Department of Health

Admitted patients aged 16 to 18 years undergoing 'Bariatric Surgery' by sex and Hospital and Health Service (HHS) of treatment, public acute hospitals, Queensland

		Financial Year
HHS of Hospital	**Sex**	**2013/14 to 2015/16**
Metro North	Female	5
	Male	0
Total Queensland public sector		5

Notes:

1. 2015/2016 data are preliminary, subject to change.
2. 'Bariatric Surgery' identified as ICD-10-AM ACHI procedure block 889 - Procedures for obesity (includes adjustments, revision and removal of gastric band)
3. Search parameters was for patients aged 0 - 18, pertinent data exists for patients aged 16 - 18

Source: Queensland Hospital Admitted Patient Data Collection (QHAPDC), Statistical Services Branch, Department of Health, Queensland

Prepared by: Statistical Reporting and Coordination Unit, Statistical Services Branch, Department of Health

Date: 29 August 2016

7/2/14

QCH0/001571

Department RecFind No:	**BR058548**
Division/HHS:	**SPP Division**
File Ref No:	

Briefing Note for Noting

Director-General

Requested by: Deputy Director-General, System Policy and Performance

SUBJECT: Public patient bariatric surgery in Queensland public hospitals

Proposal

That the Director-General:

Note that there is very limited access to bariatric surgery as part of obesity management for public patients in the Queensland public hospital system and Queensland Health does not have a statewide policy in relation to access to bariatric surgery.

Approve the preferred policy position of 'Option C – Multidisciplinary Care and Surgery' as outlined in the attached Background and Option Summary papers in line with the criteria recommended by the Queensland Policy and Advisory Committee for New Technology (QPACT).

Urgency

1. Routine.

Headline Issues

2. The top issues are:
   - The lack of access to public patient bariatric surgery in Queensland's public hospitals has been raised in correspondence to both the Minister for Health and the Premier.
   - Bariatric surgery is the only treatment that has been shown to assist a majority of patients with weight in the Class 2 and 3 severe obesity range (BMI>= 35) to achieve clinically significant weight loss and concurrent improvement in obesity-related co-morbidities over a short to medium-term horizon (two to 15 years).
   - A policy paper has been previously submitted but no decision was reached. Currently Queensland Health does not have a formal statewide policy regarding the provision of bariatric surgery and decisions about the provision of this type of surgery are determined by individual Hospital and Health Services.

Blueprint

3. How does this align with the Blueprint for Better Healthcare in Queensland?
   - Lack of access to bariatric surgery impacts on the ability of Queensland Health to provide health services which are focused on the needs of patients.

Key issues

4. For the time period July–September 2013 there were 16 public and 56 private patient episodes of bariatric surgery in Queensland public hospitals. In contrast, there were 687 episodes of bariatric surgery in Queensland private hospitals.
5. The *National Health Care Agreement* commits the State of Queensland to providing public patients with access to all services provided to private patients in public hospitals.
6. Currently, the Royal Brisbane and Women's Hospital (RBWH) is the major provider of public patient bariatric surgery, however surgery is only available to patients who were on their waiting list prior to 2007. The RBWH is not accepting new referrals for bariatric surgery.
7. Bariatric surgery in the Queensland public sector can cost between $8,000 and $18,000 depending on length of stay and complications arising from surgery. This does not take into

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account the intensive support required post-operatively to support weight reduction and prevent weight regain.

8. The QPACT recommended that bariatric surgery be considered for morbidly obese individuals who are aged less than 45 years of age with a body mass index (BMI) of >45 and co-morbidities; and adolescents over the age of 15 years with an age-related BMI over the 95th percentile or BMI >35 in the presence of severe obesity-associate complications.
9. The policy options for the management of obesity in public patients put forward in the attached papers (Attachment 1 and 2) are listed below:
   - Option A - Usual Care – patients with severe obesity are treated for their health issues as the need arises and by the relevant specialities. It is considered that there are sufficient affordable options in the private sector for persons wanting assistance to lose weight.
   - Option B – Multidisciplinary Care – severe obesity is regarded as a chronic disease and specific care pathways are developed to optimise a patient's health both to improve their quality of life and minimise dependence on the acute hospital system. It is considered that the focus of intervention should be on managing their ongoing health issues rather than weight-loss.
   - Option C – Multidisciplinary Care and Surgery – the multidisciplinary team, in addition to supporting optimal care to those for whom surgery is not an option or who choose not to have surgery, work closely with a surgical team to both identify candidates for surgery and provide post-operative support in consultation with the patient's General Practitioner.
10. Expansion of access to bariatric surgery and associated multidisciplinary support services may have a significant impact on investment and planning for the future of public hospital and health services. The Healthcare Purchasing, Funding, and Performance Management Branch would need to undertake further work to develop an appropriate purchasing framework which supported an approved model of service delivery.

Background

11. Access to bariatric surgery is recognised as a national issue. While procedures have been listed on the Medicare Benefits Schedule since 1992 the majority of surgery is performed in private hospitals with substantial out of pocket expenses for patients.
12. The *Clinical practice guidelines for the management of overweight and obesity in adults, adolescents and children in Australia (2013)* were published in October 2013. These guidelines state that bariatric surgery is considered more effective in achieving weight loss than nonsurgical interventions. For adults with a BMI >40 or adults with a BMI >35 with co-morbidities that may improve with weight loss, bariatric surgery may be considered taking into account individual circumstances. Whilst cost effective compared with other treatments, there are however significant and long term post-surgery costs for the individual and health system.
13. A briefing note and papers were prepared and submitted to the former Director-General in January 2013 to support the EMT Action Item 5.2.3 identified 27 November 2012 – 'Director-General to meet with the Minister to discuss a policy for bariatric surgery in the context of diabetes management'.

Consultation

14. The Clinical Access and Redesign Unit provided information on current bariatric surgical activity and costs and current obesity treatment approaches in Queensland Health.

Attachments

15. Attachment 1: Background Paper: The management of patients with severe and complex obesity in the Queensland Public Health System including provision of bariatric surgery.
    Attachment 2: Summary of Policy Options.

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Recommendation
That the Director-General:

Note that there is very limited access to bariatric surgery as part of obesity management for public patients in the Queensland public hospital system and Queensland Health does not have a statewide policy in relation to access to bariatric surgery.

Approve the preferred policy position of Option C – Multidisciplinary Care and Surgery as outlined in the attached Background and Option Summary papers in line with the criteria recommended by the Queensland Policy and Advisory Committee for New Technology (QPACT).

APPROVED/NOT APPROVED **NOTED**

IAN MAYNARD
Director-General

/ /

To Minister's Office For Noting ☐

Director-General's comments

(1) CHHO to be consulted.
(2) HHS to manage on a case by case basis
(3) encourage use of existing private sector capacity.

Author	Cleared by:	Cleared by: (SD/Dir)	Content verified by: (CEO/DDG/Div Head)
Josephine Peat	Graham Kraak	Colleen Jen	Philip Davies
Principal Policy Officer	Director	Senior Director	Deputy Director-General
Strategic Policy Priority Areas Unit	Strategic Policy Priority Areas Unit	Policy and Planning Branch	System Policy and Performance Division
7 February 2014	17 February 2014	17 February 2014	18 February 2014

The management of patients with severe and complex obesity in the Queensland Public Health System including provision of bariatric surgery

A background paper to support a decision on treatment options/service directions, and in particular the inclusion of bariatric surgery in those options

Prepared by the Policy and Planning Branch, System Policy and Performance Division

January 2013 V0.5

1. Introduction

The purpose of this paper is to synthesise the available information on the different options concerning the provision of bariatric surgery as part of the suite of interventions for the management of patients with severe and complex obesity with particular consideration of its efficacy in the management of type 2 diabetes.

The timing of this paper is linked to growing interest in bariatric surgery as an appropriate intervention for patients with obesity and type 2 diabetes. The International Diabetes Federation Taskforce on Epidemiology and Prevention (the Taskforce) issued a Position Statement in December 2010 that recommends (3.1.1) that, within the parameters set out in following recommendations:

> "Bariatric surgery is an appropriate treatment for people with type 2 diabetes and obesity (a Body Mass Index (BMI) equal to or greater than 35) not achieving recommended treatment targets with medical therapies, especially where there are no other obesity related co-morbidities…Under some circumstances people with a BMI 30-35 should be eligible for surgery."

The Taskforce (p.6) noted that the risk of developing type 2 diabetes "is increased 93-fold in women and 42-fold in men who are severely obese rather than of healthy weight" and "that even modest weight loss in people with type 2 diabetes who are overweight or obese is associated with improvements in glycaemic control and associated conditions such as hypertension and dyslipidaemia".

This paper takes a broad approach considering the efficacy of bariatric surgery for weight loss and the improvement/resolution of identified comorbidities, including type 2 diabetes. To inform the development of options, it includes consideration of critical success factors for the model of care and the particular features of health care delivery in Queensland, including access issues for a distributed population.

Three options have been developed and evaluated based on the following hierarchy of considerations:

- Efficacy and safety for the individual patient
- Critical success factors for the model of care if surgical outcomes are to be optimised
- Equity of access considerations in the Queensland context
- Cost effectiveness for the health system / for the Queensland Government
- Existing system capability and capacity.

These options are included in a summary document separate to this paper.

An important caveat on the information that follows is that while every effort has been made to source the latest data available, bariatric surgery techniques are constantly evolving and in some instances evidence is: (a) superceded in that the procedure it was based on is no longer commonly performed; or (b) is not yet available for its safety and efficacy. For example, the evidence base for the safety and efficacy of one of the newest procedures compared to other procedures – sleeve gastrectomy – is still developing.

2. History of previous consideration

In 2009, the House of Representatives Standing Committee on Health and Ageing Inquiry into obesity in Australia recommended: a tiered approach to management incorporating prevention, community-based primary care and acute care; that obesity be regarded as a chronic disease requiring and individual management plan under the Medicare Benefits Schedule; and that bariatric surgery be publicly funded, including multidisciplinary support teams to ensure equity of access (Recommendations 9, 7 and 5). Around this time, Western Australia (2008), Victoria and New South Wales (2009) produced framework documents for the management of obese individuals with the Victorian framework focussing on the provision of bariatric surgery.

In parallel with growing international evidence for the efficacy of bariatric surgery as an aid to the management of severe obesity and an increased prevalence of procedures being performed in the private health system, the issue of the role of the public health system in providing these surgeries has received attention within Queensland consistently since 2006. A number of models have been proposed.

Limited funding was provided through the then Centre for Healthcare Improvement in 2008 to establish a state-wide service that drew on the bariatric surgery expertise available at the Royal Brisbane and Women's Hospital (RBWH) and the medical management and obesity research strengths available at the Princess Alexandra Hospital (PAH).

In December 2011, Deloitte's delivered a Health Technology Assessment commissioned by Queensland Health that included a review of the available evidence for the efficacy of different clinical pathways for the management of two specific patient cohorts with severe obesity. Subsequently, the Queensland Policy and Advisory Committee on New Technology (QPACT) recommended the inclusion of bariatric surgery as a treatment option targeted to the following patient cohorts:

- adults aged less than 45 years of age with a body mass index > 45 (Grade 3 Obese = >40) and comorbidities; and
- adolescents over the age of 15 years with an age-related BMI over the 95th percentile or >35 with severe obesity-associated complications.

For adults, current clinical guidelines accessed[1] differ however there appears to be agreement that benefit is unclear in patients with a BMI <35. Generally upper BMI limits are not prescribed although the World Gastroenterology Organisation Global Guideline identifies that a BMI>50 has been associated with increased mortality. The Royal College of Physicians has recently (January 2013) acknowledged that BMI alone may not define the 'severity' of obesity and referenced the Edmonton Obesity Staging System (EOSS)

[1] National Institute of Clinical Excellence (43), US National Institute of Health, World Gastroenterology Organisation, American Association of Clinical Endocrinologists and the American Society for Metabolic and Bariatric Surgery and the Obesity Society, Society of American Gastrointestinal Endoscopic Surgeons and a synthesis of guidelines from the Massachusetts Department of Public Health, Scottish Intercollegiate Guidelines Network, The Endocrine Society National Institute of Clinical Excellence (43), US National Institute of Health, World Gastroenterology Organisation, American Association of Clinical Endocrinologists and the American Society for Metabolic and Bariatric Surgery and the Obesity Society, Society of American Gastrointestinal Endoscopic Surgeons and a synthesis of guidelines from the Massachusetts Department of Public Health, Scottish Intercollegiate Guidelines Network, The Endocrine Society

developed in Canada and which includes consideration of BMI plus the severity of patients associated diseases and functional status as prospectively a better tool.

For adolescents, the current Australian Guideline[2] focuses on physical and pubertal development as well as weight and identified a minimum age of 15 years, 14 years in exceptional circumstances.

Clinical guidelines are silent on age in adult patients as a predictor of efficacy of the procedure. Age however has been considered in modelling cost effectiveness in terms of likely years of benefit.

3. Trends in the performance of bariatric surgery procedures to address severe obesity and associated co-morbidities

3.1 Volume of bariatric surgeries being performed in Australia/Queensland

In a 2010 report on 'Weight Loss Surgery in Australia', the Australian Institute of Health and Welfare identified that in the years between 2004-2005 and 2007-2008:

- the number of hospital separations for weight loss surgery increased by an average of 36% per year;
- expenditure through the Medical Benefits Scheme increased by an average 33.7% per annum;
- there was a large increase in the number of laparoscopic adjustable gastric banding procedures (+40.8%), revision of gastric band (+41.5%) and insertion of a gastric bubble/balloon (+123.7%) and decline in the number of procedures for gastric reduction, laparoscopic biliopancreatic diversion and biliopancreatic diversion.

The same study reported that in 2007-2008, Australia-wide:

- the average length of stay varied across procedures in both public and private facilities – for example, the average length of stay for a patient who had undergone a biliopancreatic diversion was 27.3 days in public facilities and 9.2 days in private facilities compared with 1.9 days and 1.6 days respectively for laparoscopic adjustable gastric banding;
- public hospitals had lower numbers of same day separations (11%) compared to private facilities (19%) and for other separations, a longer length of stay than private facilities with the exception of patients who had a gastric bubble/balloon inserted where the reverse was true.

Of 17,000 separations Australia-wide in 2007-2008, 2,903 occurred in Queensland. Of the Queensland separations:

- 2,672 (92.0%) were privately funded and occurred in private facilities
- 136 (4.7%) were privately funded and occurred in public facilities
- 95 (3.3%) were publicly funded and occurred in public facilities.

[2] Child Health Division of the Royal Australian College of Physicians and the Obesity Surgery Society of Australia and New Zealand and the Australian and New Zealand Association of Paediatric Surgeons

In Queensland, an analysis of admitted patient data accessed in January 2013 shows that in 2009-2010, there were 3009 bariatric procedures for morbid obesity (Code 889) involving 2,847 separations. Of these separations:

- 2,532 (88.9%) were privately funded and occurred in private facilities.
- 162 (5.7%) were privately funded and occurred in a public facility
- 153 (5.4%) were publicly funded and occurred in public facilities.

Activity in private facilities peaked in 2008-2009 and it is unclear if the decline in numbers in 2009-2010 to below the 2007-2008 level is representative of any longer term pattern.

Table 1 below shows the number of unique procedures performed against code 889 in Queensland facilities in 2009-2010 by procedure type and by whether they were performed on private or public patients.

Table 1: Unique Procedures undertaken under Code 889 by type and number Public and Private Facilities Queensland 2009-2010. Source: Queensland Hospital Admitted Patient Data Collection accessed 3 January 2013.

Procedures	Number 2009-2010			Total
	Public	Private in Public	Private	All
Revision of Gastric Band	62	14	396	472
Gastric Reduction	4	1	51	56
Laparoscopic gastric Reduction	55	137	1737	1929
Gastric Bypass	9	4	63	76
Laparoscopic Biliopancreatic Diversion	0	0	4	4
Biliopancreatic Diversion	3	0	2	5
Surgical reversal procedures	22	6	354	382
Insertion of Gastric Bubble [balloon]	1	0	84	85
Total Procedures	156	162	2691	3009
% of Total Procedures	5.2	5.4	89.4	100

If the cohort is broadened to include gastrectomy and Roux-en-Y bypass surgeries recorded against codes 975, 879 and 970 and where the patients also had a diagnosis code of E66.x (Obesity) the total number of unique procedures in 2009-2010 was 3,252 of which 170 were publicly funded and undertaken in a public facility.

The most recently available data on activity related to obesity in Queensland's 29 reporting hospitals, and excluding procedures undertaken at the Mater and in private facilities, was accessed by considering encounters coded as major procedures for obesity (KO4A and KO4B) and obesity procedures (K07Z) in preliminary 2011-2012 data.

Table 2: Activity coded to KO4A and B and KO7Z in 2011-2012 in Queensland reporting hospitals excluding the Mater and private facilities. Source: Preliminary data accessed from NHCDC data collection January 2013.

Code	No of Encounters	Av Length of Stay	Average Age	No. where Health Fund identified
K04A	33	4.24 days	50.06 yrs	30

KO4B	121	1.85 days	39.53 yrs	119
KO7Z	66	Range 1-14 days	Range 21 – 69 yrs	66
Total	220			215 (98%)

The Royal Brisbane Hospital had the highest number of encounters across all three codes during this period and was particularly dominant in Code KO4A (27 of 33 encounters) and Code KO4B (81 of 121 procedures).

3.2 Length of Stay Bariatric procedures

The number of same day episodes of care in Queensland facilities for code 889 has increased in real numbers and as a per cent of total episodes over the period 2007-2008 to 2009-2010 but is still low at 8% of all episodes of care in 2009-2010 across private and public facilities.

The average length of stay for other episodes for Code 889 varied by procedure in 2009-2010 and in some instances over time, 2007-2008 compared with 2009-2010 as per table 3 below.

Table 3: Procedures undertaken under Code 889 (excluding same day stays) by type, private/public facility and average length of stay 2007-2008 and 2009-2010, Queensland. Source: Queensland Hospital Admitted Patient Data Collection accessed 3 January 2013.

	Av length of Stay 2007-2008		Av length of stay 2009-2010	
	Public	Private	Public	Private
Revision of Gastric Band	2.6	2.2	2.5	1.8
Gastric Reduction	9.0	2.1		1.7
Laparoscopic gastric Reduction	1.3	1.3	1.6	1.2
Gastric Bypass	19.4	10.9	8.8	9.6
Laparoscopic Biliopancreatic Diversion	na	na	na	na
Biliopancreatic Diversion	na	na	na	na
Surgical reversal procedures	2.6	3.6	6.1	3.1
Insertion of Gastric Bubble [balloon]	na	na	na	2.0

No data is available on the frequency and duration of outpatient care post-surgery. Clinical guidelines recommend that bariatric patients receive lifelong follow-up.

3.3 Most commonly performed procedures in Queensland and Australia

There are many different procedures and techniques but generally bariatric surgeries "aim to reduce weight and maintain any loss through restriction of intake or malabsorption of food, or a combination of these" (Cochrane Collaboration 2009, p3).

An AIHW analysis of bariatric procedures performed in Australia in 2007-2008 showed that laparoscopic adjustable gastric banding (LAGB) and revision of gastric band accounted for 16,051 (95%) of the 16,982 total separations for weight loss in Australian hospitals that year and 2,810 (97%) of 2,903 separations in Queensland Hospitals. An international review of surgery for obesity undertaken by The Cochrane Collaboration (2009) found that gastric bypass and adjustable gastric banding were much more commonly performed than any other procedures.

Table 1 above identified the type of procedure performed in Queensland facilities in 2009-2010 and identifies laparoscopic gastric reduction as the dominant procedure at that time - 64.1% of all procedures.

Table 4 below summarises changes in the type of procedure being performed, comparing 2007-2008 with 2009-2010. Overall, there were seven less procedures performed in 2009-2010.

Table 4: Unique Procedures undertaken under Code 889 by type, number of surgeries and change in volume 2007-2007 to 2009-2010, Public and Private Facilities Queensland. Source: Admitted Patient Data Collection accessed 3 January 2013.

Procedures	Number 2007-2008	Number 2009-2010	Change 2007-2008 compared to 2009-2010		
			Publicly funded	Private in public facility	Private facility
Revision of Gastric Band	324	472	+18	+7	+123
Gastric Reduction	60	56	+2	-3	-3
Laparoscopic gastric reduction	2490	1929	+15	+10	-586
Gastric Bypass	24	76	+4	+4	+44
Laparoscopic Biliopancreatic Diversion	7	4	-2	0	-1
Biliopancreatic Diversion	3	5	+2	0	0
Surgical reversal procedures	191	382	+11	+3	+177
Insertion of Gastric Bubble [balloon]	17	84	+1	0	+67

In 2011, QPACT recommended that the choice of procedure be a clinical decision in consultation with the patient which is consistent with current international clinical guidelines which recognise that there are a range of factors that will influence this choice.

3.4 Profile of patients undergoing bariatric surgery in public and private facilities

The most recent Australian information on the profile of persons having bariatric surgery was published in the December 2012 edition of the Medical Journal of Australia (Korda, R et al 2012). Their findings were based on an analysis of 312 persons:

- aged 45 and over;
- with a baseline BMI >=30;
- living in New South Wales;
- enrolled in a longitudinal study from January 2006 onwards; and
- had bariatric surgery for weight loss post enrolment.

They reported the study cohort had a mean BMI at the time of surgery of 39.15 and 98% of the procedures were gastric banding or gastroplasty. They found higher rates of surgery associated with: "being female, a resident in a major city, in poorer health, a non- smoker, a non-drinker, being in the lowest tertile of physical activity, being in the relatively advantaged socio-economic groups (fivefold higher rate of surgery for those with household incomes of $70,00 or more, compared with those in households with incomes less than $20,000 and increasing BMI (those with a BMI in the 40-50 range had the highest rates)".

An AIHW 2010 report on weight loss surgery in Australia in 2007-2008 similarly identified that: 78% of surgeries were performed on women; there were fairly equal numbers of women aged more or less than 45 amongst women with men having a slightly older profile; patients were significantly more likely to live in an area in the middle quintile of socio-economic advantage; and more likely to be a resident of a major city or inner regional area. The AIHW also found that the rate of bariatric surgeries for residents in major cities was 8.2 separations per 10,000 people compared to 6.8 for outer regional residents and 6.9 for remote and very remote residents.

An analysis of Queensland admitted patient data for 2009-2010 (Codes 889 plus 970, 879 and 875 with a diagnosis code of E66x obesity) and preliminary 2011-2012 hospital activity data (K04A and B) identified:

- the per cent of separations in 2009-2010 for patients aged 44 years or younger was 52% and 48% in public and private facilities respectively – if the cohort is limited to Code 889 this age distribution is similar;
- the median age for episodes in the KO4A category in reporting public hospitals in 2011-2012 was 50.06 years, and for K04B it was 39.53 years;
- 82% of episodes in the K04A category and 80% of K04B episodes in 2011- 2012 involved female patients.

Tables 5 and 6 below present information on the age and place of residence of bariatric surgical patients compared to Queenslanders with a self-reported and weighted and measured and weighted BMI >=40 by quintile of socio-economic advantage. While the data on patient residence is from 2009-2010 and the BMI data extrapolated from the 2007-2008 National Health Survey, it would seem to suggest that persons with a BMI>= 40 and resident in the lowest three quintiles of advantage are under-represented in patients accessing surgery across both the public and private sector. There is a significant margin of error in the BMI data so these findings should be treated with caution.

Table 5: Estimated number of adults 18+ with a measured and weighted BMI >=40 and as a % of all persons in that age cohort and as a % of all persons with a BMI>=40 in 2007-2008. Source: National Health Survey 2007-2008 accessed 3 January 2013.

Age	Est. Number with measured and weighted BMI>=40	Est. % of all persons in this age cohort	Est. % of all persons with BMI >= 40
18-29	6,790	1.3%	13.2%
30-39	9,235	2.2%	18.0%
40-49	15,659	3.6%	30.4%
50-59	10,977	3.1%	21.3%
60-69	6,025	2.2%	11.7%
70+	2,777	1.3%	5.4%
Total	51,463		100.0%

Table 6: Bariatric Surgeries performed in Queensland Facilities 2009-2010 by Index of socio-economic advantage (Quintiles 1-5) and number and per cent of persons in 2007-2008 National Health Survey with self-reported-weighted and measured-weighted BMI >=40 by usual place of residence: Source: Admitted Patient Data Collection accessed January 2013 and National Health Survey 2007-2008 accessed 3 January 2013.[3]

Facility Type	Q1	Q2	Q3	Q4	Q5	Total
Public	77 (23%)	95 (29%)	59 (18%)	57 (17%)	44 (13%)	332 (100%)
Private	499 (18%)	573 (21%)	621 (22%)	605 (22%)	497 (18%)	2795 (100%)
Total	576 (18.4%)	668 (21.4%)	680 (21.7%)	662 (21.2%)	541 (17.3%)	3,127 (100%)
No & % of adults 18 + self-reported and weighted BMI > = 40	14,555 (21.8%)	13,428 (20.1%)	15,636 (23.5%)	15,707 (23.6%)	7,334 (11.0%)	66,660 (100%)
% of adults 18 + with measured and weighted BMI>= 40	13,834 (26.9%)	9,876 (19.2%)	18,531 (36.0%)	5,518 (10.7%)	3,705 (7.2%)	51,464 (100%)

- New SEIFA Data based on the 2011 Census is due to be released in March 2013

Data on the measured incidence of obesity in children and young people in Queensland taken from the 2007-2008 National Health Survey data and accessed 3 January 2013 shows the proportion of children by age cohort considered to be obese were:

Ages 5-7	11.7
Ages 8-11	14.1
Ages 12-15	10.3
Ages 16-17	9.3
Total Ages 5-17	45.4

Data on access by patients by rurality was not sourced.

4 Evidence for the safety and effectiveness of surgery as an aid to weight loss and the resolution of comorbidities for individual patients

4.1 Safety

Mortality

Generally the literature supports that the safety of current procedures is acceptable and that complication rates and the rates of adverse events is declining, most likely due to changes in the type of procedures being performed. O'Brien et al (2013) in a single centre Australian context, reported no peri or later deaths related to the procedure in a study cohort of 714 patients who had undergone laparoscopic adjustable gastric banding (LAGB) at 10 year follow-up. Carlsson L et al (2012) reported an overall post-operative mortality rate of 0.2% at 15 years follow-up for patients who had undergone a number of different procedure types.

[3] Looking at only the 889 Code cohort doesn't result in significant changes to the overall distribution for all patients or for public patients

Complications
Individual studies have observed complication rates from 10 to 25 per cent but the most recent reports from longitudinal studies suggest that the range may be a narrower 12 to 15 per cent (Carlsson, L 2012, O'Brien, P et al, 2013). At 15 year follow-up, Carlsson et al reported 14.8% of episodes had complications and 2.8% of these were serious enough to require re-operation.

The 30 day complication rate recorded as either within the same episode of care with at least one episode of bariatric surgery (code 889) or within 30 days post such an episode and which occurred in public acute hospitals in Queensland in 2009-2010 was calculated as 8.25. A breakdown by age found that in patients aged 45 years and over the complication rate was more than double that of persons aged 44 or less, 15.5 versus 6.5 respectively. It should be noted that it is not possible to draw a direct link between the complication and the original procedure in the data nor to distinguish between types of procedures. It is likely that different procedures have very different complication rates. (Source: Admitted Patient Data Collection 2009-2010 accessed January 2013).

Revisions
O'Brien et al's study of patients who had undergone an LAGB procedure in a single Victorian centre reported on revisional procedures, the prevalence and poorer safety profile of which have been previously identified as problematic in some reviews. They noted that the need for revision has seemingly declined as the technique has evolved, for example the revision rate for proximal enlargement had decreased from 40% in the first five years to 6.4% in the past five years, and hypothesised that this was due to a new technique introduced in 2006. However, they conceded that there may be a time bias in this data. The reasons for which revisions were undertaken over 10 years were:

Proximal enlargement	26.0%
Erosion	3.4%
Port and Tubing problems	21.0%
Explantation (reversal)	5.6%

The Health Statistics Unit used two different methodologies to estimate revision rates in Queensland facilities utilising data from the Queensland Hospital Admitted Patient Data Collection. One method divided the number of surgeries (889 bock) identified a revisions by the total number of surgeries (889 block). This resulted in a finding that 21.7% of procedures in 2008-2009 were coded as revisions. A more complex methodology was used to look at the trajectory of individual patients. They found that approximately 60% of revisions that were identified in the years 2007-2008 to 2009-2010 had occurred within 365 days post-discharge from the original episode of care in which bariatric surgery was recorded. The estimated revision rate in public facilities was 9.34% for the three year period but it is likely that this is an underestimate as only the first revision was counted in any year and the rate of revision may also vary over a longer time horizon and by procedure.

Adverse Events
The AIHW 2010 report on 'Weight loss surgery in Australia' reported that in 2007-2008, the adverse event rate associated with weight loss surgery was 12 per 100 separations (12%) compared with a rate of 4.8 per 100 separations for separations overall. There were significant differences between procedures. In the AIHW analysis, laparoscopic gastric

banding had the lowest adverse event rate 5.2 per 100 separations compared with gastric reduction (18.7), gastric bypass (24.9) and revision of gastric band (35.2).

The same analysis found that there was significant differences between public and private hospitals with the former having significantly more separations where the adverse event "complications of other internal prosthetic devices, implants and grafts' (19.6% compared to 7.4% for private facilities) and "post procedural disorders of the digestive system" (3% compared to 0.4% for private facilities) were recorded. In 22.4% of public hospital separations in 2007-2008 the adverse event was the principal diagnosis.

Existing clinical guidelines reviewed for this paper (see Footnote1) propose that bariatric surgery should only be considered when other therapies/interventions have been proven to be ineffective. There may be a case for reviewing this position with regards lower risk procedures while being aware that all procedures still require a commitment on the part of the patient to a strict post-operative regime.

4.2 Evidence - weight loss

The most recent report (Carlsson, L et al 2012) on the weight loss outcomes for patients enrolled in the Swedish Obese Subjects study identified that for the control group, of whom some received professional advice on weight loss and some did not, their weight loss never exceeded plus or minus 3kg. For the group that received surgery the average weight loss from baseline values at 10 and 15 years was 20kg. The researchers in this instance also found that weight loss was larger after gastric bypass than after banding surgeries at all review points up to 15 years.

An Australian single centre study of 714 patients who had LAGB procedures found that a mean loss of 25.5kg in patients at 10-15 years follow-up. (O'Brien, P et al 2013). Weight loss over time expressed as % of excess weight loss (EWL) over BMI 25, was 50.5% at three years (2596 patients) and 47% at 10 years (714 patients).

A 2009 study undertaken by the Canadian Agency for Drugs and Technologies compared the literature on outcomes of different procedures not distinguishing between short and long term follow-up although most cohort studies have been limited to 1-2 years follow up. They found that in terms of weight loss only, procedures commonly performed at that time declined in effectiveness from diversionary procedures to adjustable gastric banding procedures.

O'Brien et al (2013) undertook a systematic review of studies where patients had completed a minimum 10 years follow up and found that, at maximum follow-up, patients who had undergone laparoscopic adjustable gastric banding compared with Roux-en-Y gastric bypass both had a mean EWL of 54%. It is unclear to what extent improved techniques may be a contributor to this finding as opposed to differing levels of patient motivation or the efficacy of a particular procedure.

4.3 Evidence - resolution of comorbidities

Based on self-reported health status of Queensland residents, the Chief Health Officer recently reported that in 2011, being obese was associated with about four times the likelihood of having diabetes or high blood sugar (Chief Health Officer, 2012, p.67 quoting an unpublished Queensland Health study 'Self-reported health status, 2011'). The report also

noted a study that showed loss of just five per cent of body weight improved insulin response and glycaemic control.

There is robust evidence for the association between weight loss following surgery and the resolution of type 2 diabetes, hypertension and cholesterol levels in the twelve month to two years following surgeries. Two recently published studies studies (Schauer, PR et al; Mingrone G et al) suggest that different procedures may have differing levels of efficacy for type 2 diabetes but both noted that further research is required to assess the durability of these results.

Schauer et al (2012) found that 42% of patients who received a Roux-en-Y gastric bypass compared to 37% who had a gastric sleeve procedure and 12% of those that received medical therapy only, achieved the target glycated haemoglobin level of six by 12 months post treatment. This result was associated with mean weight loss of -29 and -25 for the Roux-en-Y and gastric sleeve cohorts respectively and -5.4 for the medical therapy only group.

Mingrone et al (2012) undertook a randomised trial in which 60 patients with a BMI>35 and a history of at least 5 years of diabetes received either a gastric bypass, or a biliopancreatic–diversion, or a medical lifestyle intervention by a multidisciplinary team. The surgical groups also received multidisciplinary team follow-up. This study found that at 2 years:

- Diabetes remission had occurred in none of the non-surgical group, 75% of the gastric bypass group and 95% of the group who received a biliopancreatic diversion although both surgical procedures resulted in a similar percentage weight loss (around 33-34%) and both sets of patients were able to discontinue pharmacologic therapy within 15 days post-surgery.
- Cholesterol levels normalised in 27.3% of the medical patients and 100% of the surgical patients.
- Antihypertensive therapy was reduced or discontinued in 70% of patients receiving medical therapy, 80% of the gastric bypass group and 85% of the biliopancreatic diversion group.

Longitudinal evidence for the preventive and treatment effect of surgery in obese individuals comes from the 15 year report of the Swedish Obese Subjects study (Carlsson, P et al 2012). No participants included in the 15 year report had diabetes at baseline. At 15 years they found that the incidence of diabetes in the control group who had received 'usual treatment' was 28.4 cases per 1000 persons years compared to 6.8 cases in the group who received surgery, despite the surgical group having a less favourable profile at baseline. They found that the preventative effect of surgery increased with increasing baseline glucose and insulin levels. (Carlsson, L et al, 2012). Earlier reports from the same study of patients who had diabetes prior to surgery have indicated remission rates of 72% at two years and 36% at ten years. The cause of this diminishing effect is unclear but may be related to the plateauing of weight loss after 2-3 years that has been observed in this and other longitudinal studies.

Clinical guidelines stress the importance of comprehensive multi-disciplinary assessment of patient's pre surgery including their ability to comply with the post-operative regime as well as the availability of ongoing medical, psychological, diet and exercise advice and support.

The International Diabetes Federation issued a position statement in 2010 that identified that surgery should be an accepted option for people who have Type 2 diabetes and a BMI >=35. The United Kingdom Royal College of Physicians, in a guide published this month (January

2013) has proposed that because of the demonstrated benefits for surgery in the treatment of type 2 diabetes close integration of bariatric and diabetes services is recommended. They noted (p.58) that new endocrine consequences are being recognised in obese patients and the need to consider weight in the choice of diabetes pharmacotherapy, as further reasons for close alignment.

5 Best Practice Models of Care

5.1 Procedural

Further consideration is required vis-à-vis Queensland Health's Clinical Services Capability Framework but the requirements for anaesthetic, peri-operative and intensive care support services as well as ready access to other specialities will likely limit some bariatric procedures to facilities able to meet criteria at the top tiers of the framework. An additional consideration is that systematic reviews and clinical guidelines have identified that clinical outcomes are positively related to the surgeons expertise (e.g. World Gastroenterology Organisation, Canadian Agency for Drugs and Technologies in Health, International Diabetes Foundation) – one study reported in the systematic review by the Canadian Agency for Drugs and Technologies in 2009 suggested that an individual surgeon should perform at least 100 surgeries a year and a facility 200 - to ensure optimal clinical outcomes. Currently there is only one facility in Queensland with these volumes, the Royal Brisbane Hospital.

It is important to distinguish between post-operative care in the short and longer term – clinical guidelines recommend lifelong follow-up but the ongoing role of the surgical team may be able to vary over time depending on the type of surgery and other resources available.

5.2 Multi-disciplinary care

Although Deloittes (2011) observed that there is limited evidence for the success of multidisciplinary interventions alone in supporting significant weight loss which may or may not be due to sub-optimal application of this type of care, there is strong support in clinical guidelines and the literature for the importance of the multi-disciplinary team in the pre, peri and post-operative care of bariatric surgery patients with severe and complex obesity. The Royal College of Physicians in the United Kingdom has recently recommended (2013) that, based on an established need for strong multidisciplinary input, bariatric surgery should be commissioned as part of a holistic obesity management service rather than in isolation. They propose a multi-disciplinary team led by a Physician with expertise in obesity (including development of a recognised sub-speciality similar to bariatric surgeons) and including at minimum, consultant surgeons, dieticians, psychologists and nurse coordinators.

Also in the United Kingdom, the National Institute for Health and Clinical Excellence (NICE) Guideline 43 identifies that a person receiving bariatric surgery "has been or will receive intensive management in a specialist obesity service" and suggest a minimum six month intervention pre-surgery that includes dietary and lifestyle interventions as well as pharmacology. The guideline puts emphasis on assessing patient's ability to comply with dietary restrictions post-surgery as well as optimising the medical management of any co-morbidities pre-surgery.

A synthesis of clinical guidelines from the Massachusetts Department of Public Health, Scottish Intercollegiate Guidelines Network and The Endocrine Society regarding bariatric surgery in adolescents suggested that the minimum team should comprise a surgeon with significant bariatric experience, a paediatric specialist with adolescent and obesity training, a dietician, a mental health professional with speciality training in child and adolescent and family and treatment of eating disorders and obesity and a coordinator – either a registered nurse of social worker that case manages follow–up.

5.3 Management in Primary Health Care

The Royal College of Physicians (2013) has identified the need to grow capacity to manage obese patients within the primary health care sector, given the increasing prevalence of patients who are both obese and undergoing bariatric procedures. They note that bariatric patients will require life-long care with medical and surgical specialist input from time-to-time to manage complications or new or re-emerging morbidities.

In a very limited review of current literature, two studies both linked to managing obesity in children were identified that looked at the potential role of the primary care sector. Banks, J et al (2012) reported on a study that investigated whether a multidisciplinary model developed in a specialist outpatient setting had the same efficacy when delivered in a nurse-led clinic in a primary care setting and found that it did. Wake, M et al (2012) have registered a trial of a shared care model in which paediatric obesity specialists co-manage obese children aged 3-10 years with general practitioners, involving single appointment at a multi-disciplinary clinic followed by regular appointments with the child's general practitioner during which progress is jointly monitored and tracked by the two professional groups. The results of the latter study have not yet been published.

Effective partnership with the primary health care sector will be essential in the Queensland context if issues of access equity are to be addressed both for ongoing medical management of severe obesity and long-term post-surgical care for bariatric patients.

5.4 Local Solutions

Previous local proposals for a state-wide obesity service have included a multi-disciplinary team comprising a Physician / Endocrinologist with a special interest in obesity management, a bariatric surgeon, dietician, exercise physiologist, psychologist and Specialist nurse with the ability to access other medical specialities (e.g. cardiac) as required. A hub and spoke model was also considered to have efficacy in the Queensland setting, with hubs providing both the multi-disciplinary component of follow-up in addition to being able to do procedures such as lap band adjustments.

Further exploration of extended partnerships/shared-care models with the primary health care sector could also be considered.

6 Evidence for cost effectiveness

6.1 Distribution of the Costs of Obesity

Deloitte's 2011 analysis of the cost of different care pathways drew on earlier work by Access Economics (2006) on the financial costs of obesity. This modelling looked at where the cost falls across the individual, family, government and society. They found that:

- 29.1% was borne by individuals
- 16.4% by family and friends
- 9.1% by employers
- 12.4% by the rest of society
- 37% by the Commonwealth government
- 5% by State Governments.

Although this analysis refers to the cost of obesity for all individuals with a BMI>30 and as referenced above costs to the health system increase as BMI rises, it is likely that the greatest financial benefit from decreasing morbidity through addressing obesity generally will sit with the Commonwealth rather than State government's possibly though saving on drugs and outlays such as income support.

More targeted modelling would be required to ascertain whether, for the group of patients with severe and complex obesity proposed to be targeted for more intensive medical management and/or surgery, the return on investment will be higher for State Governments as the majority funder of admitted care and specialist outpatient care. The Royal College of Physicians (January 2013, p.31) quote research that shows that obese individuals have medical costs 30% higher than those of normal weight and that the minimum annual costs for drugs rises for both men and women as BMI increases.

6.2 Incremental Cost Utility

There have been a number of attempts to model the cost-effectiveness of surgery versus usual or mult-disciplinary treatment for patients with severe and complex obesity. The methodology has generally considered the costs of the initial episode of care and offset that against the value of the additional quality adjusted years of life for the patient.

Generally these studies have found an incremental cost utility ratio for surgery versus conventional treatment which increases over the lifetime of the patient and a long term horizon -10 to 20 years – to offset the higher initial costs of surgical intervention. The economic modelling undertaken by Deloitte Access Economics for Queensland Health in 2011 considered the health costs which would have been averted for a hypothetical cohort of patients for whom surgery resolved their Type 2 diabetes and cardio-vascular disease and found, in general, surgery and surgery with multidisciplinary care to be cost effective options for the health system. However they noted that, in their modelling, the addition of multidisciplinary care was expensive in terms of disability adjusted life year added.

The focus of the Deloitte 2011 review of the multi-disciplinary care pathway was its efficacy for weight loss. It didn't consider whether there was any cost benefit to the health system through better medical management of patients with severe and complex obesity in shared or

coordinated care models. For patients who already have established and complex co-morbidities the concept of optimal management through the development of an individual care pathway with their primary care provider similar to other chronic diseases (a recommendation from the House of Representatives Standing Committee on Health and Ageing in 2009 was to include a care pathway in MBS arrangements has never been implemented) may assist in reducing preventable hospitalisations. From the acute sector perspective, there may be value in considering these patients for hospital avoidance programs.

6.3 Procedural Costs

2011-2012 data from the National Health Cost Data Collection (NHCDC) collection for Queensland will be available in mid-February. The data below on the volume and costs of procedures in 2010-2011 is taken from the NHCDC Rd 15 submission. The total cost of all separations that year was $2.194M.

Table 7: Volume and Costs of Procedures by Codes in 2010-2011 in Queensland's 29 reporting hospitals. Source: NHCDC Rd 15 submission.

DRG	Cost Weight	Average Cost per separation	Seps	Total Cost all seps	Occupied Bed Days	Average length of stay
KO4A	4.49	20,707	25	517,675	140	5.6
KO4B	1.65	7,601	188	1,428,988	285	1.5
KO7Z[4]	1.73	7,980	31	247,659	96	3.1

2012-2013 is the inaugural year for the determination of a national efficient price. The 2012-2013 State price per WAU is $4,359.49, making the purchase price for a K04A procedure $19,574. Applying the higher national price this goes up to $21,588.

It should be noted that these costs only apply to the admitted care episode in which surgery was performed. They do not include the intensive pre and post-hospital care recommended in clinical guidelines nor the costs of subsequent admissions for revisions and complications beyond the initial episode of care.

Deloitte's 2011 analysis of cost effectiveness of bariatric procedures in the management of severe obesity in adults compared the costs of four different care pathways over ten years. They found that multidisciplinary care with surgery (cost of surgeries averaged out) was the highest cost pathway at $18,084 followed by Usual Care ($13,068), Surgery only ($11,792), Multidisciplinary Care only ($7,906) but also proposed that this option delivered the best long-term value.

6.4 Current/Potential Demand

As per Table 5, extrapolated from the 2007-2008 National Health Survey and measured and weighted, up to 51,464 persons aged 18 years and over in Queensland may have a BMI>=40. The 2012 Chief Health Officer's report for Queensland takes a broader view of obesity (Grades 1-3) and identifies that amongst adults 18 years and over (p.67-71):

[4]For a high number of these procedures the discharge unit was identified as plastics rather than bariatric.

- obesity rates (persons with a BMI equal to or greater than 30) were similar for males and females overall and increased with age for both, peaking at about 30% in the age group 45 to 74 years;
- obesity rates vary across areas of Queensland based on socio-economic status – rates were 75% higher in the most disadvantaged areas (Quintile 1 above) compared to the most advantaged (Quintile 5 above);
- obesity rates vary based on remoteness 40-50% higher in remote and very remote areas and 30-35% higher in inner and outer regional areas when compared to rates in major cities;
- obesity rates in the Indigenous population are nearly double the non-Indigenous rates;
- the rate of obesity in adults increased by an average 3.7% per year in the ten years to 2012.

The same report estimated that:

- 8.5% of children aged 5-17 years were obese (9.1% of males and 7.9% of females);
- the prevalence of obesity was highest in children in the most disadvantaged areas (12.9 compared to 6.1 in the most advantaged areas); and
- the prevalence of obesity was higher in remote and very remote areas 12.1 compared to 8.4 in major cities and 8.1 in inner and outer regional areas
- the rates of overweight and obesity in children appear to have plateaued between 2009 and 2011.

Other considerations in assessing likely demand include patient preferences and levels of private health insurance / capacity to self-fund procedures. A study by the Office of Health Economics in the United Kingdom in 2010 assumed that a maximum of 25% of patients eligible for surgery would choose this option. However, patient willingness to choose this option may be changing over time linked to:

- the increasing efficacy and safety of procedures; and
- media publicity - both high profile cases and the procedures more generally; for example a current series on television (January 2013) that tracks the stories of patients undergoing bariatric surgery.

7 Workforce Capacity and Capability

Previously a working group convened to consider this issue has identified that there is level of expertise in the public sector centred on bariatric surgery and the medical management of obesity that could be leveraged to expand obesity management services including access to bariatric surgeries throughout the state.

An analysis undertaken by the Workforce planning area in January 2013 and based on an analysis of doctors who have '06 Diseases and Disorders of the digestive system' as their highest DRG activity cluster in the last 18 months is summarised in Table 8 below.

Table 8: Bariatric Surgery capacity, actual/potential by Queensland Hospital and Health Services, January 2013.

HHS	Current Bariatric Practitioners	Surgeons who have performed K04A or B	Surgeons likely to have cross-over skills
Metro North	2	5	
Metro South	3	3	
West Moreton		1	same
Gold Coast	1	2	
Darling Downs		1	1
Cairns		1	same
Mater Hospital		1	
Sunshine Coast			1
Townsville			1

The Policy Options outlined in a summary document appended to this paper propose that surgery should be undertaken in the context of a holistic approach to management of severe obesity including input from multi-disciplinary teams in the pre, peri and post-operative period. The skill sets required in such teams is discussed briefly in section 5 including the additional skill sets/expertise specific to working with adolescents.

While raw information on key allied health workforce capacity relevant to this area is available, for example the numbers of dieticians, psychologists and exercise physiologists, it is not possible to extrapolate from this data the possibility of Hospital and Health Services being able to develop a multi-disciplinary obesity response to improve the medical management of these patients as well as assessing and supporting patients who may benefit from referral to a specialist bariatric surgery team.

More generally the paper has referenced the observation by the Royal College of Physicians (January 2013) and an Australian House of Representatives Inquiry in 2009 that recognise the need to build capacity across the health system in the management of severely obese patients including in primary health care.

If Option B or C is affirmed, further work to refine the model will be required to enable a robust approach to seeking expressions of interest from Hospital and Health Services, particularly for the multi-disciplinary component in both options.

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THE MANAGEMENT OF PATIENTS WITH SEVERE AND COMPLEX OBESITY IN THE QUEENSLAND PUBLIC HEALTH SYSTEM, INCLUDING PROVISION OF BARIATRIC SURGERY

SUMMARY

Prevalence and costs of Obesity/Severe Obesity

The prevalence of obesity in the general population is growing - the Royal College of Physicians in the United Kingdom has recently (2013) noted that environmental factors interacting with genetic susceptibility (40-70% heritability) is driving this increase and suggested that it is therefore inappropriate and unhelpful to consider obesity a self-inflicted problem.

Obesity contributes to the risks of diabetes (30-70% attributable risk), hypertension, ischaemic heart disease, cardiovascular mortality, obstructive sleep apnoea, ventilator failure and asthma and has also been associated with several cancers, Alzheimer's disease and renal failure (Royal College of Physicians, 2013). A systematic review of the economic burden of obesity worldwide estimated that medical costs for obese patients are 30% higher than for patients within the normal weight range. (Withrow, D et al 2011). Persons with severe obesity (Grade 11, BMI 35-40 and Grade 111, BMI 40 and over) tend to have more complex health problems and require life-long care. Extrapolating from 2007-2008 National Health Survey data there may be more than 50,000 Queenslanders aged 18 years and over with a BMI >=40.

In 2009, the House of Representatives Standing Committee on Health and Ageing recommended a tiered approach to management of obesity incorporating prevention, community-based primary care and acute care, that obesity be regarded as a chronic disease requiring an individual management plan under the Medicare Benefits Schedule, and that bariatric surgery be publicly funded, including multidisciplinary support teams to ensure equity of access (Recommendations 9, 7 and 5). While prevention is still a primary aim, health systems are beginning to recognise that their approach must also include how to optimally manage persons who are already severely obese.

Effectiveness of bariatric surgery versus usual care for weight loss and treatment of comorbidities

The evidence for the efficacy of bariatric surgery as an adjunct to the medical management of obesity/severe obesity has been growing and now extends to information about sustained weight loss and prevention/improvement of comorbidities up to 15 years post the initial surgery.

Sustained weight loss - at 15 year follow-up in a Swedish study, the average weight loss from baseline for surgical patients was 20kg compared with plus or minus three kg in a control group who received usual care (Carlsson L et al 2012); patients in an Australian single centre study with at least 10 years follow-up had a mean loss of 25.5kg (O'Brien, P et al 2013); in the latter study weight loss over time expressed as % of excess weight loss (EWL) over BMI 25, was 50.5% at three years (2596 patients), 47% at 10 years (714 patients); O'Brien et al also undertook a systematic review of studies where patients had completed a minimum 10 years follow-up and found that patients who had undergone

laparoscopic adjustable gastric banding compared with Roux-en-Y gastric bypass was similar - both had a mean EWL of 54% at 10 years plus.

Improvement/resolution of comorbidities - the significant weight loss experienced by surgical patients which longitudinal studies suggests peaks around year two post-surgery before plateauing, is associated in the literature with evidence of significant improvement in, or resolution of diabetes type 2, hypertension and some other morbidities; two recent studies Schauer, P et al, Mingrone, G et al, 2012) found high rates of type 2 diabetes remission - 37 to 42% at 12 months / glycaemic control achieved in 75-95% of patients at 2 years, in surgical patients respectively; different procedures reported in these studies had different levels of efficacy for the resolution of type 2 diabetes that appear to go beyond the effect of weight loss, but this is not yet fully understood; the International Diabetes Federation Taskforce on Epidemiology and Prevention has recommended that bariatric surgery, not distinguishing between procedures, should be an accepted option in the management of patients with type 2 diabetes and a BMI of 35 or more.

Prevention of morbidity – in one study at 15 year follow-up, the incidence of development of type 2 diabetes in the group that had received surgery was 6.8 cases per 1000 person years compared with 28.4 cases per 1000 person years in the control subjects; and that the preventative effect of surgery increased with increasing baseline glucose and insulin levels (Carlsson L et al, 2012).

Safety - currently performed procedures are considered to be safe - two longitudinal studies (Carlsson et al and O'Brien, P et al 2012) have reported peri-operative and later morality rates of 0.2 and 0% respectively; The Australian Institute of Health and Welfare (2010) has pointed to overall declining rates of complications and adverse events most probably related to changes in the type of procedures being performed; the rate of adverse events associated with different types of procedures varied significantly in the AIHW 2007-2008 year analysis but overall was 12%; a strong positive effect between the experience of the surgeon and the facility and optimal surgical outcomes has been identified – the more experienced the surgeon and the facility, the better the outcome.

Complications - different complications are associated with different procedures but also appear to be declining for some procedures as techniques develop; O'Brien, P et al (2012) report that in their study cohort there has been a significant reduction in the need for revisions for patients who have undergone laparoscopic adjustable gastric banding (LAGB) following introduction of a new technique in 2006 although it is too early to say if this gain will be sustained given the timeframe; the same authors undertook a systematic review of studies where patients had completed a minimum 10 years follow-up and found the median rate for revisions was 26% and the range 8 to 60%; in Queensland private and public facilities in 2009-2010, 15.6% of bariatric procedures (492) were for 'revision of gastric band' and 12.7% were for 'surgical reversal procedures' (382); revision and complication rates have been an access issue for patients considering surgery and who live outside of metropolitan centres.

Patients undergoing some types of procedures will require life-long nutritional monitoring and supplementation related to malabsorbtion issues; a percentage will require plastic surgery to remove excess skin following rapid weight loss.

Clinical guidelines currently recommend that surgery only be considered where other medical, dietary and lifestyle intervention has been unsuccessful. It is possible that this may change in the future to recognise some procedures as a 'first line of treatment option' for selected patients.

Critical Success Factors - while the evidence to date does not support multi-disciplinary interventions efficacy in achieving significant and sustained weight loss, there is strong support in clinical guidelines and the literature for input from a multidisciplinary team in the pre, peri and post-operative period including assessment and support from a dietician and a psychologist; the role of primary health care providers in ongoing care was recognised most recently by the Royal College of Physicians (2013) and is a key consideration in the Queensland context due to the State's distributed population and the way in which health care governance and costs are shared across Commonwealth and States.

Cost –Effectiveness of Care Pathways

The care pathway of surgery plus multidisciplinary care was estimated by Deloitte's 2011 report for Queensland Health to be the most expensive but also the most efficient over a ten year horizon – other economic modelling has shown that efficiency may continue to improve out to a horizon of 20 years.

The 2012-2013 QWAU price for a procedure for major obesity coded to KO4A is $19,571 compared to a notional NWAU price $21,588 and an actual average cost of $20,707 in 2010-2011. The average cost for two other codes commonly used in 2010-2011 were $7,601 (K04B) and $7, 989 (K07Z). While these costs do not include the costs or readmissions or outpatient follow-up, the costs of usual care for a patient with severe obesity will likely offset these combined costs in this patient cohort.

Admitted patient data shows that the average length of stay varied by bariatric procedure in 2009-2010 (1.6 days to 8.8 days in public facilities) but showed a general decline compared to 2007-2008; same day episodes made up just 8% of separations across public and private facilities.

Who's getting surgery and where

Queensland largely follows national trends. In 2009-2010:

- 78% were women;
- 52% and 48% of patients who received surgery in public/private facilities respectively were aged <=44 years;
- persons resident in the most advantaged socio-economic areas were over-represented in those receiving surgery compared to the proportion of people with a BMI>40 in those quintiles.

88.9% of separations for bariatric surgery in 2009-2010 were recorded in private facilities and in public facilities, an almost equal per cent of separations were publicly funded (5.3%) compared to privately funded (5.7%); preliminary activity data for 2011-2012 for Queensland's public reporting hospitals would seem to indicate that the per cent of publicly funded procedures is declining.

AIHW analysis (2010) found that residents of major cities had a separation rate of 8.2 per 10,000 people for bariatric surgeries compared to 6.8 for outer regional and 6.9 for remote and very remote residents in 2007-2008.

Options for management of patients with severe and complex obesity

Having regard to all of the above, three options for the management of persons with severe obesity in the public health system in Queensland have been identified for consideration and are summarised in the table that follows:

A. Usual Care – patients are managed in the primary health care sector and referred on an as needs basis for management of obesity related and other comorbidities;

B. Intensive Multi-Disciplinary Intervention – patients are referred from the primary health care sector for assessment and potentially time limited intervention with the primary aim of optimising management to reduce dependence on the acute care system and support ongoing management in the primary health care setting;

C. Intensive Multi-Disciplinary Intervention with the option to refer for bariatric surgery - the role of the multidisciplinary team is extended to identifying and referring patients for surgery, optimising medical management of any comorbidities ahead of surgery and providing post-operative support in partnership with the patient's primary care provider. providing pre and post-surgical assessment and support for suitable candidates to optimise outcomes.

If Option B or C is accepted, further work will be required to refine the model of care including how best to triage patients to make the most of available resources and the inclusion of children and adolescents building on work already undertaken in Queensland.

None of the options include consideration of whether the public system should provide plastic procedures for patients who have undergone rapid weight loss – this will require separate investigation and consideration.

Options

	Option A	Option B	Option C
Health service option	***Option A: Usual Treatment***	***Option B: Intensive Multidisciplinary Intervention in partnership with the patient's primary care provider***	***Option C: Intensive Multidisciplinary Intervention in partnership with the patient's primary care provider and with the option of referral for bariatric surgery as an aid to weight loss.***
Health service option features	• Patients with severe and complex obesity receive usual care from their primary care practitioner and referrals to appropriate specialists for management of their comorbidities as required - either in the public or private sector.	• Patients with severe and complex obesity (Class 11 or 111) receive multidisciplinary assessment and time limited interventions from a team headed by a Physician with specialist expertise in obesity management – consideration might be given to close integration with diabetes services as one of the most prevalent comorbidities • Longer-term, patients receive ongoing treatment and support through a shared-care model with their primary care provider taking the lead and consulting with the specialist multidisciplinary team as required.	• As per Option B plus: • Option for referral from the specialist multidisciplinary team to an experienced bariatric surgeon who: o undertakes a further risk-benefit assessment of the patient's suitability for surgery o provides surgery including pre, peri and post-operative surgical care – the duration and frequency of post-operative care will be dependent on the procedure and other factors unique to particular patients and be undertaken in partnership with the specialist multidisciplinary team o maintains an open-door policy for advice and management of issues arising over the longer term – following discharge back to the specialist multidisciplinary care team and the patients primary care provider.
Rationale	• This is the current model of care for most patients in Queensland – currently there is only one specialist public outpatient clinic located at the Princess Alexandra Hospital and bariatric surgeries are largely being provided to privately insured patients only.	• Patients with Class 11 or 111 obesity are likely to have co-morbidities and complex health care needs that require access to a range of medical specialists and lifelong care. It is hypothesised that coordinated specialist care and a strong interface with the patient's primary health care provider will result in better management of comorbidities, fewer hospital emergency presentations and admissions, and better patient experience. • It is desirable that given these persons needs for life-long care that it is provided in the patient's own community wherever possible. • A patient's general practitioner will have historical and current knowledge of a patient's health and circumstances that is critical to assessment and treatment by the specialist team and is best placed to provide long–term follow-up care with specialist support as required. • The model is limited. The available evidence suggests that a majority of patients with severe and complex obesity receiving intensive multidisciplinary care alone will not lose a significant amount of weight and are much less likely to achieve an improvement or resolution of comorbidities including type 2 diabetes, hypertension and cholesterol levels than patients who also receive bariatric surgery.	• Bariatric surgery commissioned in the context of a holistic approach to obesity management is currently recommended as the most effective and efficient option for management of patients with severe and complex obesity. • There is robust evidence that the addition of surgery for suitable patients results in greater and sustained weight loss out to a horizon of 15 years [at this time] and higher rates of improvement in /or remission of, obesity related comorbidities including type 2 diabetes. • Patient motivation and ability to comply with post-operative dietary restrictions and other follow up care requirements is a critical success factor. Clinical Guidelines emphasise the importance of multidisciplinary input in the pre, peri and post-operative care period if surgical outcomes are to be optimised and, in some instances, complications and adverse events minimised.
Benefits	• Contains costs at around the current level in the short-term recognising that demand for, and costs of, revisions and reversals plus treatment of complications and adverse events linked to episodes of care initially provided in the private sector are outside of Hospital and Health Services' control.	• Health outcomes for patients with severe and complex obesity are optimised through both direct access to specialist advice and assistance and ongoing specialist support of their primary health care practitioner to enhance the usual care they receive. • Hospitalisation and specialist outpatient costs associated with management of patients with severe and complex obesity are reduced through optimal management of comorbidities in partnership with their primary health care provider. • The public health system has a repository of expertise and knowledge of the non-surgical management and care of patients with severe and complex obesity that is not dependent on the individual interest of Physicians, other medical specialists and nursing and allied health staff who come into contact with patients	• The benefits of Option B plus: • For the motivated patient – opportunity to achieve significant weight loss and resolution of / improvement in, obesity related comorbidities leading to improved quality of life – evidence to date suggests that for patients with severe obesity this is the only option that will result in significant enough weight loss to make a real impact on health and quality of life. • For the health system – savings in ongoing care for the patient with severe and complex obesity associated with fewer presentations and admissions to acute services, savings in the costs of admissions and lower healthcare costs generally including pharmacological and other costs typically incurred in the primary health care system.

	Option A	Option B	Option C
		with severe and complex obesity. • Specialist expertise and knowledge in the management of severe and complex obesity is disseminated and built up across the health continuum.	• Improved return on investment for bariatric surgery procedures due to enhanced patient selection and enhanced post-operative care in the initial episode of care and over the longer term through the close involvement of a specialist multi-disciplinary team. • Surgeons and staff involved in the pre and peri-operative care of these patients and working in the public system maintain sufficient expertise and experience to achieve optimal surgical outcomes for patients requiring surgery to revise or reverse procedures as well as patients undergoing an initial procedure.
Risks	• Surgeons and other surgical staff working in the public system will not maintain sufficient expertise and experience to achieve optimal surgical outcomes for patients requiring surgery to revise or reverse procedures. This risk is mitigated at the individual surgeon level by the current use of visiting medical officers who perform high numbers of bariatric procedures in the private sector. • The level of expertise and knowledge of the medical management of patients with severe and complex obesity is dependent on the individual interest of Physicians, other medical specialists and nursing and allied health staff who come into contact with patients with severe and complex obesity – there is no repository of expertise that is enduring. • Negative publicity driven by health consumers or clinicians regarding access equity for persons unable to afford private treatment nor able to access a publicly funded surgery.	• Surgeons and surgical and pre and peri-operative teams working in the public system will not maintain sufficient expertise and experience to achieve optimal surgical outcomes for patients requiring surgery to revise or reverse procedures. This risk is mitigated at the individual surgeon level by the current use of visiting medical officers who perform high numbers of bariatric procedures in the private sector, • Negative publicity driven by health consumers or clinicians regarding access equity for persons unable to afford private treatment nor able to access a publicly funded surgery.	• Patients may have unrealistic expectations regarding: (1) the post-operative experience, including dietary restrictions and the possibility of further surgeries to revise the original procedure; and (2) the availability of additional care such as plastic surgery; resulting in a litigation risk.
Assumptions	• Hospital and Health Services will need to continue to respond to the clinical needs of patients who require treatment and follow-up care subsequent to bariatric surgery procedures undertaken in the private sector, • The cohort of patients who have had bariatric surgery and are hospitalised and seen in emergency departments and outpatient services will continue to grow in parallel with the rise in popularity of such procedures in the private sector and amongst health consumers. • Demand may be mitigated by the evolution of procedures that result in less need for revisions and have lower complication and adverse event rates.	• Assumptions in Option A plus: • Coordinated care across the acute/primary health care continuum and the injection of specialist expertise in the management of the sub-cohort of patients who have severe and complex obesity will result in a lower frequency of emergency department presentations, specialist outpatient referrals and hospital admissions for management of comorbidities. • General Practitioners, Medicare Locals and the Commonwealth will support a shared care model both because of patient and system benefit – improved access for other patient cohorts and savings at the funder level.	• Assumptions in Options A and B plus: • Sufficient numbers of surgeons and members of surgical teams in the system with expertise and significant experience in bariatric surgery will be available / can be recruited to ensure continuity of service. • Surgeons will be willing to work with and accept referrals from specialist multidisciplinary teams headed by physicians rather than direct from General Practitioners where the presenting issue does not require an urgent surgical response.
Resource implications	• Financial - this option results in: (a) Hospital and Health Services forgoing ABF income for elective procedures while bearing the uncertain cost of revisions, reversals, complications and adverse events (b) A continuing financial impact associated with the frequency and duration of hospitalisations of patients with severe and complex obesity and their management in the primary health care setting where Hospital and Health Services are the provider. • Workforce – no change	• Financial (a) Same as Option A (b) The shared care model and the availability of specialist expertise to support care may result in some savings for the public hospital system through improved management of comorbidities and less acute exacerbations. (c) The annual costs of a specialist multidisciplinary care team will vary depending on whether additional skill sets for working with adolescents are core and the level of staffing that is core and full-time. • Workforce - recruitment or redeployment and training would be required to staff specialist multidisciplinary teams.	• Financial (a) Same as option B plus (b) Expanded investment in activity for this purpose in selected Hospital and Health Services – volumes to be determined • Workforce - as per Option B plus consideration of surgical and related capacity in Queensland public facilities • Infrastructure – additional investment may be required for specific equipment to support the surgical and peri and post-operative care of very large patients in more facilities.