

Since the 1950s researchers have been aware of a significant link between smokeless tobacco and a special form of oral cancer known as verrucous carcinoma. Nitrosornicotine, the first organic carcinogen isolated from unburned tobacco, can be abundantly identified in smoking tobacco, chewing tobacco, and snuff in high concentrations between .03 and 90 µg/g of dry tobacco.<sup>2,6</sup>

A study was recently completed at the University of Colorado School of Dentistry in an attempt to determine the prevalence and frequency of oral hard and soft-tissue alterations associated with the use of smokeless tobacco in a teenage population.<sup>7</sup> A random sampling of 1,119 high school students throughout Colorado showed that 117 were smokeless tobacco users. Four distinct clinical lesions associated with smokeless tobacco use were identified among the students: (1) three stages of clinically discernible hyperkeratotic or erythroplakic lesions of the oral mucous membranes, (2) gingival or periodontal inflammation, (3) a combination of oral soft-tissue lesions and periodontal inflammation, and (4) cervical erosion of the teeth. Over 85% of the users were Caucasian, and use ranged from 1 to 20 "dips" per day with an average duration of use among individuals who had lesions of 3.3 years.

Stringent federal controls exist for the distribution of alcohol, cigarettes and cigars. The labeling and advertising of these tobacco products is rigidly controlled by the US government; no such regulation exists for any form of smokeless tobacco, nor are there any age restrictions for its purchase.

Although in many instances surgery can effect a "cure" for oral cancer, the resultant disfigurement and loss of function are testimony to the fact that whether a carcinogen is packaged in the form of smokeless tobacco or tobacco that can be smoked, there is little doubt that the impact on the US population can be spelled CANCER.

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1. Christen AG, Swanson BZ, Glover ED, Henderson A: Smokeless tobacco: The folklore and social history of snuffing, sneezing, dipping and chewing. *JADA* 1982; 105: 821-829.

2. Christen AG: The case against smokeless tobacco: Five facts for the health professional to consider. *JADA* 1980; 101:464-469.

3. Christen AG, Armstrong WR, McDaniel RK: Intraoral leukoplakia, abrasion, periodontal breakdown and tooth loss in a snuff dipper. *JADA* 1979; 98:

584-586.

4. Pindborg JJ, Renstrup G: Studies in oral leukoplakia. II. Effect of snuff on oral epithelium. *Acta Derm Venereol* 1963; 43:271-276.

5. Smith JF, Mincer HA, Hopkins KP, Bell J: Snuff-dipper's lesion. A cytological and pathological study in a large population. *Arch Otolaryngol* 1970; 92:450-456.

6. Hoffman D: Chemical studies on tobacco smoke. Nitrosornicotine: Presence in tobacco, formation and carcinogenicity, in Walker EA, Bogovski P, Griците L (eds): *Environmental N-Nitroso Compound Analysis and Formation*. Lyon, IARC Science Publications, 1976, vol. 14, pp 307-320.

7. Greer RO Jr, Poulson TC: Oral tissue alterations associated with the use of smokeless tobacco by teenagers. *Oral Surg* 1983; 56:275-284.

## Women, smoking, and lung cancer in Connecticut

**TO THE EDITOR:** Lung cancer incidence in women has shown a steady and dramatic increase in Connecticut since 1972, according to data from the Connecticut Tumor Registry. The percentage of women smoking has also been on the rise, as indicated in surveys of smoking habits in the state. In addition, the forecast for the future is that the rise among cancer rates in women will continue into the next decade.

Connecticut's survey data seemed to indicate a slightly higher or equal percentage of female smoking than males. Smoking prevalence in a 1978 household survey (n = 4675) was compared to a second household survey in 1982 (n = 4569)<sup>1</sup> and two smaller telephone surveys (n = 500 for each) in 1981 and 1983<sup>2</sup>. The 1978 survey showed that 36.3% of males and 24% of females were smoking. By the second household survey, the gap between the sexes was closed with 31.2% of males and 31.7% of females smoking. The telephone surveys showed a 5% higher prevalence than the 1982 household survey but this difference is within the 5% confidence interval of the smaller telephone survey samples.

Data from the Connecticut Tumor Registry, the oldest population-based registry in the country (established in 1935), shows that the age-adjusted incidence rate for female lung cancer increased from 20 to 28 per 100,000 women between the two five-year diagnostic periods 1972-1976 and 1977-1981. The number of new female lung cancer cases increased by 50% from 1810 to 2723 between these two time periods. In contrast, new male lung cancer cases increased by 15% with the age-adjusted incidence rate for male lung cancer increasing from 77 to 82 per 100,000 men.

As the number of new lung cancer cases in women has increased in Connecticut between 1972 and 1981, there

has been a corresponding increase in the number of deaths from lung cancer. In 1972, 255 women died from lung cancer. During 1980, 467 women died from the disease. The age-adjusted mortality rate for female lung cancer increased from 14 to 22 per 100,000 women between the two years. This represents an increase of 83% in the number of female lung cancer deaths and an increase of 57% in the mortality rate from female lung cancer between 1972 and 1980.

Recent cancer survival data published by the SEER (Surveillance, Epidemiology, and End Results) program of the National Cancer Institute, which includes data from the Connecticut Tumor Registry, shows that only 14% of all women diagnosed as having lung cancer during the period 1973-1979 survived five years or more. The only other cancer site for females which had a worse survival picture was that of the pancreas.

Unless treatment improves survival rates substantially, we can expect to continue to see lung cancer deaths parallel lung cancer incidence rates. Surveys of smoking habits indicated that over 70% of those who smoke have done so for more than 10 years. This leaves a large pool of people at risk because morbidity and mortality rates increase after the first 5 to 15 years of smoking.

If we are to avoid this portent of death and disability, there is only one solution: Getting teenage girls never to start smoking and getting young women to stop smoking must become our number one priority.

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