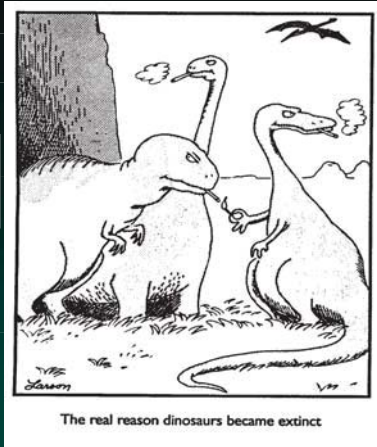


Perioperative Tobacco Use and Interventions: Beating Joe Camel

David O. Warner, M.D.



Cigarette Smoking Increases Perioperative Complications



- Cardiovascular Complications
- Respiratory Complications
- Wound-related Complications

Learning Objectives

- Describe the benefits of abstinence from cigarette smoking to surgical outcomes
- Debunk putative barriers to providing tobacco use interventions to surgical patients
- Effectively talk with your patients about their smoking

Cardiovascular Effects of Smoking

- Promotion of atherosclerosis
- Acute effects detrimental to the heart
 - ◆ Produces a hypercoagulable state
 - ◆ Causes catecholamine release
 - ◆ Reduces the capacity of the blood to carry oxygen
- Role of nicotine, CO, and other components of cigarette smoke



Why Intervene in the Surgical Patient?

Smoking Cessation Improves Surgical Outcomes

Surgery May Promote Smoking Cessation

The half-life of nicotine is approximately.....

- A. 15 min
- B. 1 hour
- C. 2 hours
- D. 4 hours

The half-life of nicotine is approximately.....

- A. 15 min
- B. 1 hour
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Effects of Smoking on Wound and Bone Healing

- Decreased tissue perfusion, leading to decreased tissue oxygenation
- Impairment of neutrophil function
- Possible effects on fibroblast and osteoblast function

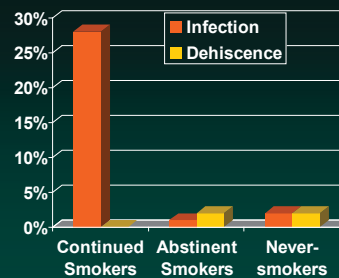


Short-term Cardiovascular Benefits of Smoking Cessation

- Nicotine
 - ♦ half life of ~1 hour
 - ♦ decreases in heart rate and systolic blood pressure within 12 hours
- Carbon monoxide
 - ♦ half life of ~4 hours
 - ♦ carboxyhemoglobin level near normal at 12 hours
- Net effect is an improvement in exercise capacity within 12 hours of cessation



Smoking Cessation Reduces Wound Infections



- 48 smokers, 30 never-smokers
- Standardized wounds
- Smokers randomized to continued smoking or abstinence

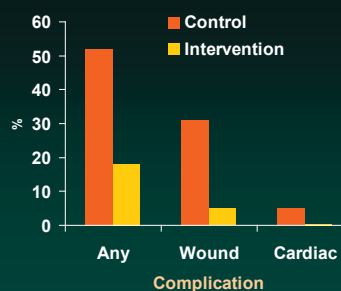
Sorensen et al, Ann Surg 238:1, 2003

Respiratory Effects of Smoking

- Primary risk factor for chronic obstructive pulmonary disease
- Decreased mucociliary transport
- Airway hyperreactivity
- Impaired pulmonary immune function



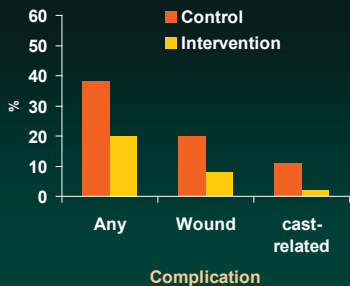
Smoking Cessation Reduces Postoperative Complications



- 120 Orthopedic patient randomized to tobacco intervention or control, 6-8 weeks prior to surgery
- ~80% of intervention patients were able to quit or reduce smoking

Moller, Lancet 359:114, 2002

Postoperative Abstinence Reduces Complications



- 105 patients post fracture surgery randomized to tobacco intervention (including follow-up) or control (advice only)
- 50% and 17% of intervention and control patients abstinent at 2 weeks

Näsell et al, J Bone Joint Surge 92:1335, 2010

Model 1: Adjusted OR (95% CI)* Model 2: Smoking-related Dx Adjusted OR*

	Model 1: Adjusted OR (95% CI)*	Model 2: Smoking-related Dx Adjusted OR*
Mortality (30 days)		
Current smoking	1.21 (1.14-1.28)	1.17 (1.10-1.24)
Past smoking	1.00 (0.94-1.06)	0.91 (0.85-0.97)
Arterial Events (MI or CVA)		
Current smoking	1.78 (1.63-1.93)	1.65 (1.51-1.81)
Past smoking	1.28 (1.17-1.40)	1.20 (1.09-1.31)
Respiratory Events (Pneumonia, unplanned intubation, MV > 48h)		
Current smoking	1.53 (1.47-1.58)	1.45 (1.40 - 1.51)
Past smoking	1.21 (1.17-1.27)	1.13 (1.08-1.18)

*Adjusted for age, sex, race, ASA, functional status, ETOH, DM, obesity, pregnancy.

*Adjusted for smoking-related morbidity (COPD, hypertension, etc) plus factors in Model 1

Smoking Cessation Reduces Postoperative Complications

- American College of Surgeons National Surgical Quality Improvement Program (NQISP) database
- 607,558 adult patients undergoing major surgery 2008-2009
 - 125,192 (20.6%) current smokers
 - 78,763 (13.%) past (>1 year quit) smokers
- Examined whether results could be explained by smoking-related comorbidities

Musallam et al, JAMA Surg, Online 148:755-62, 2013

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Effects on mortality seen with <10 pack-years exposure

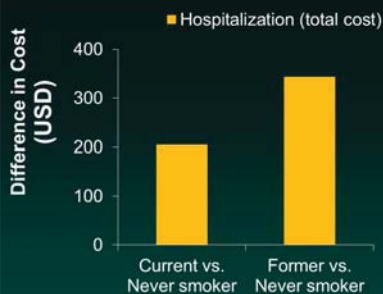
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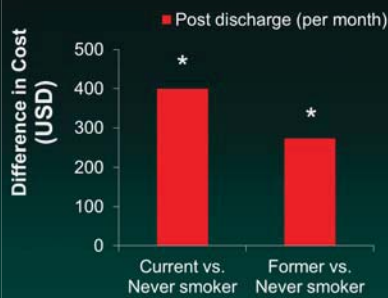
Surgical costs of smokers



- Costs measured in propensity-matched cohorts of Olmsted County residents undergoing surgery (n~700-900 per group)

- Median cost of hospitalization ~20,000 USD

Surgical costs of smokers

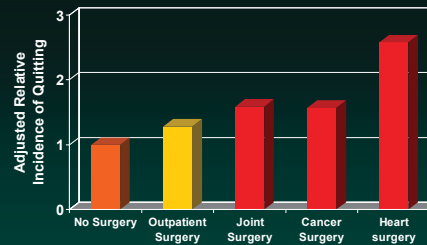


- Adjusted costs after discharge higher in both current and former smokers
- Associated with more ED visits, more hospitalizations, longer length-of-stay

Estimated to add ~\$17B to annual US healthcare costs

Warner et al. *JAMA Surg.* 2014; doi: 10.1001/jamasurg.2013.5009

Smoking Cessation After Surgery



- 5,498 US smokers > 50 yrs, longitudinal survey
- Approximately 1 in 12 quit events in older US smokers associated with these surgical procedures

8-10 million smokers undergo surgery annually in the US

Shi and Warner, *Anesthesiology* 112:102, 2010

Why Intervene in the Surgical Patient?



Which of the following is true?

- Nicotine replacement therapy is dangerous
- Quitting just before surgery increases pulmonary complications
- Quitting will increase psychological stress
- Patients don't want to hear about their smoking – they have enough to worry about
- None of the above

Surgery Promotes Smoking Abstinence

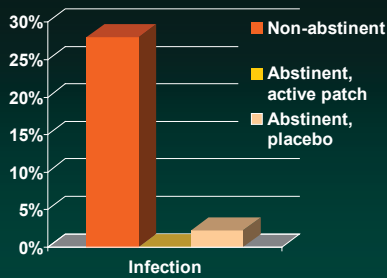
- Opportunity to intervene
 - ◆ contact with healthcare system
 - ◆ forced abstinence if in smoke-free hospitals
- Major medical interventions improve quit rates
 - ◆ Occurs even in the absence of tobacco interventions
 - ◆ May also improve the effectiveness of tobacco interventions



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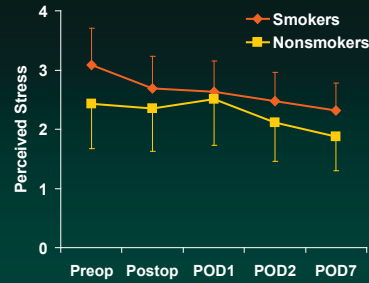
Nicotine Replacement Therapy and Wound Healing



- 48 smokers randomized to continuous smoking or abstinence, with or without nicotine replacement
- Standardized wounds over a 12 week period

Sorensen et al, Ann Surg 238:1, 2003

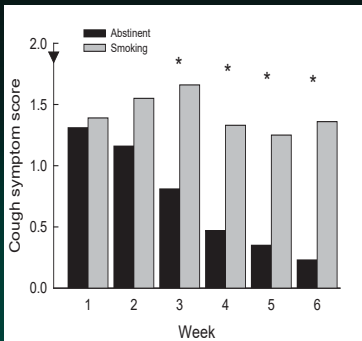
Stress and Nicotine Withdrawal in Smokers After Surgery



- Subjects recruited from Preoperative Evaluation Center, both cigarette smokers (N=141) and non-smokers (N=150)
- Perceived Stress Score measured up to 1 week postoperatively

Warner et al, Anesthesiology 100:1125, 2004

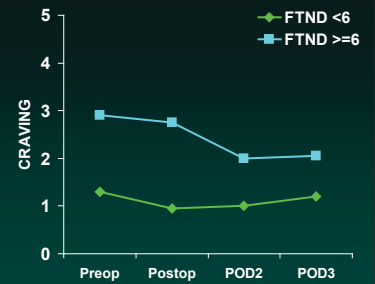
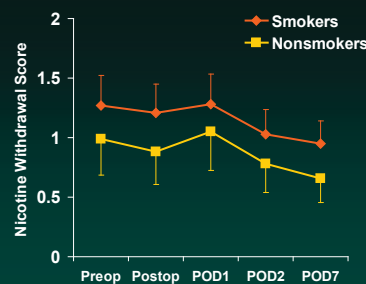
Cough following smoking cessation



- 112 completed at least one assessment; 45 abstinent > 1 week
- Upper 95% CI was < 10% for agreement with any item that changes in cough posed barrier to abstinence

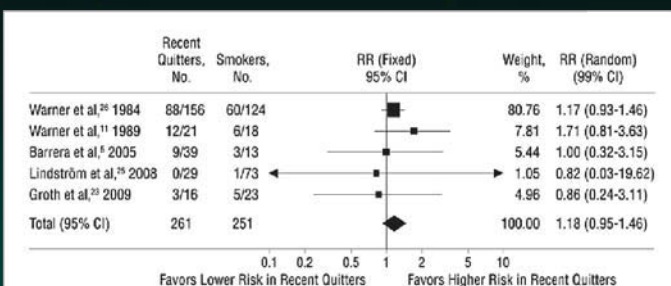
Warner et al, Nic Tob Res. 9: 11, 2007

Nicotine withdrawal and craving in abstinent smokers



Warner et al, Anesthesiology 100:1125, 2004

Meta-analysis of pulmonary complications in recent quitters



Myers et al, Arch Int Med 2011

Smokers expect us to talk about how their smoking affects surgery

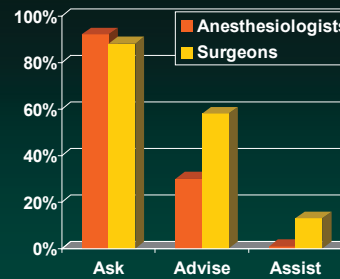
- Essentially all smokers are aware of general health hazards
 - ♦ Most are not aware of how it might affect their surgery – and want to know!
- They want information and options
- Almost all will not be offended if you discuss their smoking...
- But they do not want a sermon
- “Temporary” abstinence attractive to many

Warner et al, Am J Prev Med 2008

Barriers to Perioperative Smoking Cessation

- Nicotine replacement therapy is dangerous
- Quitting just before surgery increases pulmonary complications
- Quitting will increase stress
- Patients don't want to hear about their smoking – they have enough to worry about

Currently providers do not consistently help surgical patients quit...



- Survey responses from 329 anesthesiologists and 299 general surgeons
- Proportions that “always” performed intervention
- Actual patient perceptions may differ (e.g., ~30% of patients recall being advised)

What proportion of anesthesiologists and CRNAs report almost always advising their patient to quit smoking?

- A. 10%
- B. 30%
- C. 50%
- D. 80%

We can make a difference...



- 2606 smokers undergoing vascular proc. at 10 centers
- Quit rates at 1 year, adjusted for patient factors and proc.
- Rates higher with more invasive procedures
- Rates higher for surgeons who offered help (48% vs. 33%)

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The Real Barriers to Intervention

“I don’t know how”

“I don’t have time”

“It’s not my job”

What should we do for smokers who need surgery?

- **ASK** - assess tobacco use at every visit
- **ADVISE** - strongly urge all tobacco users to quit
- **REFER** – To a tobacco quitline or other resources

ADVISE all smoker to quit

- Why quit for surgery? – Talking points...
 - ♦ Quit for as long as possible before and after surgery
 - Day of surgery especially important – “fast” from both food and cigarettes
 - ♦ Benefits of quitting to wound healing, heart and lungs
 - ♦ Great opportunity to quit for good
 - Many people don’t have cravings
 - Need to be smoke free in the hospital anyway

What are “Quitlines”?

- Free via telephone to all Americans
- Staffed by trained counselors
- Up to 4-6 personalized sessions
- Some offer free nicotine replacement therapy
- Up to 30% success rates for patients who complete sessions

Most providers, and most patients, know nothing about quitlines....

REFER smokers to quitlines or other resources

- What are quitlines? – talking points
 - ♦ Quitlines are free
 - ♦ Talk with a specialist, not a recording
 - ♦ Free stop smoking medications may be available
 - ♦ Can call anytime, even after surgery
 - ♦ Can help you stay off cigarettes even if you have already quit
- Can also use proactive fax referral
- 1-800-QUITNOW

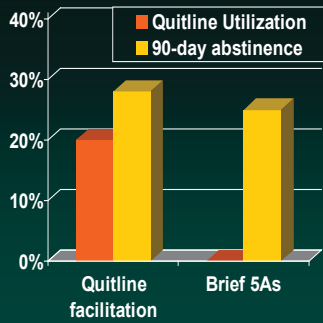
ASK every patient about tobacco use

- Ask even if you already know the answer
 - ♦ Reinforces message that you as a provider think that their tobacco use is significant

“Quitcard”



Increasing quitline utilization by surgical patients



- 300 smokers in preop clinic randomized to quitline facilitation or brief 5As (~3min)
- Included patients not motivated to quit
- 38% of quitline users abstinent at 90 days (vs. 24% of non-users, P=0.16)

Warner et al, Anesthesiology 114:846, 2011

Is a Child having Surgery also a "Teachable Moment"?

- Analysis of survey data from 2005 National Health Interview Survey
- Survey included one parent and one child selected from each household (n=9,289)
- Data included smoking behavior of the parent parent, including SHS practices, and surgery on the child within the prior 12 months
 - ♦ 1,977 (22%) of children lived with a parent who smoked

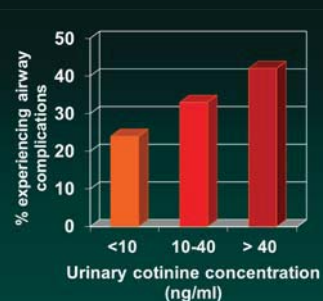
How about children?

- Secondhand smoke (SHS) kills >50,000 Americans annually
- About 20% of children in the US live in a household with a smoker
 - ♦ 53% of children aged 3-11 exposed in 2007-8
- Increases risks for allergies, asthma, ear infections, SIDS, and other conditions
 - ♦ e.g., estimated to cause ~300,000 cases of bronchitis/pneumonia annually in children < 18 months
- Also increases perioperative risk

	OR (95% CI)	P	Adjusted* OR	P
Quit attempts in past 12 months				
Child surgery	2.18 (1.42, 3.37)	<0.001	2.58 (1.54, 4.32)	<0.001
Parent surgery	2.16 (1.59, 2.93)	<0.001	2.17 (1.54, 3.06)	<0.001
Successful quit in past 12 months				
Child surgery	0.80 (0.31, 2.09)	0.651	0.49 (0.19, 1.24)	0.133
Parent surgery	2.22 (1.40, 3.53)	<0.001	2.31 (1.34, 4.00)	0.003
Intent to quit (current smokers)				
Child surgery	1.40 (0.83, 2.34)	0.204	1.86 (1.00, 3.46)	0.050
Parent surgery	1.51 (1.01, 2.27)	0.047	1.62 (1.02, 2.58)	0.041

*Child surgery and parent surgery are included in the same model, adjusted for sex of parent respondent, parent race, parent age, child age, family income, parent education, asthma history of child, and ear infection history of child.

Secondhand Smoke and Perioperative Respiratory Complications in Children



- 499 children (1 m/o to 12 y/o), halothane induction
- Complications included coughing, desaturation, laryngospasm, breath holding
- Risk highest for females with less-educated mothers

Skolnick et al, Anesthesiology 88:1144, 1998

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Patient education materials to reduce perioperative secondhand smoke exposure (MC6823)

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You have a lot to think about as you get ready for your child's surgery or medical test. One thing you can do to protect your child is to lower his or her exposure to secondhand smoke. If you can do this, you are making a healthy environment for your child that will help with healthy healing.

Theme – protect the child
Focus not on the parent, but the smoke....

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Important to know

- Secondhand smoke is the smoke from the burning end of the cigarette and the smoke you breathe out. Secondhand smoke sticks around after the cigarette is smoked, and it coats every surface inside the home - the curtains, furniture, and walls.
- Secondhand smoke increases your child's risk for breathing problems during the procedure and may increase the chances of serious problems like wound infections after the procedure.
- If you can lower your child's exposure to secondhand smoke for at least one week before the procedure and one week after, you may help your child avoid problems.

SHS: What is it? Risks?
Theme – protect the child

What you can do

- The best thing you can do is to plan for everyone who lives at home not to smoke **at all**, for at least one week before and one week after the procedure.
- If this is not possible, ask people not to smoke inside the house or car.
- If people must smoke inside, ask them to go into a different room with a closed door and an open window or an air filter. This doesn't work as well as just not smoking.

What you can do

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When you are ready to quit
 If you want to quit smoking, you can get help. Call the Mayo Clinic Nicotine Dependence Center at 507-266-1930 or 800-344-5984. Other resources include the free national Tobacco Quitline (1-800-QUITNOW) and the website www.BecomeAnEx.org.

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Mitigation procedures – try for abstinence

What About Joe?



By Signe Wilkinson, Philadelphia Daily News, Cartoonists & Writers Syndicate

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Referral to assistance

\$8.37 B spent by Big Tobacco in 2011 to target Helena, vs....

\$641 M spent by government (from \$244 B total tobacco revenue) in 2011 to protect her....



warner.david@mayo.edu



Bottom Line...

- There are short- and long-term benefits to perioperative abstinence
- Perceived barriers among patients and providers may need to be addressed
- Use the ASA website as a resource

<http://www.asahq.org/stopsmoking> Join the listserv!

