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# **Cancer care clinicians' provision of smoking cessation support: a mixed methods study in**

**New South Wales, Australia**

## ***Authors***

**Michelle DiGiacomo**<sup>a</sup> (Corresponding Author)

Improving Palliative, Aged and Chronic Care through Clinical Research and Translation (IMPACCT)

Faculty of Health

University of Technology Sydney (UTS)

PO Box 123 Broadway NSW 2007 Australia

Email: michelle.digiacomo@uts.edu.au

**Paula Simoes dos Santos**<sup>b</sup>

Institute for Public Policy and Governance (IPPG)

University of Technology Sydney (UTS)

PO Box 123 Broadway NSW 2007 Australia

Email: Paula.Simoes@uts.edu.au

**Erin Furestad**<sup>c</sup>

Cancer Institute New South Wales

Level 4, 1 Reserve Road, St Leonards NSW 2065

PO Box 41, Alexandria NSW 1435 Australia

Email: Erin.Furestad@health.nsw.gov.au

**Gemma Hearnshaw**<sup>c</sup>

Cancer Institute New South Wales

Level 4, 1 Reserve Road, St Leonards NSW 2065

PO Box 41, Alexandria NSW 1435 Australia

Email: Gemma.Hearnshaw@health.nsw.gov.au

**Shirlee Nichols**<sup>c</sup>

Cancer Institute New South Wales

Level 4, 1 Reserve Road, St Leonards NSW 2065

PO Box 41, Alexandria NSW 1435 Australia

Email: Shirlee.Nichols@health.nsw.gov.au

**Sungwon Chang**<sup>a</sup>

Improving Palliative, Aged and Chronic Care through Clinical Research and Translation (IMPACCT)

Faculty of Health

University of Technology Sydney (UTS)

PO Box 123 Broadway NSW 2007 Australia  
Email: Sungwon.chang@uts.edu.au

**Nicola Scott <sup>c</sup>**

Cancer Institute New South Wales  
Level 4, 1 Reserve Road, St Leonards NSW 2065  
PO Box 41, Alexandria NSW 1435 Australia  
Email: Nicola.Scott1@health.nsw.gov.au

**Author Affiliations**

<sup>a</sup> Improving Palliative, Aged and Chronic Care through Clinical Research and Translation (IMPACCT), Faculty of Health, University of Technology Sydney (UTS), PO Box 123 Broadway NSW 2007 Australia

<sup>b</sup> Institute for Public Policy and Governance (IPPG), University of Technology Sydney (UTS), PO Box 123 Broadway NSW 2007 Australia

<sup>c</sup> Cancer Institute New South Wales, Level 4, 1 Reserve Road, St Leonards NSW 2065  
PO Box 41, Alexandria NSW 1435 Australia

**Declaration of interest**

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EF, GH, SN, NS work for the Cancer Institute New South Wales and contributed to study design, interpretation of data, and manuscript revision. The other co-authors (MD, PS, SC) have no conflicts of interest to declare.

I confirm all personal identifiers have been removed or disguised so the persons described are not identifiable and cannot be identified through the details of the story.

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*Ethics approval*

The study was approved by the Human Research Ethics Committees of South Eastern Sydney Local Health District (18/290) and the University of Technology Sydney (ETH19-3500).

#### *Data Sharing and Data Accessibility*

Research data are not shared.

### **Abstract**

#### **Objectives**

Given the importance of supporting cancer patients to quit smoking, we sought to ascertain cancer care clinicians' beliefs and practices regarding providing smoking cessation brief interventions.

#### **Methods**

We used a cross-sectional sequential explanatory mixed method design including a survey of multidisciplinary cancer care clinicians and semi-structured interviews.

#### **Results**

One hundred and sixty-five cancer care clinicians completed the survey and 21 participated in interviews. Over half of survey respondents (53%) said they do not regularly undertake smoking cessation brief interventions and 40% rarely or never advise quitting. Non-metropolitan clinicians were more likely to discuss medication options and refer to the Quitline. Physicians were more likely to do brief interventions with patients and radiation therapists were least likely. Barriers were lack of training and experience, lack of knowledge of the Quitline referral process, lack of role clarity, lack of resources and systems, and perceived psychological ramifications of cancer for patients.

#### **Conclusion**

There is a need to upskill cancer clinicians and improve systems to provide smoking cessation brief interventions as part of routine clinical practice. All cancer care clinicians should complete brief intervention smoking cessation training relevant to the cancer context, including making referrals to Quitline, and supported by systems to record and follow-up care.

Keywords: counseling, delivery of health care, health services, neoplasms, smoking cessation

## 1. Introduction

Smoking is a major public health issue that is implicated in many chronic diseases, including cancer. In Australia, approximately 14% of the population smokes daily [1] and smoking accounts for 22% of the cancer disease burden [2]. Of people with cancer, 14% smoke at the time of receiving their diagnosis [3], and some individuals continue to smoke thereafter.

Consequences of continued smoking following a cancer diagnosis include increased risk of developing secondary primary cancers and metastases, decreased efficacy of treatment, greater occurrence of treatment complications, poorer quality of life and shorter survival [4]. Conversely, quitting smoking following a cancer diagnosis is associated with more positive treatment and survival outcomes. The 8-year survival rate following cancer diagnosis in Australia for people who quit smoking is 43% and 37% for those who continue to smoke [5].

Health care providers can play important roles in assisting patients to make quit attempts. Many patients have frequent contact with cancer clinicians during treatment. These interactions are opportunities to facilitate behaviour change when motivation is high [6]. Whether and how clinicians seize this opportunity to discuss smoking cessation with patients may influence the number and outcomes of quit attempts.

Despite endorsement by several peak national bodies advocating the inclusion of smoking cessation brief interventions in standard cancer care services [7-9], few staff in these settings provide smoking cessation support by discussing methods to enhance its efficacy [10]. For the purpose of this research, a brief intervention is defined as an evidence-based practice designed to identify people who smoke and motivate them to change their

behaviour. This involves asking patients if they use tobacco, explaining the benefits of quitting smoking and the potential harms of continuing after cancer diagnosis, and offering assistance or referring patients to a quit support service such as Quitline, a telephone smoking cessation support service in Australia. Research indicates clinicians' perceived barriers to implementing brief interventions involve lack of role clarity and low self-efficacy in helping patients to change this behaviour [11].

Previous research used survey data and focused on single discipline perspectives of clinicians' intervention engagement, limiting our understanding of what informs clinicians' beliefs across the cancer care sector and how best to address any perceived deficits in knowledge or skill. To address this gap, we aimed to ascertain information about cancer care clinicians' beliefs and behaviours regarding delivering smoking cessation interventions to patients, whether geographic or discipline factors are associated with these, and perceptions of barriers to making brief interventions part of routine clinical practice.

## **2. Methods**

We used a cross-sectional sequential explanatory mixed method design to ascertain cancer care clinicians' beliefs and practices regarding providing smoking cessation brief interventions [12]. First, an online survey of cancer care clinicians was conducted to gather data about their professional characteristics, attitudes and behaviours related to providing smoking cessation interventions. The results of the quantitative survey were used to inform the interview guide for the qualitative component which was informed by Grounded Theory. In interviews, we sought to better understand clinicians' attitudes, behaviours, and perceived barriers to design and implement an intervention to improve practice of smoking

cessation in cancer services. At the end of the survey, respondents ticked a box indicating willingness to participate in a semi-structured interview regarding their experiences and beliefs about doing smoking cessation brief interventions with patients in cancer services.

We used a non-probability, convenience sampling strategy to recruit participants. Clinicians working within cancer services who interact directly with patients as part of their cancer care in New South Wales, Australia, were eligible to participate in this study. These included medical oncologists, radiation oncologists, haematologists, radiation therapists, cancer nurses, and allied health practitioners. Staff in non-clinical roles who do not have patient contact were excluded from participation.

An email invitation was sent to eligible participants via cancer service managers in each of the 15 local health districts and one specialty health network. The email contained a link to the voluntary online survey. One follow-up email was sent encouraging staff participation. Participants were asked to complete a 40-item questionnaire that was a modified version of Warren et al.'s [11] and Day et al.'s [13] surveys exploring clinicians' smoking cessation practices and beliefs. Data were collected between February and March 2019. Demographic items included professional role, the geographic area of practice and type of practice setting. Clinicians were asked about their current practices and attitudes regarding delivering smoking cessation brief interventions, barriers to providing these, and about their training needs and preferences. Items that assessed frequency of action or degree of agreement used a Likert scale response format (never, rarely, some of the time, most of the time, always, don't know/not applicable and strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree, strongly disagree, respectively). These response options



were collapsed into two response options for the purpose of analysis (never/rarely VS some of the time/most of the time/always and neither agree or disagree/somewhat disagree/strongly disagree VS somewhat agree/strongly agree). Three open-ended questions allowed respondents to provide additional information not reflected in the options available. The survey was pilot-tested with six clinicians that were not involved in the study to ensure relevance and coherence prior to dissemination. Respondents were offered entry into a draw for one of five gift vouchers as a participation incentive. The online survey took approximately ten minutes to complete. Descriptive analysis was conducted using SPSS (version 25). Fisher's exact tests or Pearson's chi-square tests and Monte Carlo testing[14] for associations were carried out between practices and beliefs and two demographic variables (geographic setting i.e. metropolitan vs regional/remote) and health professional type (medical/nurse/allied health/radiation therapist). Monte Carlo testing was used when more than 20% of cells with a less than expected 5-count was not satisfied. All Monte Carlo tests were performed using 100,000 samples, random starting seed. Results from each Monte Carlo test are reported using the simulated exact p value, and the 99% confidence interval. Although radiation therapists are classified as allied health professionals, we separated them for the purpose of analysis because their role in cancer services is primarily involved in diagnosis and treatment and is different from other allied health professionals such as psychologists who may provide supportive care. Items depicting practices and beliefs were deemed significant if  $p < 0.05$ .

Semi-structured telephone interviews took place between May and June 2019. Interview questions sought to ascertain a more nuanced understanding of clinicians' attitudes towards providing brief interventions, what beliefs and experiences informed these attitudes, and to

elicit contextualised examples of enablers and barriers to making brief interventions part of routine clinical practice. Interviews were conducted by two researchers with social science backgrounds who had no previous relationship with participants. All participants provided informed consent to thirty-minute interviews that were audio recorded with their permission. Recordings were transcribed and de-identified prior to analysis in NVivo (version 11). Inductive qualitative content analysis [15] began with multiple readings and open coding by two separate analysts. They then met to discuss and finalise a coding framework to use with the remainder of transcripts. Categories were then developed and grouped to depict major topics evident in the raw data. Following this step, abstraction involved formulating general descriptions of the categories. that reflected the overarching topics. Headings in the results section depict these groupings of clinicians' experiences and beliefs that help to shed light on survey results and provide insight into barriers to smoking cessation brief intervention delivery.

The study was approved by the Human Research Ethics Committees of the XXX health district and University XXX.

### **3. Results**

Although 205 surveys were completed, forty respondents were removed from the analysis because they were not in clinical roles and/or did not work in cancer services. As a result, data from 165 cancer care clinicians in New South Wales, Australia, were included in the analysis. Table 1 lists characteristics of the survey respondents who were mainly allied health professionals (45%), half of whom were radiation therapists. Nurses and physicians comprised 36% and 15% of respondents, respectively. Respondents represented 14 of the

15 local health districts and one specialty network in New South Wales. This included 58 respondents (35%) from rural/regional and 107 respondents (65%) from metropolitan services. Half of the sample (50%) reported working in more than one care setting and for nearly all (98%), one of these settings was outpatient cancer services. The twenty-one clinicians who participated in semi-structured telephone interviews were nurses (9), allied health professionals (5), radiation therapists (3), and medical doctors (4).

Table 2 contains frequencies of clinicians' responses about behaviours and attitudes to smoking cessation brief interventions. These will be described below with qualitative data that offer further insight into perceptions and experiences of clinicians.

### **Perception of universal responsibility, yet lack of role clarity**

As a whole (Table 1), more than half of respondents (53%) reported not regularly providing or never having considered providing smoking cessation brief interventions to patients with either a tobacco or non-tobacco-related-cancer. This is despite clinicians' beliefs that smoking impacts cancer treatment outcomes (85%) and brief interventions should be a standard part of routine care (82%) which is part of all clinicians' roles (77%). Despite this majority perception of universal responsibility, lack of role clarity was described.

*Is it my business to really do it as an oncologist professional? Or is it just the doctor's business? Or is just the nurse's business? ... it's kind of another thing that we all acknowledge the value of, but the question is, who's actioning it? (Medical)*

In contrast, another clinician suggested smoking cessation brief interventions should be enacted by all clinicians. Presenting a repeated, consistent message across clinicians was perceived as an important approach.

*I think it should not just rest on one person, I think that everybody – everybody’s job because if the person hears it from the oncologist and then the allied health and then the nurse, everybody together is helping the patient (Medical)*

While the majority of clinicians said they always or sometimes ask if patients smoke/use tobacco (70%), plan to quit (62%) or advise patients to quit (60%), the remainder appeared to avoid this topic with patients. The following excerpt posits a reason for such avoidance:

*If they don’t ask the question, they don’t have to address it. (Medical)*

### **Psychological sequela of cancer inhibits clinicians’ smoking cessation discussions**

Clinicians referred to the psychological and physical ramifications of cancer and treatment, potential patient self-attribution of cancer to smoking, feelings of shame and guilt, and the role that smoking has in patients’ lives. Clinicians commented on the need to speak sensitively when broaching issues related to smoking so as not to compound the psychological impact of cancer.

*I think the negative could be that (patients) can blame themselves that they have developed a particular cancer because they’ve smoked so I think from the psychological perspective, making sure that it’s addressed in a thoughtful manner and, again, not a blaming manner. (Medical)*

It was perceived that the confluence of stressors upon cancer diagnosis and treatment can challenge coping, as some patients smoke as a coping mechanism. The threat to this activity was seen to challenge psychological outcomes and the willingness to make a cessation attempt. Using smoking to manage stress and anxiety is an example of why some clinicians perceived patients as uninterested in quitting (31%) or were resistant to smoking cessation interventions (25%). This offers explanation of clinicians' beliefs that quitting smoking might have a negative impact on a patient's ability to manage their treatment (41%).

Clinicians were adamant that an appropriate type and intensity of support be provided for patients given the dual stressor of living with cancer and quitting smoking.

*The other thing is obviously cancer itself can have quite a strong effect on some patients, like psychologically, and that combined with trying to stop smoking can make things really hard because smoking cessation can trigger depression or increase symptoms of depression in some people and that's a big thing in people diagnosed with cancer as well. So, having support for them right – if they're going to be participating in a smoking cessation program, it's really important. (Allied Health)*

### **Smoking cessation as an early and ongoing discussion**

Cancer was seen to potentially inhibit clinicians from engaging in brief interventions, but was also described as a potentially motivating time that should be leveraged.

*I do believe in this thing called the teachable moment whereby if someone gets cancer they will do anything to try and reduce their risk of the cancer coming back and that the teachable moment only basically lasts about a year and after that the cancer and the scariness of the cancer coming back has gone and the chance of them*

*to cease smoking will lessen and therefore we need to have interventions at the time, where possible, of acute care, to encourage people to not smoke. (Medical)*

Despite a perceived timely opportunity to leverage motivation for behaviour change, clinicians appreciated the potential for information overload upon diagnosis and that patients may not prioritise quitting smoking. Approaching the smoking cessation subject at several points over the cancer care continuum was advised.

*They get the cancer diagnosis and then they get, you know, you should stop smoking, you should stop doing this, you need to do that, and people lose some autonomy and feel like they've lost a whole heap of sense of self, you know, like they're just in this machine, so I go a bit soft at that time ... it should be talked about at the first consult and maybe more times as you go along just touch base again in case there's been a change of mind along the way. (Nurse)*

### **Perceived lack of smoking cessation training and confidence**

The majority of respondents (76%) reported not having had sufficient training or experience providing smoking cessation brief interventions, and felt a lack of confidence in being able to help people quit (54%). Once smoking status was identified, 42% of clinicians reported sometimes or always discussing medication options to support a quit attempt. Reasons for this minority include clinicians' self-reported lack of understanding of the appropriate use and dosing of nicotine replacement therapy (NRT) and not know enough about potential interactions between cessation pharmacotherapies and cancer treatments or supportive drugs (73%). Patients, too, were perceived as potentially lacking knowledge of appropriate use of NRT and therefore, not achieving its therapeutic benefit.

*I think it's underdosing, especially when they're going on to the patches as well, you know, they think, if they go and buy them, they think if they slap one on, they should be able to stop there and then and I think they just need better education on that, that it's not one patch that fits everybody, it's more, intricate than that and it should be properly assessed as to which is the best form. (Nurse)*

A perceived shortfall in expertise to support smoking cessation could be addressed with upskilling of cancer care clinicians and better availability of referral options.

*I think there's definitely a role for upskilling, or building the educational piece around [smoking cessation] for the oncology workforce. (Medical)*

Yet, the feasibility of incorporating routine smoking cessation into cancer services was questioned in light of current workloads and staffing.

*With cancer services already so busy, expecting smoking cessation to be a routine part of our service is unrealistic - especially in low SES areas where smoking among our patients is prevalent. We would need ongoing training and supervision and also increased funding for more staff if we are to begin implementing smoking cessation interventions into our practice. (Allied Health)*

Perceptions of being supported by their organisation to deliver cessation interventions was mixed with over one third (35%) of survey respondents stating not feeling supported.

*We need in-house training. I attended an external training event, but there was no support for me to introduce or implement into the department after I got back.*

*(Allied Health)*

### **Unfamiliar processes and perceived system deficits inhibit brief interventions**

Perceived lack of skills in brief interventions extended to making referrals to the Quitline.

The majority of clinicians reported not making referrals to the Quitline (90%), with 56% saying that they do not know how to do it:

*I need to become familiar with referral to Quitline, I was under the impression that the patient called themselves. (Nurse)*

Some clinicians preferred to leave the decision to engage the Quitline to the patient rather than refer without explicitly-stated interest or permission from the patient, in an effort to maintain trust.

*I have to have an interpersonal relationship with these people, so I don't want to just refer them to the Quitline if they're not receptive to it. (Nurse)*

Other clinicians spoke about assuming that other members of the health care team, such as a social worker or general practitioner (GP), would take responsibility for enacting the Quitline referral. Just 22% of clinicians reported making referrals to local smoking cessation specialists or GPs, with 26% citing lack of time. Clinicians noted the out-of-pocket costs associated with GP visits or pharmacotherapy without prescription and the potential delay in getting a GP appointment in some areas inhibiting cessation support, despite referral.

*Without medical resources - in the country - they can wait a month to get into the doctor to get the patches. So, then they'll come back to us the next visit, three weeks later for their next lot of chemo and I'll go, "How did you get on with your not*



*smoking?” And they go, “Well, I haven’t been to the doctors yet, so I haven’t started.”*

(Nurse)

System-related barriers include electronic medical record systems (EMRS) that are not conducive to recording smoking cessation referrals or interventions and prompting follow-up reminders and alerts. Survey responses indicated that EMRS were used to record a patient’s smoking status (40%), but less often to record brief intervention and referrals (16%).

### **Geographic and discipline comparisons**

Table 3 shows comparisons of clinicians’ responses according to metropolitan or regional/rural areas in NSW. Compared to their metropolitan counterparts, regional/rural clinicians were more likely to discuss medication options (53% vs 33%), provide patients with brochures or information on cessation (66% vs 55%), and send referrals to Quitline (19% vs 5%).

Metropolitan-based clinicians were more likely to agree that they have not had sufficient training or experience in providing smoking cessation brief interventions (83% vs 62%), do not know how to make a Quitline referral (63% vs 45%), feel unsupported by their organisation to deliver smoking cessation interventions (42% vs 22%), and lack available resources to support these interventions (56% vs 36%).

Table 4 displays associations of the different discipline groups of clinician respondents.

Compared to the other disciplines, physicians were most likely to report that they ask about

smoking status (100%), ask whether patients planned to quit (91%), refer to specialists or GPs for cessation support (45%), counsel patients themselves (50%), , report providing patients with brochures and information on smoking cessation (100%), and record smoking status in EMRS (77%), yet also report that they don't have time to discuss smoking cessation with patients (50%) or refer them to support (59%).

Nurses were most likely to advise patients to call the Quitline (43%) and believe patients are resistant to smoking cessation interventions (40%). Radiation therapists were most likely to perceive patients as uninterested in quitting smoking (43%) and not know how to refer patients to the Quitline (76%). They were least likely to engage in delivering aspects of smoking cessation brief interventions to patients, provide brochures and information on smoking cessation (30%), record smoking status (8%) or brief interventions in EMRS (0%), and were least likely to report having had adequate training in smoking cessation brief interventions (92%).

## **4. Discussion and conclusion**

### ***4.1 Discussion***

In this study, we surveyed different clinicians working in cancer care across the state, rather than focus on one type of health professional. This approach emanates from the premise espoused by the World Health Organisation [16] that every clinician, at every point in care, needs to be able to facilitate support for patients to quit smoking by undertaking brief opportunistic interventions. This extends to patients with cancer throughout all stages of the cancer care continuum [17, 18]. Different clinicians reinforcing these messages and offering cessation support can increase a population's quit attempts and outcomes [19].

Our findings indicate that across disciplines in cancer services, more than half of clinicians surveyed are not providing smoking cessation brief interventions, despite perceived importance. Although oncologists routinely ask patients if they smoke, fewer ask about and advise quitting [13, 20] and act to support quit attempts [21]. Partial implementation of brief intervention by oncology health professionals has been reported by patients previously [22, 23]. One reason for abbreviated approaches may be due to time constraints in clinical consultations which speaks to the importance of brief interventions that are consistently applied [24].

Consistent with previous research, common barriers cited by clinicians include perceptions of lack of training and expertise in cessation interventions [25, 26], lack of knowledge or confidence [27], few resources to support interventions, and patient resistance [13]. A recent systematic review of attitudes of oncology healthcare practitioners towards smoking cessation identified feeling impacted by their own knowledge, attitudes, perceptions of utility to improve patient outcomes, and procedures within their workplaces [28].

The current study extended previous survey research by integrating qualitative data from interviews with clinicians who contextualised responses and provided insight about addressing barriers. Clinicians recognise the specific needs of patients with cancer to be different from non-cancer patients in regards to the distress they may feel. Rather than apply a standard one-size-fits all approach to a smoking cessation brief intervention, clinicians described the need for tailored interventions requiring a skilful, supportive, nonjudgmental and compassionate approach to behaviour change [29], taking into account

the acute and chronic stress faced by patients that is often accompanied by shame and guilt [30]. Clinicians expressed concerns about potentially compromising therapeutic relationships in discussing quitting smoking [20]. Smoking cessation discussions between patient and providers have potential to fracture or strengthen trust depending on the communication and interaction during consultations [31]. In light of this, training for cancer clinicians should include provisions to strengthen communication skills when addressing this topic with patients. Additional tailoring of content of brief interventions may involve information about potential contraindications of smoking cessation pharmacotherapy and cancer treatments, different cancer types and comorbidities, and providing ongoing support for psychological issues [32].

We found that clinicians were unclear who was responsible for delivering brief interventions. Radiation therapists were least engaged in smoking cessation brief interventions, likely related to feeling under-trained for this task and that it is not part of their role. Clear communication on the role of radiation therapists in regards to smoking cessation brief interventions and training is required. We also found few clinicians making referrals to the Quitline. Cited barriers were clinicians' misunderstanding or lack of knowledge of the referral process or belief that patients were not receptive. Education to upskill clinicians in the Quitline referral process has been shown to improve the quantity and quality of referrals by health care providers [32].

Our results indicate regional and rural-area clinicians were more engaged and active in smoking cessation brief interventions, referrals to Quitline, and felt equipped and supported to do so. Perhaps by nature of access challenges they face, the rural/remote respondents

emulated a proactive, responsive approach to smoking cessation in cancer services. This contrasts with challenges reported implementing an anti-smoking program in rural and remote communities in NSW [33].

Inconsistent documentation whereby clinicians did not process referrals systematically, often due to inadequate EMRS, was noted as a barrier to referral. Systems failures including the role of health information systems has been reported as impacting chronic illness management [34]. Ensuring adequate systems to record, monitor, track and follow-up smoking cessation brief interventions is essential to improving outcomes for patients.

The findings of this study should be considered within its methodological limitations. The sample strategy was non-probability, convenience sampling, which is based on participants' availability, and willingness to participate. Given that this study was exploratory, we preferred not to overlook potentially valuable findings[35]. Therefore, we did not make adjustments for multiple tests and suggest the need to exercise caution in interpreting results of comparisons between geographic locations and clinician roles. Some significant differences we found may be due to chance. . Age and sex were not collected to protect anonymity of respondents. The number of clinicians in cancer care services who could have responded to the invitation is unknown, which precludes a response rate.

#### ***4.2 Conclusion***

For people with cancer, quitting smoking is associated with more positive treatment and survival outcomes than continuing to smoke. Despite the importance of providing smoking cessation support for these patients, not all clinicians deliver brief interventions. In this

paper we learned about cancer care clinicians' beliefs and practices as well as their perspectives of barriers to enacting smoking cessation brief interventions.

#### ***4.3 Practice implications***

To strengthen delivery of smoking cessation interventions in multidisciplinary cancer services, there is a need for strong leadership and a consistent message such that all clinicians understand that brief interventions are standard care [36]. Cancer care clinicians should be trained in brief interventions and referral to Quitline, delivering tailored brief interventions and consistent messaging throughout the patient's care trajectory, and in ensuring documentation of referrals and interventions for all cancer patients who smoke.

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Table 1. Professional characteristics of survey participants (n=165)

Characteristic		N (%)
Clinical role		
	Nurse	60 (36)
	Allied Health (excluding radiation therapists)	39 (24)
	Radiation Therapist	37 (22)
	Medical (oncology physicians, haematologists)	25 (15)
	Other	4 (2)
Geographic setting		
	Metropolitan	107 (65)
	Rural and regional	58 (35)
Care setting*		
	Outpatient services	162 (98)
	Inpatient services	83 (50)
	Community services	8 (5)
Had any training on smoking cessation brief interventions		
	Yes	52 (32)
	No	111 (67)
Provide regular smoking cessation brief interventions to*:		
	A patient with a tobacco related cancer (such as lung or head/neck cancer)	58 (35)
	A patient with a non-tobacco related cancer (such as breast or prostate cancer)	41 (25)
	I do not regularly provide any of the above in regards to tobacco cessation support for cancer patients	59 (36)
	I have never considered any of the above in regards to tobacco cessation support for cancer patients	28 (17)
For those who provide brief interventions, these are for:		
	All patients including those with metastatic disease	59 (91)
	Only patients with curative intent	6 (9)

\*Could select more than one option.

Table 2. Clinician survey responses (n=165)

<b>Clinician smoking cessation brief intervention interactions with patients*</b>	<b>Some/most/all of the time n (%)</b>
Ask your patients if they smoke or use tobacco products	71 (44)
Ask patients who smoke or use tobacco if they are planning to quit	54 (34)
Routinely record a patient's smoking status within the electronic medical record system	27 (24)
Advise patients who smoke or use tobacco products to quit	55 (34)
Discuss medication options such as nicotine replacement therapy (NRT), bupropion, varenicline, etc.	29 (18)
Send a referral for patients to the Quitline	8 (4)
Advise patients to call the Quitline themselves	24 (15)
Refer patients to a local smoking cessation specialist or GP	12 (8)
Actively treat or counsel patients for smoking cessation yourself	11 (7)
Provide patients with brochures and information on smoking cessation	17 (11)
Routinely record brief interventions and referrals to smoking support services within the electronic medical record system	14 (8)
<b>Clinician opinions of tobacco use and brief interventions in patients with cancer#</b>	
Current smoking or tobacco use impacts treatment outcomes in cancer patients	140 (85)
Smoking cessation brief interventions should be a standard part of cancer care	136 (82)
It is everyone's (medical, nursing, allied health) role to provide smoking cessation brief interventions	127 (77)
I believe it is part of my role as a health worker to provide smoking cessation brief interventions	112 (68)
Quitting smoking might have a negative impact on a patient's ability to manage their treatment	35 (21)
<b>Clinician perceptions of patient barriers #</b>	
Patients with a cancer diagnosis who smoke are resistant to smoking cessation interventions	48 (31)
Patients with a cancer diagnosis who smoke are not interested in quitting smoking or tobacco use	42 (25)
<b>Clinician perceptions of their skill and knowledge barriers to enacting smoking cessation brief interventions#</b>	
I have not had sufficient training or experience in providing smoking cessation brief interventions	125 (76)
I have had adequate training in providing smoking cessation brief interventions	21 (13)
I do not know how to make a referral to the Quitline	93 (56)
I am not confident in my ability to get patients to quit smoking or using tobacco	88 (54)
I don't know enough about potential interactions between cessation pharmacotherapies and cancer treatments or supportive drugs	121 (73)
I feel confident in my ability to provide a smoking cessation brief intervention	45 (27)
<b>Clinician perception of systems-level barriers that disable smoking cessation brief interventions#</b>	
There is a lack of available resources (printed and/or electronic material) to support smoking cessation brief interventions	81 (49)

Electronic medical record systems do not easily facilitate the recording or provision of smoking cessation brief interventions	70 (42)
I do not feel supported by my organisation to deliver smoking cessation interventions	58 (35)
I don't have time to discuss smoking with patients	46 (29)
I don't have time to refer patients to smoking cessation support	42 (26)

Table 3. Behaviours and attitudes by clinician geographic area (n=164\*)

Theme	Total (n=164*)	Geographic Area		p-value
		Metropolitan n=106 (%)	Rural n=58(%)	
<b>Frequency of clinician smoking cessation brief intervention interactions with patients</b>				
Ask patients if they smoke or use tobacco products	112 (68)	69 (65)	43 (74)	0.3
Ask patients who smoke or use tobacco if they are planning to quit	99 (60)	58 (55)	41 (71)	0.06
Routinely record a patient's smoking status within the electronic medical record system	61 (37)	39 (37)	22 (38)	0.9
Advise patients who smoke or use tobacco products to quit	39 (24)	17 (16)	22 (38)	0.2
Discuss medication options such as nicotine replacement therapy (NRT), bupropion, varenicline, etc.	66 (40)	35 (33)	31 (53)	0.02
Send a referral for patients to the Quitline	16 (10)	5 (5)	11 (19)	0.005
Advise patients to call the Quitline themselves	51 (31)	28 (26)	23 (40)	0.1
Refer patients to a local smoking cessation specialist or GP	34 (21)	18 (17)	16 (28)	0.1
Actively treat or counsel patients for smoking cessation yourself	40 (24)	24 (23)	16 (28)	0.6
Provide patients with brochures and information on smoking cessation	96 (59)	58 (55)	38 (66)	0.002
Routinely record brief interventions and referrals to smoking support services within the electronic medical record system	26 (16)	15 (14)	11 (19)	0.5
<b>Clinician opinions of tobacco use and brief interventions in patients with cancer</b>				
Current smoking or tobacco use impacts treatment outcomes in cancer patients	139 (85)	91 (86)	48 (83)	0.2
Smoking cessation brief interventions should be a standard part of cancer care	135 (82)	84 (79)	51 (88)	0.3
It is everyone's (medical, nursing, allied health) role to provide smoking cessation brief interventions	127 (77)	78 (74)	49 (84)	0.3
I believe it is part of my role as a health worker to provide smoking cessation brief interventions	111 (68)	67 (63)	44 (76)	0.3
Quitting smoking might have a negative impact on a patient's ability to manage their treatment	35 (21)	22 (21)	13 (22)	1.0
<b>Clinician perceptions of patient barriers</b>				
Patients with a cancer diagnosis who smoke are resistant to smoking cessation interventions	48 (29)	32 (30)	16 (28)	0.6
Patients with a cancer diagnosis who smoke are not interested in quitting smoking or tobacco use	42 (26)	29 (27)	13 (22)	0.4
<b>Clinician perceptions of their skill and knowledge barriers to enacting smoking cessation brief interventions</b>				
I have not had sufficient training or experience in providing smoking cessation brief interventions	124 (76)	88 (83)	36 (62)	0.004

I have had adequate training in providing smoking cessation brief interventions	21 (13)	10 (9)	11 (19)	0.09
I do not know how to make a referral to the Quitline	93 (57)	67 (63)	26 (45)	0.03
I am not confident in my ability to get patients to quit smoking or using tobacco	87 (53)	60 (57)	27 (47)	0.2
I don't know enough about potential interactions between cessation pharmacotherapies and cancer treatments or supportive drugs	120 (73)	82 (77)	38 (66)	0.1
I feel confident in my ability to provide a smoking cessation brief intervention	45 (27)	26 (25)	19 (33)	0.3
<b>Clinician perception of systems-level barriers that disenable smoking cessation brief interventions</b>				
There is a lack of available resources (printed and/or electronic material) to support smoking cessation brief interventions	80 (49)	59 (56)	21 (36)	0.009
Electronic medical record systems do not easily facilitate the recording or provision of smoking cessation brief interventions	69 (42)	41 (39)	28 (48)	0.7
I do not feel supported by my organisation to deliver smoking cessation interventions	57 (35)	44 (42)	13 (22)	0.009
I don't have time to discuss smoking with patients	45 (27)	35 (33)	10 (17)	0.03
I don't have time to refer patients to smoking cessation support	41 (25)	29 (27)	12 (21)	0.3

Table 4. Behaviours and attitudes by clinician type

Theme	Total n=165(%)	Discipline					p-value (99% CI)*
		Medical n=22(%)	Nurse n=58(%)	Radiation Therapist n=37 (%)	Allied Health n=38(%)	Other n=10 (%)	
<b>Frequency of clinician smoking cessation brief intervention interactions with patients</b>							
Ask patients if they smoke or use tobacco products	113 (68)	22 (100)	46 (79)	8 (22)	29 (76)	8 (80)	<0.001
Ask patients who smoke or use tobacco if they are planning to quit	100 (61)	20 (91)	39 (67)	12 (32)	22 (58)	7 (70)	<0.001
Routinely record a patient's smoking status within the electronic medical record system	62 (38)	17 (77)	23 (40)	3 (8)	15 (39)	4 (40)	<0.001
Advise patients who smoke or use tobacco products to quit	40 (24)	6 (27)	20 (34)	1 (3)	9 (24)	4 (40)	<0.001
Discuss medication options such as nicotine replacement therapy (NRT), bupropion, varenicline, etc.	67 (41)	15 (68)	29 (50)	3 (8)	13 (34)	7 (70)	<0.001
Send a referral for patients to the Quitline	16 (10)	1 (5)	10 (17)	0 (0)	3 (8)	2 (20)	0.04 (0.04, 0.05)*
Advise patients to call the Quitline themselves	51 (31)	8 (36)	25 (43)	2 (5)	12 (32)	4 (40)	0.002
Refer patients to a local smoking cessation specialist or GP	34 (21)	10 (45)	8 (14)	3 (8)	9 (24)	4 (40)	0.004
Actively treat or counsel patients for smoking cessation yourself	40 (24)	11 (50)	14 (24)	0 (0)	12 (32)	3 (30)	<0.001
Provide patients with brochures and information on smoking cessation	97 (59)	22 (100)	40 (69)	11 (30)	17 (45)	7 (70)	0.006
Routinely record brief interventions and referrals to smoking support services within the electronic medical record system	26 (16)	3 (14)	11 (19)	0 (0)	9 (24)	3 (30)	0.02
<b>Clinician opinions of tobacco use and brief interventions in patients with cancer</b>							
Current smoking or tobacco use impacts treatment outcomes in cancer patients	140 (85)	20 (91)	52 (90)	29 (78)	29 (76)	10 (100)	0.8 (0.7, 0.8)*
Smoking cessation brief interventions should be a standard part of cancer care	136 (82)	17 (77)	52 (90)	27 (73)	30 (79)	10 (100)	0.2
It is everyone's (medical, nursing, allied health) role to provide smoking cessation brief interventions	127 (77)	16 (73)	53 (91)	23 (62)	25 (66)	10 (100)	0.002

I believe it is part of my role as a health worker to provide smoking cessation brief interventions	112 (68)	16 (73)	46 (79)	18 (49)	22 (58)	10 (100)	0.003
Quitting smoking might have a negative impact on a patient's ability to manage their treatment	35 (21)	4 (18)	14 (24)	10 (27)	7 (18)	0 (0)	0.4
<b>Clinician perceptions of patient barriers</b>							
Patients with a cancer diagnosis who smoke are resistant to smoking cessation interventions	48 (29)	4 (18)	23 (40)	13 (35)	5 (13)	3 (30)	0.03
Patients with a cancer diagnosis who smoke are not interested in quitting smoking or tobacco use	42 (25)	2 (9)	16 (28)	16 (43)	6 (16)	2 (20)	0.003
<b>Clinician perceptions of their skill and knowledge barriers to enacting smoking cessation brief interventions</b>							
I have not had sufficient training or experience in providing smoking cessation brief interventions	125 (76)	17 (77)	43 (74)	34 (92)	26 (68)	5 (50)	0.04
I have had adequate training in providing smoking cessation brief interventions	21 (13)	3 (14)	6 (10)	3 (8)	7 (18)	2 (20)	0.6 (0.6, 0.7)*
I do not know how to make a referral to the Quitline	93 (56)	14 (64)	25 (43)	28 (76)	21 (55)	5 (50)	0.03
I am not confident in my ability to get patients to quit smoking or using tobacco	88 (53)	11 (50)	28 (48)	27 (73)	19 (50)	3 (30)	0.07
I don't know enough about potential interactions between cessation pharmacotherapies and cancer treatments or supportive drugs	121 (73)	15 (68)	38 (66)	34 (92)	26 (68)	8 (80)	0.05
I feel confident in my ability to provide a smoking cessation brief intervention	45 (27)	10 (45)	14 (24)	5 (14)	10 (26)	6 (60)	0.01
<b>Clinician perception of systems-level barriers that disenable smoking cessation brief interventions</b>							
There is a lack of available resources (printed and/or electronic material) to support smoking cessation brief interventions	81 (49)	11 (50)	32 (55)	18 (49)	14 (37)	6 (60)	0.5
Electronic medical record systems do not easily facilitate the recording or provision of smoking cessation brief interventions	70 (42)	13 (59)	25 (43)	14 (38)	12 (32)	6 (60)	0.4

I do not feel supported by my organisation to deliver smoking cessation interventions	58 (35)	11 (50)	15 (26)	16 (43)	14 (37)	2 (20)	0.08
I don't have time to discuss smoking with patients	46 (28)	11 (50)	11 (19)	13 (35)	11 (29)	0 (0)	0.02
I don't have time to refer patients to smoking cessation support	42 (25)	13 (59)	13 (22)	9 (24)	7 (18)	0 (0)	0.002

\*Monte Carlo testing was used.