■ Journal Club Article

Emerging Issues on the Impact of Smoking on Health-Related Quality of Life in Patients With Lung Cancer and Their Families

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Compelling evidence exists that continued smoking after a diagnosis of lung cancer adversely affects treatment effectiveness, survival, risk of recurrence, second malignancy, and health-related quality of life (HRQOL). The importance of HRQOL to patients with cancer and their families has been well documented. Because of increasing evidence of the benefits of smoking cessation, more research has focused on the impact of smoking on HRQOL. Smoking is a behavior that clusters in families; patients who smoke are likely to have family members who smoke, and together they experience impaired HRQOL. This article describes the evidence regarding HRQOL measurement in individuals diagnosed with lung cancer and their family members who smoke and explores the implications for nursing practice. Oncology nurses are in a critical position to advocate for the integration of HRQOL assessment into clinical settings, monitor patient and family member smoking status and environmental tobacco smoke exposure, and support development of smoking cessation interventions to enhance HRQOL.

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Lung cancer is the most common cancer worldwide. The five-year survival rate for individuals with lung cancer in the United States is 16%, but that percentage increases to 53% for individuals with localized lung cancer. Small cell lung cancer (SCLC) is less prevalent and has a lower five-year survival rate (6%) compared to non-small cell lung cancer (NSCLC), which accounts for 85% of lung cancer diagnoses and has an 18% five-year survival rate (American Cancer Society, 2013). With the advent of computed tomography screening procedures for the early detection of lung cancer, combined with improved treatments, the lung cancer survivor population is likely to increase (National Lung Screening Trial Research Team, 2011).

As a patient-reported outcome, health-related quality of life (HRQOL) is an important aspect of every patient's condition, and a critical outcome in cancer treatment and research. HRQOL is a multidimensional and dynamic construct that typically incorporates the influences of physical, functional, psychological, social, and spiritual domains on an individual's subjective perception of health and well-being (Gralla & Hollen, 2011).

Smoking and Lung Cancer

A substantial amount of research addresses the impact of smoking on HRQOL in the general population (Hays, Croghan, Baker, Cappelleri, & Bushmakin, 2010; Sarna, Bialous, Cooley, Jun, & Feskanich, 2008; Tillman & Silcock, 1997; Wilson, Parsons, & Wakefield, 1999). HRQOL is known to be lower in individuals who smoke cigarettes regularly, and even lower in

those who smoke more heavily and for a longer time. Compelling evidence exists that continued smoking after a cancer diagnosis has adverse effects on HRQOL as well as on treatment effectiveness, survival, and risk of second malignancy or recurrence (Browman et al., 2002; Dresler & Gritz, 2001; Fox, Rosenzweig, & Ostroff, 2004; Jensen, Jensen, & Grau, 2007; Krueger & Rohrich, 2001; Moller, Villebro, Pedersen, & Tonnesen, 2008; Parson, Daley, Begh, & Aveyard, 2010). Most patients diagnosed with lung cancer have a smoking history, and many are current smokers (Cox, Africano, Tercyak, & Taylor, 2003; Park et al., 2012). Continued smoking after a cancer diagnosis was first associated with a poorer HRQOL in a study of 105 patients with head and neck cancer (Gritz et al., 1999). The results showed that, at the one-year follow-up, ex-smokers reported a higher HRQOL than patients who continued smoking.

Four reviews have examined HRQOL in relationship to lung cancer. The first review spanned 25 years (1970–1995) and confirmed the value of HRQOL measurements in this population. However, smoking status was not described (Montazeri, Gillis, & McEwen, 1998). Two other reviews examined HRQOL methodologies in randomized, controlled trials during a 30-year span (1980–2010). Smoking status was not described in those reviews either (Bottomley, Efficace, Thomas, Vanvoorden, & Ahmedzai, 2003; Claassens et al., 2011). Tobacco use and environmental tobacco smoke exposure have been described as the missing drug intervention in clinical trials because they often are undocumented or not considered as potential variables (Gritz, Dresler, & Sarna, 2005). In one cross-sectional study of cancer treatment intervention trials (N = 68), only 7% reported routine collection of tobacco use information at baseline and no trial reported monitoring tobacco use during treatment follow-up .

Only a few studies have examined HRQOL in patients with lung cancer who smoke. Fewer studies have examined the effect of smoking on the HRQOL of family members. A systematic review of seven studies and one abstract from 1995–2010 examined the effect of smoking on HRQOL in patients with lung cancer (Rowland, Eiser, Rowe, & Danson, 2012). Three studies showed that smokers reported significantly impaired HRQOL compared with patients who never smoked or quit smoking (Browning, Ferketich, Otterson, Reynolds, & Wewers, 2009; Garces et al., 2004, 2009). Since the Rowland et al. (2012) review, additional studies with significant findings have been published and will be included in this review. The purposes of this article are to describe the evidence of the impact of smoking cigarettes on HRQOL in patients with lung cancer and document emerging issues, including the impact of smoking on the HRQOL on family members, as well as environmental tobacco smoke exposure.

TABLE 1. Common Withdrawal Symptoms, Causes, and Duration

Symptom	Cause	Duration
Chest tightness	Tightness is likely from the tension created by the body's need for nicotine or by sore muscles from coughing.	A few days
Constipation, stomach pain, gas	Intestinal movement decreases.	1–2 weeks
Cough, dry throat, nasal drip	The body is getting rid of mucus that has blocked airways and restricted breathing.	A few days
Cravings	Nicotine is a strongly addictive drug, and withdrawal causes cravings.	Frequent for 2–3 days; can reoccur for months or years
Depressed mood	Feeling sad for a period of time after quitting smoking is normal; many people feel a strong urge to smoke when they feel depressed.	1–2 weeks
Difficulty concentrating	The body needs time to adjust to not having constant stimulation from nicotine.	A few weeks
Dizziness	The body is getting extra oxygen.	1–2 days
Fatigue	Nicotine is a stimulant.	2–4 weeks
Hunger	Cravings for a cigarette can be confused with hunger pangs; sensation may result from cravings or the desire for something in the mouth.	Up to several weeks
Insomnia	Nicotine affects brain wave function and influences sleep patterns; coughing and dreams about smoking are common.	One week
Irritability	The body's craving for nicotine can produce irritability.	2–4 weeks

Note. From "Rx for Change," by the University of California Regents, 2012. Retrieved from http://rxforchange.ucsf.edu. Copyright 2013–2014 by the University of California Regents. Adapted with permission.

Symptomology of Lung Cancer and Smoking

Experts agree that the experience of symptoms and symptom distress affects HRQOL (Borneman & Economou, 2012). A small percentage (5%–10%) of patients with lung cancer are asymptomatic at diagnosis (Wozniak & Gadgeel, 2010). In others, presenting symptoms relate to local, regional, or distant effects of tumors. Cough, dyspnea, wheezing, chest discomfort or pain, bronchorrhea, and fatigue are common (Tyson, 2012). Lung cancer treatment (i.e., surgery, radiation, and chemotherapy) may improve or worsen symptoms. Symptoms may be exacerbated by smoking or tobacco withdrawal. Withdrawal elicits various physical and psychological symptoms that can temporarily intensify symptom burden (see Table 1). Most withdrawal symptoms manifest within the first 1–2 days, peak within one week, and subside within 2–4 weeks (University of California Regents, 2012). Overall, patients with lung cancer experience more symptom distress than patients with other cancer types (Cooley, 2000). Therefore, the patient's smoking status and environmental tobacco smoke exposure should be considered as possible factors affecting the intensity of their symptoms.

Smoking Status and Tobacco Dependence

Although no universally accepted definition exists for smoking status or tobacco dependence,

clearly describing and classifying research participants is crucial to understanding and translating findings. In clinical practice, defining smoking status helps accurately identify smokers, assess the impact of smoking, and recommend treatment. Most studies included in the systematic review by Rowland et al. (2012) organized smoking behavior into only three categories: current, former, and never. Some researchers included a score calculated using the Fagerström Test for Nicotine Dependence (Heatherton, Kozlowski, Frecker, & Fagerström, 1991) to ascertain additional information regarding nicotine dependence levels. In a study by Chen et al. (2012), smokers were categorized by the timing of smoking cessation: early quitters (more than one year prior to diagnosis), recent quitters (one year or less prior to diagnosis), late quitters (more than one year post-diagnosis), or never quit. Because nicotine addiction is a complex chronic illness, smoking status is likely to vary over time. For example, a patient with a suspicious mass may make a decision to stop smoking prior to surgery, only to relapse

TABLE 2. Quantitative HRQOL Instruments

Instrument	Description	Domains
EORTC QLQ-C30 (version 3) Type: Specific to cancer Items: 30 (Aaronson et al., 1993)	• Designed for use with a wide range of patient populations with cancer and is intended to be supplemented by more specific questionnaire modules. • Self-administered; reading level not specified • Takes 10–15 minutes to complete • Recall period is the prior week	Nine scales: one global health status (two items), five functional scales (physical, emotional, role, social, cognitive), plus three symptom scales: fatigue (three items), pain (two items), nausea and vomiting (two items), and six single items (dyspnea, appetite loss, insomnia, constipation, diarrhea, financial consequences of disease)
EORTC QLQ-LC13 Type: Specific to lung cancer Items: 13 (Bergman et al., 1994)	• Intended to supplement the EORTC QLQ-C30 • Self-administered; Reading level not required • Takes 2–3 minutes to complete • Recall period is the prior week	One scale: lung cancer-related symptoms and treatment-specific symptoms, including coughing (one item), hemoptysis (one item), dyspnea (three items), sore mouth or tongue (one item), trouble swallowing (one item), tingling hands and feet (one item), hair loss (one item), experience of pain (three items), and pain medication (one item)
FACT-L Type: Specific to cancer and lung cancer Items: 44 (Cella et al., 1995)	• Four versions; version 4 adds two questions about smoking history and level of regret in regard to smoking. • Can be self- or telephone-administered • Recall period is past seven days • Requires a sixth-grade reading level • Takes eight minutes to complete	Two parts: Part 1 is a 34-item core measure of general HRQOL (FACT-G) that has five subscales: PWB (seven items), SWB (eight items), EWB (six items), FWB (seven items), and relationship with the physician. Part 2 consists of the LCS (seven items), which focuses on shortness of breath, weight loss, clear thinking, coughing, good appetite, chest tightness, and easy breathing.
LCSS Type: Specific to lung cancer Items: 9 (Hollen et al., 1994)	• Comes in an electronic version and a version for patients with mesothelioma • Can be self- or telephone-administered • Recall period is the prior 24 hours • Requires a second-grade reading level • Takes an average of eight minutes to complete initially; only 3–5 minutes for repeated administrations	Two instruments: One for patients and one for health professionals as observers. Both focus on physical and functional domains. The patient scale has nine items: six functional analog scales (appetite, fatigue, cough, dyspnea, hemoptysis, and pain) and three summation items related to total symptomatic distress, activity status, and overall HRQOL.
SF-12 Type: Generic Items: 12 (Ware, 1996)	• Two versions: original and version 2 • Requires a sixth-grade reading level • Takes 2–3 minutes to complete • Designed to be an alternative to the SF-36	Two scales: PCS and MCS. Eight domains: physical functioning (two items), role limitations due to physical problems (two items), bodily pain (one item), general health status (one item), vitality (one item), social functioning (one item), role limitations due to emotional problems (two items), and mental health (two items).
SF-36 Type: Generic Items: 36 (Ware & Sherbourne, 1992)	• Two versions: original and version 2 • Can be self-administered or administered by an interviewer, a computer, over the telephone, electronically, or interactively by voice response • Two recall periods: The standard version recalls over the past four weeks; the acute version recalls the past week • Standard version is recommended for one-time use only, or when at least four weeks pass prior to readministration • Requires a sixth-grade reading level • Takes 5–10 minutes to complete	Two scales: PCS and MCS Eight domains: physical functioning (10 items), role limitations due to physical problems (four items), body pain (two items), general health perceptions (five items), vitality (four items), social functioning (two items), role limitations due to emotional problems (three items), mental health (five items), and reported health transition (one item)

EORTC QLQ-C30—European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 Questionnaire; EORTC QLQ-LC13—European Organisation for the Research and Treatment of Cancer Quality of Life Lung Cancer 13 Questionnaire; EWB—emotional well-being; FACT-G—Functional Assessment of Cancer Therapy–General; FACT-L—Functional Assessment of Cancer Therapy–Lung; FWB—functional well-being; HRQOL—health-related quality of life; LCS—lung cancer subscale; LCSS—Lung Cancer Symptom Scale; MCS—mental component summary; PCS—physical component summary; PWB—physical well-being; SWB—social and family well-being

TABLE 3. Research on HRQOL in Patients With Lung Cancer and Their Family Members

Study	Sample	Instruments	Findings
Balduyck et al., 2011	Prospective, longitudinal study in Belgium on patients with NSCLC (N = 70). Participants were recruited preoperatively and followed for 12 months. Fifty percent were current smokers and 8% were recent quitters (i.e., patients who stopped smoking between diagnosis and surgery).	EORTC QLQ-C30, EORTC QLQ-LC13	Recent quitters had a longer impairment in physical functioning (six months postoperatively, $p = 0.01$) and burden of dyspnea (three months postoperatively, $p = 0.02$); current smokers experienced no return to baseline physical ($p = –0.01$), role ($p = 0.01$), and social functioning ($p = 0.02$), as well as a persistent increase in dyspnea ($p = 0.04$) occurring in 12 months. Current smokers reported increased thoracic pain ($p = 0.02$) in 12 months and fatigue during the first three months postoperatively.
Browning et al., 2009	Prospective, longitudinal study in the United States with 51 patients (78% had NSCLC) recruited postoperatively and followed for six months. Sixty-eight percent had extensive disease and all were current smokers.	LCSS, FACT-L	The mean scores for the FACT-L and its components and for the LCSS corresponded with a lower (worse) HRQOL than reported mean scores in Garces et al. (2004).
Chen et al., 2012	Prospective, longitudinal study in the United States of 223 patients with SCLC (38% extensive disease). Fifty-three percent were current smokers (tobacco use within the same year as diagnosis). A matched control group (n = 334) was used.	LCSS	Smoking status had a significant impact on overall HRQOL and on each symptom when compared to a matched lung cancer-free control group; mean overall HRQOL in smokers was lower (worse) than controls ($p < 0.0001$); late or never quitters reported the worst scores; recent quitters showed an improving trend in HRQOL.
Garces et al., 2004	Cross-sectional study in the United States with 1,028 patients, 92% of whom had NSCLC (77% had localized disease) and 8% had SCLC. Sixty-nine percent had limited disease and were recruited six months to three years after diagnosis. Twenty-four percent were current smokers at diagnosis and 30% continued to smoke.	LCSS	Smokers had significantly worse HRQOL than never smokers ($p < 0.0001$); former smokers and abstinent smokers had HRQOL scores similar to never smokers; seven of the LCSS components (appetite, fatigue, cough, shortness of breath, lung cancer symptoms, illness affecting normal activities, and overall QOL) were clinically and statistically different between never smokers and smokers ($p < 0.001$).
Garces et al., 2009 (abstract)	Prospective, longitudinal study in the United States of 869 patients who were followed for 11 years. Of those, 429 patients completed a short-term (less than three years) and long-term (more than five years) one-item HRQOL assessment. Six percent were current smokers and 75% were former smokers.	LCSS	The HRQOL of all smoking groups (never, former, and current) was different before the three-year survivor mark ($p < 0.0001$) and declined significantly when assessed at the five year mark ($p < 0.0001$).
Lemonnier et al., 2011	Cross-sectional study in France of 171 patients newly diagnosed with an SPN. Sixty-six percent were current smokers and 23% had a malignant SPN, with 85% of those being current smokers. A general population comparison group (n = 17,750) was used.	SF-36	Those with a malignant SPN had significantly lower HRQOL scores on three of the eight domains: physical role ($p = 0.04$), emotional role ($p = 0.02$), and vitality ($p = 0.04$). These individuals also had lower mean scores for mental health ($p = 0.06$) and social functioning ($p = 0.05$). Compared to the general population, those with an SPN had a significantly lower HRQOL ($p < 0.001$); smoking status was related to a lower mean score for all dimensions ($p < 0.001$). These results did not differ by group (malignant versus benign).
Myrdal et al., 2003	Cross-sectional study in Sweden of 112 patients who underwent lung surgery. Eighty-four percent had stage I or II disease and 11% were current smokers.	SF-36	Smokers after surgery for lung cancer had significantly lower scores for mental health ($p = 0.003$), vitality ($p = 0.027$), and mental components summary ($p = 0.003$); a significant correlation was noted between reduced lung volume (less than 60% before surgery) and the physical summary components score ($p = 0.05$).

(Continued on the next page)

EORTC QLQ-C30—European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 Questionnaire; EORTC QLQ-LC13—European Organisation for the Research and Treatment of Cancer Quality of Life Lung Cancer 13 Questionnaire; FACT-L—Functional Assessment of Cancer Therapy–Lung; HRQOL—health-related quality of life; LCSS—Lung Cancer Symptom Scale; NSCLC—non-small cell lung cancer; SCLC—small cell lung cancer; SPN—solitary pulmonary nodule

TABLE 3. Research on HRQOL in Patients With Lung Cancer and Their Family Members *(Continued)*

Study	Sample	Instruments	Findings
Ozturk et al., 2009	Cross-sectional study in Turkey of 28 survivors (25–125 months) treated with radical or postoperative radiation therapy. Fifty-seven percent had stage II or III disease; 21% were exposed to environmental tobacco smoke within the prior week. Median consumption was 40 cigarettes per day (range = 0–102 per day).	EORTC QLQ-C30	The amount of smoking (number of pack years) was unrelated to HRQOL ($p > 0.05$). Environmental tobacco smoke correlated with appetite loss ($p = 0.02$).
Sarna et al., 2006	Cross-sectional study in the United States consisting of 51 dyads. All were female patients with NSCLC, including 35% with advanced disease and 4% who were current smokers. Other members of the dyads were spouses (57%), male (65%), and current smokers (18%). The mean time since patient diagnosis was 22 months (SD = 17, range = 6–60). More than 75% of patients and about 50% of family members had a history of smoking.	SF-36	Family members were significantly more likely to be current smokers. Current smoker status was not significantly related to HRQOL in either the physical or mental components.
Sloan et al., 2012	Prospective, longitudinal study in the United States of 2,442 patients with NSCLC. Participants were examined within the first six months of diagnosis and yearly thereafter. Current smokers made up 13% of the sample; recent quitters made up 17% at the first QOL assessment.	LCSS (used only one item)	Clinically significant HRQOL deficits were reported by 510 patients (21%), including current smokers (16%) and recent quitters (20%). Smoking status, smoking cessation, and pack years smoked were associated with an overall QOL deficit ($p < 0.001$) within six months of diagnosis.
Weaver et al., 2011	Cross-sectional study in the United States of 383 (52%) dyads where the patient was diagnosed with lung cancer. At baseline, 19% of patients and 25% of caregivers were current smokers; 7% of both dyad members were current smokers. The majority of caregivers were female, spouses, and household members.	SF-12	Family members who were members of dyads, where one or both members continued to smoke, reported worse mental HRQOL than nonsmoking dyads; dyad smoking was less strongly associated with physical HRQOL for patients and caregivers.

EORTC QLQ-C30—European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 Questionnaire; EORTC QLQ-LC13—European Organisation for the Research and Treatment of Cancer Quality of Life Lung Cancer 13 Questionnaire; FACT-L—Functional Assessment of Cancer Therapy–Lung; HRQOL—health-related quality of life; LCSS—Lung Cancer Symptom Scale; NSCLC—non-small cell lung cancer; SCLC—small cell lung cancer; SPN—solitary pulmonary nodule

immediately after discharge. Therefore, assessing tobacco use and exposure at diagnosis and repeatedly throughout the continuum of care is important.

In addition, smoking status information usually is self-reported and smokers sometimes are reluctant to discuss their smoking status. Feelings of guilt and shame, fear of being stigmatized, or fatalism about their survival may influence the accuracy of self-reported smoking status (Cataldo, Jahan, & Pongquan, 2011). Biochemical verification sometimes is used to objectively measure and confirm smoking status. Several verification procedures assess the presence of cotinine using urine, blood, or saliva; other procedures assess expired carbon monoxide levels. The costs and benefits of objective measurement need to be considered to determine if they are justified (Gorber, Schofield-Hurwitz, Hardt, Levasseur, & Tremblay, 2009).

Health-Related Quality-of-Life Measurements

Evaluating HRQOL helps professional caregivers understand patient and family member experiences with the many issues involved in a cancer diagnosis. Measuring HRQOL also helps patients and family members to understand their own experiences over time and to communicate concerns. Numerous feasible, reliable, and valid HRQOL instruments exist. The Patient-Reported Outcome and Quality of Life Instruments Database (www.proqolid.org) lists more than 1,000 instruments. Instruments typically are classified as generic, disease-specific, or condition-specific. The current review used four HRQOL instruments (see Table 2). The Medical Outcomes Study SF-36® and SF-12® were used with patients and family members (Ware, 1996; Ware & Sherbourne, 1992). Disease-specific core measures included the Functional Assessment of Cancer Therapy–General

TABLE 4. Steps for Choosing a Health-Related Quality-of-Life Instrument for Research and Practice

Step 1	**Compare** the key features of the measures of interest	Focus Number of items Type of response format Time frame for assessment Domains assessed Inclusion of therapy-related side effects Other unique features Available languages
Step 2	**Compare** the feasibility of the instruments of interest	Self-reporting style Short administration time Low reading level Patient and staff acceptance Multi-site utility
Step 3	**Evaluate** the reliability of each measure	Internal consistency Stability Equivalence
Step 4	**Examine t**he support for validity	Content validity Construct validity Criterion-related validity
Step 5	**Determine** whether a minimal important difference has been established	Interpretation or cut-off scores
Step 6	**Refer** to the normative data	Published statistical information describing scores from a defined population can act as a reference group and aid in interpretation

Note. From "Quality of Life Assessments: The Challenge of Incorporating Quality-of-Life and Patient-Reported Outcomes Into Investigative Trials and Clinical Practice," by R. Gralla & P. Hollen (p. 65). In I.N. Oliver (Ed.), *The MASCC Textbook of Cancer Supportive Care and Survivorship,* 2011, New York, NY: Springer Science+Business Media. Copyright 2011 by the Multinational Association for Supportive Care in Cancer Society. Reprinted with permission.

(FACT-G) and the European Organisation for the Research and Treatment of Cancer Quality of Life Core 30 Questionnaire (EORTC QLQ-C30), version 3.0. Condition-specific instruments focus on symptoms and specifically evaluate lung cancer characteristics. The Lung Cancer Symptom Scale (LCSS) and two lung cancer modules (EORTC QLQ-LC13 and FACT-L [version 3.0]) were used in combination with their respective core measure (Aaronson et al., 1993; Bergman, Aaronson, Ahmedzai, Kaasa, & Sullivan, 1994; Cella et al., 1995; Hollen, Gralla, & Kris, 1994).

Findings

Four studies (see Table 3) used generic instruments (SF-36 and SF-12) with patients with pulmonary nodules or localized disease, short- and long-term survivors, as well as their family members (Lemonnier et al., 2011; Myrdal, Valtysdottir, Lambe, & Stahle, 2003; Sarna et al., 2006; Weaver, Rowland, Augustson, & Atienza, 2011). Two studies showed statistically significant findings. Patients with a pulmonary nodule who were current smokers had lower mean scores for all eight domains, regardless of whether the diagnosis was malignant or benign (Lemonnier et al., 2011). For patients with stages I or II lung cancer who underwent surgery, being a current smoker was associated with lower scores for mental health and vitality (Myrdal et al., 2003).

Seven studies used disease-specific instruments to measure HRQOL along the continuum of newly diagnosed to long-term survivors. In a study by Balduyck et al. (2011), 70 patients were recruited preoperatively and followed for 12 months postoperatively. Thirty-five were current smokers and six (8%) were recent quitters, meaning they had stopped smoking after diagnosis but before their surgery date. Recent quitters experienced a significantly greater burden of dyspnea at three months and longer impairment of physical functioning at six months. No return to baseline physical functioning, role, or social functioning occurred for current smokers, and a persistent increase in dyspnea occurred during a 12-month period. Among 1,028 long-term lung cancer survivors (77% localized disease), current smokers had significantly worse HRQOL than never smokers at six months to five years after diagnosis. Seven LCSS items (i.e., appetite, fatigue, cough, shortness of breath, lung cancer symptoms, illness affecting normal activities, and overall QOL) were clinically and statistically different for never smokers and current smokers (Garces et al., 2004). Fifty-one newly diagnosed current smokers (32% localized disease) were compared by disease stage and treatment status using the LCSS and FACT-L with long-term lung cancer survivors. The mean scores reported for the FACT-L and the LCSS corresponded to lower HRQOL (Browning et al., 2009). The largest sample of patients (N = 2,442) included 300 current smokers (13%) and 420 recent quitters (17%). Only one LCSS item was used to assess HRQOL. Clinically significant HRQOL deficits were reported by 510 (21%). Smoking status, smoking cessation, and pack years were associated with an overall HRQOL deficit within six months postdiagnosis (Sloan et al., 2012).

Only one study focused on patients with SCLC (N = 223, 38% with extensive disease). Current smokers (53%) were defined as those using tobacco within a year of diagnosis. Compared to a lung cancer-free group, current smoker status had a statistically significant impact on overall HRQOL and individual symptoms on the LCSS. Among those with SCLC, former smokers had the best HRQOL, recent quitters showed improvement, and late or never quitters reported the worst HRQOL (Chen et al., 2012).

Emerging Issues

Two studies expanded the scope of HRQOL research to include family members. Smoking is an important example of a health behavior that clusters in families (Ozakinci, Wells, Williams, Munro, & Donnelly, 2010). Evidence from one cooperative group study suggests that a patient with lung cancer who smokes has, on average, two relatives who smoke (Schilling et al., 1997). For one group of 50 survivors, only 4% were current smokers. However, their relatives were significantly more likely to continue smoking cigarettes (18%) and drink alcohol (71%) (Sarna et al., 2006). Smoking may be a concern for family members who live with patients with lung cancer (Weaver et al., 2011). One study explored the concordance of patient and family member

smoking statuses and their effect on family member HRQOL. In 383 dyads of lung cancer survivors in which one or both members continued smoking, family members reported worse mental health (Weaver et al., 2011).

Environmental tobacco smoke is a carcinogen with serious short- and long-term health effects. Strong evidence suggests that no environmental tobacco smoke exposure level is risk-free (U.S. Department of Health and Human Services [USDHHS], 2006). Because of significant progress in restricting environmental tobacco smoke in public places and work sites, homes have become the predominant locations for environmental tobacco smoke exposure (USDHHS, 2006). Regardless of smoking status, exposing patients with lung cancer and their family members to environmental tobacco smoke may adversely affect HRQOL (Sarna et al., 2006). Only two studies examining HRQOL assessed environmental tobacco smoke. In one study of 51 dyads, 20% of lung cancer survivors and 42% of family members acknowledged environmental tobacco smoke exposure. In a smaller study, 21% of lung cancer survivors reported environmental tobacco smoke exposure that correlated with appetite loss on the EORTC QLQ-C30 (Ozturk, Sarihan, Ercan, & Karadag, 2009). Environmental tobacco smoke is known to cause coughing, wheezing, chest tightness, and reduced lung function in adults and should be considered a potential factor when assessing smoking status (USDHHS, 2006) and symptom burden.

Implications for Clinical Practice

Health-Related Quality-of-Life Assessment

Acquiring patient and family member input can assist the healthcare team, including oncology nurses, with understanding the balance between perception of benefit and burden. Assessing HRQOL as part of routine clinical practice is an important new trend (Varricchio & Ferrans, 2010). In clinical settings, such assessments can aid in evaluating a response of interest, planning care, selecting interventions, facilitating informed treatment decisions, and enhancing care to maximize positive outcomes. Oncology nurses can be advocates for integrating HRQOL measurement into patient care settings. Gralla and Hollen (2011) outlined six steps to choosing an HRQOL instrument (see Table 4). In clinical settings, the instrument

TABLE 5. Assessment of Cigarette Smoking, Environmental Tobacco Smoke Exposure, and Nicotine Dependence

Tobacco Use Assessment Questions	Possible Responses	Classification
Have you smoked at least 100 cigarettes in your lifetime?	Yes No	Smoker Non-smoker
Do you currently smoke?	Yes No	Current smoker Recent quitter or former smoker
If yes, how many days of the past seven days have you smoked?	1–7 days	Current smoker
If no, how long has it been since you last smoked a cigarette, even one or two puffs?	Within the past month to within the past year More than one year	Recent quitter Former smoker
Environmental Tobacco Smoke Exposure Assessment Question	**Possible Responses**	**Classification**
Does anyone (including you) smoke cigarettes in or around your home or car?	Yes, anyone is welcome to smoke in my home or car. Anyone who wants to smoke in my home or car is restricted to smoke in a specific area only. No one is allowed to smoke anywhere in my home or car.	Exposed to environmental tobacco smoke Exposed to environmental tobacco smoke Not exposed to environmental tobacco smoke
Fagerström's Test for Nicotine Dependence[a] (current smokers only)	**Possible Responses**	**Score**
How soon after you wake up do you smoke your first cigarette?	Within five minutes 6–30 minutes of waking 31–60 minutes of waking After 60 minutes of waking	3 2 1 0
Do you find it difficult to refrain from smoking in places where it is forbidden (e.g., church, at the library, etc.)?	Yes No	1 0
Which cigarette would you hate most to give up?	The first one in the morning All other	1 0
How many cigarettes per day do you smoke?	10 or fewer 11–20 21–30 31 or more	0 1 2 3
Do you smoke more frequently during the first hours after waking than during the rest of the day?	Yes No	1 0
Do you smoke if you are so ill that you are in bed most of the day?	Yes No	1 0

[a] Sum of six items: A score of less than 4 indicates that the patient is minimally dependent on nicotine, 4–6 indicates moderate dependence, and 7–10 indicates high dependence on nicotine.

Note. From "The Fagerström Test for Nicotine Dependence: A Revision of the Fagerström Tolerance Questionnaire," by T.F. Heatherton, L.T. Kozlowski, R.C. Frecker, & K.O. Fagerström, 1991, *British Journal of Addiction, 86,* p. 1125. Copyright 1991 by Karl-Olov Fagerström. Reprinted with permission.

American Cancer Society
www.cancer.org
Free printed information on tobacco use and quitting is available. The Quit For Life® Program is a telephone-based coaching and web-based learning support service for smokers wanting to quit.

American Society of Clinical Oncology
www.cancer.net
A membership-only program for oncology providers to integrate tobacco cessation counseling services into their practice settings. An available toolkit includes an evidence-based guide for professionals, a patient companion booklet, and practice tools.

Joint Commission
www.jointcommission.org
Available resources include *Helping Patients Quit: Implementing the Joint Commission's Tobacco Measure Set in Your Hospital* (a 40-page booklet describing strategies and successful case studies) and *Keeping Your Hospital Property Smoke-Free*.

National Cancer Institute
www.cancer.gov/cancertopics/smoking
The National Cancer Institute (NCI) offers information about NCI-funded tobacco-related research, the Smoking Quitline, web content, and free smoking cessation publications.

Rx for Change: Clinician-Assisted Tobacco Cessation
www.rxforchange.ucsf.edu
A comprehensive program, hosted by the University of California School of Pharmacy, is designed to enhance tobacco cessation education among health professionals.

Surgeon General Reports
www.cdc.gov/tobacco/sgr
Since 1964, 29 reports on tobacco use and secondary smoke exposure relating to health have been published by the Office on Smoking and Health within the Centers for Disease Control and Prevention. All reports can be accessed on the Surgeon General's website.

Tobacco Free Nurses
www.tobaccofreenurses.org
Tobacco Free Nurses contains links on the website to many programs and resources, including a library of articles about smoking cessation and clinical practice guidelines.

University of Wisconsin School of Medicine and Public Health, Center for Tobacco Research and Intervention
www.ocpd.wisc.edu/tobaccome.html
This no fee program, "Tobacco Use and Dependence: An Updated Review of Treatments," is designed to educate professionals who provide healthcare to tobacco users.

U.S. Department of Health and Human Services
www.ahrq.gov/path/tobacco.htm
This agency provides access to a public health service-sponsored clinical practice guideline. The guideline contains strategies and recommendations to assist clinicians and other professionals in delivering and supporting effective treatments for tobacco use and dependence.

FIGURE 1. Tobacco-Related Resources for Oncology Nurses

should be simple, efficient, and easy to score and interpret. The specific HRQOL information needed should guide instrument selection. For patients with lung cancer, an instrument incorporating symptom measurement may be most useful. The three lung cancer-specific HRQOL instruments (EORTC QLQ-LC13, LCSS, and FACT-L) have varying advantages. The EORTC QLQ-LC13 assesses disease-related symptoms and treatment toxicities, whereas the FACT-L measures psychosocial issues with less comprehensive symptom assessment; both are long questionnaires that may be considered burdensome. The LCSS does not address treatment toxicity but is shorter, simpler, and less burdensome (Earle & Weeks, 2005). For family members, a generic instrument is more appropriate.

Symptom Management and Palliative Care

Evidence suggests that patients with lung cancer who smoke experience greater symptom distress for a longer time period. Although the dimensions of HRQOL can be discussed separately (i.e., physical, functional, psychological, social, and spiritual), a dynamic interaction exists among them (Borneman & Economou, 2012). Disturbances in physical status and symptom occurrence directly affect all aspects of HRQOL (Leo et al., 2010). Physical concerns such as uncontrolled symptoms and decreased function affect psychological well-being by heightening anxiety, depression, and frustration (Fox & Lyon, 2006; Leo et al., 2010; Stark et al., 2002). For patients with lung cancer, using a lung cancer-specific HRQOL instrument in the clinical setting allows consistent assessment of essential domains so oncology nurses can facilitate adequate symptom management and make referrals to palliative care and other resources.

Smoking Cessation and Tobacco Smoke Exposure in the Environment

Smoking cessation benefits HRQOL to some degree for both patients and family members facing a lung cancer diagnosis, regardless of disease type, stage, or phase (newly diagnosed or survivor). The issue of environmental tobacco smoke exposure also needs more attention and evaluation.

Standardizing smoking status, exposure, and nicotine dependence assessment would strengthen the usefulness of such information in clinical practice (see Table 5). The evidence suggests that patients with cancer are not getting the assistance needed to stop smoking (Cooley et al., 2009; Morgan et al., 2011). Typically, patients with cancer who try to stop smoking do so without assistance, yielding low success rates (Schnoll et al., 2004). Many cancer treatment settings do not have formal smoking cessation programs. In addition, many health professionals are unaware of the evidence and believe it is too late or too stressful for patients with cancer to stop smoking (Bowles, Tuzzio, & Wiese, 2008; Gritz, Vidrine, & Lazev, 2003; Mazza et al., 2010). However, discussing the risks of continued smoking and the benefits of cessation at the time of diagnosis and over time are critical components of the educational process that surrounds the informed consent process related to treatment decision making. Patients generally do not know the health benefits of smoking cessation specific to the course of their cancer (Ostroff & Dhingra, 2007). Family members also may lack understanding of the impact of their smoking on the patient's health and ability to remain abstinent (Gritz, Nisenbaum, Elashoff, & Holmes, 1991; Ostroff & Dhingra, 2007).

Oncology nurses can play essential roles in the assessment, intervention, and evaluation of smoking cessation practices in clinical settings (Sarna, Bialous, Chan, Hollen, & O'Connell, 2012). Patients with lung cancer and their family members may have higher nicotine dependence levels, more difficulty quitting,

Implications for Practice

- Advocate for the integration of a health-related quality-of-life assessment into clinical settings.
- Monitor patient and family member smoking status and environmental smoke exposure.
- Support development of cessation interventions to enhance health-related quality of life.

and greater stress and emotional distress, thereby suggesting the need for tailored and more intensive interventions (Cataldo, Dubey, & Prochaska, 2010). Given the known risk of environmental tobacco smoke exposure, families should be encouraged to establish smoke-free homes. Many valuable educational resources are available for nurses and patients (see Figure 1). Within diverse practice settings, oncology nurses can readily offer compelling advice to patients and family members about the risks of continued smoking and environmental tobacco smoke exposure as well as the benefits of quitting (Sarna et al., 2012).

Conclusion

Oncology nurses should reflect on the strengths and limitations of research and carefully consider the value of the evidence. Interventions designed to enhance HRQOL may lead to improved HRQOL and other positive outcomes (Sloan, 2011). Continued integration of HRQOL assessment into clinical settings, palliative care programs that assess smoking status and environmental tobacco smoke exposure of all patients with cancer, and availability of smoking cessation programs for patients and family members who smoke will transform the care of patients with lung cancer and their families.

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