

# Family History of Cancer and Smoking Cessation, Is There a Role for Physicians?

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Received October 20<sup>th</sup>, 2011; revised November 28<sup>th</sup>, 2011; accepted December 24<sup>th</sup>, 2011

## ABSTRACT

**Aim:** This study aims to investigate the relationships among family history of cancer, physician's advice on quitting, and motivation to quit among smokers in the United State. **Method:** This study using data collected by the 2010 National Health Interview Survey. Five separate sets of multivariate logistic regression models were used to investigate the three-direction relationships among: 1) effect of family cancer history on medical doctors' advice on quitting; 2) effect of family cancer history on motivation to quit smoking; 3) effect of doctor's advice on smokers' motivation to quit. **Results:** Smoking cessation advice given by physicians has a significant effect on both smoker's motivation and action taken to quit smoking, but a large proportion of the smokers with family cancer history did not receive doctor's advice on quitting. **Conclusion:** Family history of lung cancer or other cancer types was not found to be associated with increased motivation to quit smoking. This is at least partly due to poor collection of family cancer history by physicians. This may be ameliorated by promoting the use of a recently developed self-administered tool for the collection of patient data on family cancer history in primary care settings.

**Keywords:** Primary Care; Family History; Oncology; Smoking Cessation

## 1. Introduction

Tobacco smoking causes various types of cancer, including cancers of the lung, throat, mouth, nasal cavity, esophagus, stomach, pancreas, kidney, bladder, cervix and acute myeloid leukemia [1,2]. The carcinogenic effects of smoking are preventable through smoking cessation [3], and the promotion of smoking cessation is an irreplaceable cancer prevention measure in today's world. However, exposure to tobacco smoke alone is not a sufficient condition to cause cancer (*i.e.* a large proportion of life-long smokers do not have cancers over their life time). Multiple cumulative mutational steps are required to complete the progression of a malignant tumor [4], tobacco smoke exposure would have to interact with other component causes of cancer including genetic susceptibility, carcinogenic environmental and dietary factors, and other carcinogenic exposures in order to accumulate all the required carcinogenic steps. In smokers, the presence of multiple cancer risk factors increases cancer risk further [3,5,6]. A positive family cancer history can be used to identify patients with clusters of genetic, environmental, and behavioral risk factors [7]. Smokers who have first degree relatives with a cancer diagnosis and who understand that such history indicates

higher cancer risk for themselves, may become motivated to quit as the personal relevance of risk is heightened [8]. To reduce cancer risk among smokers with a family cancer history and to promote smoke cessation, it is important to promote the awareness of cancer risk associated with family history of cancer - physicians in primary care settings are well placed to motivate these patients to quit smoking [9-11]. To perform smoking intervention using a patient's family cancer history requires the physician to routinely collect details of family history of disease but this can be very time consuming, and is usually ignored in practice [12-14]. This study aims to investigate the relationships among family history of cancer, physician's advice on quitting, and motivation to quit among smokers using data collected by the 2010 National Health Interview Survey.

## 2. Method

Data used in this study was collected by the 2010 National Health Interview Survey (NHIS). The NHIS is a multi-purpose health survey conducted by the National Center for Health Statistics to provide estimations on various health parameters of the American population [15]. Details of survey design and procedure can be found <http://www.cdc.gov/nchs/nhis.htm>. In the family

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history section of the NHIS, sampled adults were asked to provide information on positive cancer history and cancer types for first degree relatives including biological parents and full siblings.

The present study codes cancer history into three categories: 1) without cancer history; 2) with positive cancer history; 3) with positive lung cancer history for fathers, mothers and full siblings separately. The tobacco section of the NHIS collected information on current smoking status from every sampled adult (+18 yrs), and for current smokers, information on smoking cessation were collected.

In this study current smokers are defined as participants who had ever smoked at least 100 cigarettes, and were smoking daily or less often at the time of survey.

Current smokers who had seen a medical doctor in the last 12 months were asked whether in the last 12 months, he or she was advised by a physician to quit smoking. Responses to these questions were used to determine whether a participant had received advice on quitting from a medical practitioner.

Current smokers were asked whether they would like to completely quit smoking cigarettes. Responses to this question were used to define whether a participant had motivation to quit or not. Current smokers were also asked whether they had stopped smoking for one or more days in the last 12 months. Responses to this question were used to define whether a participant had tried to quit smoking in the last 12 months.

### Data Analysis

In order to investigate the effect of family history on 1) receiving advice on quitting from a medical doctor and 2) motivation to quit smoking, three separate outcomes were investigated: 1) whether smokers had received advice on quitting from a physician in the last year (No = 0;

Yes = 1); 2) whether smokers were motivated to quit smoking (No = 0; Yes = 1); 3) whether smokers had tried to quit smoking in the last year (No = 0; Yes = 1). To investigate the effect of receiving medical practitioner advice to quit smoking on smokers' motivation to quit, two outcomes were separately investigated: 1) whether smokers had motivation to quit smoking (No = 0; Yes = 1); and 2) whether smokers had tried to quit smoking in the last year (No = 0; Yes = 1).

The following demographic variables were controlled for in the multivariate analysis: age, gender, highest education level completed, health insurance cover, marital status and self rated general health status. Given that the outcomes of interest were relatively common (>20%), Poisson regression models were used in the analysis. Poisson regression models (with robust estimations of variance) are preferred over Logistic regression models, the former having being validated [16-18]. The outcomes of interest related to slightly different scopes of current smokers and samples missing answers in dependent or independent variables, therefore there were small variations in sample size (<10%) for the analyses relating to different outcomes.

### 3. Results

Using a univariate comparison, it was found that physicians were significantly (chi-square test,  $p < 0.05$ ) more likely to recommend smoking cessation to smokers whose biological father, mother or one sibling had cancer. However, in the multivariate analysis, physicians were significantly more likely to advise quitting to smokers whose father or mother had lung cancer, but did not appear to be influenced by parental history of other cancer types or cancer history among siblings (**Table 1**).

**Table 1. Effect of family cancer history on quitting advice from physician.**

Family cancer history	Received advice to quit smoking from physician		Prevalence rate ratio	95% confidence interval	
	No	Yes			
Cancer history of full sibling(s)					
With cancer	2394	1423	(base)		
With cancer but not lung cancer	239	232	1.03	0.94	1.14
With lung cancer	34	45	1.05	0.87	1.28
Cancer history of biological father					
With cancer	2190	1297	(base)		
With cancer but not lung cancer	388	297	1.03	0.93	1.13
With lung cancer	89	106	1.23	1.08	1.40
Cancer history of biological mother					
With cancer	2223	1305	(base)		
With cancer but not lung cancer	404	340	1.07	0.98	1.17
With lung cancer	40	55	1.21	1.00	1.45

It was observed that in both univariate and multivariate analysis, smokers' parental or siblings' history of cancer did not have a significant effect on their motivation to quit or action taken to quit smoking (**Table 2**). Combining cancer history from all family members together, the rate ratio (positive family history to negative family history) was 1.04 for motivation to quit and 1.05 for action taken to quit, and both estimations were not significant. Given marginally significant and similar associations were observed between cancer (lung and other types) history of mother and motivation to quit, a further analysis was performed by combining mother history of lung cancer and other cancers types together. A small but significant increased in motivation was observed (relative risk, 95% confidence interval from multivariate

analysis: 1.05, 1.002 - 1.107).

Some 39% of smokers who saw a physician at least once in the last 12 months were advised by their doctors to quit smoking, and among those who received advice on quitting, more than half had stopped smoking for at least one day in the last 12 months. Furthermore recommendation by a medical practitioner to quit smoking was significantly associated with motivation to quit and action taken to quit in both univariate and multivariate analysis (**Table 3**).

#### 4. Discussion

Smoking cessation advice given by physicians has a significant effect on both smoker's motivation and action

**Table 2. Effect of family cancer history on smokers' motivations and actions to quit.**

	Motivation to quit in the last 12 months		Prevalence rate ratio	95% confidence interval	
	No	Yes			
Family cancer history					
Cancer history of full siblings					
With cancer	1170	2602	(base)		
With cancer but not lung cancer	158	306	0.96	0.90	1.04
With lung cancer	23	56	1.07	0.93	1.24
Cancer history of biological father					
With cancer	1094	2356	(base)		
With cancer but not lung cancer	196	474	1.05	0.99	1.11
With lung cancer	61	134	1.01	0.91	1.11
Cancer history of biological mother					
With cancer	1115	2372	(base)		
With cancer but not lung cancer	213	521	1.05	0.99	1.10
With lung cancer	23	71	1.11	0.99	1.25
	Quit for $\geq 1$ day in the last 12 months				
Cancer history of full siblings					
With cancer	2007	1808	(base)		
With cancer but not lung cancer	249	221	1.07	0.96	1.19
With lung cancer	46	33	1.01	0.78	1.31
Cancer history of biological father					
With cancer	1837	1647	(base)		
With cancer but not lung cancer	363	322	1.04	0.95	1.13
With lung cancer	102	93	1.06	0.91	1.24
cancer history of biological mother					
With cancer	1850	1676	(base)		
With cancer but not lung cancer	400	343	0.99	0.91	1.08
With lung cancer	52	43	1.00	0.80	1.26

**Table 3. Effects of physician's advice on smokers' motivations and actions to quit.**

	Quit motivations in the last 12 months		Prevalence rate ratio	95% confidence interval	
Quitting advice from physician	No	Yes			
No	1015	1835			
yes	449	1376	1.18	1.14	1.23
	Quit $\geq$ 1 day in the last 12 months				
Quitting advice from physician	No	Yes			
No	1610	1273			
yes	889	956	1.20	1.13	1.28

taken to quit smoking. This concurs with observations from previous studies which indicates that doctors' advice appears to be one of the most effective measures for improving smoking cessation rate [8,9,19]. However, in practice, a considerable proportion of smokers did not receive any smoking cessation advice from their primary care providers [20,21]. This was also confirmed by the current study, with over 60% of smokers having not received advice on quitting from a medical practitioner in the last 12 months. This suggests that some physicians may themselves lack the motivation or time to enquire about smoking status and/or encourage smoking cessation among their patients and overlook opportunities to identify factors (including family cancer history) that may motivate quitting.

However collecting family history usually is part of the clinical routine, but this can be very brief [12-14]. It was observed that physicians were more likely to advise smoking cessation if the patient had a father or a mother diagnosed with lung cancer, however about 45% of the smokers with a father and/or a mother with lung cancer did not receive advice on quitting. Moreover there is no effect of full sibling history of lung cancer. This is likely to be due to that such family histories were missed out during the consultations. During the day-to-day practice, collecting details of family history of disease is time consuming, and family history may not be directly relevant to the issues of consultations, and therefore usually very brief but far from complete family history of disease is collected by physicians [12-14]. The *My Family Health Portrait* tool developed and tested by the Centers for Disease Control and Prevention (<https://familyhistory.hhs.gov/fhh-web/home.action>) may be useful in helping to overcome these barriers by enabling the collection and maintenance up-date family histories of cancer and other diseases in primary care settings prior to consultation (*i.e.* in the waiting room).

In this study we also observed that the association between smokers' family history of cancer and motivation of smoking cessation was very weak, but as discussed

above, smokers with family history of cancer may not be fully aware that their family history is related to their own personal risk of cancer. It has been noted that smokers are unlikely to be motivated by factors they do not know or believe to be relevant to them directly [22]. This further highlights the important role that physicians have in informing their patients about the relevance of family cancer histories and motivating their patients to stop smoking.

## 5. Conclusion

Family history of lung cancer or other cancer types was not found to be associated with increased motivation to quit smoking in an American population. This is at least partly due to poor collection of family cancer history by physicians. This may be ameliorated by promoting the use of a recently developed self-administered tool for the collection of patient data on family cancer history in primary care settings.

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