

SMOKING AMONG EMPLOYEES AT UNIVERSITY OF PITTSBURGH/UPMC

by

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The purpose of this study was to investigate the prevalence of smoking among workers at a major academic medical center including hospitals and other medical and health care facilities. It also was designed to investigate the prevalence of smoking among employees while at the workplace and the amount of time spent doing so. Finally, this study investigates the possible connection between the level of addiction to nicotine and the amount of time spent smoking while at work. The findings in this study may help employers target employees who smoke and assist them in efforts to quit. This study has public health significance because it may improve the health of the employees and those around them, as well as decrease costs and increase productivity. An internet-based survey questionnaire addressing the issues of smoking, demographics, the prevalence of smoking at the workplace, second-hand smoke, and level of dependence to nicotine was distributed via e-mail to employees of a major academic medical center and its affiliated university. The results of this study revealed that 12% of those that responded to the survey are current smokers and half of these individuals smoke at work. Those individuals who have been smoking for a longer period of time seem to be more likely to smoke at work and take more breaks to smoke. Those individuals who have a higher level of dependency to nicotine, according to their score on the Fagerstrom score of nicotine dependency, appear to be more likely to smoke at work, take more breaks to smoke, and have more difficulty refraining from smoking at work for one day than those with lower levels of dependency.

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1. INTRODUCTION

Cigarette smoking is one of the leading causes of death in the United States and *the* leading preventable cause of death [1]. Currently, 23.5 percent of U.S. adults (25.7 percent of men and 21.5 percent of women) smoke cigarettes. According to the 2000 National Household Survey on Drug Abuse, 4.8 percent of persons aged 12 or older (more than 10 million individuals) were current cigar users [2]. According to the US Centers for Disease Control, in 2002 about 3.5% of people aged 18 and older (6.7% of men and 0.5% of women) were current users of chewing tobacco or snuff [3]. Tobacco use is the leading preventable cause of death in the United States, responsible for more than 400,000 deaths annually, or 1 of every 5 deaths [4].

One of the many places that smoking occurs is in the workplace. Hospitals and other medical and healthcare facilities have banned smoking in certain areas, but employees who smoke often feel the need to smoke while at work. This raises the question of the prevalence of smoking among employees in these types of facilities. This is a significant issue for many reasons including: the safety of those within the building due to fire hazards, the health of those in the vicinity of the smoke, the image that it portrays to those who see the smokers near or in these facilities, and of course, the health of the smokers. One of the interesting issues is the message that healthcare professionals (physicians, dentists, nurses, etc) are portraying when patients see them smoke. This could have a negative impact on those who are trying to quit smoking. Healthcare professionals who smoke may be less likely to educate their patients about smoking cessation and those that do not smoke may serve as role models [5].

A recent study investigated smoking trends among occupational groups in the United States [6]. This revealed that physicians had the lowest prevalence of smoking among the 209 occupations studied at a rate of approximately 4%. Dentists came in at 207 with a rate of 7%.

Pharmacists came in at 205 with a rate of 11%. Registered nurses had a prevalence of 20% ranked at 161. Licensed practical nurses came in at 82 with a rate of 31%. This is in contrast to the prevalence of smoking in other countries such as Spain where one study revealed that 46% of physicians are smokers and 34% of nurses are smokers. In a study published in the Journal of the American Medical Association, the prevalence of cigarette smoking among physicians in Japan was 27.1% for men and 6.8% for women [7]. In this study, a questionnaire, a return envelope, and a letter from the board of directors of the Japan Medical Association requesting cooperation with the study, was mailed to the subjects. Three additional attempts were made if there was no response. The initial response rate was 66% and the response rate after three additional mailings was 87%. A French study investigated the issue of smoking among physicians by conducting telephone surveys with a response rate of 67% [8]. The results revealed that 32.1% of physicians surveyed were current smokers. In a study published in JAMA, the National Health Interview Study (NHIS) results from 1974 to 1991 were analyzed and the data from 1990 and 1991 revealed that the prevalence of smoking among physicians was 3.3%, 18.3% among registered nurses, and 27.2% among licensed practical nurses [9]. The NHIS is conducted by the National Center for Health Statistics of the Centers for Disease Control and Prevention. Data is collected by the US Bureau of the Census via within-household, in-person interviews [10].

In 1992, the Joint Commission on Accreditation of Healthcare Organizations began requiring accredited hospitals to disseminate and enforce hospital-wide no-smoking policies [11]. Smoke-free policies encourage smoking cessation among patients, prevent exacerbation of respiratory symptoms, and reduce the risk of fires [12]. In 1999, 86% of workers in the category of health

diagnosing/health assessment and treating were covered by a smoke-free workplace policy [13]. In the same study, 82% of health technologists and technicians were covered.

2. PURPOSE

The purpose of this study was to investigate the prevalence of smoking among workers at a major academic medical center including hospitals and other medical and health care facilities. It also was designed to investigate the prevalence of smoking among employees while at the workplace and the amount of time spent doing so. Finally, this study investigates the possible connection between the level of addiction to nicotine and the amount of time spent smoking while at work.

The findings in this study may help employers target employees who smoke and assist them in efforts to quit. This may improve the health of the employees and those around them, as well as decrease costs and increase productivity.

3. METHODS

A survey questionnaire (see Appendix 2) addressing the issues of smoking, demographics, the prevalence of smoking at the workplace, second-hand smoke, and level of dependence to nicotine was distributed to employees of a major academic medical center and its affiliated university.

The level of addiction was evaluated by utilizing the Fagerstrom test of dependence, which consists of a series of questions related to smoking behaviors. The answers to each question is assigned a numeric value and the total score for all the questions is an indication of the level of dependence to nicotine. The Fagerstrom tolerance questionnaire was validated in a study which found a positive correlation between individual item responses and total score to salivary cotinine levels [13].

The participants were limited to those employees that worked within a hospital or other medically related facility. The potential participants were selected from the university directory, which included the e-mail address, department, and building in which the individuals were located. No other information, including occupation or age, was known about the individuals at the time of selection.

The e-mail addresses of the selected individuals were entered into an Excel spreadsheet by the primary investigator. The questions in the survey to be distributed were entered into an online survey program (www.surveymonkey.com). The e-mail addresses were then exported into the same program. An introduction was included in the e-mail message as well as on the first page of the survey program. The introduction in the e-mail message included statements identifying the investigators conducting the study as well as the purpose of the study. It also included a statement of confidentiality of the individual answers provided by the participants. The e-mail message contained a link to the actual online survey at the bottom of the introductory statements. An option to receive the final results of the study upon completion was also offered to the participants.

This study was approved by the IRB at the institution at which the study was conducted prior to the onset of the study (Appendix 3). It was approved as an exempt study, which did not require a signed consent from the participants. Inclusion of an introductory script and completion of the survey by the participant implied consent on the part of the participant to use the answers they provided in this study.

The survey was available for completion for a period three weeks after the e-mails were distributed. After three weeks, the survey was closed and the responses were downloaded. The data was then imported into a data analysis software program (SPSS).

4. RESULTS

A total of 2,997 potential participants were sent e-mails using an online survey program. 351 of the 2,997 potential participants completed the survey resulting in a response rate of 11.7%.

One hundred twenty-five of the 351 respondents were male (35.6%) and 224 were female (63.8%). Two respondents did not indicate their gender when answering the survey questions.

Thirteen of the 351 respondents were between the ages of 18-25 (3.7%), 65 were between the ages of 26-35 (18.5%), 120 were between the ages of 36-45 (34.2%), 108 were between the ages of 46-55 (30.8%), and 43 were over the age of 55 (12.3%). See Table 1.

Table 1. Age

Age	Number of responses	Percent of total
No response	2	0.5
18-25	13	3.7
26-35	65	18.5
36-45	120	34.2
46-55	108	30.8
over 55	43	12.3
Total	351	100

The majority of respondents were Caucasian (87.5%). In descending order, the rest of the respondents were Asian/Pacific Islander (7.1%), African-American (1.4%), Hispanic (0.9%), and “other” (1.7%). See Table 2.

Table 2. Ethnicity

Ethnicity	Number of respondents	Percent
No response	5	1.4
Caucasian	307	87.5
African American	5	1.4
Hispanic	3	0.9
Asian/Pacific Islander	25	7.1
other	6	1.7
Total	351	100

Most of the respondents had at least a post-college education (72.6%). 20.8% had a college level education, and 5.1% had a high-school level education. See Table 3.

Table 3. Education

Education	Number of respondents	Percent
High School	18	5.1
College	73	20.8
Post- college	255	72.6
Total	346	98.6
No response	5	1.4
Total	351	100

The majority of the respondents were in the job classification of scientist/researcher (42.5%). The next largest group was that of physicians (21.9%), then clerical/administrative (16.0%), lab/medical technician (5.7%), nurse/nurse's aide (3.1%), and "other" (9.7%). See Table 4.

Table 4. Job Classification

Job classification	Number of respondents	Percent
No response	4	1.1
clerical/administrative	56	16.0
physician	77	21.9
scientist/researcher	149	42.5
nurse/nurse's aide	11	3.1
lab/medical technician	20	5.7
other	34	9.7
Total	351	100

Nineteen (5.4%) of the respondents stated that they were exposed to second-hand smoke at work.

Only 9 (2.6%) of the respondents stated that there was not an official smoking policy in the building in which they worked.

Thirty-two of the 351 (9.1%) respondents were current smokers. Of those 32 smokers, 3 (9.4%) had been smoking for between 0 and 2 years, 3 (9.4%) had been smoking for between 3 and 6 years, 4 (12.5%) had been smoking for between 7 and 10 years, and the majority (68.8%) had been smoking for more than 10 years.

Of the 32 current smokers, 50% stated that they smoked at work. Four (25%) of the 16 who smoked at work stated that they could not refrain from smoking at work for 1 day. None of the smokers stated that they smoked inside of a building at work.

Eleven of the 16 (68.8%) who smoked at work took between 0 and 2 breaks per day to smoke, 3 (18.8%) took between 3 and 5 breaks per day, 1 (6.3%) took between 5 and 7 breaks per day, and 1 individual did not respond to this question.

Ten of the 16 (62.5%) respondents who smoked at work took between 1 and 5 minutes for each smoking break, 4 (25%) took between 6 and 10 minutes per break, 1 (6.3%) took between 11 and 15 minutes per break, and 1 individual did not respond to this question.

Of the 16 respondents who smoked at work, an approximate average of 8.8 minutes per workday was spent on smoking breaks. Over the course of 1 week, this amounts to 44 minutes and over the course of 1 month it amounts to 176 minutes (2.9 hours). In one year, 2112 minutes (35.2 hours) were spent on smoking breaks.

None of the respondents between the ages of 18 and 25 were smokers, 5 (15.6%) of them were between the ages of 26 and 35, 15 of the 32 (46.9%) smokers were between the ages of 36 and 45, 7 (21.9%) were between the ages of 46 and 55, and 5 (15.6%) were over the age of 55. See Table 5.

Table 5. Relationship Between Age and Smoking (a)

		Smoker			
		No response	Yes	No	Total
Age	Number of respondents	2	0	0	2
	% within no response		0	0	0.6
18-25	Number of respondents	0	0	13	13
	% of total smokers	0	0	4.1	3.7
26-35	Number of respondents	0	5	60	65
	% of total smokers	0	15.6	18.9	18.5
36-45	Number of respondents	0	15	105	120
	% of total smokers	0	46.9	33.1	34.2
46-55	Number of respondents	0	7	101	108
	% of total smokers	0	21.9	31.9	30.8
over 55	Number of respondents	0	5	38	43
	% of total smokers	0	15.6	12.0	12.3
Total	Number of respondents	2	32	317	351
	% of total smokers	100	100	100	100

Those respondents between the ages of 36 and 45 had the highest percentage (12.5%) of smokers within each age group. There were no smokers between the ages of 18 and 25, 7.7% of those between 26 and 35, 6.5% of those between 46 and 55, and 11.6% percent of those over 55 years of age were smokers. See Table 6.

Table 6. Relationship between Age and Smoking (b)

		Smoker			
		No response	Yes	No	Total
Age	Number of respondents	2	0	0	2
	% within no response	100	0	0	100
18-25	Number of respondents	0	0	13	13
	% smokers within age group	0	0	100	100
26-35	Number of respondents	0	5	60	65
	% smokers within age group	0	7.7	92.3	100
36-45	Number of respondents	0	15	105	120
	% smokers within age group	0	12.5	87.5	100
46-55	Number of respondents	0	7	101	108
	% smokers within age group	0	6.5	93.5	100
over 55	Number of respondents	0	5	38	43
	% smokers within age group	0	11.6	88.4	100
Total	Number of respondents	2	32	317	351
	% smokers	0.6	9.1	90.3	100

Three of the 18 (16.7%) respondents with a high-school education were smokers, 11.0% of those with a college education were smokers, and 8.2% of those with post-college education were smokers. See Table 7.

Table 7. Relationship between Education and Smoking

Education		Smoker		
		Yes	No	Total
High School	Number of respondents	3	15	18
	% smokers within educational category	16.7	83.3	100
College	Number of respondents	8	65	73
	% smokers within educational category	11.0	89.0	100
Post-college	Number of respondents	21	234	255
	% smokers within educational category	8.2	91.8	100
Total	Number of respondents	32	314	346
	% smokers	9.2	90.8	100

Of note, 9.8% percent of the Caucasians were smokers and 8.0% of the Asians/Pacific Islanders were smokers, but there were very few other races represented in the respondent population. See Table 8.

Table 8. Relationship between Ethnicity and Smoking

		Smoker		No	Total
		No response	Yes		
Ethnicity	Number of respondents	2	0	3	5
	% within no response	40	0	60	100
Caucasian	Number of respondents	0	30	277	307
	% smokers within ethnicity	0	9.8	90.2	100
African American	Number of respondents	0	0	5	5
	% smokers within ethnicity	0	0	100	100
Hispanic	Number of respondents	0	0	3	3
	% smokers within ethnicity	0	0	100	100
Asian/Pacific Islander	Number of respondents	0	2	23	25
	% smokers within ethnicity	0	8	92	100
other	Number of respondents	0	0	6	6
	% smokers within ethnicity	0	0	100	100
Total	Number of respondents	2	32	317	351
	% smokers	0.6	9.1	90.3	100

Clerical/administrative workers had the highest percentage of smokers (14.3%) within a job classification, followed by lab/medical technician (10.0%), nurse/nurse's aide (9.1%), scientist/researcher (8.7%), and physicians (5.2%), and "other" (11.8%). See Table 9.

Table 9. Relationship between Job and Smoking

		Smoker			Total
		No response	Yes	No	
Job	Number of respondents	2	0	2	4
	% smokers within no response	50	0	50	100
clerical/administrative	Number of respondents	0	8	48	56
	% smokers within job	0	14.3	85.7	100
physician	Number of respondents	0	4	73	77
	% smokers within job	0	5.2	94.8	100
scientist/researcher	Number of respondents	0	13	136	149
	% smokers within job	0	8.7	91.3	100
nurse/nurse's aide	Number of respondents	0	1	10	11
	% smokers within job	0	9.1	90.9	100
lab/medical technician	Number of respondents	0	2	18	20
	% smokers within job	0	10	90	100
other	Number of respondents	0	4	30	34
	% smokers within job	0	11.8	88.2	100
Total	Number of respondents	2	32	317	351
	% smokers	0.6	9.1	90.3	100

Five of the 56 (8.9%) clerical/administrative workers were exposed to second-hand smoke at work. One of the 11 (9.1%) nurse/nurse's aides, 4 of the 77 (5.2%) physicians, 1 of the 20 (5.0%) lab/medical technicians, 6 of the 149 (4.0%) scientist/researchers, and 2 of the 34 (5.9%) "other" workers were exposed to second-hand smoke at work. See Table 10.

Table 10. Relationship between Job and Second-hand smoke

		Second-hand smoke			
		No response	Yes	No	Total
Job	Number of respondents	2	0	2	4
	% within no response	50	0	50	100
clerical/administrative	Number of respondents	0	5	51	56
	% exposed within job	0	8.9	91.1	100
physician	Number of respondents	0	4	73	77
	% exposed within job	0	5.2	94.8	100
scientist/researcher	Number of respondents	0	6	143	149
	% exposed within job	0	4.0	96	100
nurse/nurse's aide	Number of respondents	0	1	10	11
	% exposed within job	0	9.1	90.9	100
lab/medical technician	Number of respondents	0	1	19	20
	% exposed within job	0	5	95	100
other	Number of respondents	0	2	32	34
	% exposed within job	0	5.9	94.1	100
Total	Number of respondents	2	19	330	351
	% of total	0.6	5.4	94.0	100

Six of the 56 (10.7%) clerical/administrative workers, 7 of the 149 (4.7%) scientist/researchers, 1 of the 20 (5.0%) lab/medical technicians, and 2 of the 34 (5.9%) "other" workers smoked at work. None of the physicians or nurse/nurse's aides reported that they smoked at work. See Table 11.

Table 11. Relationship between Job and Smoking at work

		Smoke at work			
		No response	Yes	No	Total
Job	Number of respondents	4	0	0	4
	% that smoke at work within job	100	0	0	100
clerical/administrative	Number of respondents	25	6	25	56
	% that smoke at work within job	44.6	10.7	44.6	100
physician	Number of respondents	37	0	40	77
	% that smoke at work within job	48.1	0	51.9	100
scientist/researcher	Number of respondents	66	7	76	149
	% that smoke at work within job	44.3	4.7	51.0	100
nurse/nurse's aide	Number of respondents	4	0	7	11
	% that smoke at work within job	36.4	0	63.6	100
lab/medical technician	Number of respondents	11	1	8	20
	% that smoke at work within job	55	5	40	100
other	Number of respondents	12	2	20	34
	% that smoke at work within job	35.3	5.9	58.8	100
Total	Number of respondents	159	16	176	351
	% that smoke at work	45.3	4.6	50.1	100

Five of the 16 (31.3%) employees that smoked at work were between the ages of 26 and 35. Five of the 16 (31.3%) were between the ages of 46 and 55, and 6 of the 16 (37.5%) that smoked at work were between the ages of 36 and 45. See Table 12.

Table 12. Relationship between Age and Smoking at work

		Smoke at work			
		No response	Yes	No	Total
Age	Number of respondents	2	0	0	2
	% that smoke at work within no response	100	0	0	100
18-25	Number of respondents	7	0	6	13
	% that smoke at work within age group	53.8	0	46.2	100
26-35	Number of respondents	25	5	35	65
	% that smoke at work within age group	38.5	7.7	53.8	100
36-45	Number of respondents	49	6	65	120
	% that smoke at work within age group	40.8	5	54.2	100
46-55	Number of respondents	57	5	46	108
	% that smoke at work within age group	52.8	4.6	42.6	100
over 55	Number of respondents	19	0	24	43
	% that smoke at work within age group	44.2	0	55.8	100
Total	Number of respondents	159	16	176	351
	% that smoke at work	45.3	4.6	50.1	100

All of the smokers in the age categories of 26 to 35 and 46 to 55 smoked at work. Six of the 15 (40%) smokers between the age of 36 and 45 smoked at work and none of the smokers over the age of 55 smoked at work.

Five of the 16 (31.3%) employees that smoked at work were males and 11 (68.7%) were females. See Table 13.

Table 13. Relationship between Gender and Smoking at work

		Smoke at work			
		No response	Yes	No	Total
Gender	Number of respondents	2	0	0	2
	% smoke at work within no response	100	0	0	
Male	Number of respondents	52	5	68	125
	% of those who smoked at work	32.7	31.3	38.6	
Female	Number of respondents	105	11	108	224
	% of those who smoked at work	66.0	68.7	61.4	
Total	Number of respondents	159	16	176	351
	% within gender	45.3	4.6	50.1	100

Also, 5 of the 12 (41.7%) male smokers smoked at work and 11 of the 20 (55%) female smokers smoked at work.

Two of the 3 (66.7%) smokers who have been smoking for up to 2 years smoked at work. One of the 3 (33.3%) who have been smoking between 3 and 6 years, 2 of the 4 (50%) who have been smoking between 7 and 10 years, and 11 of the 22 (50%) who have been smoking for more than 10 years smoked at work. See Table 14.

Table 14. Relationship between Years of smoking and Smoking at work

		Smoke at work		Total	
		No response	Yes	No	
Years of smoking	Number of respondents	155	0	133	288
	% within no response	53.8	0	46.2	100
0 - 2	Number of respondents	4	2	28	34 ^a
	% smoking 0-2 years	11.8	5.9	82.4	100
3 - 6	Number of respondents	0	1	2	3
	% smoking 3-6 years	0	33.3	66.7	100
7 - 10	Number of respondents	0	2	2	4
	% smoking 7-10 years	0	50	50	100
> 10	Number of respondents	0	11	11	22
	% smoking > 10 years	0	50	50	100
Total	Number of respondents	159	16	176	351
	% smokers	45.3	4.6	50.1	100

a. Many of these respondents were non-smokers who responded to this question

Two of the 16 (12.5%) who smoked at work had been smoking for up to 2 years, 1 (6.3%) had been smoking for 3 to 6 years, 2 (12.5%) had been smoking for 7 to 10 years and 11 (68.8%) had been smoking for more than 10 years.

Of all the categories of numbers of years of smoking, only those who had been smoking for more than 10 years took breaks more than twice per day to smoke. See Table 15.

Table 15. Relationship between Years of smoking and Number of smoke breaks per day

		Number of breaks				
		No response	0 - 2	3 - 5	5 - 7	Total
Years of smoking	Number of respondents	287	1	0	0	288
	% within no response	99.7	0.3	0	0	100
0 - 2	Number of respondents	20	14	0	0	34 ^a
	% smoking 0-2 years	58.8	41.2	0	0	100
3 - 6	Number of respondents	1	2	0	0	3
	% smoking 3-6 years	33.3	66.7	0	0	100
7 - 10	Number of respondents	2	2	0	0	4
	% smoking 7-10 years	50	50	0	0	100
> 10	Number of respondents	4	14	3	1	22
	% smoking > 10 years	18.2	63.6	13.6	4.5	100
Total	Number of respondents	314	33	3	1	351
	% smokers	89.5	9.4	0.9	0.3	100

a. Many of these respondents were non-smokers who responded to this question

There did not seem to be a correlation between the number of years smoked and the amount of time spent on each smoke break. See Table 16.

Table 16. Relationship between Years of smoking and Minutes per smoke break

Years of smoking		Minutes per smoke break				Total
		No response	1-5	6-10	11-15	
	% within no response	100	0	0	0	100
	Number of respondents	288	0	0	0	288
0 - 2	Number of respondents	29	4	1	0	34
	% smoking 0-2 years	85.3	11.8	2.9	0	100
3 - 6	Number of respondents	1	1	1	0	3
	% smoking 3-6 years	33.3	33.3	33.3	0	100
7 - 10	Number of respondents	2	1	0	1	4
	% smoking 7-10 years	50	25	0	25	100
> 10	Number of respondents	8	12	2	0	22
	% smoking > 10 years	36.4	54.5	9.1	0	100
Total	Number of respondents	328	18	4	1	351
	% smokers	93.4	5.1	1.1	0.3	100

The mean Fagerstrom score for those who smoked at work was higher (10.5) than those who did not smoke at work (8.9), which indicates that those who smoked at work were more dependent on nicotine than those that did not smoke at work. See Table 17 and Figure 1.

Table 17. Relationship between Mean Fagerstrom score and Smoking at Work

Smoke at work	Mean Fagerstrom Score		
	Mean	N	Std. Deviation
Yes	10.5	15	1.06
No	8.9	15	3.48
Total	9.7	30	2.67

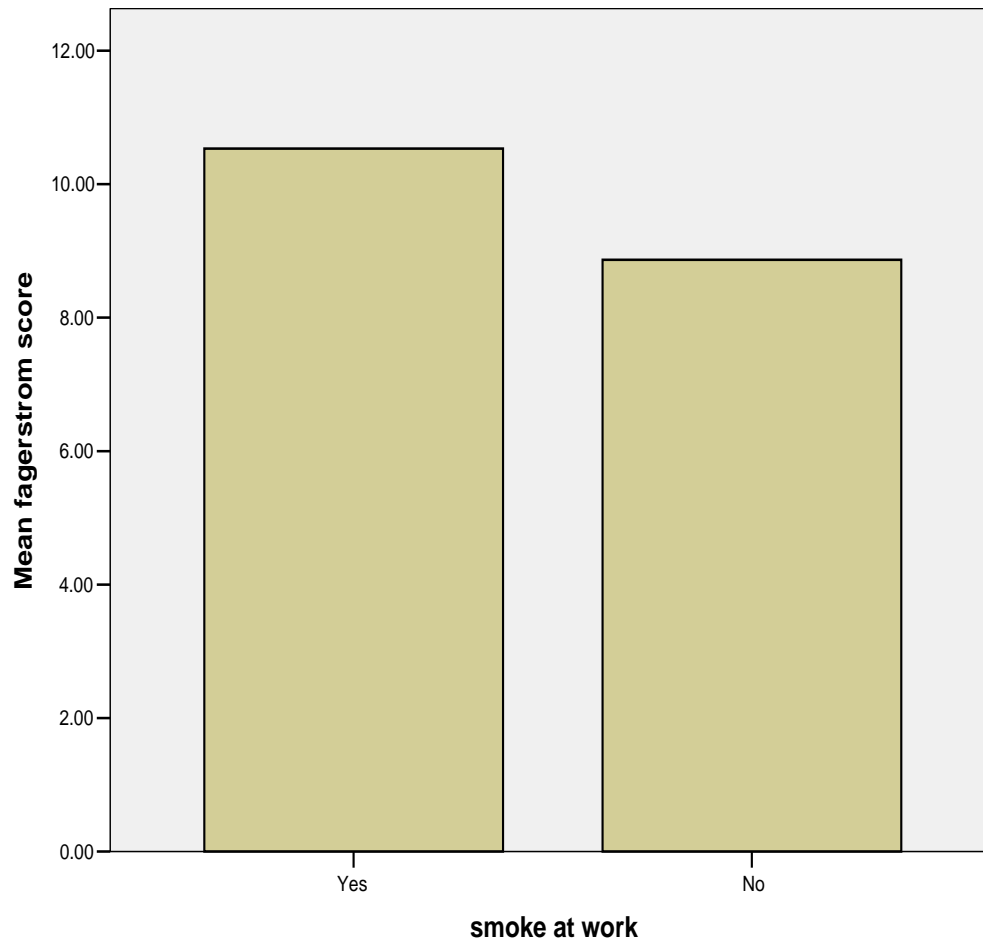


Figure 1. Relationship between Mean Fagerstrom score and Smoking at work

The mean Fagerstrom score was higher for those who could not refrain from smoking at work for 1 day (10.0) than those who could refrain from smoking at work for 1 day (9.3), which indicates that those who could not refrain were more dependent on nicotine than those who could refrain. See Table 18 and Figure 2.

Table 18. Relationship between Mean Fagerstrom score and ability to abstain from smoking at work for 1 day

	Fagerstrom score		
1 day w/o smoking at work	Mean	N	Std. Deviation
Yes	9.3	18	3.36
No	10	5	0.71
Total	9.5	23	2.98

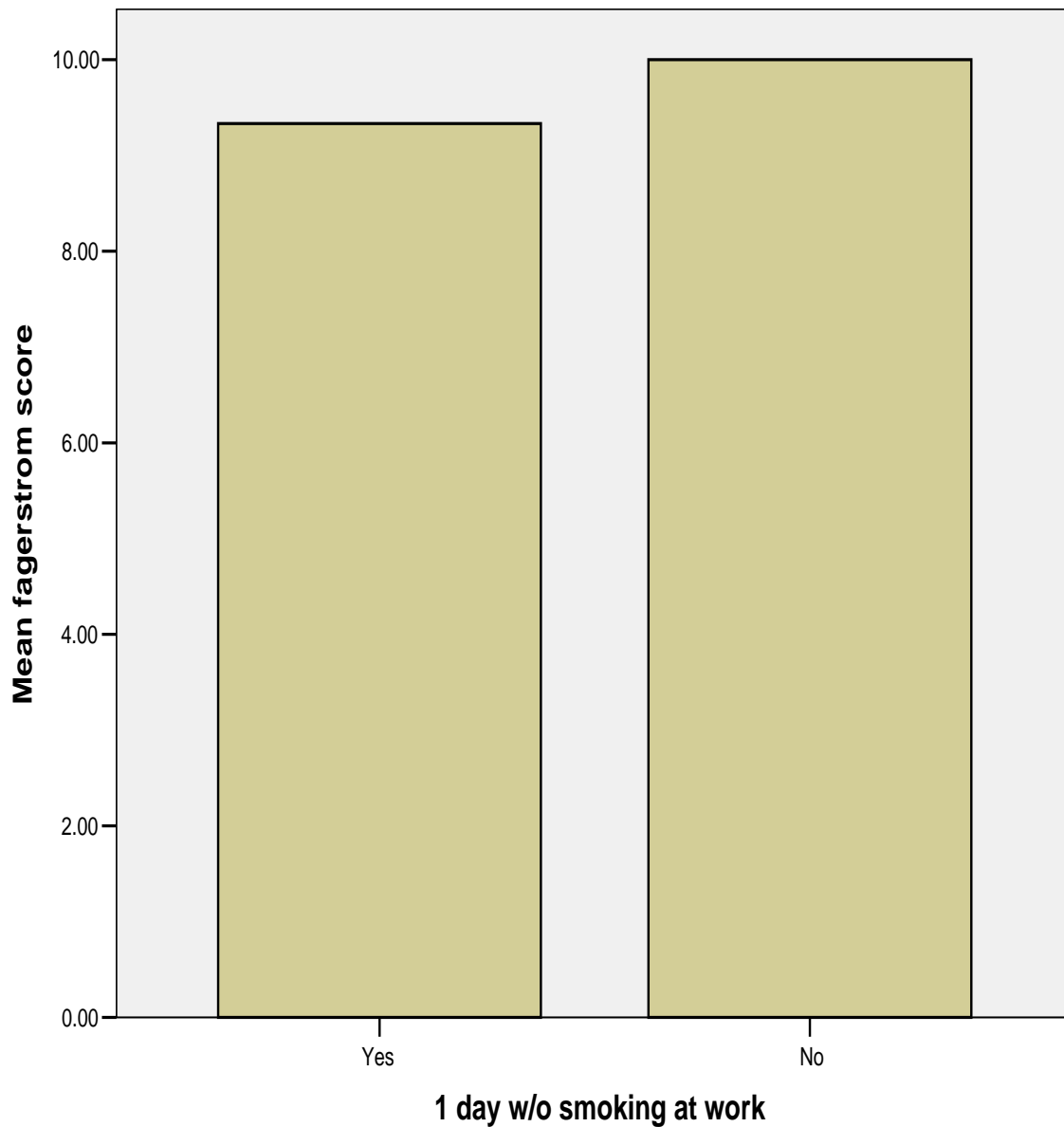


Figure 2. Relationship between Mean Fagerstrom score and ability to abstain from smoking at work for 1 day

The mean Fagerstrom score for those who took between 5 and 7 breaks per day was the highest (11.0) when compared to those who took between 3 and 5 breaks per day (10.0) and those who took between 0 and 2 breaks per day (9.3). This indicates that those who took more breaks during the day to smoke were more dependent on nicotine. Although the results are not

statistically significant in Tables 17, 18, and 19, they may indicate a general pattern. See Table 19 and Figure 3.

Table 19. Relationship between Mean Fagerstrom score and Number of smoke breaks per day

# of breaks/day	Mean	N	Std. Deviation
0 - 2	9.3	19	3.25
3 - 5	10	3	1
5 - 7	11	1.	
Total	9.5	23	2.98

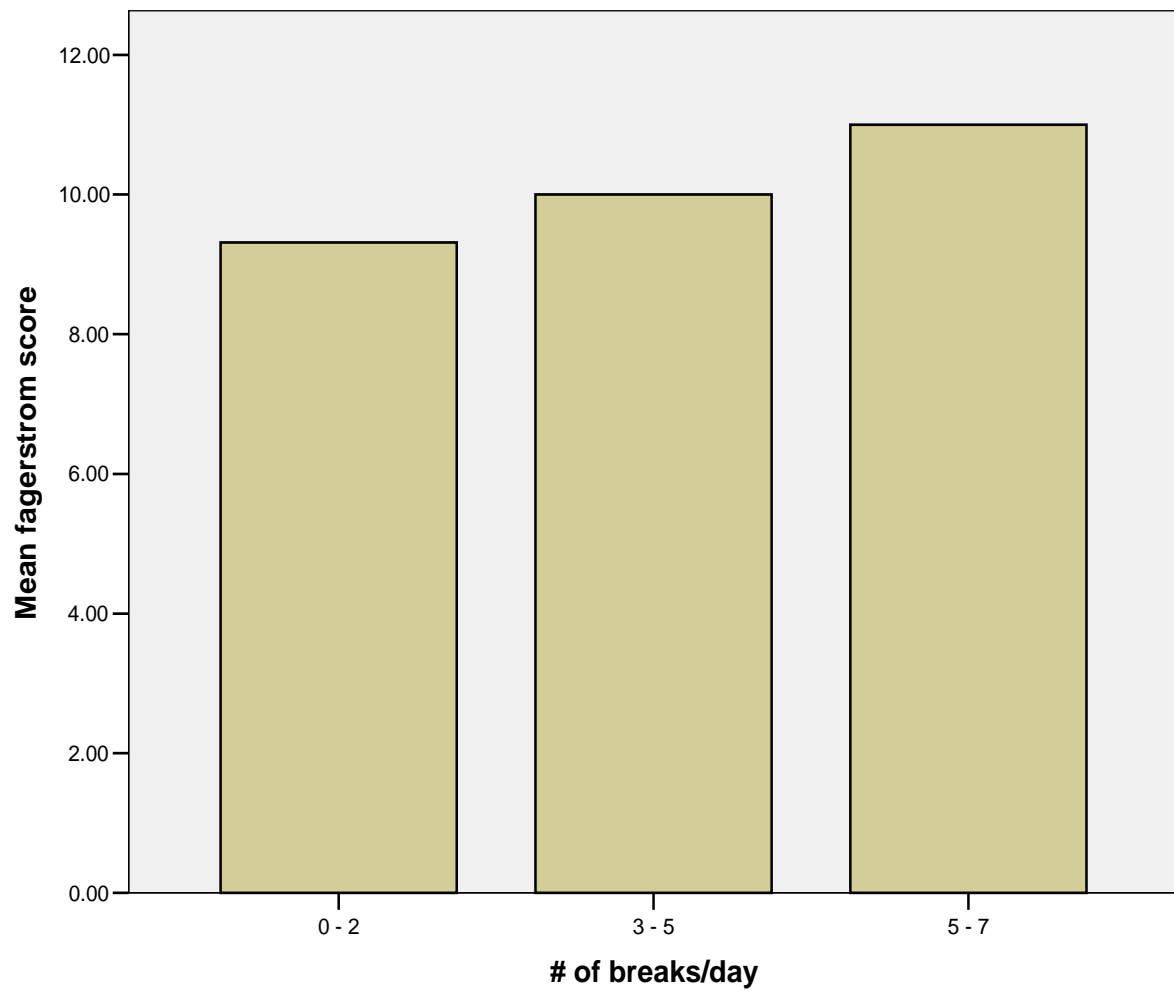


Figure 3. Relationship between Mean Fagerstrom score and Number of smoke breaks per day

There did not seem to be a correlation between mean Fagerstrom scores and the amount of time taken per break to smoke. See Table 20.

Table 20. Relationship between Mean Fagerstrom score and Minutes per smoke break

Min/smoke break	Fagerstrom score		
	Mean	N	Std. Deviation
1 -5	10.1	14	2.44
6 - 10	10	4	0.82
11 - 15	8	1.	
Total	10	19	2.16

5. DISCUSSION

The results of this study revealed that 12% of those that responded to the survey are current smokers and half of these individuals smoke at work. Those individuals who have been smoking for a longer period of time seem to be more likely to smoke at work and take more breaks to smoke. Those individuals who have a higher level of dependency to nicotine, according to their score on the Fagerstrom score of nicotine dependency, appear to be more likely to smoke at work, take more breaks to smoke, and have more difficulty refraining from smoking at work for one day than those with lower levels of dependency.

Level of education also seems to correlate with smoking behaviors. Those with less education appear to be more likely to smoke, and therefore, smoke at work. Those in the clerical/administrative job classification had the highest rate of smokers, smoking at work, and exposure to second-hand smoke among the occupations surveyed.

There were several limitations to this study. First, the results were self-reported by the individuals who responded to the survey. This may have lead to reporting bias, in which the subjects may report inaccurate information or under-report certain information because of beliefs, attitudes, perceptions, or fears. The fact that the number of smokers who responded to the survey was relatively small may be a result of reporting bias. Second, the recipients of the

survey were randomly chosen and therefore the demographics and job classifications were not equally represented in the results. This may have been a result of a form of selection bias in which individuals in certain job classifications may have more time and better access to complete the survey. Finally, some of the data was inaccurate as a result of some non-smokers responding to questions intended only for smokers (i.e. number of years smoked). This could have possibly been corrected with some adjustments in the programming of the online survey tool.

The low response rate to the survey may have been the result of several factors. The recipients of the e-mail containing the request to complete the questionnaire may have disregarded or discarded the e-mail without opening it. This is likely to happen because of the many “spam” e-mail messages that are circulated on a regular basis and the fear of computer viruses that can result from opening them. Many of the e-mails sent were returned as undeliverable. This may have been because those e-mail addresses were no longer valid at that time. As a result, the actual response rate of those who received the e-mail was higher than 11.7%. Another possible reason that the response rate was relatively low may have been because the e-mail request was distributed only once and not sent again. Also, there was no specific incentive to complete the survey. An improved response rate may have been achieved by conducting a telephone survey rather than via e-mail.

The method used in this study was convenient because it allowed for distribution of the survey questionnaire to a relatively large number of recipients at low cost. It also allowed for electronic data collection as well as analysis, once it was exported to a statistical program (SPSS). This method could be potentially useful in many fields of research and data collection.

The costs of smoking with regard to expenditures and lost productivity in the United States in 1985 were estimated to be \$65 million [15]. This cost would probably be doubled in current

dollars. Included in this estimate is the cost associated with employees who smoke. Employees who smoke miss 6.5 more days per year on average than those who do not smoke [16]. Smokers also visit a health care facility six more times per year than nonsmokers, and even dependents of smokers have four more visits per year than nonsmokers which is probably attributable to second-hand smoke [17]. The cost to employers includes work absences, health care claims, benefits not related to health care, and lost productivity [18]. In 1985, the cost of lost productivity due to passive smoking was estimated to be \$8.6 billion per year [19]. In 1990, the estimated cost of lost productivity of persons with diseases attributable to smoking and lost earnings due to premature death as result of these diseases was \$47 billion [20]. To encourage a smoke-free workplace and workforce, employers should utilize incentives for non-smokers and those who quit smoking, as well as disincentives for smokers.

The issue of smoking among those in the healthcare industry and those working in that immediate environment is significant for several reasons. First, it obviously affects the individual who smokes. It also affects the people in the working environment as a result of second-hand smoke. Smoking at work can affect individual productivity and absenteeism/presenteeism as a result of the time utilized for smoking breaks as well as the health consequences of smoking. Finally, the behavior of smoking by healthcare personnel or non-healthcare workers in a medical setting can influence the patients and families that are there to be treated. Patients that witness physicians or nurses smoking, especially if it is their own physician or nurse, may not be as convinced by the counseling given to them about the health consequences of smoking and tobacco cessation. As a result of these factors, the issue of smoking at the workplace, and specifically in healthcare settings, needs further investigation in order to improve the health of those who smoke as well as everyone affected by it.

APPENDIX A. Introductory Statement and Statement of Confidentiality

Introductory Statement:

My name is Hardy Bang and I am currently enrolled in the environmental and occupational medicine residency program at UPMC/University of Pittsburgh. I am conducting a study of UPMC and University of Pittsburgh employees working in, or adjacent to, a medical setting/environment to investigate demographics and factors related to tobacco use. This study is being performed under the supervision of Dr. Schwerha, the director of the occupational and environmental residency program.

I would greatly appreciate your time and effort in answering the questions in this brief survey. It should only take several minutes to complete.

The final results will be made available to you upon request once the study has concluded.

Thank you in advance for your help in this educational process.

Statement of Confidentiality:

The information in this survey will be kept completely confidential. This survey is purely for educational and research purposes only. Your individual responses will not be reported to your employer or any other person for any reason whatsoever. Your responses do not have any influence on your employment. The surveys will be coded numerically to maintain complete confidentiality of those who participate in the survey.

APPENDIX B. Survey questionnaire

1	Gender	1=Male	2=Female	
2	Age (yrs)	1=18-25 4=46-55	2=26-35 5=over 55	3=36-45
3	What is your ethnic background? (optional)	1=Caucasian 4=Asian/Pacific Islander	2=African American 5=other	3=Hispanic
4	What is your highest completed level of education?	1=Elementary school	2=High School 4=Post-college	3=College
5	What is your current job title?	1=clerical/ administrative 4=nurse/ nurse's aide	2=physician 5=Lab/med tech	3=scientist/ researcher 6=other
6	Are you exposed to second hand smoke at work?	1=yes	2=no	
7	Do you currently smoke tobacco ? (cigarettes, cigars, pipe) If no, thank you for your time	1=yes	2=no	
8	For how many years have you been smoking?	1=0-2 4=more than 10	2=3-6	3=7-10
9	Do you smoke while at work? If no, go to question 15	1=yes	2=no	
10	How many times per day do you take time away from your work to smoke?	1=0-2 4=more than 7	2=3-5	3=5-7
11	How many minutes on average per smoking break?	1=1-5 4=16-20	2=6-10 5=more than 20	3=11-15
12	Could you go a day without smoking at work?	1=yes	2=no	
13	Do you smoke inside of a building at work?	1=yes	2=no	
14	Have you been offered programs by your employer to help you quit smoking?	1=yes	2=no	

15	Is there a policy on smoking in the building where you work?	1=yes	2=no
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Fagerstrom Test:

16	How soon after you wake up do you smoke your first cigarette?	3 = <5 min 2 = 6 to 30 min	1 = 31 to 60 min 0 = >60 min
17	Do you find it hard to refrain from smoking in places where it is prohibited such as church, the library, or movie theaters?	1=yes	0=no
18	Which cigarette(s) during the day would you hate to give up the most?	1 = first in a.m.	0 = all others
19	How many cigarettes do you smoke per day (20/pack)?	0 = <11 1 = 11 to 20	2 = 21 to 30 3 = 31 or more
20	Do you smoke more frequently during the first hours after waking than the rest of the day?	1=yes	0=no
21	Do you smoke if you are so ill that you are in bed most of the day?	1=yes	0=no

APPENDIX C. IRB Application

IRB COVER SHEET: REQUEST FOR EXEMPT REVIEW (TESTS, SURVEYS, INTERVIEWS, OR OBSERVATIONS OF PUBLIC BEHAVIOR)

<input checked="" type="checkbox"/> NEW SUBMISSION <input type="checkbox"/> RESPONSE TO COMMENTS §46.101b(2) v. 080303	To be completed by IRB staff: IRB # _____ Date Received: _____ By: _____
Title of Study: Investigation of the prevalence of smoking among hospital employees at UPMC	
Principal Investigator: Last name: Bang First name: Hardy Title: Occupational Medicine resident Department: Environmental and Occupational Medicine Pitt Faculty <input type="checkbox"/> ; Pitt/UPMC staff <input type="checkbox"/> ; Pitt student <input checked="" type="checkbox"/> ; Other: Resident School: Arts & Sciences; <input type="checkbox"/> Business <input type="checkbox"/> ; Dental <input type="checkbox"/> ; Educ <input type="checkbox"/> ; Heath & Rehab Sci <input type="checkbox"/> ; Info Sci <input type="checkbox"/> ; Medicine <input type="checkbox"/> ; Nursing <input type="checkbox"/> ; Pharmacy <input type="checkbox"/> ; Pub Health <input checked="" type="checkbox"/> ; Social Work <input type="checkbox"/> ; LRDC <input type="checkbox"/> ; Other (specify): Environmental and Occupational Medicine Office Address: Crabtree Hall, A-718 Phone number: 412 624-3155 Fax number: _____ E-mail address: hrb1@pitt.edu	
Co-Investigators: Dr. Schwerha	
<i>If PI is student, list name of faculty sponsor or mentor who will take responsibility for the oversight of this research, and has signed the attached Faculty/Mentor assurance:</i> Name: Dr. Schwerha; E-mail: schwer@pitt.edu	
To whom should IRB correspondence be sent: PI? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> ; Other Name? _____ Other Fax: _____ Other E-mail: _____	
Where will study take place? University of Pittsburgh <input checked="" type="checkbox"/> ; UPMC Oakland Campus <input checked="" type="checkbox"/> ; CHP <input type="checkbox"/> ; Magee <input type="checkbox"/> ; Other UPMC Hospitals <input type="checkbox"/> (specify): _____; Other (specify): other UPMC hospitals – U.S. <input type="checkbox"/> ; foreign <input type="checkbox"/> . *Is documentation attached authorizing conduct of research at non-Pitt/UPMC site? No <input type="checkbox"/> Yes <input type="checkbox"/>	
Approximate number of subjects to be studied: 500 Gender: Male <input checked="" type="checkbox"/> Female <input checked="" type="checkbox"/> Subjects' Age Range: 18 and over Each subject's approximate time commitment: 6 minutes Estimated duration of entire study: 5 months	
*Is a script attached that describes the study to the subject (if applicable) and includes basic elements of consent (e.g., risks and benefits, confidentiality of data, right to withdraw)? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> NA <input type="checkbox"/>	
Source of Financial Support: Federal (e.g., NIH, NSF, CDC) <input type="checkbox"/> (name of agency): _____; Department of Education <input type="checkbox"/> ; Commercial Sponsor <input type="checkbox"/> name: _____; Other <input type="checkbox"/> name: _____; None <input checked="" type="checkbox"/>	
Does any research team member have a financial conflict of interest: No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> : If yes, (a) do they have an equity interest in the commercial sponsor that exceeds 5% or \$10,000? No <input type="checkbox"/> Yes <input type="checkbox"/> (b) do they receive payments from the commercial sponsor that are expected to exceed \$10,000/year? No <input type="checkbox"/> Yes <input type="checkbox"/> (c) do they possess a licensing agreement that may lead to revenue sharing from developing technology? No <input type="checkbox"/> Yes <input type="checkbox"/>	

Check type(s) of measures to be used: <input type="checkbox"/> Passive Observation of Public Behavior; <input type="checkbox"/> Educational Tests (cognitive, diagnostic, aptitude); <input checked="" type="checkbox"/> Survey; <input type="checkbox"/> Interview; <input type="checkbox"/> Other (Describe) * Have copies of all measures or questions been attached? No <input type="checkbox"/> Yes <input type="checkbox"/> . If no, why not?
Will subjects under 18 years of age be studied? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/> ; If yes, to what extent will researchers interact with subjects?
Will information be recorded anonymously (i.e., no subject identifiers recorded)? No <input type="checkbox"/> Yes <input checked="" type="checkbox"/> ; <i>If identifiers are recorded, provide justification:</i>
Will “sensitive information” be recorded that could damage subjects’ reputation, employability or financial standing, or place them at risk for criminal or civil liability? No <input checked="" type="checkbox"/> Yes <input type="checkbox"/>

IRB Protocol

1. Study Aims

- (a) **What is this research intended to accomplish?** To determine the prevalence, demographics, characteristics of smokers among hospital employees.

2. Background and Significance

- (a) **What observations or prior scientific findings serve as the basis for this study?** Smoking is the leading preventable cause of death in the US. Previous studies have shown that a significant number of hospital employees smoke.
- (b) **Why is it important to conduct this research?** To obtain information that may help in smoking cessation intervention programs among hospital employees. Another reason is to raise awareness of the prevalence of smoking among hospital employees. This may allow for changes in policies and regulations regarding smoking in the workplace.

3. Subjects

- (a) **Who will be studied?** Hospital employees of UPMC/University of Pittsburgh employees working in the hospital setting
- (b) **If children are included...** ☒ Not Applicable
- (i) **Provide a rationale for the specific age ranges of children to be included.**
- (ii) **Describe the expertise of the investigative team for dealing with children of that age range.**
- (iii) **Describe the adequacy of the research facilities to accommodate children of that age range.**
- (iv) **Will sufficient numbers of children be studied to answer the scientific questions? Please elaborate.**

(v) **Will the investigators interact directly with the child subject?** No ☐; Yes ☐

(vi) **Is the research limited to educational tests or observations of behavior?**
No ☐; Yes ☐

4. **Recruitment**

- (a) **How will potential subjects be identified and how and where will they be approached for participation?** In UPMC/University of Pittsburgh directory via e-mail
- (b) **Describe recruitment materials (*ads, letters, recruitment script, etc.*) to be used and enclose 1 copy.** e-mail

5. **Methods**

- (a) **Attach a script that provides participants with information about this research project as well as about their rights as a research subject.** see attached sheets.
- (b) **How will subjects be evaluated?** survey via internet-based program
- (c) **List the measures to be used, and attach 1 copy of each** (unless measure does not require submission – see listing of Standard Instruments in Appendix G of IRB Manual). questionnaire/survey
- (d) **How will information be obtained (e.g., face to face, phone, mail, Internet)?** internet, e-mail
- (e) **Where will study be conducted, and who will collect data?** UPMC hospitals/University of Pittsburgh via internet/e-mail. I (the PI) will collect the data
- (f) **How often will subjects be contacted, and why?** Once to perform the survey and if requested by the subject I will provide results after the study has been completed.
- (g) **How will confidentiality of data be maintained?** codes (ID numbers)

6. **Analysis**

- (a) **How will results be analyzed to determine that study aims have been met?** statistical analysis with the assistance of an epidemiologist.

7. **Summarize the qualifications and experience of the Principal Investigator that are relevant to the conduct this research study:** I performed similar research in the past with hospital patients (during internal medicine residency)

8. Additional Information, Clarification, or Comments for the IRB Reviewer:

CERTIFICATION OF INVESTIGATOR RESPONSIBILITIES

By signing below I agree/certify that:

1. I am cognizant of, and will comply with, current federal regulations and IRB requirements governing human subject research including adverse event reporting requirements.
2. I have reviewed this protocol submission in its entirety and that I am fully aware of, and in agreement with, all submitted statements.
3. I will conduct this research study in strict accordance with all submitted statements except where a change may be necessary to eliminate an apparent immediate hazard to a given research subject.
4. I will request and obtain IRB approval of any proposed modification to the research protocol prior to implementing such modification.
5. I will ensure that all co-investigators, and other personnel assisting in the conduct of this research study have been provided a copy of the entire current version of the research protocol.
6. I will not enroll any individual into this research study until the exempt status of this application has been determined by the IRB and I have been informed in writing.
7. I will respond promptly to all requests for information or materials solicited by the IRB or IRB Office.
8. I will maintain adequate, current, and accurate records of research data.
9. I will not knowingly include prisoners in this research study.

Principal Investigator Name: Hardy Bang	Signature:	Date:
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Faculty Sponsor / Mentor Assurance

I certify that the Principal Investigator named above will conduct this research under my supervision and guidance. I further certify that I will assume final responsibility for the conduct of this protocol in accordance with all University of Pittsburgh and UPMC policies and procedures regulating human research.

Mentor's Name: Dr. Schwerha			Signature:	Date:
Position:	Occupational Medicine	e-mail: schwer@pitt.edu		Phone: 412
Residency Program Director				624-3155

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