

# Computerized assessment of surgical patients for tobacco use: accuracy and acceptability

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## ABSTRACT

**Background** Despite increased risks of postoperative complications among patients who use tobacco, a number of barriers hinder the systematic identification of surgical patients who smoke. The study investigated the accuracy and acceptability of a patient-completed touchscreen computer program, which assessed patient smoking status during attendance at a surgical pre-operative clinic.

**Methods** One thousand and four patients participated in the study and completed a touchscreen computer smoking assessment program.

**Results** The sensitivity and specificity measures of the computerized assessment were 93% and 95% respectively. Patients, and clinic receptionists, nurses and anaesthetists found the touchscreen computer-based assessment acceptable.

**Conclusions** The findings suggest that computerized assessment of smoking status is an accurate and acceptable way to identify tobacco users in a pre-operative clinic setting.

**Keywords** screening, smoking, surgery, validity

## Introduction

Health services have an obligation to implement strategies to address tobacco use and alleviate the health burden of smoking. A variety of initiatives have been proposed to encourage clinicians to provide routine smoking cessation care to their patients.<sup>1</sup> While the essential first step in providing cessation care to patients is to identify tobacco users, research suggests that clinical staff fail to systematically identify smokers due to a lack of time, knowledge, training and organizational support.<sup>2,3</sup> Furthermore the demand characteristics of patient–clinician interaction and a desire to appear to conform to socially desirable behaviours cause some smokers to inaccurately report their smoking status to clinical staff.<sup>4</sup>

Previous research has indicated that touchscreen computer programs may overcome some of these barriers and provide an appropriate means to screen patient for tobacco use.<sup>5</sup> Given the number of patients undergoing anaesthesia each year, and the increased risk of surgical complications among tobacco users,<sup>6</sup> identification and treatment of a tobacco user prior to surgery can have both public health

and clinical benefits. The aim of this study is to investigate the validity and acceptability of a touchscreen smoking assessment program in a hospital pre-operative clinic.

## Methods

### Setting and sample

The study took place in a large public hospital pre-admission clinic in New South Wales, Australia.

### Patients

The study was conducted as part of a larger smoking cessation intervention trial for non-pregnant surgical patients.<sup>5</sup>

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Elective surgery patients attending a pre-operative clinic over a nine-month period in 2003 were eligible to participate in the study if they were over the age of 18, were not pregnant, could read English and were not too ill to participate.

### Clinic staff

All reception, nursing and anaesthetic staff who had worked at the pre-admission clinic in a four-week period during the study were invited to participate.

### Procedure

#### Patients

On arrival at the clinic, reception staff directed patients to a touchscreen computer program. A research assistant assessed study eligibility and sought consent to participate. To assess smoking status, the touchscreen program required participants to answer a question asking if they smoked tobacco products 'daily', 'at least once a week', 'less than once week' or 'not at all'.<sup>7</sup> In addition, participants were also asked to respond to items (yes/no) assessing the acceptability and ease of use of the program. Following program completion, patients were requested to provide an expired air carbon monoxide (CO) sample by the research assistant.

### Clinic staff

Clinic staff was asked to complete confidential acceptability questionnaires that were distributed during a staff meeting. Each questionnaire consisted of a statement regarding the acceptability of the computerized smoking assessment. Respondents were required to indicate on a four-point likert scale ranging from strongly agree to strongly disagree with each statement.

### Analyses

All data analyses were performed using SAS, version 8.2 statistical software. The sensitivity and specificity of self-report against CO were calculated with 95% confidence intervals, using CO at a cut-off level of 10 ppm as the criterion measure.

## Results

### Patients

A total of 1425 patients were seen in the clinic over the recruitment period; 345 of these were ineligible and 1004 (93%) agreed to take part in the study. The mean age of participants was 58 years (SD = 16.8), 63% were female, 19% lived alone and 21% had tertiary qualifications.

### Clinic staff

Acceptability questionnaires were distributed to all 20 eligible reception staff, five eligible clinic nurses and 12 eligible anaesthetists. Questionnaires were returned by all nursing staff, 10 anaesthetists and 16 receptionists. All nursing and reception staff were females as were two anaesthetists. The average age of participants across the three groups ranged from 39 years (reception staff) to 43 years (nursing staff).

### Accuracy of computerized touchscreen program

One hundred and sixty-nine (16.8%) participating patients reported that they were current smokers. The computerized smoking assessment sensitivity and specificity measures were 92.7% (CI 88.3–97.0%) and 95.2% (CI 93.7–96.6%) respectively (Table 1).

### Patient acceptability

Ninety-six percent of smokers and 98% of non-smokers indicated that the touchscreen program was acceptable to use when they came to the pre-surgical clinic, and 95% of smokers and 98% of non-smokers indicated that the computer was easy to use.

### Staff acceptability

Assessments of staff acceptability can be seen in Table 2.

## Discussion

### Main finding of this study

The findings of the study indicate that a touchscreen computer program is an accurate and acceptable means to screen pre-operative patients for tobacco use. The sensitivity and specificity measures of the computerized smoking assessment are similar to other validation research of

**Table 1** Sensitivity and specificity of computer assessment of smoking status

Sensitivity (95% CI)	Specificity (95% CI)	A	B	C	D
92.7 (88.3, 97.0)	95.2 (93.7, 96.6)	127	42	10	825

*A* represents the number of participants who self-reported as smokers and the corresponding cut-point of CO levels agreed.

*B* represents the number of participants who self-reported as smokers and the corresponding cut-point of CO levels did not agree.

*C* represents the number of participants who self-reported as non-smoker and the corresponding cut-point of CO levels did not agree.

*D* represents the number of participants who self-reported as non-smokers and the corresponding cut-point of CO levels agreed.

**Table 2** Clinic staff acceptability of the computerized smoking status assessment

Statement	Agree or strongly agree		
	Receptionists	Nurses	Anaesthetists
Smoking cessation is important for surgical patients	16/16	5/5	9/10
The computerized smoking assessment program did not interfere with usual clinical routines	16/16	3/5	9/10
The smoking assessment program would be appropriate for other pre-operative clinics	13/16	5/5	10/10
The touchscreen computer program is an appropriate way to assess patient smoking status	N/A	5/5	9/10

touchscreen programs.<sup>8</sup> Furthermore, the accuracy of the computerized smoking assessment found in this study is superior to reports of smoking status to hospital admission staff<sup>9</sup> and represents a more systematic method of detecting smokers than clinician assessment.<sup>10</sup>

Overall, the touchscreen program was found to be a highly acceptable method of assessing a patient's smoking status by patients and staff. However, two of the five clinic nurses indicated that the program interfered with clinical routines. Anecdotal reports by nursing staff indicated that on some occasions, waiting for patients to complete the program was disruptive to care delivery. Removal of items on the program used for research purposes (such as acceptability items and patient demographic information) would reduce the time taken for patients to complete the program and may enhance nursing staff acceptability.

### What is already known on this topic

Clinical staff fail to routinely assess the smoking status of their patients.<sup>2,3</sup> Computers have been found to be an accurate means to assess tobacco use by patients and have been proposed as one potential means to resolve commonly cited barriers, such as a lack of staff time and skill, to the assessment and provision of smoking cessation care to patients.<sup>5</sup>

### What this study adds

The results of this study indicate that computerized smoking assessment is feasible, acceptable and may be an effective method of identifying tobacco users to clinical staff for the provision of cessation intervention. The findings are

therefore encouraging for hospitals interested in reducing the risk of surgical complications and promoting public health. Patients who smoke can be identified and treated during pre-operative consultations. The touchscreen computerized program may similarly be an accurate and acceptable method of identifying tobacco users in other outpatient primary health care settings.

### Limitations of this study

The study could have been improved with the use of blood cotinine as the gold standard measure of tobacco use.<sup>4</sup> However, CO is frequently used as a gold standard in assessments of accuracy of reported smoking status and has been noted as an acceptable, feasible and less invasive measure of tobacco use than cotinine.<sup>4</sup>

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