

Implementation of a comprehensive smoking cessation program in cancer care

N. Abdelmutti MSc,*^a J. Brual PhD,^{†a} J. Papadakos MEd PhD,^{†‡} S. Fathima MPH,[†] D. Goldstein MD MSc,[§] L. Eng MD,^{||} T. Papadakos MA(Ed),^{†‡} G. Liu MD MSc,^{§||} J. Jones PhD,[#] and M. Giuliani MD MEd MBBS^{†***††}

ABSTRACT

Background Quitting smoking after a cancer diagnosis maximizes treatment-related effects, improves prognosis, and enhances quality of life. However, smoking cessation (sc) services are not routinely integrated into cancer care. The Princess Margaret Cancer Centre implemented a digitally-based sc program in oncology, leveraging an e-referral system (CEASE) to screen all new ambulatory patients, provide tailored education and advice on quitting, and facilitate referrals.

Methods We adopted the Framework for Managing eHealth Change to guide implementation of the sc program by integrating 6 key elements: governance and leadership, stakeholder engagement, communication, workflow analysis and integration, monitoring and evaluation, and training and education.

Results Incorporating elements of the Framework, we used extensive stakeholder engagement and strategic partnerships to establish a sc program with organizational and provincial accountability. Existing electronic patient-reported assessments were changed to integrate CEASE. Clinic audits and staff engagement allowed for analysis of workflow, ongoing monitoring and evaluation that aided in establishing a communication strategy, and development of cancer-specific education for patients and health care providers. From April 2016 to March 2018, 22,137 new patients were eligible for screening. Among those new patients, 13,617 (62%) were screened, with 1382 (10%) being current smokers and 532 (4%) having recently quit (within 6 months). Of the current smokers and those who had recently quit, all were advised to quit or to stay smoke-free, and 380 (20%) accepted referral to a sc counselling service.

Conclusions Here, we provide a comprehensive practice blueprint for the implementation of digitally based sc programs as a standard of care within comprehensive cancer centres with high patient volumes.

Key Words Smoking cessation, patient education, health care providers, implementation

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INTRODUCTION

Continued smoking by cancer patients results in a greater number of adverse events, reduced treatment effectiveness, poorer survival, and higher risk of developing secondary cancers¹. In addition to those significant effects for patient outcomes and quality of life, continued smoking contributes to an increase in health care spending and resource use^{2,3}. Many cancer patients are highly motivated to quit, and most will make a quit attempt within 6 months of diagnosis⁴. Smoking cessation (sc) programs significantly increase the likelihood of a successful quit attempt and staying smoke-free⁵.

The American Society of Clinical Oncology statement on tobacco cessation and control emphasizes the use of multipronged approaches for the integration of cessation counselling and referral to cessation services as key components of quality cancer care⁶. Similarly, in 2015, Cancer Care Ontario (cco), a provincial agency that oversees the quality of cancer care in Ontario, mandated province-wide sc requirements for cancer programs (Cancer Care Ontario. *Framework for Smoking Cessation in the Regional Cancer Programs* [unpublished report]. Ver. 2.0. Toronto, ON: cco; 2008).

^a Co-first authors.

Despite the evidence, screening for smoking status and subsequent referral to cessation programs has not been a part of standard care in most cancer centres, and sc programs have typically been underused⁷. To date, no publications have described a standardized, evidence-informed digital approach to implementing a comprehensive sc program within a large cancer centre.

Many sc initiatives have been implemented in primary care settings and deliver evidence-based sc treatment⁸. Although recommendations identify the need for dedicated personnel and for client access to effective sc counselling and medications, information to guide implementation strategies is limited⁹. However, the published literature has identified numerous strategies to avoid. For example, interventions that rely on a specific role or profession¹⁰ are not sustainable in high-volume settings. Conversely, cessation delivered by “quit lines” (dedicated telephone lines operated by personnel trained in sc assessment and counselling) or other client-referral services have not been well integrated or established within health care systems^{11,12}. That knowledge-to-practice gap in implementing sc initiatives in large cancer centres might be attributable to several barriers, including time constraints, lack of awareness among health care providers (HCPs)^{13,14}, and concerns about the effect on the patient–provider relationship^{15,16}. In addition, solutions that lack effective integration into existing clinical flow, that are paper-based, or that are dependent on a limited number of individuals with sc training might not be sustainable or adaptable when variations in care trajectories and high patient volumes are considered¹⁷. Strategies to implement sc programs in large cancer centres must therefore consider those factors.

Our objective was to implement sc screening in a way that was scalable, sustainable, and adaptable to various clinical contexts within a large cancer centre. Based on the existing literature, we sought to implement a comprehensive sc program at the Princess Margaret Cancer Centre. This large comprehensive cancer centre delivers the full spectrum of care and is organized into multidisciplinary disease site clinics. From April 2016 to March 2018, 22,137 new patients eligible for screening were seen at the cancer centre. The central component of the centre’s sc program is a clinically supported electronic tool, the sc e-referral system (CEASE)¹⁸. The patient-directed CEASE tool was developed and implemented using the Ottawa Model of Research Use knowledge translation framework¹⁹. As a patient-driven tool, CEASE addressed time-constraint barriers within high-volume and overloaded cancer clinics and a lack of awareness about sc on the part of HCPs. The CEASE tool is connected to the existing electronic medical record system, is grounded in the 3As [Ask, Advise, Act (explained in more detail shortly)], is multilingual (English, Chinese, Portuguese, Russian, Spanish, Vietnamese), and triggers a 6-month-reassessment to evaluate long-term change in smoking behaviours. It is delivered to newly diagnosed patients on a tablet computer at the point of care. Referrals are automatically generated through the tablet, and the source of referral contacts the patient within 1 week to follow up. Figure 1 summarizes the CEASE electronic process flow, and Table 1 provides a sample of CEASE content assessing a patient’s smoking and tobacco use history.

The sc program was established to fulfil 3 aims:

- Implement cancer centre-wide smoking history screening and referral for all outpatients through CEASE
- Educate patients and families about the benefits of quitting after a cancer diagnosis
- Increase awareness of, and competence in, sc on the part of oncology health care professionals as part of routine cancer care

METHODS

To guide implementation and fulfil the sc program aims, we adopted two frameworks: the cco Smoking Cessation Framework’s standardized approach to best-practice cessation counselling and the Framework for Managing eHealth Change to guide implementation of CEASE into routine clinical care. The cco Smoking Cessation Framework recommends the brief, internationally recognized evidence-based model of the 3As for cessation counselling (Cancer Care Ontario. *Framework for Smoking Cessation in the Regional Cancer Programs* [unpublished report]. Ver. 2.0. Toronto, ON: cco; 2008):

- **Ask**
Screen for smoking or tobacco use.
- **Advise**
Provide advice and tailored education about the benefits of quitting during and after cancer treatment.
- **Act**
Refer current or recent quitters to an internal or external cessation service.

Additionally, the cco framework recommends an “opt-out,” whereby a referral is offered to all active smokers without assessing readiness to quit, thus establishing sc as a standard of routine cancer care²⁰. In implementing CEASE into routine clinical care, we adopted the Framework for Managing eHealth Change. The Framework provides a guide to coordinated change management activities that can successfully integrate e-health solutions with the aim of enhancing care delivery and improving health outcomes²¹. We applied the core elements from the Framework for Managing eHealth Change to our organizational context and aims, with associated goals for successful implementation:

- **Governance and leadership**
Establish clear leadership and a governance structure to steer and guide implementation of e-based solutions that introduce significant change in practice.
- **Stakeholder engagement**
Build and cultivate multilevel stakeholder engagement from conception to execution and include diverse groups to sustain effective change.
- **Workflow analysis and integration**
Develop a detailed assessment of current clinical operations for optimal integration of e-health solutions into practice.

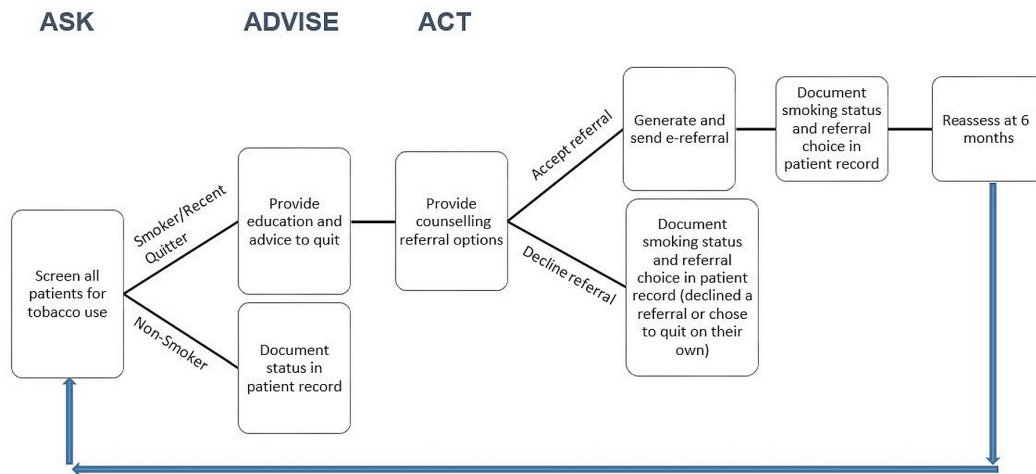


FIGURE 1 Electronic process flow for the CEASE e-referral system.

- **Monitoring and evaluation**
Measure the success of implementation by collecting and monitoring key metrics to demonstrate uptake and detect gaps in practice.
- **Communication**
Devise a communications strategy to ensure that stakeholders are informed and engaged when prompting action or responses.
- **Training and education**
Support the ongoing education and training needs of staff through development and provision of sc education and tools as key components of managing change and successful implementation.

RESULTS

Governance and Leadership

Given the provincial mandate outlined by cco for sc, we established the sc program with clear links to organizational, regional, and provincial accountability^{21,22}. We brought together a sc advisory team with responsibility to assess, implement, and report on sc initiatives. The team is multidisciplinary and includes oncologists, nurses, psychiatrists, pharmacists, dentists, cancer survivorship experts, and experts in patient and HCP education. The program lead has a leadership role within the Princess Margaret Cancer Centre, is accountable to cco, and possesses an understanding of clinical and operational structures. Those qualities are all critical to engaging senior leadership buy-in and ensuring that sc is a prominent organizational priority.

Stakeholder Engagement

We engaged a variety of stakeholders to ensure that we captured perceptions, issues, and expectations by all parties involved with or affected by the program²¹. We engaged institutional leaders for support and sponsorship to ensure that sc was elevated as an organizational and clinical priority for all health professions²³. Health care providers were

engaged for their input in designing CEASE and in assessing barriers to and opportunities for integrating CEASE and cessation counselling into clinical practice. We assessed patient informational needs and preferences relating to sc through a survey designed to inform the development of education resources²⁴. We partnered with information technology leaders within the institution to develop an e-based solution that capitalized on existing institutional infrastructure and took into account the various strengths and limitations of our current electronic patient record.

We established partnerships with 3 existing programs available locally that each offered a unique approach to sc services:

- The cancer centre's outpatient pharmacy, for its convenience and connection to the cancer program
- The national quit line service in Canada (Smoker's Helpline, run by the Canadian Cancer Society) for its ubiquity and ability to help the patient access cessation services from home
- The Nicotine Dependence Clinic at the Centre for Addiction and Mental Health for its capacity to meet the needs of patients with complex addiction and mental health concerns

To ensure ongoing stakeholder engagement, the sc working group was instrumental as we assessed new evidence, were informed of new and ongoing initiatives, and cascaded information across the organization and health professions.

Workflow Analysis and Integration

To assess the existing clinical and operational structures in place at the cancer centre and to aid in the careful integration of the sc program²¹, the screening and referral program was implemented in three phases. Phase 1 included using paper surveys and referral forms that were manually entered into the patient record to screen for smoking behaviour. That phase provided the flexibility to assess the best approaches for clinical integration, to refine the screening content, and to identify opportunities

and threats to the screening and referral process within a contained scope that was nimble to feedback and change, paving the path for conversion into a streamlined digital

process in the next phase. Phase 2 was piloted in 3 different disease site clinics: breast, gynecology, and head and neck. Those clinic sites represented a mixture of the busiest and

TABLE I Screening components of the CEASE e-referral system

Component	Sample content
ASK	<p>Screen for smoking or tobacco use in the past 6 months.</p> <p>Have you used any tobacco products (cigarettes, pipes, cigars, or chewing tobacco) in the past 6 months?</p> <ul style="list-style-type: none"> ▪ Yes ▪ No <p>How many years have you smoked or used tobacco products?</p> <p>Which of the following best describes your current situation?</p> <ul style="list-style-type: none"> ▪ I currently smoke and/or use tobacco products. ▪ I stopped smoking and/or using tobacco products within the last 6 months. <p>How many weeks ago did you stop smoking?</p> <p>Are you exposed to other people using tobacco products at home? If yes, who?</p> <p>How many years have you been exposed to other people using tobacco at home?</p>
ADVISE	<p>Advise to quit, and provide tailored education.</p> <p>Quitting is an important part of cancer treatment and care. For people diagnosed with cancer, the benefits start right away and can last a long time.</p> <p>We know that quitting can be difficult. Your health care team is here to support you.</p> <p>What are the benefits of quitting smoking and using tobacco products?</p> <ul style="list-style-type: none"> ▪ Help your body respond better to radiation and chemotherapy. ▪ Make your surgery safe, and help you heal faster. ▪ Improve some of your side effects. ▪ Lower your risk of your cancer coming back (recurring). <p>Lower your risk of getting a second cancer.</p>
ACT	<p>Refer smokers or recent quitters to an internal^a or external^b smoking cessation service.</p> <p>Here is some more information about each program. You can choose only one program:</p> <ol style="list-style-type: none"> 1. Smoker's Helpline <p>This program can help you</p> <ul style="list-style-type: none"> ▪ find support in your neighbourhood. ▪ get help from a Quit Coach (someone who gives you support on how to quit). ▪ get support over the telephone. 2. Nicotine Dependence Clinic at the Centre for Addiction and Mental Health <p>This program can help you</p> <ul style="list-style-type: none"> ▪ get weekly counselling and treatments to help you quit or reduce your smoking. ▪ get private support in-person and over the telephone. 3. University Health Network Outpatient Pharmacy <p>This program can help you</p> <ul style="list-style-type: none"> ▪ get help making a plan to quit. ▪ get medication to quit or lower the amount you smoke (if needed). ▪ get private advice from a pharmacist in-person, over the telephone, or by e-mail. 4. I do not want to be referred, I want to quit on my own. <p>You have selected <agency name>. Someone from the program will call you to share more details and to finish registering you in the program. Your oncology team at Princess Margaret will also be informed that you have registered.</p>

^a University Health Network Outpatient Pharmacy.

^b Smoker's Helpline, or Nicotine Dependence Clinic at the Centre for Addiction and Mental Health.

highest volume clinics and the clinics with a high proportion of patients having a history of tobacco use, which allowed for the workflow and capacity of the clinics to integrate CEASE into their existing clinical and system processes to be tested. Audits were performed to determine the number of tablets required in the various clinics, to identify any wireless dead zones in the waiting and consult spaces, to troubleshoot printouts of the smoking screening report, and to problem-solve any staffing and resource issues. That pilot was instrumental in establishing a baseline for performance metrics, informing the approach to integration into existing clinic flows, and identifying gaps in staff training. In phase 3, CEASE was rolled out to all outpatient clinics centre-wide. We appended the CEASE tool to an existing symptom assessment program administered with the use of tablets in clinic waiting rooms, thereby streamlining the process for patients and staff.

Monitoring and Evaluation

Monthly and yearly reports were generated to assess hospital-wide and clinic-specific screening and referral rates. Figure 2 shows smokers as a proportion of all patients who were screened for smoking status, by disease site clinic, and overall. Reports such as those allowed the sc program team to assess performance at the individual clinic level and to tailor interventions and investigations based on the unique care trajectories of each patient population²⁵. The data also allowed for an assessment of the disease sites at the cancer centre with a higher proportion of smokers, because those sites could then be used to pilot future interventions that would improve the identification of smokers at diagnosis and facilitate increased uptake in cessation services. The attitudes, knowledge, and competence of HCPs were also assessed before and after receipt of orientation and education about the sc program to uncover any knowledge gaps or misconceptions about sc in the cancer setting. The findings from that informal information needs assessment helped to establish how to integrate brief cessation counselling strategies into standard clinical practice. It also indicated that a more sustained HCP education strategy would be needed to support the sc program in the long term, reinforcing knowledge for existing staff and providing education as new staff and trainees came on board. Figure 3 summarizes the

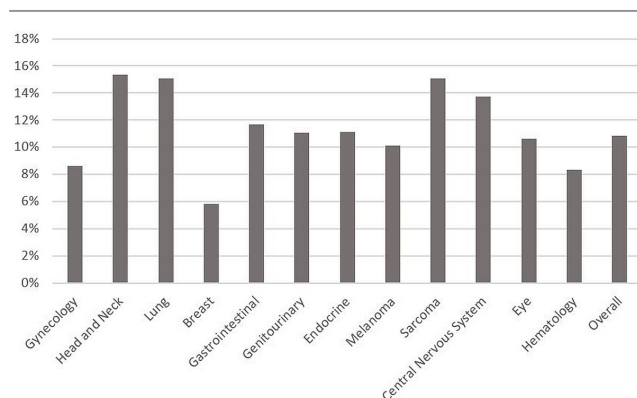


FIGURE 2 Proportion of smokers among screened patients by disease site at the Princess Margaret Cancer Centre, April 2017 to March 2018.

proportion of patients screened, patient smoking histories, and referral outcomes. Between April 2016 and March 2018, 13,617 new patients (62%) were screened for their smoking status. Of those patients, 1382 (10%) were identified as current smokers, and 532 (4%) reported having quit within the preceding 6 months. Of patients in the latter two groups, all received a brief, tailored education program that advised them to quit or encouraged them to remain smoke-free, and 380 (20%) accepted a referral to a sc program.

Communication

A communications strategy was devised to actively engage with and inform stakeholders about the importance of sc²⁶. It involved the use of e-communication blasts, messages from senior leadership, an internal Web page with an overview of the program, and presentation of contact information and updates at operational and leadership committee meetings. An essential component of the communications strategy was to use monthly reports to assist in maintaining sc as an important priority in routine clinical care and to provide real-time data and feedback about the rates of smoking screening, cessation, and referral activities for each clinic. The internal monthly reports were delivered through hospital e-mail to ambulatory care staff, clinic

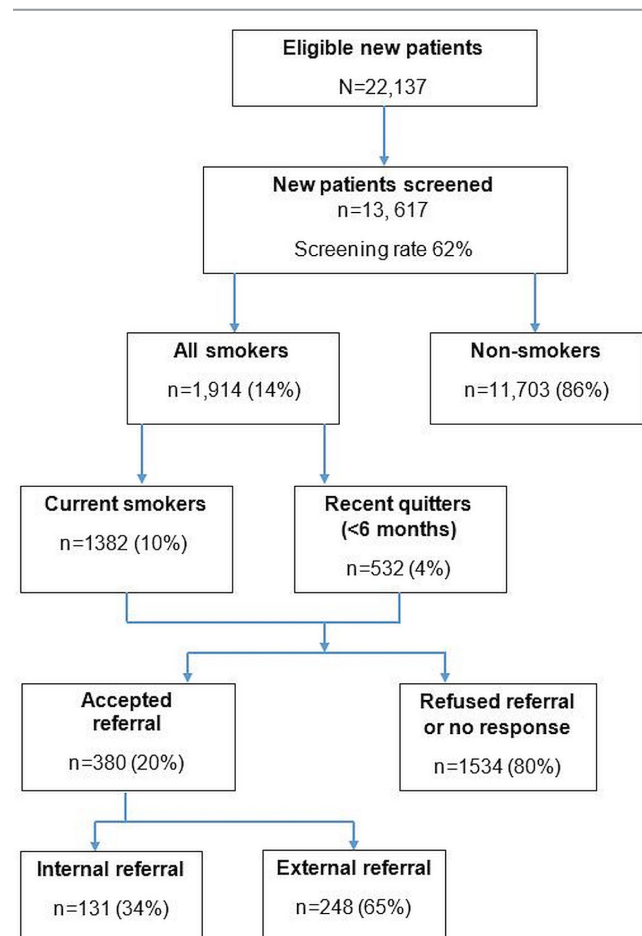


FIGURE 3 CEASE screening for smoking status and referral activities, all ambulatory cancer clinics at the Princess Margaret Cancer Centre, April 2016 to March 2018.

site leads and teams, and the sc advisory working group. To improve visual impact and rapid communication, information is presented using a traffic-light system (Figure 4), allowing for timely assessment of screening rates within clinics, how one clinic compares with others, and how well the clinics perform over time.

Training and Education

Within the context of a sc program, patient and provider education are both required²¹. After an environmental scan of existing sc resources, it was evident that, despite widely available resources and campaigns for the general public, a very small amount of that information is tailored and targeted to people diagnosed with cancer. To inform the development of education resources, we designed and administered a survey to investigate the sc information needs of patients with cancer and their caregivers. Based on a needs assessment study that included 62 patient and caregiver participants, cancer-specific education resources were developed: pages on the main cancer centre Web site, e-learning modules, and print resources distributed and displayed in clinic waiting areas. The methods and results of that needs assessment (published elsewhere) describe the key information elements that should be considered when developing sc resources²⁷. Study results found that patients and caregivers gave high importance to receiving information about the direct effects of continued smoking and about how quitting smoking can affect their cancer treatment. It was also found that information about quitting should be consistently offered at all stages of the cancer journey. In addition, we integrated social-marketing health promotion techniques^{24,28} that made use of Web videos and posters in the clinics to encourage patient-provider discussions about cessation. All staff across the organization received brief training: oncology HCPs during their site-based multidisciplinary rounds, and key professional groups such as nursing and patient flow coordinators during their staff meetings. The training described the effects of smoking on cancer treatment and recovery, and integrated the evidence-based 3As approach into practice.

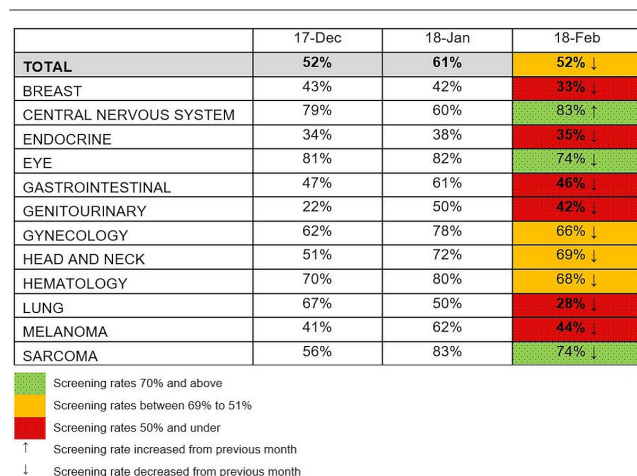


FIGURE 4 A 3-month report using a traffic-light system is distributed to all ambulatory disease site clinics for real-time assessment of screening rates.

DISCUSSION

Our objective was to implement sc screening in a large cancer centre in a way that was scalable, sustainable, and adaptable to various clinical contexts. The use of the cco Smoking Cessation Framework coupled with the Framework for Managing eHealth Change led to an effective approach that implemented a sc program by assessing and addressing a number of patient, provider, and organizational issues.

From the patient perspective, cancer presents a set of unique challenges: among others, knowledge deficits related to the risks of smoking during and after treatment, fatalistic beliefs, feelings of guilt and stigma, perception of low threat of smoking to important cancer clinical outcomes, and concerns about access to care^{29,30}. Targeted verbal and written education about the cancer-specific benefits of quitting and enrolling in sc programs are an essential component of cessation efforts²⁵. Cancer-specific cessation resources must be developed to emphasize the benefits of quitting before, during, and after treatment; to dispel myths and stigma; and to explain the efficacy of sc programs. Given the documented knowledge deficit among cancer patients^{15,31,32}, it is imperative that all education resources be written in plain language and adhere to the principles of health-literate design³³.

Although the role of HCPs in sc has been established as an essential component of providing high-quality care, many lack the knowledge and training to provide sc assistance¹⁵. Health care providers can also be influenced by their own beliefs relating to smoking and cancer, concern about time as a barrier, lack of awareness of cessation programs, and choice to forgo screening for smoking behavior to avoid upsetting or overwhelming the patient^{13–16,34}. However, recommendation from a HCP can significantly increase the motivation to quit, and most patients report a desire to discuss sc and reliance on their HCP to initiate the discussion³⁴. Developing a sc program with the aim of engaging and educating HCPs requires a thorough understanding of the foregoing issues within the local context. It was critical for our sc program to engage a diverse group of HCPs and to incorporate ongoing feedback and input, embedding support for sc initiatives to achieve sustained practice change across the organization²⁵.

Our efforts to integrate sc education into multidisciplinary rounds allowed us to achieve a basic level of HCP engagement. However, a more sustained HCP education strategy is needed. Further to efforts performed in person, targeted e-learning could also be designed for the busy HCP as an effective tool for ensuring broad knowledge and awareness across the organization³⁵. Development of as-needed e-learning modules—to define the HCP's role in sc, to dispel myths and misperceptions of smoking and cancer, to increase awareness of the clinical implications of smoking during and after cancer treatment, to increase confidence in the use of the brief 3As approach to counseling, and to increase awareness of internal and external sc programs—will be part of the sc program activities. Finally, the organizational context is a critical consideration. In an environment with multiple competing priorities that affect the quality of care, we found that monthly communications

and clinic-based reporting assisted with maintaining sc as a prominent priority. That approach allowed site leads and teams to assess their screening rates quickly and to compare their performance with that in other clinics.

Our large-scale, technology-based sc program overcame a number of perceived and real barriers to introduce sc as a standard clinical practice. Given limitations in funding and the challenges presented by our large patient volumes, it was important to integrate seamlessly into existing systems and processes, and to leverage linkages to well-established sc programs. Our external partners, the Smoker's Helpline and the Nicotine Dependence Clinic at the Centre for Addiction and Mental Health, proved to be vital for the sustainability of our sc program and its potential for long-term outcomes. Those programs are an important means of offering a breadth of services that can be tailored to the individual based on preferences, medical history, and needs; the same programs also provide an efficient means to measure key outcomes such as referral rates and quit rates. Those stakeholder partnerships allowed for the impact on the time and space dedicated to sc at the cancer centre to be minimized and for the entire sc program to be more rapidly developed by leveraging existing infrastructure and regional resources. However, an important limitation to our current sc program is the lack of vital programmatic data (namely, cessation outcomes in referred cancer patients) to assess the long-term and overall effects of the sc program on patient outcomes. Programs should consider how they might be able to track outcomes data and will likely have to engage a diverse group of stakeholders to accomplish that tracking.

CONCLUSIONS

Implementing and sustaining a comprehensive sc program within a cancer centre is feasible and has important implications for delivering effective cancer care. The Framework for Managing eHealth Change provides a useful implementation framework for other large cancer centres seeking to establish their own programs. In taking such action, integration of a multipronged sc program can encourage a cultural shift in the cancer system that views sc as a standard of routine clinical care in cancer and engages the whole clinical care team: oncologists, nurses, pharmacists, and other HCPS, such as radiation therapists. Ongoing monitoring and program evaluation is necessary to assess the long-term effect of a sc program on sc efforts, patient outcomes, and other quality improvement measures in the context of cancer care. Future considerations for the sc program include integrating the CEASE tool into the patient portal to facilitate screening and referral from home, and investigating opportunities to improve and capture long-term outcomes in collaboration with our sc counselling-program partners.

CONFLICT OF INTEREST DISCLOSURES

We have read and understood *Current Oncology's* policy on disclosing conflicts of interest, and we declare that we have none.

AUTHOR AFFILIATIONS

*Cancer Strategy Stewardship Program and †Cancer Education Program, Princess Margaret Cancer Centre, Toronto; ‡Patient

Education, Cancer Care Ontario, Toronto; §Otolaryngology, Head and Neck Surgery Clinic, ||Division of Medical Oncology and Hematology, #Cancer Rehabilitation and Survivorship Program, and **Radiation Oncology, Princess Margaret Cancer Centre, Toronto; and ††Department of Radiation Oncology, University of Toronto, Toronto, ON.

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