



Guideline on smoking as related to the perioperative period

1. Introduction

Tobacco use is a major global health problem and the single greatest preventable cause of death and disease in Australia and New Zealand.^{1,2} Smokers are at increased risk of perioperative respiratory, cardiac and wound related complications, and quitting smoking may reduce the risk of complications.³

ANZCA is committed to its role of health advocacy and recognises that the perioperative period represents a “teachable moment” when many smokers quit or attempt to quit smoking, sometimes permanently.^{4,5} The opportunity for clinicians to actively participate in this phase should be seized and patients instructed on the means available to them to quit smoking prior to their surgery.

2. Purpose and scope

The purpose of these guidelines is to update anaesthetists and trainees with contemporaneous information about the effects of smoking in the perioperative period, including current state of preoperative cessation of smoking and the science supporting cessation.

Although the information in this document may be of benefit to the community as a whole, it is intended to apply to clinicians with a view to advocating cessation of smoking and ensuring optimal timing for cessation.

3. Issues

3.1 The health/disease/illness burden of tobacco in Australia and New Zealand is a major one with approximately 15,500 deaths attributable to tobacco in Australia each year⁶ and 5000 in New Zealand.² Smoking is the single greatest preventable cause of death and ill health, accounting for 8 per cent of the total disease burden in Australia⁶ and costing the economy an estimated \$31.5 billion in tangible costs. Estimates vary, but conservatively, half of all smokers will eventually die as the result of their smoking⁷, while quitting before the age of 40 years reduces the risk of death associated with continued smoking by about 90 per cent.⁸

The spontaneous quit rate in the general population of smokers is estimated to be about 2 per cent per annum⁹ however tobacco addiction is characterised by poor spontaneous recovery rates and high rates of relapse. In the absence of any interventions to support quitting, longer term abstinence after surgery is low although successful permanent quitting does occur.

3.2 Smoking worsens surgical outcome. This has been demonstrated in over 300 studies that have been carried out since the first published study in 1944 by a British anaesthetist who found a six-fold increase in pulmonary complications in smokers following abdominal surgery.¹⁰

Smoking cessation before surgery has been shown to improve surgical outcome. Although there is some controversy about optimal timing of smoking cessation there is agreement that longer quitting is best. It would seem that recent quitters are no worse off than continuing smokers in

terms of pulmonary complications.¹¹⁻¹³ Further data are needed on this important question but current available evidence should not dissuade anaesthetists and surgeons from advising patients to quit at any time before surgery.

4. Assisting patients to quit before surgery

Many smokers try to quit on their own however in the absence of additional support, each quitting attempt will only have a success rate of 4-7 per cent.¹⁴ Quitting success tends to be greater in patients having surgery. Advice and encouragement delivered by physicians improves quitting success.⁹ Further, this group may be more motivated to quit.

The Smoking Cessation Taskforce of the American Society of Anesthesiologists developed a simple three-point cessation strategy (A-A-R=Ask, Advise, Refer) that may be used in everyday practice.¹⁵ These are consistent with guidelines for Australian General Practice¹⁶ and recommendations of the Australian National Health Preventative Taskforce.¹⁷

A=Ask. Patients should always be asked about their smoking status. Asking, even when the answer is already known, is suggested as this reinforces the message to the patient that his or her doctor believes the tobacco use is a significant issue.

A=Advise. Most smokers are aware of the risks that are printed on the packet regarding future cardio-respiratory disease and cancer, yet data show that few have awareness of the specific perioperative risks that smoking poses them.^{4, 5} By understanding the benefits of quitting before surgery, the likelihood of behavioural change prior to surgery may be increased.⁴

R=Refer. An awareness of locally available smoking cessation support and referral of patients is likely to significantly improve quit rates. In randomised controlled trials of perioperative quit programs, more intensive interventions produced significantly greater abstinence.¹⁸ General practitioners, pharmacists, quit counsellors at local community health centres and telephone Quitlines may be appropriate referral points. Compared to the provision of self-help material alone, multi-session counselling delivered via telephone Quitlines increased smoking abstinence at 12 months by a significant 25-50 per cent.¹⁹ A Victorian study showed that multi-session Quitline counselling resulted in 24 per cent of participants being abstinent at three months.²⁰ Fax referral and online referral are options for Quitlines in Australia and New Zealand.

4.1 Cessation support can be achieved by pharmacological or non-pharmacological means, or a combination. Effective pharmacotherapy options include nicotine replacement therapy, nicotine partial agonists such as varenicline (Champix), bupropion (Zyban), nortryptiline and clonidine. Table 1 in the accompanying background paper identifies the side effects from this group.

Of the non-pharmacotherapy options, those that are effective include individual counselling, group counselling, and rapid smoking aversive therapy. See Table 2 in the accompanying background paper.

Nicotine is addictive, and tobacco additives such as basing agents increase the unionised nicotine content, or other additives that make inhalation of tobacco smoke more tolerable, increase addictiveness and make quitting more difficult.

Many of the harmful toxins and carcinogens present in tobacco smoke are in higher concentrations in side-stream smoke than main-stream smoke, posing a significant risk to "passive" smokers.

Cigarette smoke induces liver enzymes in the cytochrome P450 system, which performs such (Phase 1) reactions as drug oxidation/hydroxylation.²¹ Polycyclic aromatic hydrocarbons in smoke are principally involved in induction the isoenzymes CYP1A1, CYP1A2 and CYP2E1.²¹

Some anaesthetic drugs are also metabolised via these enzymes so this may explain some of the literature such as the increased requirements for vecuronium and rocuronium in smokers.²¹ Smokers also have higher opioid requirements after surgery and experience more postoperative pain, although pharmacokinetic explanations via enzyme induction are unlikely to account fully for this.²²

5. Conclusion

- 5.1 Quitting smoking for one day will lower carboxyhaemoglobin and nicotine levels and could be expected to improve tissue oxygen delivery.¹²
- 5.2 Quitting smoking for as little as three weeks has been shown to improve wound healing.²³
- 5.3 Quitting smoking for six to eight weeks results in sputum volumes that are not increased compared to non-smokers²⁴, and improved²⁵ pulmonary function.
- 5.4 Immune function is significantly recovered by 6 months after quitting smoking.²⁶

Practitioners are strongly encouraged to use every opportunity to address the subject of smoking with its inherent multiplicity of risks, encourage cessation of smoking preoperatively, and assist patients to quit.

This document is accompanied by a background paper (PG12(POM)BP) which provides more detailed information regarding the rationale and interpretation of the Guideline.

References

1. Australian Institute of Health and Welfare. Australia's health 2010. Australia's health series no. 12. Canberra: Australian Institute of Health and Welfare, 2010. Cat. No 122.
2. Ponniah S, New Zealand. Ministry of Health. Tobacco trends: Monitoring tobacco in New Zealand. Wellington: Ministry of Health, 2006. From: [http://www.moh.govt.nz/notebook/nbbooks.nsf/0/2CA43F6104C0C581CC25709300029F0C/\\$file/tobacco-trends-2006.pdf](http://www.moh.govt.nz/notebook/nbbooks.nsf/0/2CA43F6104C0C581CC25709300029F0C/$file/tobacco-trends-2006.pdf). Accessed 28 May 2013.
3. Khullar D, Maa J. The impact of smoking on surgical outcomes. *J Am Coll Surg* 2012 Sep;215(3):418-426.
4. Webb AR, Robertson N, Sparrow M. Smokers know little of their increased surgical risks and may quit on surgical advice. *ANZ J Surg* 2013 Feb.
5. Shi Y, Warner DO. Surgery as a teachable moment for smoking cessation. *Anesthesiology* 2010 Jan;112(1):102-107.
6. Begg S, Australian Institute of Health and Welfare, University of Queensland. School of Population Health. The burden of disease and injury in Australia 2003. Canberra: Australian Institute of Health and Welfare, 2007.
7. Vineis P, Alavanja M, Buffler P, Fontham E, Franceschi S, Gao YT, et al. Tobacco and cancer: Recent epidemiological evidence. *J Natl Cancer Inst* 2004 Jan;96(2):99-106.
8. Jha P, Ramasundarahettige C, Landsman V, Rostron B, Thun M, Anderson RN, et al. 21st-century hazards of smoking and benefits of cessation in the United States. *N Engl J Med* 2013 Jan;368(4):341-350.
9. Stead LF, Bergson G, Lancaster T. Physician advice for smoking cessation. *Cochrane Database Syst Rev* 2008 (2):CD000165.

10. Morton H. Tobacco smoking and pulmonary complications after operation. *Lancet* 1944;243(6290):368-370.
11. Myers K, Hajek P, Hinds C, McRobbie H. Stopping smoking shortly before surgery and postoperative complications: A systematic review and meta-analysis. *Arch Intern Med* 2011 Jun;171(11):983-989.
12. Warner DO. Perioperative abstinence from cigarettes: Physiologic and clinical consequences. *Anesthesiology* 2006 Feb;104(2):356-367.
13. Chow CK, Devereaux PJ. The optimal timing of smoking cessation before surgery: Comment on "Smoking cessation shortly before surgery and postoperative complications". *Arch Intern Med* 2011 Jun;171(11):989-990.
14. Simon JA. Smoking cessation interventions: A primer for physicians: Comment on "Use of varenicline for 4 weeks before quitting smoking". *Arch Intern Med* 2011 Apr;171(8):777-778.
15. Warner DO, Force ASoASCIT. Feasibility of tobacco interventions in anesthesiology practices: A pilot study. *Anesthesiology* 2009 Jun;110(6):1223-1228.
16. Zwar N, Richmond R, Borland R, Peters M, Litt J, Bell J, et al. Supporting smoking cessation: A guide for health professionals. Melbourne: Royal Australian College of General Practitioners, 2011.
17. Australia. National Preventative Health Taskforce. Tobacco Working Group, Australia. Dep of Health and Ageing. Australia: The healthiest country by 2020: Tobacco control in Australia: Making smoking history: Including addendum for October 2008 to June 2009. Technical report 2. Canberra: Australian Government Preventative Health Taskforce, 2009.
18. Thomsen T, Villebro N, Møller AM. Interventions for preoperative smoking cessation. *Cochrane Database Syst Rev* 2010 (7):CD002294.
19. Stead LF, Perera R, Lancaster T. Telephone counselling for smoking cessation. *Cochrane Database Syst Rev* 2006;3:CD002850.
20. Borland R, Segan CJ, Livingston PM, Owen N. The effectiveness of callback counselling for smoking cessation: A randomized trial. *Addiction* 2001 Jun;96(6):881-889.
21. Sweeney BP, Grayling M. Smoking and anaesthesia: The pharmacological implications. *Anaesthesia* 2009 Feb;64(2):179-186.
22. Shi Y, Weingarten TN, Mantilla CB, Hooten WM, Warner DO. Smoking and pain: Pathophysiology and clinical implications. *Anesthesiology* 2010 Oct;113(4):977-992.
23. Kuri M, Nakagawa M, Tanaka H, Hasuo S, Kishi Y. Determination of the duration of preoperative smoking cessation to improve wound healing after head and neck surgery. *Anesthesiology* 2005 May;102(5):892-896.
24. Yamashita S, Yamaguchi H, Sakaguchi M, Yamamoto S, Aoki K, Shiga Y, et al. Effect of smoking on intraoperative sputum and postoperative pulmonary complication in minor surgical patients. *Respir Med* 2004 Aug;98(8):760-766.
25. Buist AS, Sexton GJ, Nagy JM, Ross BB. The effect of smoking cessation and modification on lung function. *Am Rev Respir Dis* 1976 Jul;114(1):115-122.
26. Kotani N, Kushikata T, Hashimoto H, Sessler DI, Muraoka M, Matsuki A. Recovery of intraoperative microbicidal and inflammatory functions of alveolar immune cells after a tobacco smoke-free period. *Anesthesiology* 2001 Jun;94(6):999-1006.

Professional documents of the Australian and New Zealand College of Anaesthetists (ANZCA) are intended to apply wherever anaesthesia is administered and perioperative medicine practised within Australia and New Zealand. It is the responsibility of each practitioner to have express regard to the particular circumstances of each case, and the application of these ANZCA documents in each case. It is recognised that there may be exceptional situations (for example, some emergencies) in which the interests of patients override the requirement for compliance with some or all of these ANZCA documents. Each document is prepared in the context of the entire body of the college's professional documents, and should be interpreted in this way.

ANZCA professional documents are reviewed from time to time, and it is the responsibility of each practitioner to ensure that he or she has obtained the current version which is available from the college website (www.anzca.edu.au). The professional documents have been prepared having regard to the information available at the time of their preparation, and practitioners should therefore take into account any information that may have been published or has become available subsequently.

Whilst ANZCA endeavours to ensure that its professional documents are as current as possible at the time of their preparation, it takes no responsibility for matters arising from changed circumstances or information or material which may have become available subsequently.

Promulgated: 1986
Reviewed: 1991, 1996, 2001, 2007, 2013, 2014
Date of current document: September 2014

© Copyright 2020 – Australian and New Zealand College of Anaesthetists. All rights reserved.

This work is copyright. Apart from any use as permitted under the Copyright Act 1968, no part may be reproduced by any process without prior written permission from ANZCA. Requests and inquiries concerning reproduction and rights should be addressed to the Chief Executive Officer, Australian and New Zealand College of Anaesthetists, 630 St Kilda Road, Melbourne, Victoria 3004, Australia. Email: ceo@anzca.edu.au

ANZCA website: www.anzca.edu.au