Tobacco-Free Campus Action Research Team

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EXECUTIVE SUMMARY

The "Tobacco-Free Campus" Action Research Team (ART) was a student-led research project formed to raise awareness and analyze UCLA's tobacco-free policy, which was enacted on April 22, 2013. Through this policy, all tobacco products including cigarettes, cigars and chewing tobacco, as well as electronic cigarettes, are prohibited on campus and on any areas owned or leased by the university. The team focused on creating and structuring a research study, in addition to creating a media campaign for several Earth Day events. The overall objective of the team's research was to analyze the change in tobacco use before and after the implementation of the ban.

The research segment of the project focused on cigarette butt collection, air quality tests, and a visual count of smokers around designated hotspot areas on campus. Our cigarette butt counts were conducted bi-weekly for eight weeks, while our air quality tests and smoker counts were conducted four times throughout Winter and Spring Quarters. We had a total of five hotspots which were areas that had significant amounts of smokers and cigarette butts: the Neuroscience Research Building courtyard (NRB), the Powell Library footsteps, the Physics and Astronomy Building courtyard (PAB), Wilson Plaza, and Covel Commons. We also designated two control spots: one near the entrance to the emergency room portion of the Ronald Reagan Medical Center (ER) and the other in the Community Health Sciences courtyard (CHS). These two locations already had a non-smoking policy in place prior to the ban, and served as a point of comparison for our hotspots. Our cigarette butt counts were conducted at all of these locations while our air quality tests and smoker counts were conducted at three of these sites (Powell, NRB, CHS).

The implementation of the tobacco ban was associated with decreases in cigarette litter and smoker counts for all of our hotspots, but the control sites told a more interesting story. The CHS site continued to have low counts for both cigarette litter and smoker counts, while the ER actually saw an increase of cigarette butt litter. A possible explanation for this anomaly could be that the hospital population is simply different from the rest of the UCLA community in terms of its smoking tendencies, perhaps due to the stressful nature the work.

In addition to the research aspect of our project, the team's other goal was to increase overall awareness of the tobacco ban. To achieve this goal, the team created several media and promotional campaigns. In our first quarter, we compiled a film that featured hundreds of pictures of UCLA students and faculty promoting the upcoming policy change. The team also created a project website and Facebook page to inform students, other colleges, and the general public about our work. To promote the initiation of the tobacco ban the team also attended several Earth Day events. For these events, we created several visual and educational displays, including informational posters that highlighted key statistics regarding the environmental consequences of tobacco production and disposal. The last aspect of our awareness campaign was the initiation of the first "Great Butt Hunt". In this event the team, along with 15 student volunteers, walked throughout UCLA's campus and picked up nearly 10,000 cigarette butts.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	EXECUTIVE SUMMARY	2
ABSTRACT	ACKNOWLEDGEMENTS	5
SIGNIFICANCE OF THE PROJECT 6 TEAM MISSION AND PROJECT OBJECTIVES 8 INITIAL CONDITIONS 9 THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS 10 EDUCATIONAL AND EARTH DAY EVENTS 10 BUTT HUNT 11 BUT HUNT 11 SOCIAL AWARENESS AND MEDIA CAMPAIGN 15 RECOMMENDATIONS 20 CONCLUSION 22 APPENDIX 22 A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS 22 Methods 23 Results: 23 Methods 23 Results: 28 Key Findings and Discussion 53 B. CIGARETTE COUNT: RAW DATA (INCONCLUSIVE RESULTS) 69 C. INFORMATIONAL POSTERS 73 CITATIONS 75	ABSTRACT	5
TEAM MISSION AND PROJECT OBJECTIVES8INITIAL CONDITIONS9THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERSCOUNTS [SUMMARY]10EDUCATIONAL AND EARTH DAY EVENTS11BUTT HUNT11EARTH DAY TABLING EVENTS13SOCIAL AWARENESS AND MEDIA CAMPAIGN15RECOMMENDATIONS20CONCLUSION22APPENDIX22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:28Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS73CITATIONS75	SIGNIFICANCE OF THE PROJECT	6
INITIAL CONDITIONS9THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERSCOUNTS [SUMMARY]10EDUCATIONAL AND EARTH DAY EVENTS11BUTT HUNT11EARTH DAY TABLING EVENTS13SOCIAL AWARENESS AND MEDIA CAMPAIGN15RECOMMENDATIONS20CONCLUSION22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:24Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS.73CITATIONS	TEAM MISSION AND PROJECT OBJECTIVES	8
THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS [SUMMARY]	INITIAL CONDITIONS	9
EDUCATIONAL AND EARTH DAY EVENTS11BUTT HUNT11EARTH DAY TABLING EVENTS13SOCIAL AWARENESS AND MEDIA CAMPAIGN15RECOMMENDATIONS20CONCLUSION22APPENDIX22A THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:2828Key Findings and Discussion5353B. CIGARETTE COUNT: RAW DATA5959AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)6969C. INFORMATIONAL POSTERS7373CITATIONS75	THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND COUNTS [SUMMARY]	SMOKERS 10
SOCIAL AWARENESS AND MEDIA CAMPAIGN15RECOMMENDATIONS20CONCLUSION22APPENDIX22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:28Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS73	EDUCATIONAL AND EARTH DAY EVENTS Butt Hunt Earth Day Tabling Events	11 11
RECOMMENDATIONS20CONCLUSION22APPENDIX22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:28Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS73	SOCIAL AWARENESS AND MEDIA CAMPAIGN	15
CONCLUSION22APPENDIX22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:28Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS73CITATIONS75	RECOMMENDATIONS	20
APPENDIX22A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS22Introduction22Methods23Results:28Key Findings and Discussion53B. CIGARETTE COUNT: RAW DATA59AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS)69C. INFORMATIONAL POSTERS73CITATIONS75	CONCLUSION	22
CITATIONS	APPENDIX A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS CO Introduction Methods Results: Key Findings and Discussion B. CIGARETTE COUNT: RAW DATA AIR QUALITY GRAPHS: RAW DATA (INCONCLUSIVE RESULTS) C. INFORMATIONAL POSTERS	22 DUNTS 22 22 23 23 28 28 53 59 59
	CITATIONS	

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ABSTRACT

The "Tobacco-Free Campus" Action Research Team (ART) was a student-led research program that was formed to raise awareness and analyze UCLA's tobacco-free policy, which was enacted on April 22, 2013. Through this policy, all tobacco products including cigarettes, cigars and chewing tobacco, as well as electronic cigarettes, are prohibited on campus and on any areas owned or leased by the university. The team focused on creating and structuring a research project, using social media to promote awareness of the tobacco ban, and creating a media campaign for several Earth Day events. The overall objective of the Tobacco-Free Campus team's research was to analyze the change in tobacco use before and after the implementation of the ban. The research segment of the project focused on cigarette butt collection, air quality tests, and a visual count of smokers around designated hotspot areas on campus. Our research displayed a strong association between the initiation of the tobacco ban and an overall decrease in cigarette litter and the number of smokers seen.

For our social media campaign the team created a Facebook page in addition to a team website, both of which contained resources on the team's progress. For our three Earth Day events the team created several visual and educational displays highlighting the environmental consequences surrounding tobacco production and its use. The last aspect of our awareness campaign was the initiation of the first "Great Butt Hunt" in which the team, along with 15 student volunteers, walked throughout UCLA's campus and picked up nearly 10,000 cigarette-butts.

SIGNIFICANCE OF THE PROJECT

UCLA was the first UC campus to go tobacco free. Although there are many public

health issues associated with tobacco use, such as the risk associated with secondhand smoke, the

team focused on the environmental aspects of the ban. To research and promote the impact that

tobacco has on the environment over its lifecycle the team created an article, in conjunction with

Professor Christensen's Environment 150 class, which highlights the environmental impacts of

tobacco:

The Lifecycle of Tobacco: A Worldwide Journey

Imagine a cigarette, as it gradually burns with a soft orange glow. It slowly releases vapors of ash and tobacco that will soon be blown away in the wind. This lasts for one minute, five minutes, maybe even ten. Within ten minutes the cigarette has likely burned out and it's time for a new one. But what happens to the old cigarette? Better yet, what did it take to produce the first one? These environmental questions are often neglected during the discussion of tobacco cessation policies. Tobacco production is a global industry, with global ramifications. If you're smoking a cigarette right now, it is likely the tobacco used in it was grown outside of the United States. Tobacco production is quickly migrating from developed nations to developing nations. Developing nations now account for 86% of global tobacco production, up from 57% in 1961ⁱ. In 1999 China was producing nearly a third of global tobacco leavesⁱⁱ. This article looks to analyze the lifecycle of tobacco and shed light on its environmental impact.

Tobacco Cultivation: A Tale of Two Worlds

The environmental ramifications of tobacco use begin years before a smoker takes their first puff. Cultivating tobacco is an extremely intensive process. Tobacco is a nutrient intensive plant, and it readily depletes all of the available nutrients from the local soil. Nutrients have to be put back into the soil or tobacco can't grow again. Farmers must also be cautions of diseases and insects that can swiftly destroy their tobacco crops. In the world of tobacco production there are only two options, replace the depleted nutrients yourself or let nature do the work for you.

Throughout most of the developed world fertilizers are used to revitalize the land. Fertilizers pose a risk by adding excess nutrients into the local ecosystem. These nutrients often find their way into the local water source and stimulate the growth of algaeⁱⁱⁱ. The algae grow so numerous that when they die, they use up all the oxygen in the water and kill all other organisms as well. Pesticides also pose a significant environmental risk by increasing local air pollution. Aldicarb was a pesticide used in tobacco production in the United States until 2007^{iv}. Less than one-thousandth of an ounce of Aldicarb



FIGURE 1: FRESH TOBACCO PLANTS PHOTO CREDIT: ©UNIVERSAL POPS:FLIKR

is enough to kill a human and it is extremely toxic to most other animals^v.

Tanzania is a nation of 44 million people that sits on the eastern coast of Africa^{vi}. Tanzania's tobacco production has increased by 1825% since 1961^{vii}. Tanzanian tobacco farmers, as with many tobacco-farmers from developing nations, do not have the luxury of using synthetic fertilizers or pesticides. For the average Tanzanian farmer, natural processes are their only fertilizer. These farmers allow the land to lie fallow. It is up to nature to decide how long it will take for the land to be nutrient-rich once more. While this sounds like an environmentalist's paradise, it turns out to be much worse than many traditional methods. Tanzanian farmland should be left to lie fallow for 20 years to fully regain its nutrients. As demands for tobacco increases the time land is allowed to lie fallow has decreased to 4-5 years^{viii}. Virgin land becomes introduced into the farmer's crop rotations in order to reduce soil-borne disease and increase nutrient availability. In Tanzania, close to 70% of farmers reported that they cleared new woodland areas for every new season of farming^{ix}. This stresses ecosystems that are already suffering from deforestation. As tobacco production continues to shift to developing nations, the deforestation effects will likely be more pronounced.

Demanding a cure for "Tobacco Curing"



FIGURE 2: TOBACCO AFTER IT IS "CURED" PHOTO CREDIT: ©USONIAN:FLIKR

There is a good reason why tobacco is called a cash crop. During the 2010-year, 303 billion cigarettes were sold in the United States alone. This doesn't include another 122 million pounds of smokeless tobacco products or the other 13.3 billion cigars sold^x. In 1999 Tobacco production in China was so large it accounted for 10% of their entire government revenue^{xi}. Before all of this tobacco is sold, the raw tobacco leaves must be processed. Tobacco leaves go through a process known as "curing". This process dries out the fresh tobacco leaves so it is acceptable for consumption. More than 90% of the energy used in the tobacco industry comes from the curing stage^{xii}. This is because something must be providing the energy to dry out the tobacco leaves. Oil is often used among farmers from developed nations. This poses serious concerns at a time when nations are looking to cut their carbon emissions due to climate change. As of 2006, it has been estimated that tobacco industry releases around half a million tons of carbon dioxide per vear^{xiii}.

Throughout the developing world, timber is largely used in the curing stage. In Tanzania, timber is taken from some of the most ecologically sensitive areas in the region. As Tanzania is a semi-arid

environment, using wood in the curing process promotes greater deforestation. This process is responsible for 3.5% of annual deforestation in the Urambo region of Tanzania^{xiv}. Farmers use an average of $23m^3$ of raw wood products per season for the curing process, with over 70% of the wood coming from public lands and forest reserves^{xv}. After curing comes shipping and packaging, where timber products are used to wrap the cigarettes in addition to making the boxes. With nearly 6 trillion cigarettes produced every year, it is easy to see how 600 million trees are used in tobacco production^{xvi}.

Cleaning Up the Mess

The next time you are walking down a busy street, look down. While the cultivation of tobacco significantly contributes to environmental degradation, the real problem lies in what we leave on our streets. Cigarette litter is the most prominent type of tobacco litter. Tobacco, and the paper it is wrapped in, is derived from plant matter. Shouldn't it biodegrade? While the tobacco residue of cigarettes will eventually biodegrade, the cigarette filters do not. Cigarette filters are made of a material called cellulose acetate, which is photodegradable^{xvii}. As the sun's rays hit the cigarette filters, it will break the filter up into smaller and smaller pieces. The trick is, they never truly break down. Cigarette filters will get so small they become diluted in the soil or water and then go unnoticed.

Cigarette litter has been an ongoing problem for many municipalities, both in terms of cost and aesthetics. It has become such a problem in recent years that the city of San Francisco wants to begin imposing a waste fee of \$0.20 per cigarette pack^{xviii}. San Francisco has estimated that cigarette litter costs their city 7.4 million dollars annually^{xix}. Surprisingly, municipalities were not the first organizations to identify the environmental costs of cigarette litter. Decades before municipalities were even thinking about cigarette litter the tobacco industry was studying its effects. Released documents from the tobacco industry states that, "careless, offensive and occasionally harmful' cigarette butt disposal practices were contributing to the declining acceptability of smoking."^{xx} For the tobacco industry, it was simple. Improper disposal of cigarette butts gave smokers a bad public image, and a bad public image always means lower sales.

The ultimate environmental problem of the tobacco disposal lies in the numbers. As of 2004 there were an estimated 44.5 million smokers in the United States alone, each of who used an average of 5-14 cigarettes per day^{xxi}. There are only two paths a cigarette will take when it is no longer useful, the trash or the floor. A 2009 report from the organization Keep America Beautiful states that tobacco products form almost 38% of all collected litter from roadways and streets in the United States^{xxii}. In California cigarette butts make up 34% of all litter collected and costs public agencies 41 million dollars every year^{xxiii}. The lucky few cigarettes that aren't thrown away or cleaned up soon after often find themselves along beaches and waterways. During the 2010 International Coastal Cleanup, enough cigarettes and cigarette filters were found along U.S. beaches to fill more than 94,000 cigarette boxes^{xxiv}.

According to estimates from the World Bank, over 1 billion lives will be lost due to tobacco use this century^{xxv}. In attempt to reduce tobacco use on April 22, 2013 UCLA will be the first UC campus to go "Tobacco-Free". It doesn't matter if you smoke, chew, or sniff your tobacco, you will no longer be able to use it at UCLA. This even includes the 21st century version of the cigarette, the e-cigarette. UCLA is only one of many college campuses around the United States transitioning to a tobacco-free policy. It is time that environmental factors play a role in tobacco-cessation policy making.

TEAM MISSION AND PROJECT OBJECTIVES

The overall mission for our team was to add another perspective to the tobacco ban

debate. Our team wanted to expand the conversation surrounding tobacco policy through an

environmental viewpoint. Analyzing the tobacco ban's influence on environmental consequences

stemming from tobacco production was beyond the scope of this class. Analyzing litter and pollutants, to analyze the ban's impact on tobacco use and disposal, was an achievable goal. Our objectives were twofold:

1. To study the effectiveness of the tobacco ban in relation to the environmental consequences stemming from tobacco use and disposal. This was achieved by comparing the number of smokers, cigarette butts, and air quality measurements before and after the ban.

2. To raise awareness and educate the UCLA population about the tobacco ban and the negative environmental impacts surrounding tobacco production, use and disposal.

INITIAL CONDITIONS

This project began through UCLA's Tobacco-Free Initiative, a facet of UCLA's Healthy Campus Initiative. Chair of the Tobacco-Free Steering Committee and nursing professor Dr. Linda Sarna, who spearheaded the ban's implementation, approached the ESLP program to see if one of the Action Research Team projects could investigate tobacco use on campus.

The Tobacco-Free Campus team was the first Action Research Team devoted to tobacco use and the tobacco ban. Our team did not have a previous year's project to base our goals on, so it was up to our members to decide exactly what research topics we wanted to focus on. Our team's initial goal was to create a survey to assess UCLA students and faculty's attitudes toward the ban. The first few meetings and assignments of Winter Quarter included brainstorming objective and subjective questions for a comprehensive 20-question survey. When we presented the survey to our stakeholders, it was decided that we did not have the resources nor the time to implement an accurate and full-scale survey. Our survey would have a sampling bias, as almost all people taking the survey would have been UCLA students. Members of the population such as UCLA faculty and staff would have been inadequately represented in the sample. To reduce all forms of bias it would have been ideal to hand out the survey using a simple random sample method, but we did not have the capacity to do this.

We originally had the intent of contacting UCLA facilities to understand how often they picked up cigarettes and how much money is associated with picking up and properly disposing cigarette butts. Unfortunately, our team was not able to get a meeting with a representative from facilities. After pivoting from our original goal, our team decided to focus our project on counting cigarette litter and monitoring air quality on certain areas of campus.

THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS [SUMMARY]

The research segment of the project focused on cigarette butt collection, air quality tests, and a visual count of smokers around designated hotspot areas on campus. Beginning in the ninth week of Winter Quarter, each team conducted bi-weekly 20-minute cigarette butt collections at each of seven sample sites (two control sites and five hotspot sites). In the interest of gathering comparable data, individuals collected at their assigned site in the general time interval between 4 p.m.-7 p.m. Techniques for each individual varied, but in general, a team member would use gloves and a plastic bag to collect all of the cigarette butts they found in their sample site. This included cigarettes on the floor and within ashtrays. Collected cigarettes were kept to use as visual displays during our Earth Day events.

At the end of our testing the data showed an overall decrease in median cigarette butt counts at five of seven monitored sites, and an overall decrease in median cigarette butt counts across the combined site counts. Across all sites, 595.5 cigarette butts formed the median before the ban, with a standard deviation of 148.8, while post-ban analysis shows a 159.5 cigarette butt median and a 32.89 standard deviation.

Our air quality and smoker counts were analyzed at three of our sample sites. Smoker counts were conducted in ten-minute intervals, throughout our four-hour monitoring shifts. The sites we focused on were the steps in front of Powell Library, the entrance of the Neuroscience Research Building and one of the courtyards of the Community Health Sciences building. Air quality tests were conducted around four times throughout the project.

Smoker counts were conducted concurrently with air quality monitoring, although difficulties with getting accurate readings from our air quality monitoring devices led the group to shift our focus onto the smokers counts. The average number of smokers decreased for each site, Powell experienced the biggest drop-off, as its average number of smokers decreased by a factor of 30. A detailed report of our research project, including tables and figures, can be found in Appendix A.

EDUCATIONAL AND EARTH DAY EVENTS

BUTT HUNT

The idea for the "Great Butt Hunt" event came about a few weeks into our initial cigarette butt collection. Since we collected hundreds of cigarette butts only from our sample sites, we were curious as to how many littered and properly disposed cigarettes would be found in a campus-wide search. Due to the limited time and resources, it would have been impossible for our team to conduct a campus-wide sweep of cigarette butts. Thus to show the public how many cigarette butts are found on UCLA, especially those that have been littered, we created a volunteering event called the "Great Butt Hunt."

We designed the butt hunt as a citizen science project, asking for help and support from our community. The event was advertised through Facebook, flyers, club and class announcements, and word-of-mouth. We advertised it as both a community service event and a "spring cleaning event," since it was held on April 21, 2013 – the day before UCLA's campus-

wide tobacco ban went into effect. The Butt Hunt lasted from 11:30 a.m. to 2:00 p.m., and about 15 volunteers attended. When volunteers checked in with us, we divided them into teams of two, handed them small bags and gloves, and assigned each team to a different area of campus. In preparation, we had already



FIGURE 3: THE 9,907 CIGARETTES WE COLLECTED FROM THE BUTT HUNT

divided the campus into ten different segments and created maps to show the teams their assigned area.

When the teams returned at the end of the two hours, we tallied all of the cigarette butts that each team had collected. In just two hours with only 15 volunteers, we collected a grand total of 9,907 cigarette butts throughout campus. We had a very positive response from our volunteers. They were very surprised to see how many cigarette butts were littered on campus and all seemed to enjoy the competitive aspect of seeing which team would "win" by collecting the most cigarette butts. The winning team collected 1,913 cigarette butts, and some of the other high-scoring teams brought in hauls of 1,813, 1,536, and 1,200 butts each. The Great Butt Hunt provided us with an important talking point and visual display, as most individuals were shocked to hear that we collected close to 10,000 cigarette butts in two hours. It also gave new meaning to

our research, since we were able to quantitatively identify how many cigarette butts were littered throughout UCLA.

EARTH DAY TABLING EVENTS

In celebration of Earth Day, which coincided with the initiation of the tobacco ban, our team was invited to table at several campus events and share information about the work we had been doing. Our team tabled at three events: the Tobacco-Free Initiative Launch in Bruin Plaza, E3's Earth Day Fair, and the Ronald Reagan Medical Center Earth Day Fair.

A launch event for the tobacco ban took place on April, 22 2013 within Bruin Plaza. The purpose of the event was to inform students, faculty, and the local media of the new policy and resources available to current tobacco-users during this transition. The event consisted of informational tabling by various organizations, free giveaways, and a brief speech about the new policy by Chancellor Gene Block. Along with our ART group, members of the Ashe Center, USAC Gen Rep 3, the Los Angeles County Department of Public Health, and Colleges Against Cancer also tabled. E3's Earth Day Fair is an annual event organizations to table at their event and educate the public on different sustainability projects. The Ronald Reagan Medical Center's Earth Day fair was a smaller tabling event. This event was largely targeted at the medical center's employees. The overall goal of the event was to educate hospital employees about environmentally friendly activities such as composting, recycling, public transportation, and carpooling. It was interesting and encouraging to receive positive feedback from medical center employees, as the population we often interacted with was students.



FIGURE 4: AN EXAMPLE OF OUR TABLE SETUP, HERE AT THE E3 EARTH DAY EVENT.

Our tabling method for each event was fairly consistent. At each event, we lined our table with jars that were filled with the cigarettes that we had collected from our from cigarette litter research. The purpose of this was to visually show the distribution of cigarette litter throughout our test sites. We filled each jar with a maximum of 500 cigarettes to accurately show the distribution of cigarette litter for

each site. This was a very effective tool in not only getting individuals to come to our table, but to also see which sites had the most cigarette litter. Individuals were often shocked when they saw the amount of cigarettes that we displayed. As an example, at the time of these events, our CHS site had only 3 cigarette butts in one jar while our Powell site had filled 3.5 jars.

We also featured a banner as part of our table display. The banner contained informational posters and an info graphic focused on the environmental effects of tobacco



FIGURE 5: TEAM MEMBER, MICHELLE YU, AT THE TOBACCO-BAN INITIATION EVENT WITH THE BUTT-O-METER.

production, use, and disposal. In an effort to make our display more interactive, we filled a 5-foot-tall tube called the Butt-o-meter, which we borrowed from Heal the Bay, with cigarettes collected from our Butt Hunt event. We then had participants guess how many cigarettes butts filled the tube. The participants with the most accurate guess each received a team t-shirt. Individuals who approached our table were eager to learn more about our work and participate in the activity.

Overall, these events were very successful. Tabling at these events was a great opportunity to reach out to a large population and inform them about our research and educational materials that we had been creating. At the events our team was also able to get public exposure for the ban and our project. Several media organization wrote an article about the ban and featured our project. These organizations included the Los Angeles Times, Daily Bruin, and a USC student newspaper.

SOCIAL AWARENESS AND MEDIA CAMPAIGN

In preparation for the initiation of the tobacco ban and the team's Earth Day events we created a social media campaign. A video campaign was created to raise awareness of the ban. The video comprised of several still shots of individual UCLA students and faculty members holding whiteboards that stated what he or she thought about the tobacco ban and the prospect of a tobacco-free campus. Over the course of two or so weeks, hundreds of pictures were taken at notable sites on campus, including the Sculpture Garden and in front of Royce Hall.



FIGURE 6: FOUR EXAMPLES OF STUDENTS WRITING THEIR THOUGHTS ON THE TOBACCO BAN FOR OUR VIDEO CAMPAIGN

We also created a Facebook and team website that featured pictures of cigarette pick-up counts, reminders about the policy ban, and previews of our informational posters. The Facebook page in particular provided a forum for students to express their attitudes towards the tobacco ban. This created a dialogue between those in support of the ban and those who were opposed to the ban. The most prominent discussion, an 11-response comment thread, was initiated by a student's clarification question regarding the areas covered by the ban. After a team member answered the question, two commenters took the opportunity to make a handful of sarcastic remarks concerned with the legal authority of UCLA to enact the ban.

Out of the desire to maintain its integrity, the group left the formation of these conversations to the visitors, and individual team members did not voice their opinions on any of the matters. We believe that an active voice would have fostered more discussion and thus generated more traffic, but we also knew that the nature of our project already might have made the group susceptible to claims of bias.

The team also looked for a way to create more substantive conversation about the ban. To get a small survey of opinions in the UCLA community regarding the implementation of ban, a multi-layered, seven-question email was sent out to smokers who had mutual friends with the team. A shortened questionnaire was also sent out to about a dozen of the people who "liked" the team's Facebook page. Students and faculty who voluntarily associated them with the initiative figured to have strong, and hopefully informed, views that would make them qualified to talk about the validity and effectiveness of the ban. The more private nature of responses from an email or interview figured to enhance the quality of participants' remarks, since detachment from a more public forum like Facebook, would discourage people from having the attention-seeking mindset that often comes with social networking communication.

Only smokers wound up participating in the interview process, with three students sending detailed electronic responses to the questionnaire, and a fourth talking to one of our team

members. This report summarized the important aspects of these email responses and conversations.

1. Second-year environmental science student Franz Anunciacion became a smoker as a way to deal with "college stress." Currently, Anunciacion only "vapes," a slang term for using also-banned electronic cigarettes. Though he made the choice to transition toward electronic cigarettes, he does not agree with the judgments his peers make about smokers: "I think UCLA people hate (smoking), but I don't care. If it's your thing, it's your thing. If it's not, then it's not." Anunciacion sees that, while the ban's enforcement is limited to warnings, he expects decreases in smokers at UCLA because many do not understand the "educational" nature of the ban. On the subject of selecting hotspots, Anunciacion named numerous locations on the Hill not considered by the team: outside of the Northwest Auditorium, in Drake Stadium, near Sunset Canyon Recreation Center and the balcony area next to Cafe 1919 and the Hilltop Store.

2. Second-year linguistics student Andres Siqueiros, who has been smoking for two years, likes the way smoking feels. " (Smoking) feels really good and brings me to a better mood." He Siqueiros believes that only personal illness, "large sums of money" or a "spiritual revelation" would get him to consider stopping an activity that he calls "meditational" and "calming." Siquieros does not see much potential with the policy, despite how well UCLA promoted the ban. "I think UCLA boasts that it has successfully implemented a ban on tobacco, but I don't think it has anything to the community of smokers. Just like how UCLA is an alcohol free campus, and the community of alcohol users goes unaffected," Siquieros said. "I was pretty informed about it, the signs are hard to miss. "(UCLA) could not have done a better job spreading the word, in my mind. I have not had an effect on my thought process of continuing to smoke. (The signage) is clear to students, (but) first timers or visitors might miss the signs". Siquieros believes the UCLA community is "pretty welcome" with to smokers, and when people do see him smoke, he shrugs off any "self-conscious ideas. " He continues to smoke on campus, and notes no noticeable change in smoker activity. "You can really smoke anywhere on campus, and people do smoke everywhere."

3. Fifth-year linguistics student Allen Manansala has been smoking "on and off" for four years. Manansala claims to have gotten into smoking as a result of coping with his parents' divorce and the popularity of smoking among his nursing school classmates. The biggest draw of smoking to Manansala is the social aspect: for the most part, he smokes a cigarette when "a particular friend of mine offers me one." Manansala recognizes an effect of smoking on his health: "I dislike being short of breath really quickly into a workout, so as long as I have a physical activity, I will smoke less, or not at all." UCLA's ban did not take Manansala by surprise. He knew about the policy months in advance, which he considers "well in advance." Even before the ban, Manansala was considering dropping the habit altogether. Manansala, who considers himself a "light" smoker, alternates between smoking roughly one cigarette day, if at all, to about one cigarette per week. As a commuting student, he did not feel qualified to comment on the frequency of smoking on campus.

Though Manansala was informed about the ban well ahead of time, he was not aware that electronic cigarettes were also included in the ban, believing the devices could be a means of bypassing the ban. He does not notice the no-smoking signage much, believing that he has essentially quit anyway. Because he quit on his own, he did not make use of any of the services provided by the Ashe Center for those reconsidering their smoking habit. Manansala notices that peers do, though rarely, voice their objections to smoking when he does so in public. "At times, when some choose to offer their opinion by talking 'at' me, or talking loud enough for me to hear,

I care enough to offer nothing more than a sarcastic response." On one occasion, someone near a smoking Manansala rhetorically asked, to no one in particular, "What is smoking?", to which Manansala replied, "A bad habit." Manansala recalls that a majority of bystanders just walk away when they notice smoke coming from him.

With regards to enforcement of the policy, Manansala heard from others that the policy as being "toothless" with regards to enforcement, but has also heard that there are "potential serious" consequences for violating school policy. He believes that the policy has a good chance of keeping smoking numbers down, assuming that Bruins will adhere to the policy. "I don't think anyone who knows about the policy would be disrespectful enough to continue to smoke," he said. Manansala predicts that some people may continue to smoke, but in areas away from big crowds.

4. First-year English student Brendan Hornbostel takes serious issue with the tobacco ban because he feels that the university does not have the authority to "criminalize" an activity that is not considered illegal in the country. He feels that, while there are legitimate, adverse health outcomes associated with smoking tobacco, a tobacco ban violates civil liberties.

On a personal level, Hornbostel, who has smoked for a little over a year, has found that smoking is the only way to effectively take a study break and one of the only means by which he can relax himself. Smoking breaks were large social events for the first-year, and the implementation of the ban has restricted Hornbostel from meeting up on the Hill with many of the friends he made through smoking. Hornbostel realized, however, the limited extent of the ban's enforcement when a residential adviser (RA) called campus police, believing Hornbostel and others to be smoking marijuana in a parking lot on the Hill. According to Hornbostel, after the officer discovered only tobacco at the scene, the RA was notified that students could not be punished for smoking tobacco.

Despite experiencing the limited enforcement of the ban, Hornbostel still seeks out secluded smoking areas away from the Hill, with avoiding hassle being his biggest motivation. Once able to smoke within a five-minute walk from his dorm, Hornbostel sometimes finds himself taking a 15-minute trip to the intersection of Bellagio and Sunset for a smoke break. Hornbostel believes that he goes through more cigarettes after the implementation of the ban, reasoning that longer trips warrant longer breaks, and thus more tobacco smoked. Hornbostel does not believe that the ban will have any noticeable effect on the UCLA smoking population. He sees little value in the hotspot model employed by the team's project, saying that people will simply move to more low-key locations when they want to smoke.

RECOMMENDATIONS

If a follow-up Tobacco-Free Campus team is commissioned, its primary focus should be determining whether the tobacco ban continues to improve the level of cigarette litter on campus. This can be determined by continuing the weekly cigarette butt collections and smokers count at select sample sites. A future Action Research Team could utilize the data that our Action Research Team had collected in order to analyze long-term changes in tobacco use. Research has shown that few smokers make the commitment to quit smoking after a tobacco ban is implemented^{xxvi}. However, the study did find that smokers decrease their consumption levels. The authors analyzed a tobacco ban that was implemented in a hospital setting. The study found that only 6% of the survey participants, who are smokers, quit smoking and very few hospital workers took advantage of the free smoking cessation program that was offered. The hospital

environment as an influencing factor is reflected in our own study, as the highest level of cigarette litter found post-ban was at the Emergency Room site. This was alarming to our team, considering the emergency room is a space on campus that has been designated "tobacco-free" since November 2011.

Our team initially had some trouble determining the dates and times for our cigarette collection. This was largely due to the limited amount of members we had for our project and the variation of class schedules within our team. This ultimately meant our data could not fully capture all the variables we wanted to and caused some aberrations in our data. Future teams should do the best they can in maintaining a consistent data collection schedule. Another way to measure cigarette levels and tobacco use on campus might be to hold another "Great Butt Hunt" event, similar to the one we held during Spring Quarter. It would be interesting to hold the same event on the same date to see how the levels of cigarette litter have changed.

It is unrealistic to assume that all smokers have quit, or will quit, smoking as a result of the ban. Recognizing this, it would be noteworthy to analyze the new distribution of smokers throughout campus. It would also be significant to analyze whether or not perimeter smoking, when individuals who are smoking right outside of UCLA's boundaries, is prevalent. Additionally, the ban on electronic cigarettes (e-cigarettes) is of little consequence from an environmental standpoint. E-cigarettes emit water vapor and create small levels of waste from the filters. E-cigarettes may be a useful tool to smokers who are trying to quit, due to the nicotine it delivers and the comforting motion performed. Thus, from an environmental standpoint, we recommend that the ban be modified to exclude e-cigarettes.

While our team was unable to receive feedback from the facilities department, a future team should once again try to get an interview with a representative from the facilities

department. Facility workers have an important role in cleaning up our campus, so it would be insightful to see how they feel about the effectiveness of the tobacco ban. It would be interesting to see how the economic costs related to cigarette litter have changed.

CONCLUSION

After the tobacco ban went into effect, we saw significantly less cigarette litter around our sample sites and significantly less people smoking at select sample sites. While it remains to be seen how effective the ban will be in the long-term, it is exciting to see its success after only a few months. With the initiation of the tobacco ban, we believe the UCLA community has decreased emissions of harmful secondhand smoke in addition to decreasing the levels of toxic cigarette butts that are released into the environment. By involving our community through projects such as the "Great Butt Hunt," we are hoping that UCLA's student population and faculty will begin to acknowledge the environmental impacts of tobacco along with its health impacts.. This project provides the framework in which to conduct research on the effectiveness of the ban across a college campus, in addition to providing the platform for a media campaign that can then be adapted for the individual college.

APPENDIX

A. THE EFFECT OF UCLA'S TOBACCO BAN ON CIGARETTE LITTER, AIR QUALITY, AND SMOKERS COUNTS

INTRODUCTION

One of the major goals for the Tobacco-Free Campus team was to analyze the change in environmental consequences due to the tobacco ban. One environmental consequence the team decided to focus on was that of cigarette butt litter. Cigarette butt litter is a major environmental hazard due to the fact that the cigarette filters, made of cellulose acetate, photodegrade but do not biodegrade^{xxvii}. In order to assess these effects, the team identified areas on campus that contained high amounts of cigarette litter. Recording the change in cigarette litter over time allowed our team to analyze the effects of the tobacco ban on UCLA's campus.

The second segment of our research project involved air quality sampling and a smokers count at selected cigarette-count sites. The air quality data that we collected supplemented our cigarette litter analysis. Our air quality tests served as a pilot test. It was used to test the effectiveness and accuracy of the devices for use in outdoor environments around UCLA. The team had no knowledge of any outdoor air quality tests within UCLA that utilized our monitoring devices.

METHODS

To determine which sites to monitor, we surveyed areas on campus that contained a relatively large amount of smokers and cigarette butts. We informally scouted up to 10 spots on campus but narrowed down our monitoring sites to two control sites and five hotspots due to the fact that monitoring ten sites was unrealistic for our small team. The control sites chosen included a courtyard within the Community Health Sciences (CHS) building and an area outside of the Ronald Reagan Emergency Room (ER). These were chosen as control sites because they both have been tobacco-free since 2011. The final hotspots that were chosen included the steps outside of Powell Library (Powell), an area in front of Covel Commons (Covel), an area in front of the Neuroscience Research Building (NRB), an area outside of the Ronald Reagan Hospital Emergency Room (ER), an area in front of the Physics and Astronomy Building (PAB), and an area within Wilson Plaza. A map displaying these locations relative to UCLA's campus along with other information can be found in Figure 7. The team began collecting cigarette butts during

the 9th week of Winter Quarter. This process continued bi-weekly until the end of the 7th week of Spring Quarter. Cigarette litter collection was limited to 20 minutes at each site to create comparable data. As our sample sites varied in surface area, the team compared [cigarettes/m²] in addition to the total number of cigarettes collected. At the end of each sample period all cigarette counts from each site were collected and recorded into a table created on Google Docs.

The team's air quality testing and smokers count began during the 9th week of Winter Ouarter. This testing was completed between two to three times before the ban, and once after the ban. An unofficial test was done during the 10th week of Winter Quarter because the team was curious as to whether or not the upcoming finals week would cause more people to smoke. For our air quality tests, the team chose two hotspots and one control site to monitor. The control site chosen was the Community Health Sciences Building. The two hot spots chosen include the steps outside of Powell Library and the area outside of NRB. A map of our air quality test sites can be found in Figure 8. The Tobacco-Free Campus team used four different devices to analyze to air quality. The four devices include the P-Trak, the Q-Trak, the DustTrak, and a pumping tube to measure the mass of nicotine. The sorbent tubes, used to measure mass of nicotine, were ordered from Bureau Veritas, a laboratory in Chicago. The P-Trak device measures the concentration of ultrafine particles (less than 100 nanometers) in the air. The Q-Trak measured the site's temperature, humidity, carbon monoxide concentration and carbon dioxide concentration. The DustTrak measures the concentration of PM 2.5 (particulate matter 2.5 micrometers or less in size). The sorbent tubes and pump measured nicotine from the secondhand smoke and was sent to Bureau Veritas to be analyzed. As the team was uncertain as to the sensitivity of these older devices, data was collected every second. After several trials it was decided that collecting data every minute was satisfactory. The devices were placed into a plastic container on an elevated surface downstream of the prevailing wind.

In addition to these devices, non-electronic measurements were recorded. Two or more team members would scan the study area and tally the amount of smokers in the area. These counts were placed into ten-minute intervals, starting at the hour. In addition to counting the number of smokers, the proximity of the smokers to the devices was recorded. As distances varied widely, the team did not feel that it would be feasible to get exact measurements of a smokers distance to the devices.