

## Letter to the Editor

### THE AUTHORS REPLY

We appreciate the opportunity to respond to the letter by Dr. Rodu (1). In his letter, Rodu asks whether the female head and neck cancer (HNC) cases who used snuff were from the southern United States while the male HNC cases who used snuff were from throughout the United States. In response to this question, we have now performed analyses stratified by sex (female and male) and by region (southern United States and non-southern United States). The following International Head and Neck Cancer Epidemiology (INHANCE) studies or centers (2) were included in the “southern United

States” stratum: Houston, Texas; North Carolina (1994–1997); North Carolina (2002–2006); and the Atlanta, Georgia, center of the US Multicenter Study. All other US studies or centers were included in the “non-southern United States” stratum: Seattle, Washington; Iowa; Los Angeles, California; Baltimore, Maryland; New York, New York (Memorial Sloan Kettering Cancer Center); New York State (multicenter); and the Los Angeles, California; New Jersey; and Santa Clara/San Mateo counties, California, centers of the US Multicenter Study.

**Table 1.** Odds Ratios for Head and Neck Cancer According to Snuff Use and Cigarette Smoking, by Sex and Region, Among US Studies in the INHANCE Consortium, 1981–2006<sup>a</sup>

Sex and Snuff Use	Smoking Status							
	Never Cigarette Smokers				Ever Cigarette Smokers			
	No. of Cases	No. of Controls	OR <sup>b</sup>	95% CI	No. of Cases	No. of Controls	OR <sup>c</sup>	95% CI
<i>Non-South<sup>d</sup></i>								
Female								
Never snuff user	273	886	1.00	Referent	857	832	1.00	Referent
Ever snuff user	5	1	15.91	1.20, 211.43	1	1	0.47	0.02, 12.92
Missing data	0	0			1	0		
Male								
Never snuff user	442	1,109	1.00	Referent	2,186	2,247	1.00	Referent
Ever snuff user	4	21	0.44	0.12, 1.57	54	74	0.79	0.50, 1.24
Missing data	0	0			1	1		
<i>South<sup>e</sup></i>								
Female								
Never snuff user	118	458	1.00	Referent	444	329	1.00	Referent
Ever snuff user	15	11	11.25	2.14, 59.07	22	8	0.80	0.16, 3.90
Missing data	0	0			1	0		
Male								
Never snuff user	295	603	1.00	Referent	1,443	1,054	1.00	Referent
Ever snuff user	20	29	1.01	0.37, 2.73	90	81	0.79	0.46, 1.40
Missing data	0	0			0	0		

Abbreviations: CI, confidence interval; INHANCE, International Head and Neck Cancer Epidemiology; OR, odds ratio.

<sup>a</sup> The Boston, Massachusetts, study was excluded from analyses of snuff use because information on snuff use was not available.

<sup>b</sup> Adjusted for age (years), race/ethnicity (white, nonwhite), educational level (less than high school, high school or more), frequency of alcohol use (mL/day, truncated at the 95th percentile among alcohol drinkers to account for extreme values), duration of cigar smoking (years), and duration of pipe smoking (years). Since ORs were stratified by sex, they were not adjusted for sex.

<sup>c</sup> Adjusted for the same variables as those for never cigarette smokers, plus duration of cigarette smoking (years).

<sup>d</sup> Studies/centers included in the “non-South” region: Seattle, Washington (data collected at 2 time points: 1985–1989 (men only) and 1990–1995 (men and women)); Iowa; Los Angeles, California; Baltimore, Maryland; New York, New York (Memorial Sloan Kettering Cancer Center); New York State (multicenter); and 3 centers from the US Multicenter Study (Los Angeles County, California; New Jersey; and Santa Clara and San Mateo counties, California).

<sup>e</sup> Studies included in the “South” region: Houston, Texas; North Carolina (1994–1997); North Carolina (2002–2006); and 1 center from the US Multicenter Study (Atlanta, Georgia).

We found that the majority of HNC cases who had ever used snuff but had never smoked cigarettes, regardless of sex, were from the southern region of the United States. Among females, 15 of the 20 (75%) HNC cases who had ever used snuff but had never smoked cigarettes were from the South (Table 1). Among males, 20 of the 24 (83%) HNC cases who had ever used snuff but had never smoked cigarettes were also from the South. Differences in snuff prevalence by region do not necessarily indicate differences in the association with HNC by region. Snuff use was strongly associated with elevated HNC risk in both Southern women (odds ratio = 11.25, 95% confidence interval: 2.14, 59.07) and non-Southern women (odds ratio = 15.91, 95% confidence interval: 1.20, 211.43; Table 1). Among men, we did not observe an association between snuff use and HNC in either region.

It is important to note that the estimates presented in Table 1 are stratified according to 3 variables—cigarette smoking, sex, and region—and are therefore quite imprecise, as indicated by the very wide confidence intervals. Additional studies carried out in larger samples or among special populations (e.g., occupations in which the prevalence of smokeless tobacco use is high) are needed to more reliably assess possible modification of the association between smokeless tobacco use and HNC by sex or region. We were unable to perform analyses stratified by type of snuff, since many studies in our pooled analysis did not collect this information. Therefore, we cannot comment on whether snuff users—female or male, Southern or non-Southern—in our analysis used dry or moist snuff.

In summary, a high proportion of both female and male snuff users in our pooled analysis were from southern US studies; however, we did not observe a difference in HNC associations by region. Among never cigarette smokers, we found that snuff use was associated with elevated HNC risk in both Southern and non-Southern women.

#### ACKNOWLEDGMENTS

Conflict of interest: none declared.

#### REFERENCES

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