**Objectives:**

*To provide a systematic review of smoking prevention and cessation interventions that have been conducted with cancer survivors.*

**Data Sources:**

*Published research studies and government reports.*

**Conclusion:**

*Although few interventions have been developed to improve smoking prevention and cessation rates in cancer survivors, existing studies suggest that it is possible to decrease tobacco use in this high-risk population.*

**Implications for Nursing Practice:**

*Oncology nurses are in a unique position to build on the current literature to address cancer survivors' tobacco use as part of clinical care.*

**Keywords**

*Smoking, interventions, cancer survivors*

# Smoking Prevention and Cessation Interventions for Cancer Survivors

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TOBACCO USE accounts for over 435,000 deaths each year, making it the leading cause of death in the United States.[1] Further, in 2008, it is estimated that 170,000 people will die from cancer that was caused by tobacco.[2] Although historically smoking cessation has not been considered a key part of the treatment of cancer survivors, with the advent of improved cancer treatments and the resulting improved survival rates, smoking prevention and cessation among cancer survivors has become increasingly important. The available evidence suggests that there is considerable room for improvement in smoking behavior among cancer survivors. Twenty-eight percent of pediatric cancer survivors report having ever smoked,[3] and between 46% to 75% of adult cancer survivors smoked at the time of diagnosis.[4] Cancer survivors who quit smoking, like all smokers, remain at risk for subsequent relapse.[5,6]

Smoking after a cancer diagnosis is particularly harmful. Pediatric cancer survivors are at increased risk for second primary tumors, and smoking may exacerbate the late effects of cancer treatment.[7-10] Adult cancer survivors who continue to smoke after diagnosis and treatment are less likely to respond to treatment and more likely to experience toxicity and complications.[11-14] They are also at higher risk for a second primary tumor and have lower survival rates than patients who stopped smoking before or at the time of diagnosis.[11,13-17]

Health care providers are in a unique position to address tobacco use as part of clinical care.[18] Approximately 70% of all smokers visit a physician annually,[18] and cancer survivors are in frequent contact with the health care system during their treatment and follow-up care. Advice to quit from a health care provider has been

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shown to be a powerful motivator of healthy behavior change.[19-23]. In addition, the 2008 Public Health Service (PHS) best practice guidelines recommends that health care providers address tobacco use with their patients at every visit.[24] A cancer diagnosis can be a teachable moment,[14] such that it is an opportunity to emphasize the importance of not smoking at a time when survivors' health is salient. Thus, a strong message to not smoke or to quit smoking from health care providers may be a particularly powerful intervention for cancer survivors.

This article presents a systematic review of smoking prevention and cessation interventions that have been conducted with cancer survivors. As part of this review, we will discuss methodologic and design considerations relevant to intervening with this population and present recommendations to oncology nurses for how to address tobacco use with their patients. Interested readers should also peruse other published reviews that describe smoking cessation and prevention services for cancer survivors.[4,25-29]

## METHODS

We conducted a review of articles published from 1976–2007 using PubMed. The following key words were searched: *smoking cessation cancer, smoking intervention cancer, smoking prevention cancer survivor, health promotion cancer survivor, childhood cancer smoking cessation, adolescent cancer smoking cessation, cancer survivor smoking cessation, nicotine cessation cancer, nicotine intervention cancer,* and *nicotine replacement therapy cancer.* We also collected additional references cited in retrieved articles. Articles were included if they were published in an English language journal, incorporated a quasi-experimental or experimental design, and included an evaluation of a smoking prevention or cessation intervention that was delivered to a cancer survivor population. Evaluations of interventions delivered to a mixed population that included cancer survivors were included, but only if the results for cancer survivors were discussed separately.

## RESULTS

We identified 1,470 papers, of which 15 met eligibility criteria. Two interventions were evaluated in more than one paper[30-34]; thus, our review included three unique smoking prevention interventions[35-37] and nine unique smoking cessation interventions (Table 1).[30-34,38-44]

### Smoking Prevention Interventions for Cancer Survivors

The three smoking prevention interventions that we identified were implemented in a childhood cancer survivor population.[35-37] Of those interventions, one had a small impact on smoking behavior and one had a substantial impact on predictors of smoking behavior. In the first intervention, Hollen et al[35] compared risk behavior outcomes between 21 childhood cancer survivors who attended a 1 day, 5-hour health promotion workshop and 43 control participants who were invited but did not attend the workshop. The intervention consisted of an educational intervention to improve decision-making for health risk behaviors (eg, smoking). The intervention improved overall decision-making, although results were not presented separately for smoking. In addition, there was a marginally significant intervention effect on smoking behavior at 6 months ($P = .08$), suggesting that the intervention decreased self-reported smoking initiation rates. This study had several noteworthy limitations. First of all, using intervention refusers as the control group is a potential source of selection bias because we would expect these individuals to be less interested in health promotion than survivors who agreed to participate in the workshop. In addition, the response rate was quite low (34%).

In the second intervention, Tyc et al[37] randomized 103 pediatric cancer survivors to a control group that included standardized advice to refrain from tobacco (n = 50) or an educational and counseling intervention (n = 53). The response rate was 87%. The intervention was delivered in a single session, which allowed for practical implementation in a clinical setting. It included an educational video about the risks of tobacco use, counseling on the late effects of treatment, goal setting for tobacco abstinence or cessation, a letter from each participant's physician, tobacco literature, and telephone counseling at 1 and 3 months. At 12 months, the intervention group had higher knowledge and perceived vulnerability scores and lower intention to use tobacco. There was no intervention effect on self-reported smoking status.

Although empirically evaluated smoking prevention programs are relatively uncommon in

**TABLE 1.**
**Smoking Prevention and Cessation Interventions for Cancer Survivors**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| **Smoking Prevention Interventions for Childhood Cancer Survivors** | | | | |
| Tyc et al, 2003[37] | Convenience sample<br>n= 103 childhood cancer survivors<br>RR = 87% | Control (n = 50):<br>Standardized advice to quit/ remain abstinent.<br>Intervention (n = 53):<br>Delivered by a psychologist and research nurse.<br>Video about risks of tobacco use, late effects counseling, and goal setting for tobacco use.<br>Letter from physician and phone calls at 1 and 3 months.<br>Study outcomes were assessed by self-report. | Intervention patients had higher knowledge, perceived vulnerability, and lower intentions to use tobacco.<br>No effect on smoking behavior. | No biochemical verification of smoking status. |
| Hollen et al, 1999[35] | Convenience sample<br>n= 64 childhood cancer survivors<br>RR = 34% | Control (n = 43):<br>No treatment<br>Intervention (n = 21):<br>1 day, 5-hour health promotion workshop to address making decisions about health risk behaviors.<br>All outcomes assessed by self-report at 1, 6, and 12 months. | Intervention improved decision-making about health behaviors at 1 and 12 months.<br>Marginally significant intervention effect on smoking at 6 months ($P = .08$). | Control participants were selected from intervention refusers. |
| Hudson et al, 2002[36] | Convenience sample<br>n= 251 childhood cancer survivors<br>RR = 86% | Control (n = 135):<br>Instruction in doing breast or testicular self exams.<br>Clinical assessment and late effects counseling.<br>Intervention (n = 131):<br>Delivered by clinic physician or nurse practitioner.<br>Control services plus a written clinical summary, health behavior training and telephone calls at 3 and 6 months.<br>All data collected by self-report. | No intervention effect on health knowledge, health perceptions, and smoking behavior. | Data collected by self-report.<br>Use of global outcome measures for specific health behaviors. |

**TABLE 1.**
**Continued**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| **Smoking Cessation Interventions for Childhood Cancer Survivors** | | | | |
| Emmons et al, 2005[44] | Population based sample<br>n= 796 childhood cancer survivors,<br>current smokers<br>RR = 63% among possible smokers, 83% among verified smokers | Control (n = 398):<br>Letter from study physicians about smoking cessation<br>Smoking cessation manual.<br>Intervention (n = 398):<br>Delivered by a peer-counselor who was a cancer survivor.<br>≤ 6 telephone sessions based on motivational interviewing.<br>Tailored to survivors' readiness to quit and interest in other health topics.<br>NRT (n = 115).<br>7-day point prevalence of smoking at 8 and 12 months was verified by bogus pipeline. | Control: 8.5% quit at 8 months and 9% quit at 12 months.<br>Intervention: 16.8% quit at 8 months and 15% quit at 12 months.<br>Smoking cessation rate increased with the number of phone calls. | Difficulty contacting the CCSS cohort to verify smoking status.<br>8% of controls took NRT. |
| **Smoking Cessation Interventions for Adult Cancer Survivors** | | | | |
| Duffy et al, 2006[38] | Convenience sample<br>n= 184 newly diagnosed head and neck cancer patients,<br>smoked in the last 6 months,<br>RR = 42% | Control (n = 91):<br>Referral for smoking cessation, alcohol treatment, and/or psychiatric evaluation.<br>Intervention (n = 93):<br>Delivered by a nurse trained in CBT<br>CBT workbook, 9-11 sessions of telephone counseling, and pharmaceuticals (n = 33).<br>Point prevalence of smoking at 6 months was assessed by self-report. | Control: 31% quit at 6 months.<br>Intervention: 47% quit at 6 months.<br>Intervention effectiveness did not vary by comorbid depression or alcohol use. | Low RR.<br>No bio-chemical verification of smoking status.<br>14 controls reported taking smoking pharmaceuticals. |
| Stanislaw & Wewers, 1994[32] | Convenience sample<br>n= 26 cancer patients admitted for surgery,<br>smoked continuously for the last year<br>RR = 97% | Control (n = 14):<br>Possible physician advice to quit.<br>Intervention (n = 12).<br>Delivered by a nurse certified as a smoking cessation facilitator. | Marginal intervention effect.<br>Control: 43% quit at 5 weeks.<br>Intervention: 75% quit at 5 weeks. | Small sample size. |

**TABLE 1.**
**Continued**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| | | 3, 20-30 minute sessions to facilitate smoking cessation<br>Cessation manual and relaxation recording and exercises.<br>5 weekly phone calls.<br>Point prevalence of smoking at 5 weeks was verified by saliva cotinine analysis. | | |
| Browning et al, 2000[43] | Convenience sample<br>n= 25 newly diagnosed lung cancer patients,<br>smoked daily for 1 year or longer<br>RR = 100% | Control (n = 11)<br>Standardized physician advice to quit.<br>Intervention (n = 14)<br>Delivered by a surgeon.<br>Advice and strategies to quit smoking, encouragement to use pharmacotherapy (n = 8), education materials.<br>Follow-up 10-14 days after patients' quit date.<br>5 follow-up visits.<br>7-day point prevalence of smoking at 6 months was verified by saliva cotinine analysis. | No intervention effect.<br>Control: 55% quit at 6 months.<br>Intervention: 71% quit at 6 months. | Small sample size |
| Cox et al, 2002[30] | Convenience sample<br>n= 201 lung cancer patients and n = 201 controls<br>RR, not reported | Administered by a trained nicotine dependence counselor.<br>Non-residential treatment program (n = 381)[1]<br>45–60 minute behavioral, addiction, pharmacologic, and relapse prevention consultation.<br>NRT (utilization unknown)<br>Residential treatment program (n = 8)<br>8-day group based multi-component intervention<br>Pharmacotherapy | No intervention effect.<br>Controls: 14% quit at 6 months.<br>Intervention: 22% quit at 6 months. | Quasi-experimental design.<br>Participants not matched on variables other than date of treatment.<br>No biochemical verification of smoking status. |

**TABLE 1.**
**Continued**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| | | 7-day point prevalence of smoking assessed by self-report. | | |
| Garces et al, 2004[31] | Convenience sample<br>n= 101 head/neck cancer patients and n = 101 controls<br>RR, not reported | Administered by a trained nicotine dependence counselor.<br>Non-residential treatment program (n = 198)<br>45–60 minute behavioral, addiction, pharmacologic, and relapse prevention consultation.<br>NRT (utilization unknown)<br>Residential treatment program (n = 4)<br>8-day group based multi-component intervention<br>Pharmacotherapy<br>7-day point prevalence of smoking at 6 months assessed by self-report. | No intervention effect.<br>Controls: 26% had quit at 6 months.<br>Intervention: 33% had quit at 6 months. | No biochemical verification of smoking status. |
| Griebel et al, 1998 | Convenience sample<br>n= 28 cancer survivors, smoked for at least 1 year<br>RR = 58% | Control (n = 14)<br>Possible physician advice.<br>Intervention (n = 14)<br>Delivered by a nurse certified as a smoking cessation facilitator.<br>20-minute session to facilitate smoking cessation.<br>Smoking cessation manual.<br>5 weekly follow-up telephone calls.<br>Point prevalence of smoking at 6 weeks was verified by saliva cotinine analysis. | No intervention effect on smoking cessation.<br>Control: 14% quit at 6 weeks.<br>Intervention: 21% quit at 6 weeks. | Small sample size. |
| Gritz et al, 1993[42] | Convenience sample<br>n= 186 newly diagnosed head and neck cancer patients, smoked within the past year | Control (n = 94)<br>Standardized physician advice to quit.<br>Intervention (n = 94) | No intervention effect.<br>Control group: 77% quit at 12 months. | 49% of controls received pieces of the intervention.<br>39% attrition. |

**TABLE 1.**
**Continued**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| | RR = 84% | Delivered by health care providers.<br>Physician advice to quit, discussion of patients' readiness to quit, self-help materials.<br>Determination of quit date.<br>6 booster sessions tailored to smoking status.<br>Point prevalence of smoking at 12 months verified by urine cotinine analysis. | Intervention group: 64% quit at 12 months. | |
| Schnoll et al, 2003[40] | Convenience sample<br>n= 432 cancer patients, smoked within the last 30 days or current smokers<br>RR, not reported | Control (n = 217):<br>Possible physician advice and assistance with smoking cessation.<br>Intervention (n = 215)<br>Delivered by physician.<br>Brief (<5 min) quit advice based on the 5A's.<br>7-day point prevalence of smoking at 6 and 12 months was assessed by self-report. | Control: 11.9% quit at 6 months and 13.6% quit at 12 months.<br>Intervention: 14.4% quit at 6 months and 13.3% quit at 12 months.<br>No significant intervention effect. | No biochemical verification of smoking status.<br>Same physician delivered the intervention and control content.<br>56% of controls received advice to quit. |
| Wakefield et al, 2004[41] | Convenience sample<br>n= 137 cancer patients, current smokers<br>RR = 41% | Control (n = 63)<br>Standardized physician advice to quit.<br>Smoking cessation resources.<br>Intervention (n = 74)<br>Delivered by trial coordinator.<br>Telephone and in-person counseling based on motivational interviewing.<br>NRT (n = 33).<br>At the 6-month follow-up, 7-day and 3-month period prevalence of smoking was verified by cotinine analysis for some participants. | Control: at 6 months, 11% did not smoke during previous 7 days and 8% did not smoke during previous 3 months.<br>Intervention: at 6 months, 19% did not smoke during previous 7 days and 12% did not smoke during previous 3 months. | Low RR.<br>36% attrition.<br>Incomplete biochemical data to verify smoking status.<br>10 control participants took NRT. |
| Wewers et al, 1994[59] | Convenience sample | Control (n = 14 cancer survivors)<br>Possible physician advice. | No intervention effect.<br>Control: 50% quit at 6 weeks. | Small number of oncology patients. |

**TABLE 1.**
**Continued**

| Authors | Sample and RR | Intervention | Results | Limitations |
|---|---|---|---|---|
| | n= 80 postoperative patients from oncology (n = 30), cardiovascular and general surgical units,<br>smoked for at least 1 year<br>RR = 94% | Intervention (n = 16 cancer survivors)<br>Delivered by a nurse certified as a smoking cessation facilitator.<br>3, 20-30 minute sessions to facilitate smoking cessation.<br>Smoking cessation manual, relaxation recording and relaxation exercises.<br>Five weekly follow-up phone calls.<br>Point prevalence of smoking at 6 weeks was verified by saliva cotinine analysis | Intervention: 64% quit at 6 weeks. | |
| Wewers et al, 1997[33] | Convenience sample<br>n= 15 newly diagnosed lung cancer patients,<br>smoked for at least 1 year<br>RR = 100% | Intervention (n = 15 cancer survivors)<br>Delivered by a nurse certified as a smoking cessation facilitator.<br>3, 20-30 minute sessions to facilitate smoking cessation.<br>Smoking cessation manual, relaxation recording and relaxation exercises.<br>Five weekly follow-up phone calls.<br>Point prevalence of smoking at 6 weeks was verified by saliva cotinine analysis. | No intervention effect.<br>At 6 weeks, 93% patients reported at least one quit attempt.<br>40% were confirmed abstinent. | Quasi-experimental design.<br>Small sample size. |

Abbreviations: RR, response rate; CCSS, Childhood Cancer Survivor Study; CBT, cognitive behavioral therapy; NRT, nicotine replacement therapy.
[1]13 people were missing data on type of treatment.

the oncology setting, the programs described above provide important guidance on how to address smoking prevention with pediatric cancer survivors. Key characteristics of effective smoking prevention interventions are summarized in Table 2.

### Smoking Cessation Interventions for Cancer Survivors

Of the nine unique interventions that we reviewed, two significantly increased smoking cessation rates among cancer survivors and a third had a marginal impact on smoking behavior. The first intervention, Partnership for Health, was conducted by Emmons et al,[44] who randomized 796 cancer survivors who were smokers from the Childhood Cancer Survivors Study to self-help (n = 398) or a peer-led telephone counseling intervention (n = 398). Partnership for Health was the only intervention that we reviewed to use a population-based recruitment approach, which is an important strength of this study. The response rate was 83% among Childhood Cancer Survivors Study participants who were verified as being smokers. The self-help condition received a letter from the study physicians about the importance of smoking cessation and a smoking cessation manual. Participants in the intervention condition were assigned a peer counselor who was also a childhood cancer survivor. The peer counselor provided up to six tailored calls during the 7-month study period that were based on motivational interviewing to emphasize survivors' responsibility to change their behavior and to increase self efficacy for smoking cessation. The peer counselor also discussed nicotine replacement therapy, which was provided to survivors and their smoking partner/spouse who were planning to quit smoking. The quit rate (verified by bogus pipeline) was significantly higher in the intervention group compared with the self-help group at both the 8-month (16.8% vs 8.5%) and 12-month follow-up (15% vs 9%).

**TABLE 2.**
**Characteristics of Effective Smoking Prevention Programs**

1. Emphasis on cancer survivors' unique health risks and vulnerability to tobacco-related health problems.
2. Setting goals for tobacco abstinence.
3. Regular reinforcement of the importance of smoking prevention.
4. Training to make healthy lifestyle choices that include refraining from tobacco use as well as other health risk behaviors.
5. High intensity delivery over multiple sessions.

In the second intervention, Duffy et al[38] randomized 184 head and neck cancer patients who reported smoking in the last 6 months, an alcohol problem, and/or depression, to usual care (n = 91) or a nurse-led cognitive behavioral therapy and pharmacotherapy intervention to decrease rates of smoking, alcohol use, and depression (n = 93). Usual care included a referral to smoking cessation, alcohol treatment, and/or psychiatric evaluation and a list of appropriate resources. The intervention included a smoking cessation workbook based on cognitive behavioral therapy. Workbook exercises were coordinated by a nurse during tailored telephone sessions. Study participants who smoked were also offered nicotine replacement therapy and/or bupropion. At 6 months, 47% quit in the intervention group and 31% quit in the control group. A unique feature of this study was the concurrent intervention for smoking, alcohol use, and depression. Targeting the three conditions simultaneously may have facilitated smoking cessation efforts because 76% of the sample who were smokers reported comorbid alcohol use and depression. The primary weakness of this study was a low response rate (42%).

In the third intervention, Stanislaw and Wewers[32] randomized 26 oncology patients who were admitted for surgery and who reported smoking continuously for the last year to usual care (n = 14) or a smoking cessation intervention led by a nurse who was a certified smoking cessation facilitator (n = 12). The response rate was 100%. Intervention sessions were delivered on an inpatient basis and included three consecutive daily visits each lasting 20 to 30 minutes. Over the three sessions, the intervention facilitator discussed benefits of not smoking, participants' personal triggers for smoking, and possible substitutes for smoking. Participants also received a smoking cessation manual, an audio tape of relaxation recordings, and instruction to perform progressive relaxation exercises. After discharge, participants received five weekly phone calls to assess smoking status and encourage maintenance of smoking cessation. Five weeks post-discharge, 75% intervention group had quit smoking, as indicated by biochemical verification of smoking status, compared with 43% of control group. This difference approached statistical significance ($P = .10$). This study was limited by a small sample size.

Few smoking cessation intervention have been delivered to cancer survivors and fewer yet have been effective. Nevertheless, research suggests that many cancer survivors who smoke are motivated to quit,[45] and it is feasible to address smoking prevention and cessation with this population.[30-34,38-44] Future research should incorporate characteristics of existing effective interventions (Table 3). Based on our review, interventions that failed to impact smoking prevention and cessation rates had methodologic limitations that may have limited their efficacy such as a small sample size and a control condition that reflected current best practices for addressing tobacco use in the clinical setting.[24] These issues and other methodologic considerations of addressing tobacco use with cancer survivors are discussed below.

## Discussion and Recommendations

### Methodological and Design Considerations

It is critical that future investigators consider the design and conduct of current smoking interventions when developing new programs to address cancer survivors' smoking behavior. We recommend that attention be paid to the following issues: (1) sample size, target population, and selection bias; (2) intervention intensity and appropriate control conditions; and (3) assessment of smoking status.

***Sample size, target population, and selection bias.*** Failing to recruit an adequate sample for smoking prevention and cessation studies limits statistical power to detect an intervention effect. In addition, it is difficult to draw conclusions about small trials because the absence of an intervention effect is sometimes caused by inadequate sample size. Large-scale studies of smoking in cancer patients are challenging to conduct. First of all, they are expensive, and national funding agencies traditionally have preferred to sponsor smoking research in the context of cancer prevention. In addition, smoking-related cancers are typically diagnosed in late stages, and survival rates are quite low.[46] Consequently, it is difficult to recruit and retain large numbers of participants in this type of research. Large and well-designed trials are needed to advance the science of smoking prevention and cessation in cancer survivors. One way to address the sample size and resources barriers described above is to capitalize on existing cooperative networks (eg, Cancer and Leukemia Group B) to test a common intervention across multiple sites.

**TABLE 3.**
**Characteristics of Effective Smoking Cessation Programs**

1. Attention to health risk behaviors that may impact smoking status and smoking cessation.
2. Designing intervention content around a theoretical framework.
3. Tailoring intervention content to survivors' stage of readiness to quit smoking.
4. Using "peers" to deliver intervention content.
5. Regular reinforcement of the importance of smoking cessation
6. A combination of nicotine replacement therapy or other pharmacotherapy and behavioral strategies for smoking cessation.
7. High intensity delivery over multiple sessions.

A second sampling issue that is related to sample size considerations is the choice of whom to sample. As summarized by Gritz,[25] all smokers, except those with end-stage disease, should be included in smoking interventions. Patients who are recent ex-smokers remain at high risk for relapse, so they should also be included in smoking research. In addition, families and relatives who smoke can also be targeted with interventions around the time of the patient's diagnosis, which can be a teachable moment for everyone touched by the patients' cancer diagnosis.

Participants for smoking research can be drawn from a sample of convenience or the population. Samples of convenience are typically easy to identify and recruit; however, they do not always represent the population to which one wishes to draw conclusions (eg, cancer survivors who smoke).[47] This is particularly true in studies where the response rate is low, indicating that smokers who were unwilling to quit may not have been included in the study. A population-based sample will be more representative of the population and the study will have higher generalizability. However, population-based recruitment can be logistically prohibitive. We encourage oncology nurses to use population-based recruitment. However, when it is necessary to recruit a sample of convenience, it is imperative to ensure a high response rate.

***Choice of control group and intervention intensity.*** Because of ethical concerns of not addressing tobacco use with this high-risk

population, all of the experimental studies that we reviewed used "usual care" as their control condition rather than no intervention (Table 1). In six interventions, "usual care" included standardized advice to quit (in person or by letter). An additional five studies did not standardize the smoking cessation content for the control group; however, existing studies suggest that many control participants received some advice about smoking cessation as part of usual care.[48,49] Routine assessment of smoking status and brief clinical intervention is consistent with the PHS best practice guidelines to address tobacco use in the clinical setting. When best practice is used as the control condition, nurses must develop higher intensity programs to impact smoking behavior beyond what is achievable with "usual care."

Characteristics of higher intensity interventions include longer contact with participants and multiple sessions, both of which are associated with greater intervention effectiveness.[24] Interventions with multiple sessions may be particularly important for cancer survivors who continue to smoke after diagnosis because these individuals may be strongly addicted to nicotine and the experience of smoking. In addition, if smoking is a coping strategy to deal with stress, cancer survivors may find it hard to quit smoking at the time of an acute health crisis. Thus, an intensive intervention that incorporates the components described in Table 3 may be more effective than brief physician advice and counseling.

It can be challenging to deliver an intensive tobacco use intervention during a normal clinical encounter because of time constraints. However, cancer patients often receive treatment on an inpatient basis or for regular or prolonged outpatient visits, which allows nurses greater flexibility and time to address tobacco use with this population. In addition, cancer patients are frequently seen by a health care provider during their treatment, which gives nurses an opportunity to engage in tobacco use counseling and relapse prevention on an ongoing basis.

***Verification of smoking status.*** Collecting smoking status by self-report may underestimate the prevalence of smoking in a study population.[50-52] Underreporting smoking is more common among medical patient samples and patients with smoking-related disease and in clinic-based and high intensity interventions.[52,53] Consequently, biochemical verification of smoking status is especially warranted in these situations.[52] Unfortunately, is difficult and expensive to biochemically validate self-reported smoking status in the context of large, multi-site, and population-based studies that are needed to advance the field of smoking prevention and cessation for cancer survivors. To avoid complete biochemical validation of all smoking data, nurses can use the bogus pipeline procedure,[53] which has been shown to increase the accuracy of self-reported smoking status.[54] In the case of population-based studies, biochemical verification of smoking status may actually be less important because such interventions typically have fewer demand characteristics that pressure study participants to report that they have quit smoking.[52]

## Strategies to Incorporate Tobacco Use Treatment into Clinical Care

Oncology nurses have a responsibility to address tobacco use with their patients. For patients who do not use tobacco, nurses need to emphasize the importance of remaining abstinent. For patients who smoke, nurses need to offer at least a brief intervention to help them quit. The PHS 5A's approach to address tobacco use in the clinical setting is an important resource for oncology nurses.[24] Essentially, the PHS recommends that health care providers screen patients for tobacco use at every visit. For patients who smoke, providers should assess their willingness to quit and then provide appropriate intervention to help with quitting (Table 4). The 5A's approach provides a useful framework to

**TABLE 4.**
**5A's Approach to Treat Tobacco Use in the Clinical Setting**

1. *Ask:* Ask and document each patient's tobacco use status at every clinic visit.
2. *Advise:* In a clear, strong, and personalized manner; urge all tobacco users to quit.
3. *Assess:* Determine patients willingness to make a quit attempt within the next 30 days.
4. *Assist:* If the patient is willing to make a quit attempt, help the patient to quit.
5. *Arrange:* Schedule follow-up contact close to patient's stated quit date to reinforce success or intervene as needed if they have relapsed.

Data from: Fiore MC, Jaén CR, Baker TB, et al. *Treating Tobacco Use and Dependence*: 2008 update. Clinical Practice Guideline. Rockville, MD: US Department of Health and Human Services. Public Health Service. May 2008.[24]

incorporate the components of successful smoking prevention and cessation intervention that are summarized in Tables 2 and 3. The complete PHS guidelines and the abridged guideline for physicians are publicly available.[24,55,56]

### Smoking Cessation Resources

Oncology nurses should make smoking prevention and cessation resources available to patients who use tobacco. For example, all patients who wish to quit smoking should be encouraged to use pharmacotherapy (except when specifically contraindicated).[24] In addition, nurses should combine pharmacotherapy with behavioral approaches for a more comprehensive tobacco use intervention.[24] Furthermore, nurses should recommend that their patients use smoking cessation resources such as quit lines (eg, 1-800-QUITNOW) and websites (eg, www.quitnet.com).

## Conclusion

Smoking prevention and cessation must be addressed as part of survivorship care. Although few interventions have been developed to improve smoking prevention and cessation rates in cancer survivors, existing studies provide valuable information about how to decrease smoking behavior in this high-risk population. Oncology nurses are in a unique position to build upon the current body of literature to incorporate tobacco use intervention into clinical care.

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