Tobacco Use in the Pediatric and Adolescent Cancer Survivor

The purpose of this article is to highlight the special challenges in addressing tobacco use by pediatric and adolescent cancer survivors; to urge greater emphasis by pediatric oncologists and other clinicians on tobacco prevention and cessation efforts; to discuss the existing tools for successful prevention and cessation; and to advocate for more research on these issues.

The Alliance for Childhood Cancer was formed in 2002 as a forum for national patient advocacy groups, professional medical societies, and scientific organizations to meet regularly, share ideas and concerns, and work collaboratively to improve public education, as well as advance research and policies to improve cancer prevention, diagnosis, treatment, supportive care, and survivorship of children and adolescents with cancer. Currently, the Alliance includes more than 25 member organizations. As more children and adolescents survive their cancers, there are long-term issues that affect their health. The risk of new or secondary cancers is significant for survivors of childhood cancers as a result of their treatments. This population is also more vulnerable to developing heart and lung disease. These risks are increased when combined with tobacco use.

Given these factors, the Alliance believes it is imperative to heighten awareness among clinicians, patients, survivors, and their families about the importance of avoiding tobacco use initiation and exposure to secondhand smoke. Because of their heightened risk, this population would benefit from even stronger messages and education about the risks of tobacco. In addition, the Alliance believes it is critical to ensure that survivors, families, and clinicians have all the necessary tools and resources available to help those who use tobacco to quit.

Tobacco use is the leading preventable cause of disease and death in the United States, and is associated with increased risk of at least 15 types of cancer. It is estimated that more than 30% of all cancer deaths, including 87% of all lung cancer deaths, are caused by tobacco use.¹ According to the American Cancer Society's *Cancer Facts & Figures 2008*, this meant 170,000 deaths in 2008 from tobacco use. In addition, there is growing evidence that smoking may compromise the effectiveness of treatment, reduce the tolerance of patients for treatment, increase the risk of complications, and increase the risk of patients for a secondary primary cancer.² Although research has been conducted in the adult cancer population, there has been little attention paid to studying the potential effect of tobacco use on treatment effectiveness for pediatric cancer patients.³ Because most smokers start before age 17, it is important that we pay greater attention to the childhood and adolescent patient and survivor population to understand and address their needs in avoiding tobacco use.

Current Smoking Rates Among Childhood Survivors

It is clearly understood that smoking and use of other tobacco products is even more risky for children and adolescents who have been treated for cancer than for the general population. However, studies show that the smoking rates for pediatric cancer survivors are comparable or only slightly lower compared with their peers who have not had cancer. There are limited data available regarding smoking rates for children and adolescents undergoing active cancer treatment.⁴ In one study performed at a large pediatric oncology institution, of 104 patients age 10 to 19, 6.7% of patients who were consecutively admitted during a 1-year period indicated that they were current smokers. These data are based on families who provided information about tobacco use at the time of admission.⁵ Another recent study showed that approximately 2% of children 12 to 18 years old undergoing cancer treatment and close to their time of diagnosis reported smoking. This compares with 22% of children the same age without cancer.⁶ In this study, the low rate among cancer patients was attributed to their medical status. The study also found that adolescent cancer patients were one third as likely as their healthy peers to indicate some intention to smoke in the future. This is important because according to experts, the intention to use tobacco is a strong predictor of future behavior, even though this association has not been studied in cancer patients. Though seemingly low, the rates of tobacco use are cause for significant concern given survivors' exposure to treatments that compromise the functioning of their heart, lungs, and other organs.

According to a 1994 US Surgeon General report, the early health consequences for young smokers without a history of cancer include respiratory symptoms and infections, reduced rates of lung growth and function, increased cough and phlegm production, compromised physical activity, and adverse changes in lipid profiles resulting in cardiovascular sequelae.² These tobacco-related complications may be even worse for adolescents being treated for cancer, including predisposition to respiratory infections and increased symptoms of acute radiation mucositis. Smoking may also delay rates of healing after surgery, thus compromising rehabilitation efforts and return of the patients' optimal daily functioning. These findings have been compiled in a comprehensive review article, "Emerging Issues in Smoking among Adolescent and Adult Cancer Survivors."⁷

Are Childhood Cancer Survivors at Higher Risk for Tobacco Use After Treatment?

Children and adolescents with cancer obviously have more interactions with health care providers both during and after

their treatment. This provides ample opportunity for them to be counseled about the dangers of smoking. In fact, as a result of their more frequent contact with health care clinicians, they report a heightened knowledge about their health risks from tobacco use as well as lower rates of stated intentions to smoke. However, a study by Tyc et al⁶ comparing the tobacco-related risk factors between adolescents with and without cancer pointed out that it is not known “whether the psychosocial factors that contribute to smoking onset in adolescents deter or promote smoking among adolescents with cancer relative to their peers without cancer.” Are adolescents with cancer less likely to be susceptible to the influence of their peers when it comes to smoking because of their cancer experience? Or do they view smoking as a way to connect socially with their peers when they may have felt more detached from their cancer experience?

This study showed that the rate of ever having smoked for adolescents with cancer (22%) is approximately half the rate of their healthy peers. Data also showed that only 2% of adolescents with cancer currently smoked, compared with 22% of adolescents without cancer. Tyc et al pose that the low incidence may reflect the fact that the study population was in active treatment. Given the status of these patients, it may be that the low rate of smoking among the study participants was temporary.⁶

The *Cancer* review article also reports that “psychologic distress is a well-established factor that influences smoking among adolescents.”⁷ Although the findings are mixed, evidence suggests that survivors of childhood cancer experience greater levels of psychologic distress in adolescence and young adulthood than do unrelated or sibling controls, thus placing them at high risk for smoking onset and progression.⁸

What Does Research Show About the Impact of Tobacco Use by Parents?

It is well known that pediatric and adolescent cancer patients and survivors face magnified risks from tobacco use either during treatment or post-treatment. Because of the toxicities of many anticancer treatments, their cardiac, vascular, and pulmonary function is already compromised and they are at higher risk for developing secondary cancers. Exposure to environmental tobacco smoke (ETS) also poses additional adverse health effects as a result of the toxic treatments they receive. These complications from ETS exposure include an increased risk of respiratory infections, and long-term exposure to high levels of ETS may increase the risk of treatment-related pulmonary complications or cardiovascular disease.⁹ Thus, smoking habits by parents or others in households of patients and survivors are of significant consequence.

In a study by Tyc et al,¹⁰ researchers examined smoking by parents and the patients’ respiratory and pulmonary symptoms

on the basis of household smoking status. Among 303 children (younger than 20 years old) newly diagnosed with cancer, approximately 45% of patients had at least one current parent smoker, and 20% of current nonsmoking parents reported past tobacco use. The study compares the presence of respiratory and pulmonary problems among newly diagnosed children with cancer from nonsmoking and smoking households. The symptom categories identified as being associated with ETS included upper respiratory symptoms (eg, chronic allergies, sinusitis, or upper respiratory tract infections), lower respiratory symptoms (eg, pneumonia, bronchitis, or lower respiratory tract infections), middle-ear effusions/otitis media, chronic cough, asthma/wheezing, and dyspnea/breathing difficulties. In the study, symptoms that were present in the patient’s medical history before diagnosis were reported.

As expected, those patients in smoking households experienced more respiratory problems. For example, 41.5% of children from smoking households had upper respiratory infections and symptoms, compared with 34.8% from nonsmoking households. There were 10.4% with chronic coughs, compared with 4.4% from nonsmoking households. The study also revealed that a greater proportion of cancer patients from smoking households smoked than those from nonsmoking households (14.6% v 6.7%).⁵

A study at St Jude Children’s Research Hospital (described in more detail later) examined the effectiveness of an intervention to reduce smoking initiation among pediatric survivors. Though the intervention had demonstrated efficacy, there was less effect among patients whose parents smoked. The findings indicated that nonsmoking patients who had used tobacco in the past, who had parents who use tobacco, and who perceived greater benefit from tobacco use, measured higher in their intention to smoke.¹⁰

What Does Research Show About Effectiveness of Interventions?

More research is clearly needed to address the effectiveness of tobacco cessation interventions among pediatric and adolescent cancer survivors. However, programs like the one at St Jude demonstrate that interventions for cancer survivors can work.¹¹ This randomized, controlled trial was to determine whether a risk counseling intervention would improve knowledge about tobacco risks and reduce future intentions to use tobacco among 103 survivors between 10 and 18 years old. Participants in the group received intervention that included more intensive late-effects risk counseling, an educational video, goal setting, written physician feedback, smoking literature, and follow-up telephone counseling. As a result of the counseling program, participants had significantly higher understanding of the dangers of smoking, higher perception about their vulnerability to health risks from tobacco use, and lower intention to smoke. These effects were seen 1 year after the intervention.

Informal Survey on Tobacco Use by Teens With Cancer: The Group Loop Survey Results

The Alliance conducted an informal survey to ask survivors of childhood cancers about their tobacco use. The survey was posted online to Group Loop, an online resource of The Wellness Community that provides support to teens with cancer. This site provides 24 hours per day/7 days per week discussion boards for teens, as well as online support groups for parents, and was visited by more than 10,000 people in 2007. The survey was also posted to the Children's Cause for Cancer Advocacy Facebook page. Response to this survey was very low and the Alliance is considering a more focused effort to gather information about tobacco use among pediatric and adolescent survivors. Among the small number of respondents, they reported very low smoking incidence. However, approximately half of them reported that they were not counseled about tobacco use where they were treated. Again, although the response rate for this survey was limited and we cannot draw any conclusions, the information may indicate the need to redouble efforts to educate patients and survivors about the dangers of tobacco use.

This was the first study of its kind and the results indicated that tobacco-related health risks, perceived vulnerability to tobacco-related health risks, and intentions for future use can be modified with a risk counseling intervention. The findings show that it is feasible to conduct brief, individualized, single session tobacco interventions with phone follow-up in a medical setting.

However, longer-term studies are needed to examine whether these interventions prevent smoking past the 12-month follow-up, which is critical as these kids move through the years where they are at high risk for smoking initiation.

What Can the Community Do to Raise Awareness and Improve Tobacco Control Efforts?

The public is generally well informed about the dangers of tobacco use. Although more could be done, there are public education efforts directed at all age levels, including many public school programs that teach the health consequences of smoking. Smoking rates among adults and adolescents have declined significantly during the past decade. According to the Centers for Disease Control and Prevention (CDC), in 2006, 23% of high school students used tobacco compared with 36.4% in 1997. In addition, 8% of middle school students currently smoke. However, there is increasing evidence that the decline in smoking among teens has begun to level off. This points to the need to redouble our efforts in tobacco cessation among children.

Pediatric and adolescent cancer patients are counseled about the importance of avoiding tobacco, and there seems to be a relatively high knowledge among these patients about the heightened risks they face both during and after treatment. This is reflected in the generally lower smoking rates in these kids. However, as researchers point out, the rates for this population are still too high and must be addressed. Health care providers play a pivotal role in consistently conveying to their patients the dangers of tobacco, as well as providing cessation counseling. The opportunities for education and intervention are numerous and must be taken advantage of. We in the pediatric cancer community should do more to ensure these messages are being delivered at all available opportunities.

Tools for intervention and cessation exist, but more can be done to raise awareness and to improve access and utilization. Researchers who have examined the pediatric and adolescent patient and survivor population note that the same strategies used to counsel healthy kids may be applicable to this population. However, they stress the need to conduct research and develop programs and delivery strategies targeted to cancer patients and survivors. Programs such as the one at St Jude should be replicated and expanded. The Children's Oncology Group Guidelines for Long-Term Follow-Up¹² refer repeatedly to the need for discussion between clinicians and patients about the importance of tobacco use prevention. Such guidance should be emphasized even more. The Public Health Service Guidelines on smoking cessation include tools for youth cessation,¹³ and the CDC has many resources for youth prevention and cessation.¹⁴

Conclusion

Children and adolescent cancer survivors are an at-risk population and as those who care for and advocate for them, we should do all we can to mitigate their health risks from tobacco use. This includes consistently discussing the risks of tobacco use, as well as offering counseling and other interventions for those who do smoke. In addition, much more research is needed on tobacco use in pediatric cancer patients and survivors. Research efforts should include studies on prevention strategies and interventions specific to this population, such as the optimal timing for delivering interventions. In addition, there should be more research to identify disease- and treatment-related complications that could be worsened by tobacco use in the pediatric and adolescent populations. More research is needed on the available pharmacotherapies for smoking cessation and how they may benefit childhood cancer survivors who use tobacco in the context of their health issues as a result of cancer treatment.

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