the cost impact by £6.0 million from £25.4 million to £31.5 million.

Cost of surgery (gastric band and Roux-en-Y gastric bypass)

5.2.2 The proposed 2015/16 NHS tariff has a specific tariff for obesity surgery which is relatively lower than the 2014/15 tariff used in this costing model. The proposed tariff for these 2 types of surgery is 28% less than the weighted average tariff used in the costing model. Assuming the tariff is agreed this may result in a significant decrease in the commissioning cost of a gastric band or Roux-en-Y gastric bypass. Applying the proposed tariff for sleeve gastrectomy and roux-en-Y gastric bypass as a minimum unit cost, the cost impact falls by £7.1 million from £28.7 million to £21.6 million.

Surgery for people with a BMI of 30 to less than 35

5.2.3 Varying the number of people with a BMI of 30 to less than 35 who have surgery from a minimum of 0.50% to a maximum of 0.64% will increase the cost impact by £3.7 million from £26.7 million to £30.4 million.

Potential savings because of remission of type 2 diabetes

5.2.4 The [National Bariatric Surgery Registry report, 2014](#), highlighted that 60% of people with type 2 diabetes achieve remission 1 year after surgery progressing to 80% at 3 years after surgery. The impact to the NHS would be a potential saving in medication for type 2 diabetes. Table 9 shows the estimated potential savings from remission of type 2 diabetes modelled over a 5-year planning period. The cost of type 2 diabetes medication per person per year is estimated to be £549 (Hex et al, 2012).

5.2.5 Table 9 shows the potential savings from needing less medication for type 2 diabetes rising from £1.8 million in year 2 to £6.2 million in year 5, 4 years after surgery. The cumulative saving to the NHS over this period is £18.1 million.

Potential savings from needing less medication for type 2 diabetes because more people achieve remission^a

Time horizon	%	Year 1	Year 2	Year 3	Year 4	Year 5
Estimated number of people who have surgery each year ^b		5,545	5,545	5,545	5,545	5,545
Remission of type 2 diabetes						
No. of people 1 year after surgery	60	0	3,327	3,327	3,327	3,327
No. of people 2 years after surgery	65	0	0	3,604	3,604	3,604
No. of people 3 years after surgery	80	0	0	0	4,436	4,436
Total per year		0	3,327	6,931	11,367	11,367
Potential saving (£000)		0	1,825	3,804	6,238	6,238
a. Savings are expected to start from year 2 after surgery increasing annually over the 5-year planning period.						
b. See table 8, section 3 of this costing report.						

6 Impact of guidance for commissioners

6.1.1 This guidance is likely to have a significant impact on NHS England (tier 4 services) and CCGs (tier 3 services) budgets for commissioners. Bariatric surgery which is included in tier 4 services and other aspects of tier 3 services are within the PbR tariff.

6.1.2 CCGs may wish to ensure that local commissioning arrangements for tier 3 services are available to all people who need them including those who have recent-onset type 2 diabetes. This should be done in conjunction with local authority partners and NHS England.

6.1.3 Commissioners and providers of tier 3 and 4 services should work together to ensure there is capacity to manage the potential increase in demand for services. Additional funding to set up tier 3 and 4 services may be needed if these are not available. Trusts

may need to make additional investment for equipment such as specialised beds and trolleys, and general supplies to meet an increase in activity (for example, in intensive care and high-dependence units).

- 6.1.4 The 2015/16 National tariff for obesity surgery is likely to change from the 2014/15 tariff used in this costing report. Organisations using the costing template from 2015/16 onwards should replace the tariffs used in this report with the final tariffs for that financial year onwards.

7 Conclusions

7.1 *Total national cost for England*

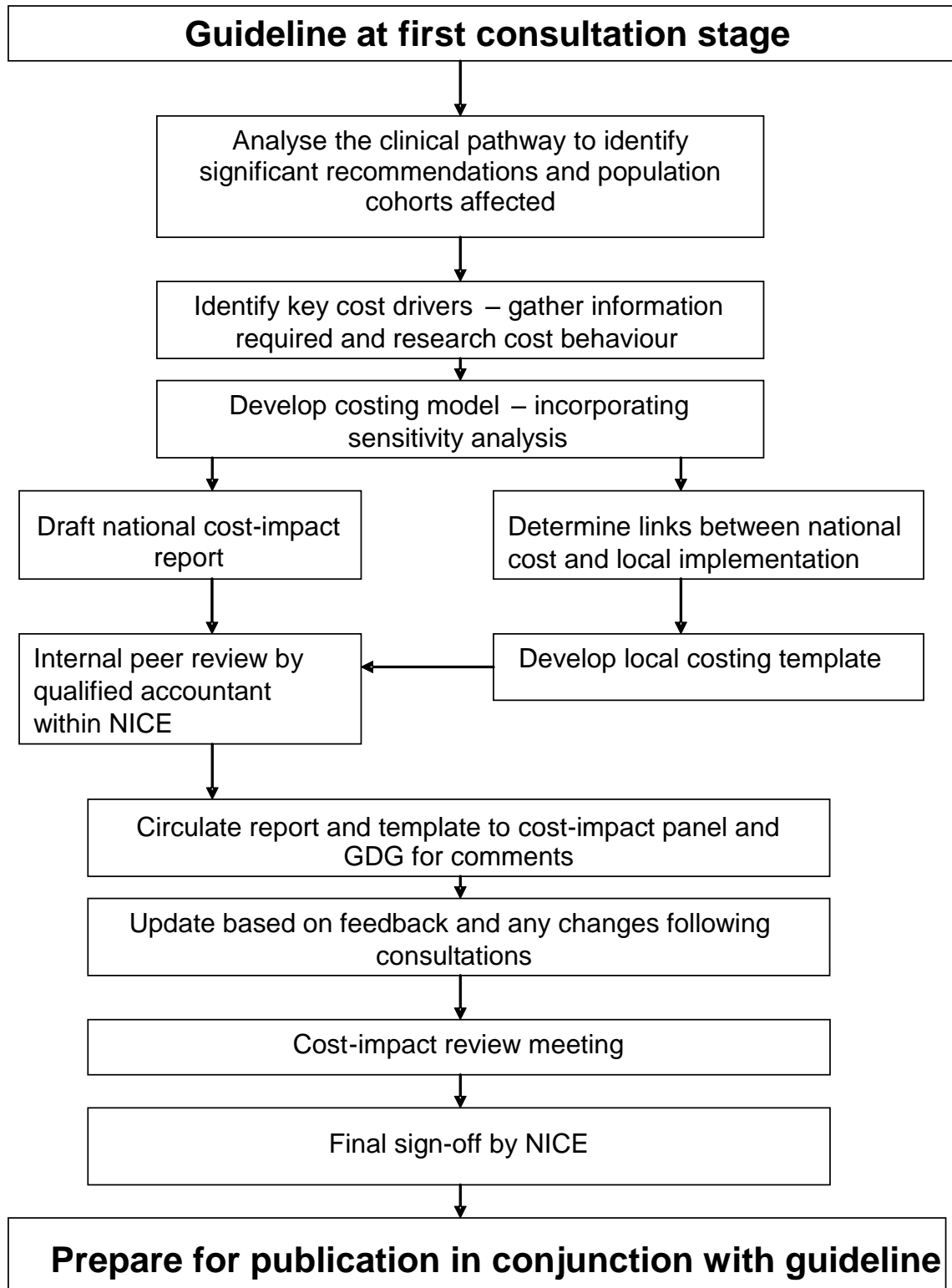
- 7.1.1 Using the significant resource-impact recommendations shown in table 7 and assumptions specified in section 3 we have estimated the annual impact of implementing these recommendations in England to be a cost of £28.7 million. Table 8 shows the breakdown of cost of each significant resource-impact recommendation.

- 7.1.2 The costs presented are estimates, and should not be taken as the full cost of implementing the guideline.

7.2 *Next steps*

- 7.2.1 The local costing template produced to support this guideline enables organisations such as primary care trusts or health boards in Wales and Northern Ireland to estimate the impact locally and replace variables with ones that depict the current local position. A sample calculation using this template showed that a population of 100,000 could expect to incur additional costs of £48,000. Use this template to calculate the cost of implementing this guidance in your area.

Appendix A. Approach to costing guidelines



Appendix B. Results of sensitivity analysis

The table below shows the sensitivity of the total cost of implementation to changes in each variable individually. If there are 2 or more variables that make up 100% between them, they have been varied together to ensure the model remains realistic.

The sensitivity ratio allows comparison of the variables by analysing the percentage changes in the variables and associated cost. The closer the ratio is to 1, the more sensitive the overall cost is to fluctuations in the variable.

Individual variable sensitivity	Recurrent costs						
	Baseline value	Minimum value	Maximum value	Baseline costs (£000s)	Minimum costs (£000s)	Maximum costs (£000s)	Change (£000s)
Future practice							
Incidence of recent-onset type 2 diabetes	4.04%	4.00%	4.08%	28,690	28,403	28,974	571
Surgery activity							
People with a BMI of 30 to less than 35	0.57%	0.50%	0.64%	28,690	26,727	30,444	3,717
People with a BMI of 35 and over	1.15%	1.00%	1.28%	28,690	25,478	31,561	6,083
People of Asian family background with a BMI of less than 30	0.29%	0.25%	0.32%	28,690	28,563	28,799	236
Type of for surgery							
Gastric band	21.00%	18.00%	15.00%	28,690	29,265	29,813	548
Roux-en-Y gastric bypass	67.00%	73.00%	76.00%	28,690	29,265	29,813	548
Sleeve gastrectomy	10.00%	7.00%	7.00%	28,690	29,265	29,813	548
Gastric balloon	2.00%	2.00%	2.00%	28,690	29,265	29,813	548
	100.00%	100.00%	100.00%				
Unit costs							
Gastric band	£2,588	£2,588	£2,614	28,690	28,838	28,720	-118
Roux-en-Y gastric bypass	£5,999	£4,335	£5,999	28,690	21,584	28,690	7,106
Sleeve gastrectomy	£5,999	£4,335	£5,999	28,690	21,584	28,690	7,106
Gastric balloon	£587	£587	£1,304	28,690	28,838	28,770	-68

Appendix C. References

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