

Joint briefing: Smoking and surgery

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Smoking is the single biggest cause of premature and preventable death in the UK. It is responsible for almost 100,000 deaths every year across the country.¹ In addition to the general health risks associated with smoking, research has shown that smokers are more likely to suffer a range of complications before, during and after surgery.² Quitting smoking improves surgical outcomes through reducing risk and complications and as such provides cost savings to the NHS and social care system. The [NHS 5 Year Forward View](#) states that the sustainability of the NHS relies on a radical upgrade in prevention and public health. This includes reductions in smoking related ill health.

This briefing has been produced jointly by Action on Smoking and Health (ASH), the Royal College of Anaesthetists (RCOA), the Royal College of Surgeons of Edinburgh (RCSEd) and the Faculty of Public Health. It has been designed for health professionals and commissioners, to provide clear advice and examples of good practice in relation to smoking and surgery.

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Summary of the evidence

Risks associated with smoking and surgery

There is strong evidence of higher risks and worse surgical outcomes when a patient continues to smoke. The risks associated with smoking mean that it is not always safe for surgery to take place when a patient continues to smoke and, as a result, some surgeons will not carry out procedures until a patient is able to abstain from smoking.³ Smokers are 38% more likely to die after surgery than non-smokers.⁴ Following surgery smokers:

- have higher risks of lung and heart complications^{5,6,7}
- have higher risks of post-operative infection^{8,9,10}
- have impaired wound healing^{11,12}
- require longer hospital stays and higher drug doses¹³
- are more likely to be admitted to an intensive care unit¹⁴
- have increased risk of emergency re-admission¹³

Smoking has a serious impact on a range of surgery types, for example orthopaedic surgery. Smoking is the most important factor for the development of postoperative cardiopulmonary and wound-related complications in elective cases.⁵ It is also the most important risk factor for the development of serious post-operative complications in patients undergoing elective hip and knee replacement,^{14,15} it has pronounced effects on foot and ankle surgery^{16,17} and a 2015 systematic review reported the negative impact it has on clinical outcomes following shoulder surgery.¹⁸ The negative effects of smoking are also reported in gum surgery¹⁹ and smoking is an important predictive factor for anastomotic complications after colonic and rectal resection.^{20,21} Smokers are also at significantly higher risk of complications during reconstructive breast surgery and breast cancer surgery.^{22,23}

Smokers often need a higher dose of anaesthesia than non-smokers.^{24,25} They have decreased blood oxygenation, leading to decreased oxygen delivery to their tissues,²⁶ consequently they are more likely to need oxygen therapy.

Benefits of quitting smoking

Quitting smoking is the best thing any smoker can do to improve their current and future health. Quitting smoking before a surgical intervention is extremely important because of the elevated risks that smokers undergoing surgery face.

Quitting smoking before surgery reduces the risk of postoperative complications.²⁷ It reduces lung, heart and wound-related complications, it decreases wound healing time and reduces the average length of stay in hospital.

Evidence about the optimum time to quit smoking prior to surgery varies. Whilst a 1989 study suggested that stopping smoking shortly before surgery may increase complications,²⁸ a 2011 systematic review found no increase in complications amongst smokers who quit within two months of surgery.²⁹ This is supported by further evidence which suggests quitting two months prior to surgery provides the most benefit.^{29,30,31,32} For smokers who are unable to quit, the Royal College of Anaesthetists advises that smokers should give up smoking for at least several weeks before surgery and certainly not to smoke on the day of an operation.³³

Quitting smoking after surgery also brings significant benefits. As well as general health benefits, a 20 year follow-up study of smokers who underwent coronary artery bypass graft surgery found that smoking cessation after surgery was an important independent predictor of a lower risk of death and repeat coronary procedures compared with patients who continued smoking.³⁴

Cost to the NHS

Health problems associated with smoking have a severe impact on the NHS. Around 2.6 million episodes of inpatient care are delivered to 1.1 million smokers every year and around 47% of people treated in hospital are current or ex-smokers.³⁵

Smoking is estimated to cost the NHS around £2 billion every year.³⁶ This does not include the cost of those who require care in later life as a result of smoking related illnesses, work days lost, sickness benefits or other indirect costs.

It has been estimated that in London alone savings of around £2.6 million a year could be made if between 8% and 17% of smokers quit before having surgery.³⁷ The Welsh government has estimated that supporting smokers to quit before having surgery could save as much as £2.3 million every year.³⁸ These savings are derived from "bed days" saved and the reduced cost of treating post-operative complications.

The role of health professionals

Health professionals have a key role to play in encouraging smokers to quit. For over 10 years NICE has recommended that health professionals seek to identify smokers and refer them to an intensive support service.³⁹ Surveys have found that prompts from health professionals are the second most common reason for a quit attempt.⁴⁰

To make surgical care more effective and efficient, an integrated approach to patient care which includes joined up working between and across primary and secondary care, should be taken. This should take “fitness for surgery” into account and encourage smoking cessation prior to surgical intervention as good practice.

General Practitioners

GPs are normally the first point of contact for patients. As a matter of routine, they should identify smokers and offer smoking cessation interventions. (See section on smoking cessation interventions for more information).

Evidence suggests undergoing surgery is associated with an increased likelihood of smoking cessation.¹ As such it is important that primary care physicians understand (1) the consequences of smoking in the perioperative period and how quitting can mitigate these problems, (2) how surgery serves as a “teachable moment”, and (3) the importance of specific medication and support that can be used to help their patients quit smoking.

Anaesthetists

Anaesthetists provide general anaesthesia before an operation. More recently, they have also taken on the role of assessing patient wellbeing and fitness before surgery. This involves discussing the risks and benefits of the proposed operation, ensuring that the appropriate care required for a full recovery is in position and providing timely perioperative interventions to reduce the risk of postoperative complications. This discipline has been called perioperative medicine.

Even though preoperative assessment may take place shortly before surgery, it provides a further opportunity to encourage smoking cessation and as such improve general health.

Helping patients to stop or reduce the amount they smoke before any form of anaesthetic has become an important goal for anaesthetists. They can help by:

- Discussing the merits of stopping smoking before surgery with patients.
- Involving trained staff to assist in smoking cessation interventions.
- Referring patients to a specialist smoking cessation service.
- Involving hospital and community pharmacies in assisting in the process of smoking cessation.
- Ensuring that smoking cessation is reinforced postoperatively for a long term healthier lifestyle.

Surgeons

The point at which the patient and surgeon agree that surgery should take place should also be seen as a ‘teachable moment’ where patients are often more receptive to intervention and more motivated to quit. When discussing the risks of any potential procedure the surgeon should outline the reduction in risk associated with smoking cessation. Advice from surgeons to quit smoking is likely to have a big impact on patients and it is important that patients receive consistent messages from all health professionals about smoking.

When this decision has been made, it provides a timeline during which a patient can prepare for their operation. During this period surgeons should work with perioperative medicine teams to increase fitness for surgery and in this case, encourage patients who smoke to quit.

Why hospitalisation is an opportune time to encourage patients to stop smoking

- Quitting smoking before surgery can lead to significant health benefits.
- The period before surgery is often a “teachable moment” where patients are more receptive to intervention and are more motivated to quit.
- The hospital’s no smoking environment creates an external force to support abstinence or quitting.
- Patients are ideally placed to be given information about treatment options, support through withdrawal and signposted to specialist services.

NCSCT, Interventions in Secondary Care

Stop smoking interventions and harm reduction

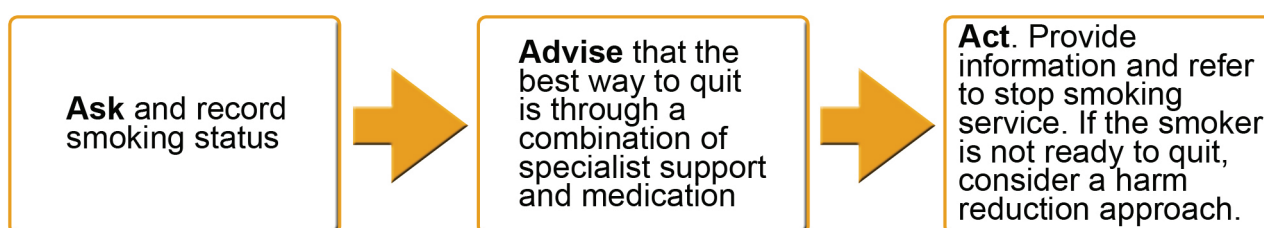
NICE guidance (PH48) recommends that smokers using secondary care services are identified and offered intensive support to quit.

Support should include;

- the provision of stop smoking pharmacotherapies
- the referral of patients who smoke to specialist stop smoking services
- the adjustment of drug doses for people who have stopped smoking; drugs that are affected include clozapine, olanzapine, theophylline and warfarin.

Whilst smoking cessation is the preferred option, where an individual is unable or unwilling to stop smoking, a program of harm reduction (NICE Guidance PH45) should be followed to support temporary abstinence or smoking reduction. This should include the provision of behavioural support and nicotine replacement therapy and/or electronic cigarettes.

To support the identification and referral of smokers, the National Centre for Smoking Cessation and Training (NCSCT) has developed a simple method known as “Very Brief Advice” (VBA). VBA has 3 components: Ask, Advise and Act. VBA can be used by all health professionals, and patients who say that they have ‘cut down’ should still receive a Very Brief Advice intervention at future consultations.



Behavioural support and stop smoking pharmacotherapies

The most effective way to quit smoking is a combination of medication and behavioural support. Smokers should be offered Varenicline [Champix] which is only available on prescription or nicotine replacement therapy (NRT) which is available over the counter. NRT includes nicotine gum, patches, strips, lozenges, microtabs and mouth and nasal sprays. *[In line with NICE Guidance a patient should remove nicotine patches 24 hours before microvascular reconstructive surgery and surgery using vasopressin injections.¹³ However, it is worth noting that the use of nicotine patches is safer than returning to smoking.]*

Stop smoking pharmacotherapies should be combined with intensive group or individual behavioural support. Smokers are up to four times more likely to succeed in quitting with a local stop smoking service than if they try to quit unaided.¹³ Patients should be identified and referred to the appropriate service and this will vary according to locality. It could be an inhouse service within the hospital, delivered through pharmacies, GPs, local authority specialist stop smoking service, or the voluntary sector.

Electronic cigarettes

Electronic cigarettes are battery-powered devices which deliver nicotine orally. They are not burnt and do not contain tobacco, which is the harmful component of smoking. While people are addicted to nicotine it is the tobacco smoke which is harmful. The most common reason smokers give for using the devices is to help them quit smoking^{41,42} and a recent review of the evidence for Public Health England found that electronic cigarettes can be an effective way for smokers to quit or abstain from smoking.⁴³ At the time of writing no electronic cigarette product licenced as a medicine was available on the market. Although one product has received an MHRA medicinal licence it is not known if or when it will come to market. It is anticipated that at some point in the future products will be available with a licence and hence could be prescribed by health professionals.

The evidence to date has not identified any major concerns about the use of electronic cigarettes around surgery.

For more information see the following documents - [ASH: Briefing on electronic cigarettes](#), PHE: [E-cigarettes: an evidence update](#),⁴⁴ NCSCT: [A briefing for Stop Smoking Services](#)

What should smokers expect from the NHS ahead of surgery

- To be informed of the risks of smoking prior to surgery by all relevant professionals
- To be referred to specialist stop smoking support where this is available
- To be given the opportunity to have behavioral support to help them quit
- To be provided with medication to support a quit attempt or temporary abstinence prior to surgery

References

1. ASH Fact Sheet: [Smoking Statistics, illness and death](#), 2015.
2. Theadom A, Cropley M. [Effects of preoperative smoking cessation on the incidence and risk of intraoperative and postoperative complications in adult smokers](#): a systematic review. *Tobacco Control* 2006; 15: 352–8.
3. Cosmetic Surgery Consultants website. “Smoking and Cosmetic Surgery”. Accessed 03 March 2016.
4. Turan A, Mascha EJ, Roberman D, et al. [Smoking and perioperative outcomes](#) *Anaesthesiology* 2011; 14
5. Møller AM, Pedersen T, Villegro N. [Effect of smoking on early complications after elective orthopaedic surgery](#). *Journal of Bone and Joint Surgery* 2003; (85-B) 178 – 81.
6. Walker NM, Morris SAC, Cannon LB. [The effect of pre-operative counselling on smoking patterns in patients undergoing forefoot surgery](#). *Foot and Ankle Surgery* 2009; 15: 86 – 89.
7. Petrar S, Bartlett C, Hart RD, MacDougall P. [Pulmonary complications after major head and neck surgery](#): a retrospective cohort study. *The Laryngoscope* 2012; 12 (5): 1057-1061.
8. Jorgensen LN, Kallchave F, Christensen E, et al. [Less collagen production in smokers](#). *Surgery* 1998; 123:450–5.
9. Jones RM. [Smoking before surgery: the case for stopping](#). *BMJ* 1985; 290: 1763-1764.
10. Sørensen LT, Horby J, Friis E. et al Smoking as a risk factor for wound healing and infection in breast cancer surgery. *European Journal of Surgical Oncology* 2002; 28 (8): 815-820. DOI: 10.1053/ejso.2002.1308
11. Jones JK, Triplett RG. [The relationship of cigarette smoking to impaired intraoral wound healing](#): a review of evidence and implications for patient care. *J Oral Maxillofac Surg* 1992; 50: 237-9.
12. Sørensen LT. [Wound healing and infection in surgery: the clinical impact of smoking and smoking cessation: a systematic review and met-analysis](#). *Arch Surg.* 2012; 147 (4): 373-383
13. NICE Guidelines (PH48) [Smoking: acute, maternity and mental health services](#). 2013.
14. Møller AM, Maaloe R, Pedersen T. Post-operative intensive care admittance: the role of tobacco smoking. *Acta Anaesthesiol Scand* 2001; 45: 345-8.
15. Kotani N, Hashimoto H, Sessler DI, et al. [Smoking decreases alveolar macrophage function during anaesthesia and surgery](#). *Anesthesiology* 2000; 92:1268-77
16. Ishikawa SN, Murphy GA, Richardson EG. [The effect of cigarette smoking on hindfoot fusions](#). *Foot Ankle Int.* 2002; 23 (11): 996–8.
17. Bettin CC, et al. [Cigarette Smoking Increases Complication Rate in Forefoot Surgery](#), *Foot and Ankle Journal* Pub Online 12 Jan 2015
18. Santiago-Torres J, Flanigan DC, Butler RB, Bishop JY. [The Effect of Smoking on Rotator Cuff and Glenoid Labrum Surgery](#): A Systematic Review 2015, *Am J Sports Med.* 2015; 43 (3):745-51
19. Kotsakis G, Javed F, Hinrichs J, Karoussis I, and Romanos, G. [Impact of Cigarette Smoking on Clinical Outcomes of Periodontal Flap Surgical Procedures](#): A Systematic Review and Meta-Analysis *Journal of Periodontology* 2015; 86 (2): 254-263
20. Sørensen LT, Jørgensen T, Kirkeby LT, et al. Smoking and alcohol abuse are major risk factors for anastomotic leakage in colorectal surgery. *British Journal of Surgery* 1999; 86 (7): 927-931.
21. Kim, M. [The impact of heavy smoking on anastomotic leakage and stricture after low anterior resection in rectal cancer patients](#). *World J Surg.* 2011; 35 (12): 2806-10.
22. Chang DW, Reece GP, Wang B, et al [Effect of smoking on complications in patients undergoing free TRAM flap breast reconstruction](#). *Plastic and Reconstructive Surgery* 2000; 105 (7): 2374-2380.
23. Sørensen LT, Horby J, Friis E, et al [Smoking as a risk factor for wound healing and infection in breast cancer surgery](#). *European Journal of Surgical Oncology* 2002; 28 (8): 815-820.
24. Rodrigo C. [The effects of cigarette smoking on anesthesia](#). *Anesth Prog.* 2000; 47(4): 143-50.
25. Ozturk E, et al “Does smoking increase the anesthetic requirement?” *Euroanaesthesia Congress* 2015; Abstract 8AP 14-7 2015.
26. Jensen JA, Goodson WH, Hopf HW. [Cigarette smoking decreases tissue oxygen](#) *Arch Surg* 1991; 126: 1131-1134.
27. Moore S, Mills BB, Moore RD, et al. Perisurgical smoking cessation and reduction of postoperative complications. *American Journal of Obstetric Gynaecology* 2005; 192: 1718-21.
28. Warner MA, Offord KP, Warner ME, et al. [Role of preoperative cessation of smoking and other factors in postoperative pulmonary complications](#): a blinded prospective study of coronary artery bypass patients. *Mayo Clin Proc.* 1989; 64 (6): 609-616.
29. Myers K, Hajek P, Hinds C, McRobbie H. [Stopping smoking shortly before surgery and postoperative complications](#). *Archive of Internal Medicine* 2011; 171 (11): 983-98.
30. Pearse RM et al. European Surgical Outcomes Study (EuSOS) group for the Trials groups of the European Society of Intensive Care Medicine and the European Society of Anaesthesiology. [Mortality after surgery in Europe](#): a 7 day cohort study. *Lancet* 2012; 380 (9847): 1059-65.
31. Bluman LG, Mosca L, Newman N, Simon DG. [Preoperative smoking habits and postoperative pulmonary complications](#). *Chest* 1998; 113 (4): 883-889
32. Khan MA, Hussain SF. Pre-operative pulmonary evaluation. *J Ayub Med Coll Abbottabad* 2005; 17 (4): 82-86.
33. RCOA. [You and your anaesthetic](#), 4th edition. 2014

34. van Domburg RT, Meeter K, van Berkel DFM. et al. [Smoking cessation reduces mortality after coronary artery bypass surgery](#): a 20 year follow-up study. Journal American College of Cardiology 2000; 36 (3): 878-883.
35. Szatkowski L, Murray R, Hubbard R, et al. [Prevalence of smoking among patients treated in NHS hospitals in England](#): a national audit. Thorax 2015; 70 (5): 498-500
36. ASH. [Ready Reckoner](#), 2016.
37. London Health Observatory. [Stop before the op](#). LHO and SmokeFree London. 2006
38. [A summary of the health impact of smoking and the short-term benefits of pre-operative smoking cessation in Wales](#). Welsh Government. Last updated Feb. 2009.
39. NICE Guidelines [PH1]. [Smoking: brief interventions and referrals](#), 2006.
40. West R. Getting Serious About Stopping Smoking: A Report for No Smoking Day, 1997
41. YouGov. Smokefree Britain Survey, 2015. Fieldwork undertaken March 2015. Sample size: 12,055 adults. The figures have been weighted and are representative of all GB adults (aged 18+).
42. Adult smoking habits in Great Britain 2014, ONS, 2016
43. PHE. [E-cigarettes: an evidence update](#). A report commissioned by Public Health England, 2015

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