Smoking habits of healthcare professionals and students and the impact of smoking bans at an academic medical center in Northwest Ohio

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2009
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Introduction

Tobacco use is a serious threat to public health worldwide and has been identified as the single greatest avoidable cause of disease and death (U.S. Centers for Disease Control and Prevention [CDC], 2004; World Health Organization [WHO], 2008a). More than 5 million people die prematurely each year from smoking tobacco or exposure to secondhand smoke, with more than 443,000 deaths in the United States alone. The World Health Organization reports that the use of tobacco products is increasing, especially in developing countries (WHO, 2008b).

The adverse health effects of tobacco smoking on the human body are extensive and contribute to the top four causes of death in the United States: heart disease, cancer, stroke, and chronic lower respiratory disease (CDC, 2009). Cancer was among the first diseases causally linked to smoking, with lung cancer, the leading cause of cancer death, most commonly the result of cigarette use (CDC, 2004). In addition, tobacco smoking has been found to cause oral, pharyngeal, laryngeal, esophageal, bladder, stomach, cervical, kidney, and pancreatic cancer.

The Surgeon General’s Report states that tobacco use also significantly affects the cardiovascular and respiratory systems (CDC, 2004). Cigarette toxins contribute to the development of heart disease and stroke. They also increase the risk of dying from chronic obstructive pulmonary disease (COPD) by more than tenfold. Furthermore, tobacco use has been linked with sudden cardiac death. In 2001, an average of one death every 33 seconds was attributable to cardiovascular disease in the United States while more than 118,000 deaths were due to COPD.

Tobacco smoking not only has adverse health effects on the person smoking the cigarette but also on the people around a smoker. Secondhand smoke (SHS) contains the same 50 carcinogens found in cigarette smoke, and concentrations of some toxins are even higher (CDC,
This puts non-smokers at risk for lung cancer, heart disease, and acute respiratory effects, even with exposure to a small amount of SHS. The workplace is one of the most significant sources of SHS exposure for non-smoking adults.

Across the world, there are over one billion smokers from all different ages, cultures and occupations, including healthcare professionals and students. Physicians, physician assistants, and nurses are taught the deleterious consequences of smoking on health, and yet some continue to be smokers. This study aims to examine the smoking habits of healthcare professionals and students at an academic medical center in Northwest Ohio and to evaluate the effects of recently implemented smoke-free policies.
Literature Review

It is assumed that healthcare professionals (M.D., D.O., P.A., N.P., R.N.) are educated on the harmful health effects of tobacco smoking. In spite of such knowledge, several literature reviews confirm that smoking persists among those professionals and healthcare students throughout the world (Smith, 2007; Smith & Leggat, 2007a, 2007b). Self-report questionnaires were the most commonly used method of evaluating smoking habits, with response rates ranging from 62% (Chalmers, Seguire, & Brown, 2002) to 97% (Sotiropoulos et al., 2007). In these studies, questionnaires were hand-delivered to the majority of student populations and mailed to professional populations. Sample sizes ranged from 272 nursing students in Canada (Chalmers et al.) to 3,652 physicians in China (Jiang et al., 2007).

Tobacco Use Among Healthcare Students

The highest prevalence of smoking was found to be among nursing students in Italy, where 51% of the students smoked cigarettes (Boccoli, Federici, Melani, & De Paola, 1996). The study included a sample of 662 students with an 88% response rate; therefore, barring untruthful responses, the calculated smoking rate was assumed to accurately represent the population. A longitudinal study on 501 nursing students in Italy found that the smoking rates increased by more than 6% as they progressed from their first year to their third year of training in school (Boccoli, Federici, Trianni, & Melani, 1997). These findings suggest that learning about the adverse health effects of tobacco smoking may have little influence on the smoking habits of nursing students in Italy.

These smoking habits, however, are not consistent throughout the world. A cross-sectional study of all baccalaureate nursing students in a Canadian province was found to have a
much lower smoking prevalence of 13% (Chalmers et al., 2002). In addition, a study in 2001 compared the smoking habits of medical and nursing students at a healthcare oriented university in Philadelphia, PA, and found the smoking prevalence for nursing students to be 13.5% (Patkar, Hill, Batra, Vergare, & Leone, 2003). The study also found that nursing students who smoked consumed more cigarettes per day and were more severely nicotine dependent when compared to the medical students who smoked. Another study in 2001 examined the smoking prevalence of 476 nursing students at 12 nursing schools in the New York City metropolitan area and found the smoking rate to be 24% (Gorin, 2001). This discrepancy of smoking rates among American nursing students may be related to different demographics, but nonetheless conclude that the rate is lower than that of other nursing students around the world.

Medical students appear to have the lowest prevalence of cigarette use among the health professionals reviewed. In Malaysia, 9% of students smoked, all of whom were male, while medical students in Pakistan had a slightly higher rate of 11% (Nawaz et al., 2007; Yaacob & Abdullah, 1994). Both studies cited a negative cultural image portrayed by female smokers as the most likely reason for the small or non-existent smoking incidence among their gender. In addition, these cultural beliefs may have deterred some respondents from admitting that they smoked on the survey, leading to inaccurate estimates of cigarette use among students in those countries.

In the United States, a study in 2003 surveyed first- and fourth-year medical students at three different universities and found the smoking prevalence to be 3% (Schkrohowsky, Kalesan, & Alberg, 2007). Likewise, Patkar et al. (2003) found the smoking prevalence among medical students at a single medical university to be 3.3% and concluded that the smoking among medical students was indeed declining. These significantly lower smoking rates compared to
nursing students may indicate that medical students receive more extensive education on the health effects of tobacco or possibly that the known health effects exert greater influence in medical students rather than nursing students.

Among the students who were current smokers, various motivations were given to begin smoking cigarettes. Nursing students in Canada reported stress and social factors (peers, image & ‘wanting to fit it’) as the most common influences (Chalmers et al., 2002). Likewise, medical students in Malaysia and physicians in Turkey were influenced by peers to begin (Marakoglu, Kutlu, & Sahsivar, 2006; Yaacob & Abdullah, 1994). Interestingly, 37% of current smokers among nursing students in Italy claimed “to do something new” as motivation to take up smoking. Sixty percent of current smokers among medical students in Malaysia cited relief from stress as the most common reason to continue smoking (Yaacob & Abdullah). While it is clearly evident that healthcare students smoke cigarettes, further inquiry arises as to why these habits persists after learning about the detrimental health effects of tobacco use.

Tobacco Use Among Healthcare Professionals

The prevalence of smoking among physicians around the world is variable. In developed countries such as the United States, Australia and the United Kingdom, smoking rates appear to be steadily declining over the last 30 years (Smith & Leggat, 2007b). Since 2000, several studies have found the smoking prevalence among physicians in America to be less than 10 percent (An et al., 2004; Misra & Vadaparampil, 2004; Soto et al., 2005). Other countries around the world have a higher smoking prevalence. In Greece, 39% of physicians claimed to be current smokers and were most likely to be male, unmarried, surgeons, anesthesiologists, or residents and smoked more than 10 cigarettes per day (Sotiropoulos et al., 2007). Having parents who smoked was
found to be another risk factor for smoking. In China, 23% of physicians currently smoked with a higher prevalence among male physicians (Jiang et al., 2007). Twenty-nine percent of physicians in Turkey reported ever smoking, and having close friends or family members who smoked was identified as a strong risk factor (Marakoglu et al., 2006).

Interestingly, many smoking healthcare providers began smoking during their professional training. In a study of physicians in Greece, 50% of the current smokers began during medical school (Sotiropoulos et al., 2007). Similarly, 43% of current smokers among medical students in Pakistan began during school (Nawaz et al., 2007). In addition to the studies where smoking habits increased with year in school, these findings suggest that knowledge about the effects of tobacco use is not sufficient to decrease or prevent tobacco use. However, other research contradicts this conclusion. Nursing students in both Italy and Canada cited health reasons as cessation motivation (Boccoli et al., 1996; Chalmers et al., 2002).

Healthcare professionals and students constitute a small portion of tobacco smokers worldwide, however their smoking habits, like every other smoker, contribute to the rising annual death toll from tobacco use. Based on current trends, an estimated 10 million deaths will occur annually by 2020, so it is imperative for action to be taken to reduce tobacco smoking (WHO, 2008a). Since healthcare professionals are often the individuals to counsel others to quit smoking, it is important for smoking cessation to begin with them so they can set a good example and encourage the reduction of tobacco use.

Smoking Bans and Their Impact on Smoking Behavior

According to the Centers for Disease Control and Prevention, smoke-free policies can significantly reduce the adverse health effects of secondhand smoke exposure and even improve
the overall health of smokers themselves. Juster et al. (2007) conducted a 10-year review of data on hospital admissions for acute myocardial infarctions and stroke in New York State and found a rapid decline of admissions after the implementation of a statewide smoking ban. Additionally, a meta-analysis of studies from five countries found that smoking bans reduce the risk of acute myocardial infarction by 15% after the first year and up to 36% after 3 years (Lightwood & Glantz, 2009). A study by Rayens et al. (2008) also found a decrease in asthma-related emergency department visits by adults and children after the implementation of a smoke-free policy in one county in Kentucky.

In addition to improving health, smoke-free policies have also been found to reduce overall smoking rates. The Task Force on Community Preventive Services reports that smoking bans can reduce daily consumption of cigarettes and can aid in cessation for some smokers (CDC, 2000). This conclusion was also reached in a meta-analysis on the effects of smoke-free workplaces by Fichtenberg and Glantz (2002), where 26 studies were reviewed and the smoking prevalence among employees decreased by 3.8% and daily cigarette consumption by an average of 3.1 cigarettes. In hospitals, one study found that employees of hospitals with smoking bans had higher quit rates and a shorter time to quit smoking when compared to employees in workplaces of similar communities where smoking was allowed (Longo et al., 1996).

In November of 2006, over 2.2 million voters in the state of Ohio approved the Smoke-Free Workplace Act, which prohibited “the smoking and burning of tobacco in all enclosed areas of public places and enclosed areas of places of employment” (SmokeFreeOhio, 2005). This law strengthened the previously enacted Toledo Clean Indoor Air Ordinance, which allowed smoking in bars and private clubs and organizations (Provance, 2006). The Smoke-Free Workplace Act was initiated in an effort to protect public health from the proven harmful health effects of
secondhand smoke. In 2008, SmokeFreeOhio, a campaign by the American Cancer Society, American Heart Association, American Lung Association, the Ohio Health Commissioners Association, and other supporting organizations, conducted a voter survey and found that 7 out of 10 voters approve of the policy, even two years after its enactment. The survey also found that 72% of voters believed employees of private clubs should be protected from secondhand smoke in their workplace (SmokeFreeOhio, 2008).

In January of 2008, the University of Toledo Smoke-Free and Tobacco-Free Policy was implemented on the Health Science Campus ("University of Toledo Smoke Free and Tobacco Free Policy," 2008). The policy prohibited smoking and tobacco use “both indoors, outdoors, in all parking areas and/or around all properties of The University of Toledo Health Science Campus and HSC Satellite facilities.” Furthermore, the sale of cigarettes or other tobacco products on campus was forbidden. In August of 2008, the policy was expanded to prohibit smoking in all indoor spaces on the Main Campus, including administrative offices and residence halls. It also specified that smoking within thirty feet of any entrance of a university-owned or leased building was forbidden. Like the Ohio Smoke-Free Workplace Act, the purpose of the UT Smoke-Free and Tobacco-Free Policy was to protect “all workers from unhealthy exposure to secondhand smoke and” to provide “a supportive environment that helps tobacco users cut back, cease, or quit tobacco products.”

Lake (2004) Study

In 2004, an email-based survey was conducted to determine the prevalence of tobacco use at an academic health facility in Toledo, Ohio (Lake, 2004). The study included students and employees (clinical and non-clinical) at the Medical College of Ohio. The overall smoking rate
was found to be 10%; among the clinical staff who responded, medical technicians had the highest percentage of smokers (25%) and physicians had the lowest (0%). In regards to the student responses, public health students had the highest percentage (12.5%) while all other students (medical, physician assistant, PT, OT) were each below 9%. These results were then compared to the local, state, and national averages provided by the CDC and found to be substantially lower, although it is uncertain if the difference was statistically significant as no statistical analysis was reported.

It is important to note that the previous study had a response rate of only 18%, which is considered low even for online questionnaires (Sue & Ritter, 2007). These findings were not likely to be representative of the actual population. Regardless, the study design and purpose provided the foundation for further research. The current study modified Lake’s research and examined the smoking habits of healthcare professionals and students at the same academic medical center (with a new name). The study results were compared to the smoking prevalence rate at this institution five years prior and to the smoking habits of similar populations around the world. In addition, another purpose of this study was to evaluate the attitudes of smoking bans and their influences on smoking habits.
Methods

Five years have passed since Lake’s study was conducted, and replicating it provided data for comparative analysis of the smoking prevalence among healthcare professionals and students at the institution. (Since the completion of Lake’s research, the Medical College of Ohio changed its name to the Medical University of Ohio, which in turn merged with the University of Toledo. The University of Toledo academic medical center consists of the same units prior to the merger: the medical center and colleges of health sciences, medicine, and nursing.) This study also aimed to evaluate the effects of and attitudes toward the 2006 Ohio Smoke-Free Workplace Act and the 2008 UT Smoke-Free and Tobacco-Free Policy.

The following students from the University of Toledo (UT) and the following employees from the University of Toledo Medical Center (UTMC) were recruited to participate in the study: nursing students, physician assistant students, medical students, nurses, nurse practitioners, physician assistants, and physicians. In order to better balance group sizes, the most recently graduated class of physician assistant students (December 2008) was also recruited for the study. Other professions were not included in the study as their education could not be assumed to include the health effects of tobacco use.

An e-mail was initially sent to each of these populations requesting their participation in the study and included a web link to an online survey (Appendix A). Recipients were informed of the purpose of the study, their eligibility, and ensured anonymity should they choose to participate. Two weeks after the original e-mail was dispatched, a follow-up e-mail was sent to remind the students and employees of the last date in which they could participate in the study. The deadline to submit the survey and participate in the study was 4 weeks after the initial invitation. Data was collected between March and May of 2009.
The online study invitation was distributed to a total of 170 physicians who were members of the institution’s physician practice plan. Six hundred and sixty-three valid e-mail addresses for physician assistants, nurse practitioners, and nurses were obtained from the payroll office, and the invitation was emailed directly to them. Likewise, the 58 currently enrolled physician assistant students and the 29 most recent physician assistant graduates with valid e-mail address were also contacted directly. The associate deans of both the graduate nursing program and the undergraduate nursing programs e-mailed their respective students to invite a total of 577 nursing students to participate in the study. Finally, a total of 600 medical students were e-mailed by the associate dean of the medical school to participate in the study. This yielded a grand total of 2097 perspective students and employees to participate in the study.

The online survey was adapted from the questionnaire used in the study by Lake (2004) and designed with the assistance of The Office of Institutional Research at the University of Toledo using Vovici software (Vovici Corporation, Dulles, VA). It consisted of 17 questions and was organized into three parts (Appendix B). First, general information was collected, including gender, age, profession, and area of healthcare specialty. Secondly, questions were asked regarding the respondent’s smoking habits. “Current” smokers were defined as those who had smoked at least one cigarette within the last thirty days. “Former” smokers were defined as those who had last smoked more than thirty days ago. All others were categorized as “never” smokers. Current and former smokers were subsequently asked to indicate his/her daily consumption of cigarettes on days while he/she is and is not on campus, age he/she began smoking, and reasons for smoking. Finally, all respondents were asked to rate his/her attitude toward both the Ohio Smoke-Free Workplace Act and the UTMC Tobacco-Free and Smoke-Free
Policy using a Likert scale. A section was available at the end of the questionnaire for respondents to submit comments.
Results

A total of 405 participants responded to the research study invitation and completed the online questionnaire. This yielded a 19.3% overall response rate; however, eight respondents reported professions other than those of interest to this study and were eliminated from further analysis. This adjustment resulted in an overall 18.9% response rate.

The data for this study was collected and analyzed using SPSS (Statistical Package for the Social Sciences, version 16.0, SPSS Inc., Chicago, IL). The Pearson chi-square test was used to assess any statistically significant association between variables with a significance level set at $\alpha = 0.05$.

Demographics

Of the 397 respondents, the majority were women (71.5%). Three respondents omitted reporting their age, but the remaining respondents ranged from 20 to 70 years old with a mean age of 34.6. Based on profession/educational program, physicians accounted for 8.6% of the respondents, 2% were physician assistants, 2.5% were nurse practitioners, 34.3% were nurses, 35.5% were medical students, 11.3% were physician assistant students, and 5.8% were nursing students (Table 1).

Reported Smoking Habits

The next portion of the questionnaire addressed the smoking habits of respondents. A total of 9.3% of respondents reported smoking at least one cigarette within the last 30 days, classifying them as “current” smokers (Table 2). “Former” smokers, having last smoked a cigarette more than 30 days ago, comprised 16.1% of respondents, and the remaining 74.6%
were categorized as “never” smokers. The majority of current and former smokers were female (73% and 78.1% respectively), however gender was not found to be statistically associated with smoking status \(X^2(2, N=397), p=0.411\). As seen in Table 7, profession was found to be statistically associated with smoking status \(X^2(12, N=397), p=0.000\); almost 60% of the respondents who were current smokers were nurses and over 24% were medical students. No physicians, physician assistants, nor nurse practitioners were current smokers. Former smokers were most likely to be nurses (62.5%) and medical students (20.3%) while each of the other student groups/professions was less than 10%. The majority of each profession reported being never smokers; physician assistant students had the highest percentage of 93.3 percent (Table 8).

In regards to the number of cigarettes smoked on days while the respondent was on campus, 16.2% of current smokers reported smoking less than one cigarette per day, while more than half of the current smokers (51.4%) reported smoking up to half a pack per day (Table 3). Only 8.1% of current smokers consumed more than half a pack per day. The remaining 24.3% of current smokers responded “I don’t smoke” when asked the number of cigarettes smoked on days that he/she is on campus. The assumption was made that these individuals did not smoke on days while on campus because they later reported smoking on days while not on campus. On days that the current smoker was not on campus, 21.6% reported smoking less than one cigarette per day, while 40.5% smoked up to half a pack per day, and another 32.4% smoked somewhere between 11 and 20 cigarettes per day (Table 3). Only two current smokers (5.4%) reported smoking more than a pack of cigarettes per day on days that he/she was off campus.

This study also examined the time when current and former smokers began smoking in relation to their professional medical education (Table 4). A total of 73.3% of respondents began smoking before entering nursing/PA/medical school, 7.9% started smoking during school and
2.0% reported smoking after graduating nursing/PA/medical school. Four percent of this population subset selected “none of the above” and the remaining 12.9% selected “I don’t smoke.” It is important to note that all of these individuals did previously admit to being a current or former smoker and to currently being a medical professional; thus these last responses are inconsistent and indicate a limitation within the questionnaire design.

The most common response (49.5%) reported as a reason for smoking included social factors, such as when drinking alcohol or when out with friends (Table 5). Another 22.8% of smokers reported smoking as a stress reliever, and 3.0% of respondents chose smoking as a way to relieve boredom. Other reasons respondents stated they smoked included addiction (4.0%), enjoyment (5.9%), or a combination of factors (4.0%).

Attitude Toward and Influence of Smoking Bans

The final part of the questionnaire gauged the respondent’s attitude toward the Ohio Smoke-Free Workplace Act and the UT Smoke-Free and Tobacco-Free Policy (Table 6). When asked to respond to the statement “I support the Ohio smoking ban,” the majority of respondents (63%) strongly agreed; however, only 7.3% of respondents strongly agreed with the statement that the Ohio smoking ban had influenced his/her attitude toward smoking. The same statements were asked regarding the UT Smoke-Free and Tobacco-Free Policy (Table 6). A larger majority of respondents (70.3%) strongly supported the policy, whereas a similar 7.8% strongly agreed that the policy influenced his/her attitude toward smoking.

Smoking status was found to be statistically associated with people’s attitude toward smoking bans \[X^2(8, N=397), p<0.01\] (Table 9). Current smokers were more likely to disagree or strongly disagree with support for the Ohio smoking ban (56.7%), while former and never
smokers were most likely to agree/strongly agree with the ban (71.8% and 85.2% respectively). In regards to the UT Smoke-Free and Tobacco-Free Policy, current smokers were closely divided on their support for (48.6%) and against (45.9%) the campus ban, while former and never smokers were most likely to support it (82.8% and 90.2% respectively).

The majority of current smokers also disagreed or strongly disagreed with the idea that both the Ohio smoking ban (56.7%) and the UT Smoke-Free and Tobacco-Free Policy (62.1%) have influenced their attitude toward smoking. Former and never smokers divided opinions on both bans. Among current smokers, 40.5% agreed that the Ohio smoking ban has influenced the amount he/she smokes; 10.8% felt neutral and the remaining current smokers disagreed or strongly disagreed. A large portion of current smokers (43.2%) reported that they smoke less due to the influence of the Ohio smoking ban, while 5.4% reported smoking more and 51.4% reported no effect.

In regards to the UT Smoke-Free and Tobacco-Free Policy, the majority of current smokers (59.4%) either disagreed or strongly disagreed with the idea that the policy has influenced the amount that he/she smokes. Almost a quarter of the current smokers (24.3%) agreed or strongly agreed, and 16.2% felt neutral about the policy influencing smoking behavior. Only one individual reported smoking more due to the influence of the UT policy, while 21.6% of current smokers reported smoking less. One individual’s decision to quit smoking was actually influenced by the UT policy.

Analysis of Written Comments

A large number of respondents entered comments at the end of the questionnaire regarding their opinions on smoking bans. Both smokers and non-smokers believed smoking
was a personal right, but opponents of smoking bans felt the laws were an infringement on their basic human rights. Proponents, on the other hand, felt smoker’s right to choose to smoke should not infringe on non-smoker’s right to breathe clean air. A supporter commented, “I appreciate walking into facilities without having to get secondhand smoke.”

Numerous opponents of the Ohio Smoke-Free Workplace Act did not approve of idea of the government controlling the smoking status of private businesses, such as restaurants or bars. One person commented, “These businesses have a right to conduct their operation as they so choose, and the consumer, smoker or not, has the right to choose to enter the establishment, or not.” Others felt smoking bans were a way of allowing the government to dictate their personal behaviors, and were concerned about not knowing where the control would stop. One respondent asked, “Next year, are they going to start weighing me on my way into work to check my BMI??”

The majority of the opponents, however, did support the UT Smoke-Free and Tobacco-Free Policy since the University of Toledo made the choice, as an independent institution, to become smoke-free. Smoking ban advocates furthermore supported the UT policy since the campus encompasses a hospital, and they believed it should be setting a good example. A respondent wrote, “In the shift toward preventative medicine, it is the duty of a hospital and medical education facility to promote healthy lifestyles and to protect those persons who make these good choices from the effects of others poor decisions.”

While the majority of respondents supported the UT Smoke-Free and Tobacco-Free Policy, 26 individuals specifically commented on its lack of enforcement. One person stated, “Frequently there are visitors, patients, and sometimes employees who are smoking on campus. The people who stand in the middle of Arlington [in the median of the street closest to the
medical center] smoking give this campus a very poor look.” Others agreed with the opposition of employees taking breaks to smoke on campus: “[Their] clothes smell when they get back. Plus when they step out, it increases the load on a nurse covering and could have a major effect on care.” One advocate felt “healthcare practitioners shouldn’t smell like smoke while caring for patients.”

One other major position in opposing the UT Smoke-Free and Tobacco-Free Policy was the opinion that a hospital is often a stressful environment, and smoking is commonly used as an outlet to relieve stress. Prohibiting smoking on campus prevents employees, patients, and patient’s families from alleviating their anxiety. Critics felt a designated area should be created for smokers because “it is very unfair to expect smokers to just not smoke. Anyone who thinks that does not understand nicotine addiction.” Others suggested that the institution should offer smoking cessation devices for free or to organize a wellness program that offers yoga classes in the morning or planned walks during the day.
Discussion/Conclusion

This study was a modified replication of research conducted in 2004 by Kevin Lake. The demographics of respondents from this study and Lake’s study were very similar in male:female participants (28.5:71.5% vs. 30.1:69.8%) and mean age (34.6 vs 35.5 years). One important difference was the study populations. Lake’s study included all employees and students at the academic medical center, both clinical and non-clinical; this study only examined healthcare professionals and students. The overall smoking prevalence, defined in this study as those who smoked at least one cigarette within the last 30 days, was found to be 9.3%. This rate was slightly lower than the rate found by Lake in 2004 (10%). Due to the previously mentioned population differences in each study, it cannot be concluded that the smoking prevalence did indeed decrease over the last five years.

Smoking status was found to be statistically associated with profession in this study ($p=0.000$). Current and former smokers were most likely to be nurses and secondly, medical students. Since one of the most commonly reported motivations to begin smoking in this study was due to stress, perhaps nurses and medical students feel more stress when compared to other professions. No physicians, physician assistants, or nurse practitioners reported being current smokers. Lake’s study included one physician assistant and two nurse practitioners who reported smoking. This is a lower smoking prevalence; however, it cannot be concluded whether it is statistically significant or not.

Examining each profession individually, physician assistant students were most likely to have reported to never smoked, while nursing students had the highest reported prevalence of smoking with a rate of 17.4%. This is much higher than the rate found by Lake (6%), but the current study only had 23 respondents who were nursing students whereas the previous study had 84. Nonetheless, this rate falls on the lower end of the spectrum of smoking prevalence among
nursing students across the world and correlates with previous studies on nursing students in the United States (Gorin, 2001; Patkar et al., 2003). Nurses in this study also had a high smoking prevalence at 16.2% with 132 respondents. Compared to Lake’s study in 2003 where 17% of nurses smoked (out of 87 respondents), it appears that the smoking prevalence has slightly decreased.

Surprisingly, eight respondents reported initiation of smoking during their professional healthcare education, and two respondents began smoking after graduation. As mentioned previously, this was also seen among physicians in Greece and medical students in Pakistan (Nawaz et al., 2007; Sotiropoulos et al., 2007). This suggests that learning the adverse health effects of smoking may not be enough to deter some people from using tobacco. This idea is also supported with this study’s finding that 5.9% of smokers reported smoking because they enjoyed it.

Among current and former smokers, the most common reasons to begin smoking were related to social factors, such as when drinking alcohol or out with friends. Opponents to smoking bans often believe that bans do not reduce cigarette consumption. Given this common motivation, however, restricting one’s ability to smoke in social areas would logically reduce their cigarette consumption. This study in fact provides evidence that smoking bans do reduce cigarette consumption. Over 43% of current smokers reported that they smoke less due to the influence of the Ohio Smoke-Free Workplace Act. The UT Smoke-Free and Tobacco-Free Policy has also had an effect. Twenty-one percent of current smokers report smoking less, and one respondent reported that the UT policy influenced him/her to quit smoking. This decrease in smoking habits is supported by the data for daily cigarette consumption among current smokers.
Over 40% smoke less than 1 cigarette/day on days while he/she is on campus. The percentage decreases to 21.6% on days while he/she is not on campus.

In regards to attitudes toward smoking bans, over 75% of respondents supported both the Ohio smoking ban and the UT Smoke Free and Tobacco Free Policy. This is similar to the previously mentioned survey conducted by SmokeFreeOhio which found that 7 out of 10 voters in Ohio continue to support the Ohio Smoke-Free Workplace Act (SmokeFreeOhio, 2008). Current smokers were most likely to oppose the Ohio smoking ban. Based on comments submitted at the end of the survey, this opinion may be derived from their belief that the government should not dictate the smoking status of private businesses. Respondents, however, felt that since the University of Toledo is its own institution, it has the right to implement its own smoking policy. This could explain why fewer current smokers opposed the UT policy.

Limitations

There are limitations within this study, as with all self-report questionnaires. Given that smoking tends to be perceived as socially undesirable, especially for healthcare workers, as well as against policy to smoke on campus, potential participants may have chosen not to complete the questionnaire, and those who did complete the questionnaire may have selected socially desirable responses about their smoking status, rather than accurate responses. For example, current smokers may significantly underreport their cigarette consumption or deny smoking all together. In order to reduce this tendency, anonymity was guaranteed to the participants by utilizing an online questionnaire that did not require any kind of log-in or identification information to submit the survey. Unfortunately, not requiring unique identification may result in a subsequent limitation to the study: multiple submissions by an individual. It is, however,
unlikely that participants would submit multiple questionnaires as there was no compensation or incentive provided to participate in this study. Another limitation within a self-report questionnaire is the subjective interpretation of the question and answer options. For example, several participants admitted to being a medical professional (MD/PA/RN etc.) and a current smoker, but subsequently denied initiation of smoking either before, during, or after professional medical schooling. Logically, this is not possible; if you are currently a healthcare provider who smokes, you must have attended a professional school and have started smoking at some point relative to graduation. These types of inconsistencies are a drawback of anonymous survey research because the researcher cannot ask clarifying questions.

Another potential limitation of the study was the distribution of the invitation e-mail to the students and employees. Distribution of the invitation emails to the multiple populations of this study (UTMC physicians, nursing students, and medical students) relied on individuals other than the principal investigators to forward the invitation email to their respective students and employees. Coordinating these efforts resulted in different deadlines for each population and data collection to span over several months rather than the same four-week period. Furthermore, while it was reported that the e-mails were forwarded, there is no way of being absolutely certain that the initial invitation and follow up emails were sent to every eligible employee and student. It is recommended that future researchers minimize the amount he/she must rely on other individuals for data collection in order to have greater control over the study conditions.

As a part of the questionnaire, the participants were asked to indicate his/her specialty area of healthcare. After reviewing the numerous manually entered specialty areas and determining the difficulty of combining and comparing areas of medicine with areas of nursing,
it was decided that this part of the survey would be eliminated from further analysis within the study.

Recommendations for Future Research

Unfortunately, this study did not obtain a very high response rate, but fundamentally, the study design has positive implications. Future research could include replicating this study to obtain a higher response rate, perhaps by offering compensation or an incentive to participate in the study. It is recommended that the online questionnaire be revised to include more advanced programming and offer detailed branching questions (i.e., subsequent questions change based on responses given) so as to prevent inconsistent responses. Lastly, it is recommended that information regarding the Ohio Smoke-Free Workplace Act and the UT Smoke-Free and Tobacco-Free Policy be provided to study participants before they answer the questionnaire so they are able to make informed responses.

Implications

Based on the results of this study, it is clear that smoking among healthcare professionals and students still persists, regardless of the fact that they have been educated about the adverse health effects of smoking. It could be beneficial to provide additional assistance in quitting smoking, such as offering free cessation devices and organized community walks. In addition, since stress was identified as a major reason to continue smoking, it could also be beneficial to teach the students and employees better ways to cope with the stress.

The results of this study also demonstrate the effectiveness of smoking bans and provide support for their future implementation at other institutions. While it could not be concluded that
the smoking prevalence had in fact decreased over the last five years, the study found that smoking bans did influence smoking habits, and respondents actually reported smoking less on a daily basis. Smoking bans aim to eliminate secondhand smoke exposure, and numerous respondents commented on their appreciation to breathe clean air while at work. It is unlikely that cigarette smoking will be completely eliminated in the future, but this research adds to the growing body of evidence that smoking bans are effective and should continue to be implemented.
Reference List


Lake, K. (2004). *The prevalence of tobacco use at a local academic health facility compared to the national, Ohio, and Toledo averages*. Unpublished master’s scholarly project. Medical College of Ohio, Toledo, Ohio.


Table 1

Summary of Respondents by Position

<table>
<thead>
<tr>
<th>Position</th>
<th>n/397</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse</td>
<td>136 (34.3%)</td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>10 (2.5%)</td>
</tr>
<tr>
<td>Physician</td>
<td>34 (8.6%)</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>8 (2.0%)</td>
</tr>
<tr>
<td>Student – Medical</td>
<td>141 (35.5%)</td>
</tr>
<tr>
<td>Student – Nursing</td>
<td>23 (5.8%)</td>
</tr>
<tr>
<td>Student – Physician Assistant</td>
<td>45 (11.3%)</td>
</tr>
</tbody>
</table>

Table 2

Summary of Respondents by Smoking Habits

<table>
<thead>
<tr>
<th>Category</th>
<th>n/397</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current</td>
<td>37 (9.3%)</td>
</tr>
<tr>
<td>Former</td>
<td>64 (16.1%)</td>
</tr>
<tr>
<td>Never</td>
<td>296 (74.6%)</td>
</tr>
</tbody>
</table>

Table 3

Summary of Respondents by Cigarette Consumption among Current Smokers (n=37)

<table>
<thead>
<tr>
<th>Consumption</th>
<th>Days on Campus (%)</th>
<th>Days off Campus (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1/day</td>
<td>16.2</td>
<td>21.6</td>
</tr>
<tr>
<td>1-10/day</td>
<td>51.4</td>
<td>40.5</td>
</tr>
<tr>
<td>11-20/day</td>
<td>5.4</td>
<td>32.4</td>
</tr>
<tr>
<td>More than 20/day</td>
<td>2.7</td>
<td>5.4</td>
</tr>
<tr>
<td>I don’t smoke</td>
<td>24.3</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4
### Summary of Respondents by Cigarette Smoking Initiation among Current and Former Smokers

<table>
<thead>
<tr>
<th>Category</th>
<th>n/101</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before entering nursing/PA/medical school</td>
<td>74 (73.3%)</td>
</tr>
<tr>
<td>During nursing/PA/medical school</td>
<td>8 (7.9%)</td>
</tr>
<tr>
<td>After graduating nursing/PA/medical school</td>
<td>2 (2.0%)</td>
</tr>
<tr>
<td>None of the above</td>
<td>4 (4.0%)</td>
</tr>
<tr>
<td>I don’t smoke</td>
<td>13 (12.9%)</td>
</tr>
</tbody>
</table>

### Summary of Respondents by Reasons for Smoking among Current and Former Smokers

<table>
<thead>
<tr>
<th>Category</th>
<th>n/101</th>
</tr>
</thead>
<tbody>
<tr>
<td>To relieve stress</td>
<td>23 (22.8%)</td>
</tr>
<tr>
<td>Social factors (with friends, when drinking, etc.)</td>
<td>50 (49.5%)</td>
</tr>
<tr>
<td>To relieve boredom</td>
<td>3 (3.0%)</td>
</tr>
<tr>
<td>Other – Addiction</td>
<td>4 (4.0%)</td>
</tr>
<tr>
<td>Other – Enjoyment</td>
<td>6 (5.9%)</td>
</tr>
<tr>
<td>Other – Combination of Factors</td>
<td>4 (4.0%)</td>
</tr>
<tr>
<td>Other</td>
<td>8 (7.8%)</td>
</tr>
<tr>
<td>I don’t smoke</td>
<td>3 (3.0%)</td>
</tr>
</tbody>
</table>
Table 6

Summary of Attitude & Influence of Smoking Bans

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Agree (%)</th>
<th>Agree (%)</th>
<th>Neutral (%)</th>
<th>Disagree (%)</th>
<th>Strongly Disagree (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I support the Ohio smoking ban. ((n=397))</td>
<td>63</td>
<td>15.1</td>
<td>5.3</td>
<td>6.3</td>
<td>10.3</td>
</tr>
<tr>
<td>The Ohio smoking ban has influence my attitude toward smoking. ((n=397))</td>
<td>7.3</td>
<td>16.4</td>
<td>42.6</td>
<td>17.9</td>
<td>15.9</td>
</tr>
<tr>
<td>The Ohio smoking ban has influenced the amount that I smoke. ((n=37))</td>
<td>8.1</td>
<td>32.4</td>
<td>10.8</td>
<td>21.6</td>
<td>27</td>
</tr>
<tr>
<td>I support the UT Smoke Free and Tobacco Free Policy. ((n=397))</td>
<td>70.3</td>
<td>14.9</td>
<td>4.5</td>
<td>3</td>
<td>7.3</td>
</tr>
<tr>
<td>The UT Smoke Free and Tobacco Free Policy has influenced my attitude toward smoking. ((n=397))</td>
<td>7.8</td>
<td>11.6</td>
<td>47.1</td>
<td>17.4</td>
<td>15.9</td>
</tr>
<tr>
<td>The UT Smoke Free and Tobacco Free Policy has influenced the amount that I smoke. ((n=37))</td>
<td>8.1</td>
<td>16.2</td>
<td>16.2</td>
<td>24.3</td>
<td>35.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Statement</th>
<th>Smoke More (%)</th>
<th>Smoke Less (%)</th>
<th>Quit Smoking (%)</th>
<th>No Effect (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much has the Ohio smoking ban influenced the amount that you smoke? ((n=37))</td>
<td>5.4</td>
<td>43.2</td>
<td>0</td>
<td>51.4</td>
</tr>
<tr>
<td>How much has the UT Smoke Free and Tobacco Free Policy influenced the amount that you smoke? ((n=37))</td>
<td>2.7</td>
<td>21.6</td>
<td>2.7</td>
<td>73</td>
</tr>
</tbody>
</table>
Table 7

**Smoking Status by Gender and by Profession, Chi-square Analyses**

<table>
<thead>
<tr>
<th>Category</th>
<th>% Current (n=37)</th>
<th>% Former (n=64)</th>
<th>% Never (n=296)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27.0</td>
<td>21.9</td>
<td>30.1</td>
</tr>
<tr>
<td>Female</td>
<td>73.0</td>
<td>78.1</td>
<td>69.9</td>
</tr>
<tr>
<td>Profession*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>0</td>
<td>6.2</td>
<td>10.1</td>
</tr>
<tr>
<td>Physician Assistant</td>
<td>0</td>
<td>1.6</td>
<td>2.4</td>
</tr>
<tr>
<td>Nurse Practitioner</td>
<td>0</td>
<td>3.1</td>
<td>2.7</td>
</tr>
<tr>
<td>Nurse</td>
<td>59.5</td>
<td>62.5</td>
<td>25.0</td>
</tr>
<tr>
<td>Student – Medical</td>
<td>24.3</td>
<td>20.3</td>
<td>40.2</td>
</tr>
<tr>
<td>Student – PA</td>
<td>5.4</td>
<td>1.6</td>
<td>14.2</td>
</tr>
<tr>
<td>Student – Nursing</td>
<td>10.8</td>
<td>4.7</td>
<td>5.4</td>
</tr>
</tbody>
</table>

* = significant at <0.01

---

Table 8

**Demographics Distributed by Smoking Status, Chi-square Analyses**

<table>
<thead>
<tr>
<th>Category (n)*</th>
<th>Current (%)</th>
<th>Former (%)</th>
<th>Never (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician (34)</td>
<td>0</td>
<td>11.8</td>
<td>88.2</td>
</tr>
<tr>
<td>Physician Assistant (8)</td>
<td>0</td>
<td>12.5</td>
<td>87.5</td>
</tr>
<tr>
<td>Nurse Practitioner (10)</td>
<td>0</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Nurse (136)</td>
<td>16.2</td>
<td>29.4</td>
<td>54.4</td>
</tr>
<tr>
<td>Student – Medical (141)</td>
<td>6.4</td>
<td>9.2</td>
<td>84.4</td>
</tr>
<tr>
<td>Student – PA (45)</td>
<td>5.4</td>
<td>2.2</td>
<td>93.3</td>
</tr>
<tr>
<td>Student – Nursing (23)</td>
<td>17.4</td>
<td>13</td>
<td>69.6</td>
</tr>
</tbody>
</table>

* = significant at p<0.01

---

$n=$sample size, df=degrees of freedom, N=population size
Table 9

Smoking Status vs. Attitude, Chi-square Analyses

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Current Smoker (%)</th>
<th>Former Smoker (%)</th>
<th>Never Smoker (%)</th>
<th>df=8, N=397, p=0.000*</th>
</tr>
</thead>
<tbody>
<tr>
<td>I support the Ohio smoking ban.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree/Strongly Agree</td>
<td>32.4</td>
<td>71.8</td>
<td>85.2</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>10.8</td>
<td>9.4</td>
<td>3.7</td>
<td></td>
</tr>
<tr>
<td>Disagree/Strongly Disagree</td>
<td>56.7</td>
<td>18.7</td>
<td>11.2</td>
<td></td>
</tr>
<tr>
<td>The Ohio smoking ban has influenced my attitude toward smoking.</td>
<td>df=8, N=397, p=0.005*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree/Strongly Agree</td>
<td>21.6</td>
<td>23.4</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>21.6</td>
<td>42.2</td>
<td>45.3</td>
<td></td>
</tr>
<tr>
<td>Disagree/Strongly Disagree</td>
<td>56.7</td>
<td>34.3</td>
<td>30.8</td>
<td></td>
</tr>
<tr>
<td>I support the UT Smoke Free and Tobacco Free Policy</td>
<td>df=8, N=397, p=0.000*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree/Strongly Agree</td>
<td>48.6</td>
<td>82.8</td>
<td>90.2</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>5.4</td>
<td>9.4</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Disagree/Strongly Disagree</td>
<td>45.9</td>
<td>7.8</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>The UT Smoke Free and Tobacco Free Policy has influenced my attitude toward smoking.</td>
<td>df=8, N=397, p=0.000*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree/Strongly Agree</td>
<td>10.8</td>
<td>17.2</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td>27</td>
<td>40.6</td>
<td>51.2</td>
<td></td>
</tr>
<tr>
<td>Disagree/Strongly Disagree</td>
<td>62.1</td>
<td>42.2</td>
<td>27.8</td>
<td></td>
</tr>
</tbody>
</table>

n=sample size, df=degrees of freedom, N=population size
* = significant at p<0.01
Appendix A: Invitation Emails

Initial Email Invitation to Employees and Students

Subject Line: Online Survey of Smoking Habits/Attitudes toward Smoking Bans

We are conducting research to examine the smoking habits of employees and students at the University of Toledo-Health Science Campus (UT-HSC) and University of Toledo Medical Center (UTMC). In addition, we are evaluating the attitudes toward the Ohio smoking ban and the UT Smoke-free and Tobacco-free Policy and its impact on smoking habits.

You have been selected to participate in this study based on your enrollment/employment at UT-HSC/UTMC. If you choose to participate in this study, the link at the bottom of this e-mail will take you to the anonymous online survey; it should take less than 10 minutes to complete. You will have until XX/XX/2009 to submit the survey. All answers will be kept anonymous and the results from this study will be used for research purposes only. Please note that your participation in this study is voluntary and submission of the survey implies your consent.

We would like to thank you for taking the time to complete this survey. If you have any questions or would like to receive the results of this study after the analysis is complete, please e-mail us at kimberly.hebeler@utoledo.edu or jolene.miller@utoledo.edu.

Sincerely,

Jolene Miller, MLS
Principal Investigator & Faculty Advisor

Kimberly Hebeler, Physician Assistant student
Co-investigator

This research project has been designated as exempt by The University of Toledo Institutional Review Board on February 17, 2009 (IRB# 106328).

Here is the link of the survey: http://vovici.com/wsb.dll/s/15b20g3aa0a
Follow-up Email to Employees and Students

Subject Line: Reminder: Online Survey of Smoking Habits/Attitudes toward Smoking Bans

This is just a reminder that you have until XX/XX/2009 to complete the survey of smoking habits and attitudes toward smoking bans. The original e-mail, with a link to the survey, is below. If you have already responded, thank you for taking the time to do so and please disregard this e-mail.

******************************************************************************

We are conducting research to examine the smoking habits of employees and students at the University of Toledo-Health Science Campus (UT-HSC) and University of Toledo Medical Center (UTMC). In addition, we are evaluating the attitudes toward the Ohio smoking ban and the UT Smoke-free and Tobacco-free Policy and its impact on smoking habits.

You have been selected to participate in this study based on your enrollment/employment at UT-HSC/UTMC. If you choose to participate in this study, the link at the bottom of this e-mail will take you to the anonymous online survey; it should take less than 10 minutes to complete. You will have until XX/XX/2009 to submit the survey. All answers will be kept anonymous and the results from this study will be used for research purposes only. Please note that your participation in this study is voluntary and submission of the survey implies your consent.

We would like to thank you for taking the time to complete this survey. If you have any questions or would like to receive the results of this study after the analysis is complete, please e-mail us at kimberly.hebeler@utoledo.edu or jolene.miller@utoledo.edu.

Sincerely,

Jolene Miller, MLS
Principal Investigator & Faculty Advisor

Kimberly Hebeler, Physician Assistant student
Co-investigator

This research project has been designated as exempt by The University of Toledo Institutional Review Board on February 17, 2009 (IRB# 106328).

Here is the link of the survey: http://vovici.com/wsb.dll/s/15b20g3aa0a
Subject Line: Online Survey of Smoking Habits/Attitudes toward Smoking Bans

Dear UT Physician Assistant Class of 2008,

We are conducting research to examine the smoking habits of employees and students at the University of Toledo-Health Science Campus (UT-HSC) and University of Toledo Medical Center (UTMC). In addition, we are evaluating the attitudes toward the Ohio smoking ban and the UT Smoke-free and Tobacco-free Policy and its impact on smoking habits.

You have been selected to participate in this study based on your recent enrollment at the University of Toledo-Health Science Campus. In addition, your participation is requested in order to increase the population size of the physician assistant students. If you choose to participate in this study, the link at the bottom of this e-mail will take you to the online survey; it should take less than 10 minutes to complete. For question 3, please select “student – physician assistant.”

You will have until 04/13/2009 to submit the survey. All answers will be kept anonymous and the results from this study will be used for research purposes only. Furthermore, please know that your results will not be isolated from other health care professionals & students who have been recruited to participate in the study. Your participation in this study is voluntary and submission of the survey implies your consent.

We would like to thank you for taking the time to complete this survey. If you have any questions or would like to receive the results of this study after the analysis is complete, please e-mail us at kimberly.hebeler@utoledo.edu or jolene.miller@utoledo.edu.

Sincerely,

Jolene Miller, MLS
Principal Investigator & Faculty Advisor

Kimberly Hebeler, Physician Assistant student
Co-investigator

This research project has been designated as exempt by The University of Toledo Institutional Review Board on February 17, 2009 (IRB# 106328).

Here is the link of the survey: http://vovici.com/wsb.dll/s/15b20g3aa0a
Follow-up Email to UT Physician Assistant Class of 2008

Subject Line: Reminder: Online Survey of Smoking Habits/Attitudes toward Smoking Bans

This is just a reminder that you have until 04/13/2009 to complete the survey of smoking habits and attitudes toward smoking bans. The original e-mail, with a link to the survey, is below. If you have already responded, thank you for taking the time to do so and please disregard this e-mail.

*******************************************************************************

Dear UT Physician Assistant Class of 2008,

We are conducting research to examine the smoking habits of employees and students at the University of Toledo-Health Science Campus (UT-HSC) and University of Toledo Medical Center (UTMC). In addition, we are evaluating the attitudes toward the Ohio smoking ban and the UT Smoke-free and Tobacco-free Policy and its impact on smoking habits.

You have been selected to participate in this study based on your recent enrollment at the University of Toledo-Health Science Campus. In addition, your participation is requested in order to increase the population size of the physician assistant students. If you choose to participate in this study, the link at the bottom of this e-mail will take you to the online survey; it should take less than 10 minutes to complete. **For question 3, please select “student – physician assistant.”**

You will have until 04/13/2009 to submit the survey. All answers will be kept anonymous and the results from this study will be used for research purposes only. Furthermore, please know that your results will not be isolated from other health care professionals & students who have been recruited to participate in the study. Your participation in this study is voluntary and submission of the survey implies your consent.

We would like to thank you for taking the time to complete this survey. If you have any questions or would like to receive the results of this study after the analysis is complete, please e-mail us at kimberly.hebeler@utoledo.edu or jolene.miller@utoledo.edu.

Sincerely,

Jolene Miller, MLS
Principal Investigator & Faculty Advisor

Kimberly Hebeler, Physician Assistant student
Co-investigator

This research project has been designated as exempt by The University of Toledo Institutional Review Board on February 17, 2009 (IRB# 106328).

**Here is the link of the survey:** [http://vovici.com/wsb.dll/s/15b20g3aa0a](http://vovici.com/wsb.dll/s/15b20g3aa0a)
Appendix B: Questionnaire

The following anonymous survey is to assess the smoking habits of employees and students at the University of Toledo-Health Science Campus and University of Toledo Medical Center. In addition, the survey will ask you about the Ohio smoking ban and the UT Smoke free and Tobacco free policy. Your participation is greatly appreciated. Please fill in the blanks or check the appropriate boxes. Once you submit the survey, no changes may be made. Thank you for your time.

I.) General Information

1.) Gender:
   ○ Male
   ○ Female

2.) Please enter you age. _________

3.) What is your profession?
   ○ Physician
   ○ Physician Assistant
   ○ Nurse Practitioner
   ○ Nurse
   ○ Student – Medical
   ○ Student – Physician Assistant
   ○ Student - Nursing
   ○ Other (please specify) _________

4.) What is your specialty?
   ○ Family practice
   ○ Emergency
   ○ Cardiology
   ○ Radiology
   ○ Internal Medicine
   ○ Pediatrics
   ○ Urology
   ○ Surgery
   ○ Orthopedics
   ○ OB/GYN
   ○ Student
   ○ Other (please specify) _________

II.) Smoking Related Habits

5.) What is your current smoking status?
   ○ Current (smoked at least 1 cigarette within last 30 days)
   ○ Former (last cigarette smoked more than 30 days ago)
   ○ Never

6.) How many cigarettes do you smoke on days that you are on campus (ex. working/attending class)?
   ○ Less than 1/day
   ○ 1-10/day
   ○ 11-20/day
   ○ More than 20/day
   ○ I don’t smoke
7.) How many cigarettes do you smoke on days that you are NOT on campus (ex. weekend/holiday)?
   ○ Less than 1/day
   ○ 1-10/day
   ○ 11-20/day
   ○ More than 20/day
   ○ I don’t smoke

8.) When did you begin smoking?
   ○ Before entering nursing/PA/medical school
   ○ During nursing/PA/medical school
   ○ After graduating nursing/PA/medical school
   ○ None of the above
   ○ I don’t smoke

9.) Why did you smoke in the past and/or why do you smoke now?
   ○ To relieve stress
   ○ Social factors (with friends, when drinking, etc.)
   ○ To relieve boredom
   ○ I don’t smoke
   ○ Other (please specify): ____________________________

III.) Attitude Toward Smoking Bans

10.) I support the Ohio smoking ban.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree

11.) The Ohio smoking ban has influenced my attitude toward smoking.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree

12.) The Ohio smoking ban has influence the amount that I smoke.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree
13.) How much did the Ohio smoking ban influence the amount that you smoke?
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree
   ○ I don’t smoke

14.) I support the UTMC Smoke Free and Tobacco Free Policy.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree

15.) The UTMC Smoke Free and Tobacco Free Policy has influenced my attitude toward smoking.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree

16.) The UTMC Smoke Free and Tobacco Free Policy has influenced the amount that I smoke.
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree
   ○ I don’t smoke

17.) How much did the UTMC Smoke Free and Tobacco Free Policy influence the amount that you smoke?
   ○ Strongly disagree
   ○ Disagree
   ○ Neutral
   ○ Agree
   ○ Strongly Agree
   ○ I don’t smoke

18.) Comments: __________________________________________________________
Abstract

**Objective:** To examine the smoking habits of healthcare professionals and students at an academic medical center in Northwest Ohio and to evaluate the effects of recently implemented smoke-free policies. **Method:** An online questionnaire was distributed to all UTMC physicians, PAs and nurses, and all UT medical, PA and nursing students. The survey covered demographic information, smoking habits and attitudes toward the Ohio Smoke Free Workplace Act and UT Smoke Free and Tobacco Free Policy. **Results:** Current smokers comprised 9.3% of respondents with the majority being nurses and medical students. Cigarette consumption decreased on days when respondents were on campus. The majority of respondents supported both smoking policies while current smokers were most likely to disapprove. **Conclusion:** A small percentage of healthcare professionals and students at this facility do continue to smoke despite knowing their adverse health effects. Smoking bans do reduce cigarette consumption and are appreciated by smokers and non-smokers.