

# Tobacco Use and Exposure Among Youth Undergoing Cancer Treatment

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## ABSTRACT

**Introduction:** Adolescents with cancer are susceptible to the health consequences associated with secondhand smoke exposure (SHSE) and tobacco use. The present study compared tobacco use, exposure, and risk factors between patients and population peers.

**Method:** Self-reported data on tobacco use, SHSE, and tobacco-related risk factors were drawn from a pediatric oncology hospital and the National Youth Tobacco Survey. Conditional logistic regression was used to estimate odds ratios for patients and control subjects.

**Results:** Patients were as likely to have tried tobacco and report home SHSE as control subjects. Patients were more likely to report car SHSE, less likely to report that SHSE is harmful, and less likely to report home smoking bans.

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**Discussion:** Patients experienced SHSE, tobacco use, and tobacco-related risk factors at rates greater than or equal to control subjects. These results provide support for consideration of intervention targets, health status, and delivery mechanisms, particularly by health care providers, when developing comprehensive tobacco control strategies. *J Pediatr Health Care.* (2015) 29, 80-87.

## KEY WORDS

Adolescent health care, oncology, smoking, tobacco use

Secondhand smoke exposure (SHSE) and tobacco use represent significant health concerns for adolescents receiving treatment for cancer because of their increased health vulnerabilities as a result of cancer treatment and genetic predisposition (Bhatia et al., 2003; Geenen et al., 2007; Huang et al., 2011; Hudson et al., 2003; Miller et al., 2010; Oeffinger et al., 2006). Pediatric cancer survivors are at increased risk for experiencing adverse health outcomes such as cardiovascular disease, stroke, kidney failure, pulmonary fibrosis, and second malignancies (Bhatia et al., 2003; Geenen et al., 2007; Huang et al., 2011; Hudson et al., 2003; Miller et al., 2010; Oeffinger et al., 2006), conditions that may also be the result of, or exacerbated by, tobacco use or exposure (Kahalley et al., 2012; U.S. Department of Health and Human Services, 2004). Despite increased risk for secondary health consequences, children with cancer exhibit rates of SHSE that are similar to those of the general population (Centers for Disease Control and Prevention [CDC], 2010; Kahalley et al., 2012; Tyc, Klosky, Throckmorton-Belzer, Lensing, & Rai, 2004a; Tyc, Lensing, Vukadinovich, & Hovell, 2009b; Tyc, Throckmorton-Blezer, et al., 2004b). Although rates of current smoking among adolescents receiving treatment for cancer have been reported to be lower than those of their healthy peers (CDC, 2013; Tyc, Hovell, & Winickoff, 2008), rates of tobacco use among adolescent survivors (15%-38%) are generally

equivalent (CDC, 2010; Kahalley et al., 2012; Klosky et al., 2012; Tyc, 2008). These findings are concerning because lower rates of exposure and smoking are desired among these youth as a result of their increased risk for tobacco-related morbidities and increased opportunities for tobacco interventions from health care providers (HCPs).

Consequently, preadolescence and adolescence represent critical periods for engagement in behavioral health decision making for protective health behaviors, such as SHSE avoidance (Ding et al., 2010) and risky health behaviors, including smoking initiation and progression (Turner, Mermelstein, & Flay, 2004). In fact, SHSE and smoking initiation in adolescence are closely related, because exposure is a frequent consequence of parental smoking, and parental smoking has been associated with greater adolescent intentions to smoke, early onset, rapid escalation, and long-term persistence of smoking (Best, Committee on Environmental Health, Committee on Native American Child Health, & Committee on Adolescence, 2009; CDC, 2007; Chassin, Presson, Pitts, & Sherman, 2000; Ding et al., 2010). Parental smoking has also been identified as a risk factor for tobacco use among adolescent cancer survivors (Kahalley et al., 2012). Furthermore, parental smoking, the most common source of SHSE (Ding et al., 2010), also serves as a risk factor for adolescent smoking through mechanisms such as modeling, increased access to tobacco (Best et al., 2009; Chassin et al., 2000; Chassin, Presson, Rose, Sherman, & Prost, 2002; Flay, Hu, Siddiqui, Day, & Hedeker, 1994), or genetic predisposition for addiction to nicotine that leads children to adopt the habit themselves (Boomsma, Koopsman, Van Doornen, & Orlebeke, 1994). Beyond parental smoking, research has also established both fixed and modifiable risk factors associated with adolescent tobacco use. Risk factors include sociodemographic factors (e.g., age, socioeconomic status [SES], and gender; Backinger, Fagan, Matthews, & Grana, 2003; CDC, 2008; DiFranza et al., 2007; Gilpin, Choi, Berry, & Pierce, 1999; Johnston, O'Malley, Bachman, & Schulenberg, 2012), psychosocial factors (e.g., intentions to smoke, perceptions of mortality risk, and perceived social value of smoking; Ellickson, McGuigan, & Klein, 2001; Lundborg & Andersson, 2008; Tyc, Klosky, Lensing, Throckmorton-Belzer, & Rai, 2009a), and social factors (e.g., having friends who smoke; Chassin, Presson, Sherman, Montello, & McGrew, 1986). All of these aforementioned factors are important and can inform tobacco assessment and intervention planning. Thus, these developmental periods represent key surveillance and intervention targets for health behaviors, especially among youth at risk for adverse health outcomes.

Three previous studies have compared the rates of tobacco use and related risk factors for youth with and without cancer by separately examining preadolescents

(8-11 years; Tyc, Klosky, et al., 2009a) and adolescents (12-18 years; Kahalley et al., 2012; Tyc, Lensing, Klosky, Rai, & Robinson, 2005). Tyc and colleagues (Tyc et al., 2009a,b) focused on youth's intention to smoke and found that nonsmoking healthy preadolescents reported more intentions to smoke and perceived social value of smoking compared with children who had cancer. Alternatively, preadolescents with cancer reported more tobacco-related knowledge, perceptions about their vulnerability to tobacco health risks, optimism, and value of overall health. In a similar study, adolescents with cancer reported less current smoking (2% vs. 22%) and fewer intentions to smoke than a matched comparison of healthy peers from the local community but reported similar rates of past smoking behavior (20% vs. 18%; Tyc et al., 2005). A recent study compared smoking between adolescent survivors of cancer and their siblings and found no significant differences in either having a history of smoking or active smoking (Kahalley et al., 2012). Further, risk factors for smoking among adolescent survivors included having friends who smoke and living in a household with smokers (Kahalley et al., 2012). Taken together, these results suggest that youth with cancer report similar rates of a history of smoking, lower or comparable rates of current smoking, established risk tobacco factors of peer smoking and household exposure to smokers, and fewer individual-level tobacco-related risk factors compared with their healthy peers.

No previous studies have concurrently examined SHSE, tobacco use, and risk factors among both preadolescents and adolescents receiving treatment for cancer and compared these rates to national data. Previous research has (a) explored these constructs separately and among either preadolescents or adolescents or (b) utilized local comparison groups (e.g., local schools) or sibling comparison groups rather than national data. The current study extended previous research by comparing rates of SHSE, tobacco use, and other potential tobacco-related risk factors in pediatric patients with cancer (patients in the current study are being treated at an institution with a large representation of referral areas; Umbach, 2013) to a larger, nationally representative sample of youth (10-18 years) using a matched-controlled design. Further, the present study simultaneously examined SHSE and tobacco use (Klosky et al., 2012; Tyc, 2008; Tyc et al., 2009a,b; Tyc et al., 2004a,b), using statistical methods recommended for matched-controlled designs, with the aim of exploring a more comprehensive surveillance of health behaviors (Niven, Berthiame, Fick, & Laupland, 2012). Additionally, prevalence rates were examined by preadolescent and adolescent age groups to explore any developmental differences that may exist in these tobacco outcomes. Examination of these deleterious health behaviors and plausible differences between medically compromised and healthy groups will help

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