Report to the Clinical Operations Group Meeting on 5 April 2017

Title: Health Optimisation Policy in Somerset Pre-Surgery	**Enclosure C**

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Summary and Purpose of Paper

Both smoking and being obese have well established health impacts including adverse outcomes seen post-surgery. Prevention is part of the CCG and NHS plans as well as a key aspect of the Somerset Sustainability and Transformation Plan for the local health care economy. The evidence base for the adverse impact of obesity and smoking on surgical outcomes is presented along with costs of introducing lifestyle interventions and potential cost-savings due to delayed surgeries, increased surgery efficacy and long-term health benefits.

Recommendations and next steps

COG is asked to discuss the options for delaying or limiting access surgery, where this is not clinically contra-indicated to people who are obese or smoker until they have spent time attempting to lose weight or stop smoking.

Impact Assessments – key issues identified				
Equality	Both smoking and being overweight or obese are more prevalent within more deprived areas. Rurality may impact on availability and range of lifestyle support available. A full impact assessment will need to be completed according to the decision taken and potentially for each policy area.			
Quality	There is likely to be a positive outcome on surgical outcomes based on reduced post-operative infections and avoidance of other complications.			
Privacy	None			
Engagement	None at present. This is an early stage paper.			
Financial / Resource	Financial implications of different options are estimated in the paper.			
Governance or Legal	Ethical and legal implications of delaying surgery in some groups of patients.			
Report History	None.			
Risk Description	Likelihood of adverse publicity in relation to decision.			
Risk Rating	Consequence	Likelihood	RAG Rating	GBAF Ref
	2	3	6	

Health Optimisation Policy in Somerset Pre-surgery

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Summary

Both smoking and being obese have well established health impacts including adverse outcomes seen post-surgery. Prevention is part of the CCG and NHS plans as well as a key aspect of the Somerset Sustainability and Transformation Plan for the local health care economy. Evidence base for adverse impact of obesity and smoking on surgical outcomes is presented along with costs of introducing lifestyle interventions and potential cost-savings due to delayed surgeries, increased surgery efficacy and long-term health benefits. Options for implementation are presented for consideration. It is recommended that the CCG adopt a policy of reviewing surgical areas individually to assess the health benefits and cost implications of introducing lifestyle interventions as part of the surgical pathway.

What has been implemented elsewhere in the country?

A degree of limitation on access to procedures according to smoking status or obesity is common. A GP Online investigation in 2015[1] based on FOI request responses reported that 62% of CCGs limit at least some types of surgery for smokers and 83% limit surgery based on high body mass index.

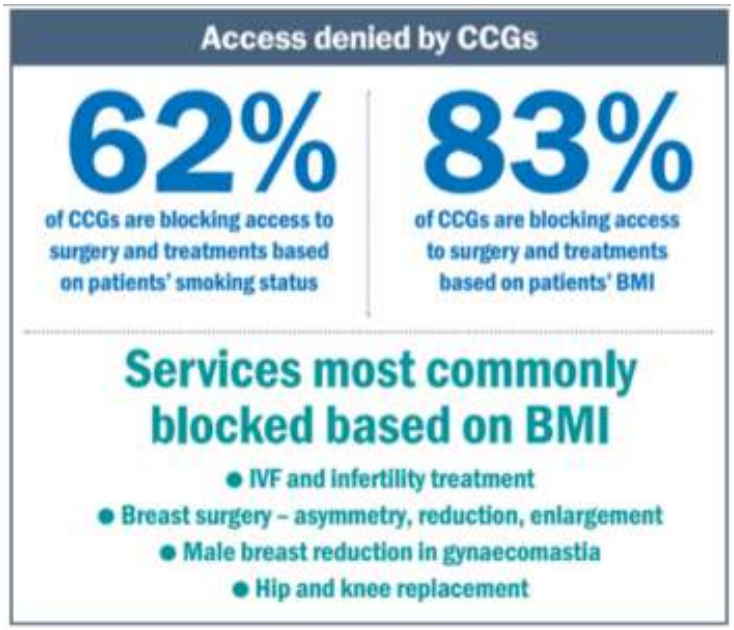

Figure 1 Graphic from GP On-line.

Some areas have gone further and have introduced cross surgery policies applying to all surgery, although generally with the caveat that this does not apply to situations where the patient's condition may worsen significantly, e.g. oncology and or clinicians feel a delay would be harmful for other reasons.

[1] Exclusive: NHS care rationed for smokers and obese. http://www.gponline.com/exclusive-nhs-care-rationed-smokers-obese/article/1337080l

Table 1 Summary of other CCGs with cross surgery obesity / smoking pre-surgery policies

Area	Obesity	Smoking
Harrogate and rural district CCG http://www.harrogateandruraldistrictccg.nhs.uk/data/uploads/linking-prevention-commissioning-statement_final_28.10.16.docx	All non-urgent, routine referrals to surgical specialties for patients who smoke and/or have a BMI of ≥ 30 are to be offered a period of health optimisation for 6 months before commencement of referral for surgery. This may include a referral to Smoking Cessation services or Tier 2 Weight Management services.	
Herts Valleys CCG (June 2016) http://hertsvalleysccg.nhs.uk/publications/policies/3639-bmi-and-smoking-policy-v1	Patients with a BMI >40, or those with metabolic syndrome* and a BMI >30, will be offered surgery if they lose at least 10% of their weight over 6-9 months or loses sufficient weight to meet criteria 1.2 ie patients with a BMI between 35-40, without metabolic syndrome, should be offered advice to lose weight before surgery, and a brief intervention to promote long term behavioural change.	Smokers should be advised to quit, even if on a temporary basis prior to surgery.
Vale of York http://www.valeofyorkccg.nhs.uk/data/uploads/governing-body-papers/1-september-2016/item-7.1-prevention-and-better-health-strategy.pdf	BMI >30 need 10% weight loss prior to surgery or attempted weight loss for a year.	Postpone elective surgery for conditions that are not life threatening for six months or until they've stopped smoking for eight weeks.

Vale of York CCG has implemented a programme to limit surgery for those who are obese and continue to smoke. Their website states "Patients in the Vale of York that require surgery, but have a BMI of 30 or above, must reduce their weight by at least 10% before they can go on to a surgeon's waiting list. As soon as the target weight loss is achieved, or following a year of actively trying to achieve the target, patients will then be added to the waiting list."[2]

It is understood that GPs have a power to waive this delay where they feel clinically appropriate but it is not certain what proportion of patients are being required to attempt weight-loss by their GP.

In October 2014, NEW Devon CCG proposed patients with a BMI of 35 or above would have to shed 5% of their weight while smokers would have had to quit eight weeks before non-essential surgery. This plan was revised following feedback.

What is Somerset CCG already doing to limit surgery for the obese or smokers?

At present Somerset CCG has a number of policies which contain limits or principles in relation to surgery for those who are obese or smoke. Examples of policy areas for Somerset CCG which already include limitations based on smoking status or obesity are shown in Table 2 along with surgery types not restricted in Somerset but restricted elsewhere.

[2] http://www.valeofyorkccg.nhs.uk/your-health/weight-loss-to-improve-surgery-outcomes/

Table 2 Examples of policy areas for Somerset CCG frequently limited elsewhere based on smoking status or obesity.

Policy area	Obesity	Smoking
Abdominoplasty/ Apronectomy Sept 2015	1) Patients BMI must be ≤ 27 (taking account of the weight of the skin fold to be removed) 2) Patients who received morbid obesity surgery and other previously obese patients who have achieved significant weight loss **of the order of 20 BMI points** 3) Weight loss has been maintained for at least 2 years at the current level and further weight loss is unlikely – the scale of the weight loss and the period for which it has been sustained must be verified in the patient's clinical record	Patients have not smoked/used nicotine replacement therapy over preceding 3-months
Breast reduction (female) (July 2016)	Patients with a BMI > 27 or where weight loss has not been sustained for a minimum of 6 months at the current BMI of 27 or below.	Patients who have smoked/used nicotine replacement therapy over preceding 3 months (Note 2)
Cataracts (May 2015)	No restriction	No restriction
Fertility Assessment and Treatment (Feb 2016)	The prospective mother must have a body mass index of >19 and <30 (fertility preservation excluded)	Neither partner should smoke (patients who smoke can be referred to the smoking cessation service) (fertility preservation excluded)
Gynaecomastia (male)	Not routinely funded for anyone, no other mention of BMI.	Not routinely funded for anyone
Hair Depilation	No restriction	No restriction
Hernia (June 2016)	Patients with BMI >35: the decision to refer requires particular care, as the benefits of intervention may well be outweighed by risks of surgical intervention, including poorer healing and higher complication rates. If in doubt, the clinician may refer the patient, but should advise them that surgery may not be an appropriate option for them. Referral to local weight management programmes should be offered.	Patients who smoke should be warned of clinical advice that hernia recurrence rates are 3 times higher in smokers than non-smokers. All patients who smoke should be encouraged to stop and offered information on local cessation support services.
Hip Replacement Surgery (May 2016)	Patients with an elevated BMI of 35 or more are likely to receive fewer benefits from surgery and should be encouraged to lose weight further prior to seeking surgery. In addition, the risks of surgery are significantly increased. Weight loss should be maximised prior to referral to OASIS.	Patients that are smokers should be referred to smoking cessation services in order to reduce the risk of surgery and to improve healing.
Total Knee Replacement (March 2017)	Patients with an elevated BMI of 35 or more have an increased risk of complications from surgery, therefore (Thelwall, 2015) should be encouraged to lose weight further prior to seeking surgery. Weight loss should be maximised prior to referral to OASIS. (General principle)	Patients who are smokers should be referred to smoking cessation services in order to reduce the risk of surgery and improve healing. (Loof S., 2014) (General principle)
Varicose vein Dec 2015	No restriction	No restriction

Evidence for impact of smoking on surgery

The evidence for the impact of smoking on outcomes from surgery is well established. A briefing paper by Royal College of Anaesthetists and others[3] summarises the evidence and highlights increased risk of surgery for smokers:

- higher risks of lung and heart complications
- higher risks of post-operative infection
- impaired wound healing
- longer hospital stays and higher drug doses
- more likely to be admitted to an intensive care unit
- increased risk of emergency re-admission

Sørensen (2012)[4] found in general doubled risk of adverse healing outcomes for smokers compared to non smokers, see Table 3. Rates of adverse outcomes for former smokers were still increased compared to never smokers but much reduced compared to current smokers, demonstrating advantages of quitting prior to surgery.

Table 3 Reproduction of tables from Sørensen (2012) highlighting adverse outcomes for smokers compared to former and never smokers.

Table 2. Meta-analyses of Observational Studies on Healing Complications in Smokers Compared With Nonsmokers

	Studies Reporting Crude Data			Studies Reporting Adjusted Values			
Complication Category	No. of Studies[a]	OR (95% CI)[b]	*P* Value	No. of Studies[a]	OR (95% CI)[b]	*P* Value	eTable No.
Necrosis of wound and tissue	15	3.61 (2.78-4.68)	<.001	9	3.60 (2.62-4.93)	<.001	1
Healing delay and dehiscence	9	2.86 (1.49-5.49)	.002	12	2.07 (1.53-2.81)	<.001	2
Surgical site infection	25	2.12 (1.56-2.88)	<.001	32	1.79 (1.57-2.04)	<.001	3
Wound complications, nonspecified	20	2.06 (1.60-2.65)	<.001	17	2.27 (1.82-2.84)	<.001	4
Hernia	2	2.21 (0.71-6.84)	.17	7	2.07 (1.23-3.47)	.006	5
Lack of healing	6	2.21 (1.60-3.05)	<.001	4	2.44 (1.66-3.58)	<.001	6
Sensitivity analysis[c]	...	...	...	24	1.52 (1.36-1.69)	<.001	...

Abbreviations: ellipses, not applicable; OR, odds ratio.
[a] Indicates combined studies.
[b] Pooled treatment effects (OR [95% CI]) are calculated by means of the random-effects model. Forest plots and funnel plots on the meta-analysis and sensitivity analysis can be obtained from the author by request.
[c] Includes studies with a maximum Newcastle-Ottawa Scale score and more than 1000 patients (smokers and nonsmokers).

[3] Joint briefing: Smoking and surgery https://www.rcoa.ac.uk/sites/default/files/Joint-briefing-Smoking-Surgery.pdf

[4] Sørensen LT. (2012). Wound healing and infection in surgery. The clinical impact of smoking and smoking cessation: a systematic review and meta-analysis. *Arch Surg.* 147(4):373-83. doi: 10.1001/archsurg.2012.5.

Table 3. Meta-analyses of Observational Studies on Healing Complications in Former Smokers Compared With Patients Who Never Smoked or Smokers

Healing Complications Combined	Studies Reporting Crude Data			Studies Reporting Adjusted Values			eTable No.
	No. of Studies[a]	OR (95% CI)[b]	*P* Value	No. of Studies[a]	OR (95% CI)[b]	*P* Value	
Former smokers compared with those who never smoked	22	1.30 (1.07-1.59)	<.001	15	1.31 (1.10-1.56)	.006	7
Former smokers compared with current smokers	26	0.69 (0.56-0.85)	.002	2	0.28 (0.12-0.72)	.008	8
Sensitivity analysis[c]	. . .	. . .	. . .	5	1.23 (0.99-1.51)	.06	. . .

Abbreviations: ellipses, not applicable; OR, odds ratio.
[a] Indicates combined studies.
[b] Pooled treatment effects (OR [95% CI]) are calculated by means of the random-effects model. Forest plots and funnel plots on the meta-analysis and sensitivity analysis can be obtained from the author by request.
[c] Includes studies with a maximum Newcastle-Ottawa Scale score and more than 1000 patients (former smokers and those who never smoked).

The seminal review in regards to the impact of peri-operative quitting is Theadom & Cropley (2006)[5] which was a Cochrane review of twelve studies. This showed reduced mortality, pulmonary and respiratory complications, wound infections and increased length of stay in those who stopped smoking prior to surgery. More recently Mills et al (2012)[6] have also found significantly fewer complications in patients who had stopped smoking prior to surgery in a series of RCTs (RR 0.59, 95% CI 0.41 to 0.85; I^2=14%). Each week of cessation resulted in a larger effect size (effect size-coefficient -0.191, 95% CI -0.368 to -0.014) suggesting that earlier cessation brings greater health benefits.

Evidence for impact of excess weight on surgery

In comparison to the evidence on smoking and surgical adverse outcomes, the evidence on obesity and adverse outcomes is less clear.

There is fairly clear evidence that increased obesity is linked to some types of healing complications from surgery. A Dutch study reviewed records of 4293 consecutive patients (age 14+) undergoing elective or urgent surgery, excluding bariatric and any local anaesthetic procedures. [7] The results found a number of significant differences in outcome between the weight categories as shown in Table 4. However the majority of differences were driven by a difference between those in the underweight category and other groups. Overweight and obese patients had significantly higher rates of wound infection compared to those of normal weight. The obese also showed increased operation time (on average 10 minutes) and blood loss.

There was no impact on readmissions, length of stay with overweight patients showing significantly shorter stay than those of normal weight and significantly reduced 30-day mortality. There was no impact on rates of complications or length of stay although a multivariate analysis taking into

[5] Theadom, A & Cropley, M. (2005). Effects of preoperative smoking cessation on the incidence and risk of intraoperative and postoperative complications in adult smokers: a systematic review. *Tobacco Control*, 15, 5. http://tobaccocontrol.bmj.com/content/15/5/352.long

[6] Mills, E, Eyawo, O, Lockhart, I, Kelly, S., Wu, O & Ebbert, J O. Smoking Cessation Reduces Postoperative Complications: A Systematic Review and Meta-analysis. *American Journal of Medicine*, Volume 124, Issue 2, Pages 144–154.e8.

[7] Tjeertes, E K M et al (2015) Obesity – a risk factor for general surgery? BMC Anesthesiology, 15, 112 **DOI:** 10.1186/s12871-015-0096-7 http://bmcanesthesiol.biomedcentral.com/articles/10.1186/s12871-015-0096-7

account confounders did show a 30% increased risk of complications / mortality in the obese group compared to those of normal weight.

In part these results may be due to all those obese being considered in the same category which may lessen the ability to detect adverse results for those with more morbid obesity levels. The results for those underweight may be impacted by effects of illness which cause weight loss, this may be compounded by a larger proportion undergoing high risk surgery than the other weight groups. Also the underweight group contained more smokers. An obesity paradox was shown with the obese showing better survivorship which may be related to selection of healthier but obese patients for surgery.

Table 4 Postoperative Outcome within 30 Days (Table 3 reproduced from Tjeertes, 2015)

	Normal weight	Underweight	Overweight	Obese	
	BMI 18.5–25(kg/m2)	BMI < 18.5(kg/m2)	BMI 25–30(kg/m2)	BMI > 30(kg/m2)	*p* value
	(*N* = 1815)	(*N* = 100)	(*N* = 1635)	(*N* = 743)	
Wound infection	87 (4.8 %)	11 (11.0 %)[a]	127 (7.8 %)[a]	81 (10.9 %)[a]	*P* < 0.001
Pneumonia	31 (1.7 %)	4 (4.0 %)	41 (2.5 %)	16 (2.2 %)	*P* = 0.231
Deep vein thrombosis and/or pulmonary embolism	7 (0.4 %)	1 (1.0 %)	5 (0.3 %)	5 (0.7 %)	*P* = 0.474
ICU admission	232 (12.8 %)	27 (27.0 %)[a]	198 (12.1 %)	95 (12.8 %)	*P* < 0.001
Reoperation	87 (4.8 %)	11 (11.0 %)[a]	72 (4.4 %)	39 (5.2 %)	*P* = 0.028
Readmission	57 (3.1 %)	5 (5.0 %)	67 (4.1 %)	34 (4.6 %)	*P* = 0.246
Length of hospital stay (days) (median + IQR)	3 (1–8)	7 (3–16) [a]	2 (1–7) [a]	2 (1–7)	*P* < 0.001
Operation time (minutes) (median + IQR)	39 (24–65)	41 (27–90)	41 (26–66)	50 (27–80) [a]	*P* < 0.001
Blood loss (mL)[b] (median + IQR)	10 (5–50)	25 (5–138) [a]	15 (5–50)	20 (10–100) [a]	*P* < 0.001
30 days mortality	27 (1.5 %)	4 (4.0 %)	11 (0.7 %)[a]	10 (1.3 %)	*P* = 0.008
Cardiovascular complication	67 (3.7 %)	4 (4.0 %)	53 (3.2 %)	26 (3.5 %)	*P* = 0.897
Any complication	339 (18.7 %)	28 (28.0 %)	345 (21.1 %)	185 (24.9 %)	*P* = 0.001

[a] Significantly different ($p < .05$) compared to normal weight (shown shaded)
[b] Data was available in 84.3 % of patients

Thelwall et al (2015)[8] in a major review of 350,000 patients undergoing surgery in one of five categories (hip replacement, knee replacement, coronary artery bypass graft, large bowel surgery, and abdominal hysterectomy) in NHS hospitals in England between 1 January 2007 and 31 December 2011 found a strong association between obesity level and risk of surgical site infection. Interestingly this study distinguished between risk according to level of obesity and by operation type as shown in Figure 2.

[8] Thelwall, S, Harrington, P, Sheridan, E & Lamagni, T. (2015). Impact of obesity on the risk of wound infection following surgery: results from a nationwide prospective multicentre cohort study in England. Clin Microbiol Infect 2015; 21: 1008.e1 –1008.e8

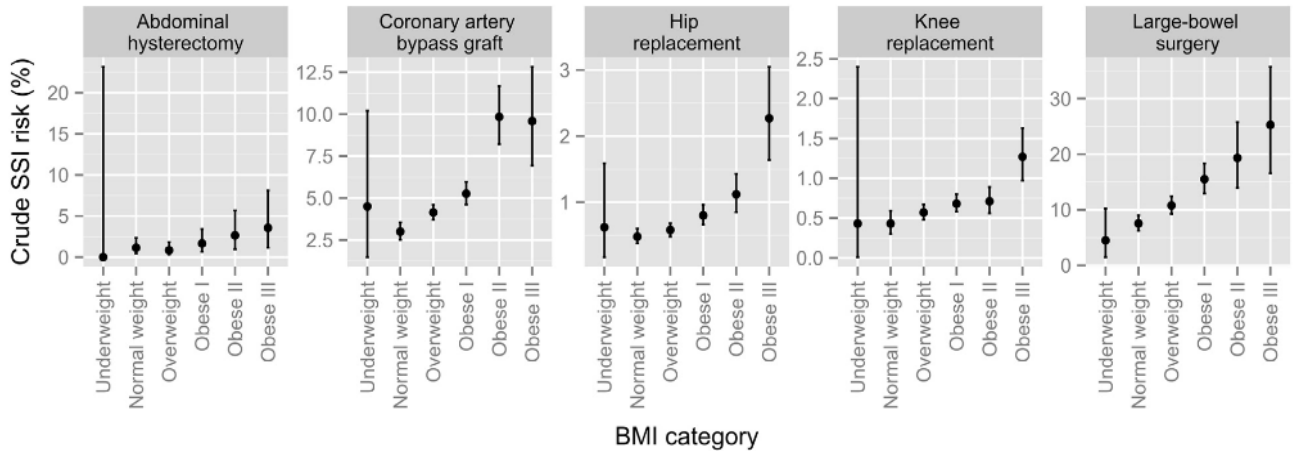

Figure 2 Unadjusted risk of surgical site infection by body mass index and surgical category. England 2007-2011. (Thelwall et al, 2015, Fig 1.) (BMI < 18.5= Underweight; 18.5–24.9= normal weight; 25.0–29.9= overweight; 30.0–34.9= class I obesity; 35.0–39= class II obesity; ≥ 40.0= class III obesity)

There is more comprehensive evidence for some surgical outcomes such as total knee replacements. Rodriguez-Merchan (2014)[9] and cost savings are likely from both reduced surgical complications and improved survival of the prosthesis. However in contrast a UK based study[10] following over 2000 patients with TKR found no significant impact of BMI on costs or QALY gains – the authors noted this discrepancy with previous work and caution more research is required. There is some evidence that by delaying TKR and pursuing weight loss, the surgery becomes unnecessary in cases of degenerative joint disease (with 15% weight loss) (DeClaire et al. 2014)[11]. It hasn't been possible to find other evidence on the possible negative impact of delaying surgery, but it is reasonable to assume that in cases of knee osteoarthritis, continued pain and lack of mobility would need to be clinically assessed. There are also continuing costs of medical management of the knee problems.

There have been few evaluations of the success and impact of preoperative interventions for weight-loss. Most of these have occurred in relation to bariatric surgery and in the super obese and so are not as applicable to the general population for a wider range of surgeries. A recent systematic review[12] of studies comparing outcomes for those who had received bariatric surgery prior to total knee replacement or hip replacement found no significant differences in surgical outcomes including surgical site infections, revisions and mortality.

Lifestyle services in Somerset

Weight management and smoking cessation services are both under review in Somerset with approaching end-points of current contracts. The move is towards a focus on healthy lifestyles at a

[9] Rodriguez-Merchan, E C et al (2014) The influence of obesity on the outcome TKR: Can the impact of obesity be justified from the viewpoint of the overall health care system? HSS, 10(2) 167-170. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4071468/

[10] Dakin et al (2012). https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3269047/

[11] DeClaire JH, Savich TT, Montgomery BS, Warritay OK. Significant weight loss may delay or eliminate the need for total knee replacement *Int J Prev Med*. 5(5):648-52

[12] Smith, T O, Aboelmagd T, Hing CB and MacGregor A. (2016). Does bariatric surgery prior to total hip or knee arthroplasty reduce post-operative complications and improve clinical outcomes for obese patients? Systematic review and meta-analysis. *Bone Joint J*, 98 1160-6.

population level and a move away from individual and face to face services with some exceptions for the most vulnerable groups. This is likely to mean that additional capacity will be required to support widespread introduction of services. Costs of a tier two programme have been estimated as £620 and £120 per person for smoking and weight management respectively. These costs may be able to be modified if some patients can use a less intensive approach although this may also impact on success rates.

Stop before the op has not really been robustly implemented in Somerset. This intervention has been used with success elsewhere. A Cochrane review by Thomsen, Villebro and Møller (2010)[13] found quit rates of around 53% in patients given intensive support to quit, with success measured as quitting for 3-4 weeks prior to surgery compared to 5% meeting this level without support. Current estimates of success for mainstream smoking cessation services is a 51% quit rate[14] although this is of people that agree to access services.

For weight management any weight loss has some benefit so success is more difficult to define. Most people accessing weight management service receive some positive intervention. NICE return on investment tools[15] estimates a ⅓ drop out (so ⅔ achieve some benefit). Most commercial weight loss services demonstrate ⅓ service users losing 5% of their body weight and this level has previously been seen in Somerset. It should be noted that some CCGs introducing a requirement for weight loss before surgery have asked people to achieve 10% weight loss and this is likely to be a high and possibly unrealistic target for most people.

Health benefits from smoking cessation and weight management have been estimated at £223 per person per year from smoking cessation and £60 per person per year from weight management. It should be noted that these are fairly speculative figures but provide a base to work on.

Cost estimates of introducing mainstream smoking cessation and weight management interventions into the surgical pathway

The broadest policy introduction is to look at all procedures barring those where it is likely there are clear reasons why any delay would be adverse to health. An initial estimate has been made at the likely costs of introducing this measure to this wide group of patients followed by more honed sensitivity analyses.

There are about 39,000 procedures in Somerset each year excluding those which are related to cancer or are booked (based on 2015/16 daycase and elective activity). Of these an estimate has been made of the numbers of patients likely to be obese or smokers based on total population rates and thus the number of interventions where it may be reasonable to consider application of any policy. This is likely to under-estimate rates for operations where the lifestyle factor is related to the need for the operation. For example in the knee arthroplasty trial, 43% of patients were obese. In a review by Thelwell of over 68,000 surgical patients found rates of 42% obese and 38% over-weight. The National Joints Register reported in 2015 40% of primary hip replacement and

[13] Thomsen T, Villebro N, Møller AM. Interventions for preoperative smoking cessation. Cochrane Database of Systematic Reviews 2010, Issue 7. Art. No.: CD002294. DOI: 10.1002/14651858.CD002294.pub3 http://www.ncsct.co.uk/usr/pub/interventions-for-preoperative.pdf

[14] http://content.digital.nhs.uk/catalogue/PUB14610/stat-stop-smok-serv-eng-2014-q4-rep.pdf

[15] https://www.nice.org.uk/about/what-we-do/into-practice/return-on-investment-tools

57% knee replacement patients were obese.[16] It will also be less accurate where the age profile of those requiring the operation differs substantially from the general population age profile. Cost of the lifestyle intervention per person is based on current services costs. There will be some overlap of smokers who are also obese but for the purposes of simplicity this has been ignored.

The costs of the lifestyle interventions can be off-set by a number of health and cost gains within the system.

It has been assumed that lifestyle interventions would take 12 weeks and thus delay surgery by this time period only. It should be noted that other areas that have introduced this type of policy have required a much longer period of time attempting to change behaviour, typically 12 months for obesity and 6 months for smoking in the absence of success so this is a conservative estimate. The ability to 'cash out' these savings from the healthcare system also needs to be considered given other waiting list pressures which will exist. Delay is the key contributor to cost savings in the general model considered.

As noted, success rates of lifestyle interventions are based on the current population who are voluntarily accessing the service so may not match the proposed population. Those who do successfully stop smoking or lose a reasonable amount of weight will have health gains and there are some theoretical costs which would be recouped through lower surgery costs and also shorter length of stay. Duration of the year on year health gains depends in part on lifestyle gains being at least maintained.

In some areas there is a benefit of lifestyle intervention, generally weight-loss, meaning that for those who successfully lose weight, symptoms are eliminated. For some procedures success of the intervention and costs associated with revision are reduced and will also provide long-term gains to the patient and healthcare economy. At present for a mixed set of cases as proposed these benefits are not included. Reduced care costs per patient will positively impact on hospital budgets but would not impact on payment for tariffed procedures. The general figure of £200 per person for surgical cost savings is likely to be wide of the mark for many procedures which are both low cost and or with high cost implications of infection.

[16] http://www.njrreports.org.uk/

Table 5 Somerset cost estimates for limits to surgery based on smoking status or obesity

	Smoking	Obesity	Comments
Volume of Relevant Procedures	39,199	39,199	Volume of Activity in 2015/16 for Daycase and Elective Activity, less admissions with a cancer programme budget code or admission method of planned or booked.
Prevalence of smokers and BMI ≥ 30 amongst cohort	16%	24.40%	Basic assumption based on latest countywide prevalence data, without taking into account deprivation/age mix
Number of Interventions	6,272	9,565	Basic assumption based on latest countywide prevalence data, without taking into account deprivation/age mix
Cost of lifestyle Intervention (£)	620	120	Based on current service
Economic benefit of long term health gain per year per patient enrolled (£)	223	60	Based on generalised public health estimated used in healthy lifestyles business case.
Likelihood of success per patient	50%	33%	Based on voluntary access figures
Improved efficiency of surgery per patient	200	200	Obesity figure based on PH figure of A$159 per patient per BMI unit, with success patients losing 2 units of BMI
Average delay to surgery (weeks)	12	12	Provisionally assumed 12 week delay while intervention takes place, deferring 2 months of treatments to following year.
Average cost of procedure (£)	1,235	1,235	Used National Tariff in SUS for 2015/16 casemix

The above assumptions have been applied to the Somerset model as shown in Table 6. The costs of the smoking intervention mean that in year one this blanket approach the introduction of smoking intervention has a positive cost although this is off-set in year two by the wider health gains to the system of smokers remaining abstinent – it is likely that a number of quitters will relapse but this has not been included. Health gains from weight-management interventions are cost–saving in year 1, primarily due to the lower intervention costs. Overall the implementation of a blanket delay is cost saving for both obesity and smoking over two years. Sensitivity analyses, presented in Table 8 show varied positions but all show overall cost savings by year 2.

Table 6 Costs

	Smoking Year 1	Smoking Year 2+	Obesity Year 1	Obesity Year 2+
Costs of Intervention (£k)	3,888,541	0	1,147,747	0
Total Improved efficiency of surgery (£k)	(627,184)	0	(631,261)	0
Economic Impact of Long Term Health Benefit	(1,398,620)	(1,398,620)	(573,873)	(573,873)
Non Recurrent Benefit of Delay to Surgery	(1,787,474)	0	(2,725,898)	0
Total Net Impact	75,262	(1,398,620)	(2,783,286)	(573,873)

Table 7 Total net impact

Total Net Impact	Year 1	Year 2
Smoking	75,262	(1,398,620)
Obesity	(2,783,286)	(573,873)
Total	(2,708,024)	(1,972,493)

Table 8 Sensitivity analyses taking into account variation in assumptions of effectiveness of intervention and scope of policy

Scenario	Smoking Y1	Smoking Y2+	Obesity Y1	Obesity Y2+
Base	75,262	(1,398,620)	(2,783,286)	(573,873)
Effectiveness of intervention 20% lower	712,481	(1,118,896)	(2,123,331)	(459,099)
Effectiveness of intervention 50% lower	1,668,309	(699,310)	(1,133,400)	(286,937)
15% growth in relevant procedure volume	86,551	(1,608,413)	(3,200,779)	(659,954)
Efficiency of surgery impact 25% less	232,058	(1,398,620)	(2,625,471)	(573,873)
Only Applying to existing Policies	1,173,741	(4,396,222)	(4,799,601)	(1,182,840)
Only Applying to Hip/Knee/Colorectal and Breast Surgery	(469,622)	(91,127)	(904,995)	(37,391)

Options to consider

1. **Do nothing.**

Advantages: No further work required. No adverse attention.
Disadvantages: Does not send a strong prevention message, misses an opportunity to implement health and cost savings.

2. **Blanket type implementation. BMI ≥30 / smokers. Single policy paper developed**

Advantages: Quicker and 'simpler' to implement, cost savings greater overall
Disadvantages: Evidence more tenuous for some conditions, cost of intervention outweighed in lower value procedures, more visible, likely open to more criticism, modelling more variable

3. **Policy area implementation. Revise each policy area paper and where evidence suggests health gains move from recommendation levels for lifestyle interventions to mandated implementation**

Advantages: stronger evidence base / cost-effectiveness of areas for implementation, may have more credibility, able to tailor recommendations for obesity and smoking cessation
Disadvantages: smaller cost gain overall, administrative burden greater, slower implementation

COG is asked to consider and discuss the above options or variations on these approaches.

It is recommended that option 3 is implemented with a focus on areas where evidence is likely to be strongest like smoking cessation in general and restrictions due to obesity in specific instances like orthopaedic surgery.