Smoking Initiation and Lung Cancer Latency

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A. Introduction

It is estimated than in the year 2000, approximately 550,000 people died from cancer. 23% of those deaths will have been secondary to lung cancer. Cigarette smoking is the primary risk factor for lung cancer accounting for 90% of cases in men and 75% of cases in women. A recent study demonstrated that the rates of smoking initiation among teenagers began to increase in 1993 after a decline in the eighties and early nineties. Almost more. frightening was a study by Wiencke et al. in April 1999 demonstrating that age of smoking initiation was inversely associated with DNA adduct levels. Their data suggested that smoking in adolescence may produce physiologic changes that lead to increased DNA adduct formation and increased adduct burdens even after they quit smoking compared with those who began later in life. Because of this data, I thought it would be interesting to look at age of smoking initiation and latency to lung cancer diagnosis. If the latency is decreased significantly in people who initiated smoking at younger ages, the public health implications would be great. This would also suggest that there are physiologic changes that transpire in younger smokers, that not only increases their risk of developing lung cancer, but shortens their latency to developing lung cancer.

B. Hypothesis

The latency between age of smoking initiation and diagnosis of lung cancer is shorter in people who begin smoking at an age younger than or equal to 16, than in those who began smoking at an age greater than 17.

C. Methods

The outcome to be measured is latency defined as the number of years between smoking initiation and. diagnosis with lung cancer, A study by Wells et al. (2001) showed the mean age of diagnosis to be 61.2 (+/- 9.8 yrs) with a median of 63 years. The average age of smoking initiation was determined in a study by Lando et al. (1999) to be 17.7+/-4. 1). Hence, the average latency can be estimated at 45 years (+/- 15.0).

The study design will be a prospective study to take place at CPMC. Between 1990 and 2000 there were roughly 250 new lung cancer diagnoses/year at CPMC. Given the number of subjects we will need (to be discussed in sample size) it will take approximately 2-3 years to recruit enough people into our study. To collect data and choose subjects we will design a questionnaire asking questions including age of smoking initiation, packs/day smoked (<l, 1-2, >2), age quit smoking, other cancer diagnoses, family history, asbestos exposure, radon exposure, gender. The cancers will have to be diagnosed primary lung cancers with pathologic confirmation (see subjects selection).

To analyze our data we will use a T-Test to compare mean number of years to diagnosis (latency) between the young initiators and the older initiators.

We will use a multiple regression analysis to account for confounders including gender, family history, asbestos, radon exposure, and pack years smoked.

The sample size was calculated using Cohen to achieve a power strong enough to detect a 5 year difference in latency. Knowing that the average latency is 45 years, we felt that a clinically relevant

difference between young and old initiators would be AT LEAST 5 years (or a latency less than or equal to 40years). To calculate this 5-year difference with a standard deviation of +1-15 we will need 143 patients per group or a total of 286 participants.

D. Subject Selection

The subjects will be selected from patients at CPMC with newly diagnosed lung CA beginning in June 2002. All newly diagnosed patients/potential volunteers will have to fill out a questionnaire including questions on age of smoking initiation, pock/yr smoked, age quit, gender, family history, asbestos and radon exposure, prior cancer' diagnoses, and prior radiation/chemotherapy treatment. People will be excluded if their h1mg tumor is metastatic from a known or unknown primary, if this is not their first primary lung cancer diagnosis, if they have had prior cancers treated with radiation or chemotherapy, if they have had significant asbestos/radon exposure, or their diagnosis is mesothelioma. All patients to be included must have lung CA diagnosis confirmed by pathology and pathologic/radiologic evidence of no other primary disease.