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Role of the "Tobacco Free Teens" Mobile Application in Adolescent Smoking

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DNP Practice Inquiry Project

Role of the “Tobacco Free Teens” Mobile Application in Adolescent Smoking

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University of Kentucky

College of Nursing

Spring 2014

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Dedication

I would like to dedicate this DNP Practice Inquiry Project to my loving husband, Bryce. Without his unwavering support, understanding, and love I would not have achieved this goal. I also dedicate this project to my two great kids, Brenna and Luke. My pride and love for them is endless. They are my greatest work. This project is also dedicated to my parents Al and Shirley Saunders, and my sister Charlotte Leedy- my eternal cheerleaders.

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Introduction

The year 2014 marks the 50th anniversary of the U. S. surgeon general's report linking tobacco use to poor health outcomes. Over the last 50 years smoking has killed more than 20 million Americans prematurely (U. S. Department of Health and Human Services [HHS], 2014). Smoking has placed a tremendous health and financial burden on Americans, with a current annual loss of over 289 billion dollars (HHS, 2014). Health research from medicine, nursing, sociology, pharmacy, public health, education and many more disciplines have contributed to the gains we have seen in decreased smoking rates in America; from 43% in 1964 to 18% in 2014 (HHS, 2014). Much of the research has been focused on preventing adolescents from becoming adult smokers; since 90 percent of adult smokers had their first cigarette before the age of 18. "If we continue on our current trajectory, 5.6 million children alive today who are younger than 18 years of age will die prematurely as a result of smoking" (Sebelius, K., HHS, 2014). The majority of the American adolescent population spends eight hours daily in schools, therefore, many school nurses and school administrators have tried to identify and implement effective and cost-efficient tobacco use education programs.

It is recommended that schools provide tobacco use education (Campaign for Tobacco Free Kids, 2013), however, many schools do not follow a specific evidence-based curriculum or program. In the tobacco state of Kentucky, tobacco use education is not regulated by the state. Kentucky has seen decreased tobacco use rates due to grass-roots efforts in other tobacco control legislation. However, 24.1% of high school students in Kentucky smoke compared to 18.1% of high school students nationally (Campaign for Tobacco Free Kids, 2014). A political analysis using John W. Kingdon's (2011) three streams theory explains why mandatory tobacco education legislation is not feasible in Kentucky's current political climate.

Although tobacco use education is not mandatory in all states, school nurses are in a unique position to identify and implement evidence-based tobacco use education in their population of adolescents. The adolescent population has a busy schedule and is highly connected to each other and the internet through mobile technology (Madden, Lenhart, Duggan, Cortesi, & Gasser. 2013). School nurses understand the barriers to school-based tobacco education programs, and their unique population, therefore, they should be familiar with the characteristics of effective programs identified in the literature.

This practice inquiry report describes a pilot study conducted in February of 2014 with a population of 32 adolescents in Lexington, Kentucky. The subjects were asked to download a free mobile application called Tobacco Free Teens onto their mobile device. The subjects were then instructed to explore the mobile application and take an on-line survey regarding their satisfaction with the Tobacco Free Teens mobile application. The subjects were generally satisfied with the mobile application; however, it appealed more to the girls than to the boys. This is an important finding because mobile applications may be an important tool for school nurses to use in their adolescent population. However, more research is needed to assess mobile application characteristics that may also appeal to boys. This is critical among boys in Kentucky because 28.1% of high school males use tobacco compared to 12.8% of high school males who use tobacco nationally (Campaign for Tobacco Free Kids, 2014).

Tobacco Education for Kentucky's Youth: Is Public Policy the Answer?

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Abstract

This paper explores the possibility of placing mandatory annual tobacco use prevention and cessation education on the political agenda in the state of Kentucky which is a known tobacco growing state. Using Kingdon's (2011) Three Streams Metaphor, the overwhelming problem and consequences of youth tobacco use are analyzed in the light of Kentucky's current political and policy climates. Kentucky's local control education curriculum policy and current tobacco control policy supporters are identified as barriers to obtaining a state law mandating annual tobacco education at this time. Alternatives to the desired policy are explored and a strategy proposed to obtain the desired mandatory education by building consensus with special interest groups who support comprehensive tobacco control policies in local schools.

Keywords: policy, tobacco, education, schools

Tobacco Education for Kentucky's Youth: Is Public Policy the Answer?

Kentucky is the national leader in youth tobacco use (Substance Abuse and Mental Health Services Administration, 2010) yet Kentucky's leaders have not asked for legislation to make tobacco use prevention and cessation education mandatory in public schools. This paper explores the possibility of passing a state law that mandates annual tobacco use prevention and cessation education for Kentucky's youth, in middle and high school. Using John W. Kingdon's (2011) streams theory, this paper will analyze the problem of youth tobacco use, the policy and politics surrounding it, and the likelihood of mandatory tobacco education becoming law in Kentucky. Other tobacco policy alternatives and their consequences will be considered. Finally, a strategic plan will be developed and analyzed to move this bill toward a potential vote. A synthesis of relevant information according to Kingdon's (2011) theory reveals that mandatory tobacco education through public policy will not be achieved in Kentucky's current political climate.

Background and Significance of Youth Tobacco Use

Cigarette smoking is the leading cause of preventable death in the United States, responsible for almost 443,000 premature deaths at a cost of almost \$193,000,000 per year (Centers for Disease Control and Prevention, 2008). More than 90% of adult smokers have smoked their first cigarette before the age of 18 (U.S. Department of Health and Human Services, 2012). Every day in the United States approximately 3,800 people under the age of 18 smoke their first cigarette with 1,000 teens in that age group becoming daily smokers (Substance Abuse and Mental Health Services Administration, 2010). Moreover, the overall prevalence of having ever smoking cigarettes is higher among 10th-grade (44.0%), 11th-grade (50.0%), and

12th-grade (55.5%) students than among 9th-grade (37.7%) students (the Youth Risk Behavior Surveillance Survey [YRBSS], 2009). Among the 19.5% of students nationwide who currently smoke cigarettes, 7.8% had smoked more than 10 cigarettes per day during the 30 days before the survey (YRBSS, 2009). Also, 16% of high school students smoked a whole cigarette before the age of 13 (YRBSS, 2009) and almost half of teens who smoke (50.8%) have tried to quit at least once (Centers for Disease Control and Prevention, CDC, 2012).

Kathleen Sebelius, the Secretary of Health and Human Services said:

Despite the well-known health risks, youth and adult smoking rates that had been dropping for many years have stalled. When this Administration took office, we decided that if these numbers were not changing, we had to do something. We accelerated our efforts to fight tobacco by helping Americans stop smoking, and protecting young people from starting to smoke (U. S. Department of Health and Human Services, 2012).

The 2012 Surgeon General's Report, *Preventing Tobacco Use in Youth and Young Adults* states that "the current problem isn't that tools have stopped working, it's that they haven't been applied with sufficient effort or nationwide" (U. S. Department of Health and Human Services, 2012).

Youth smoking prevention and cessation are two key elements to winning the war on tobacco. The U. S. government has spent millions of dollars on research to discover the, who, what, how and why of youth tobacco use and to prevent, decrease and halt tobacco use in youth. National and state leaders have passed public policy to decrease youth access to tobacco and exposure to second hand smoke in public places; yet the problem of youth tobacco use and its consequences remain. Kentucky has not passed legislation mandating youth education on the

dangers of tobacco use. Kentuckians should ask whether we are doing all that we can to support youth smoking prevention and cessation in Kentucky.

Multiple studies have documented that evidence-based tobacco use prevention and education programs can decrease the rate of youth tobacco use (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Sherman & Primack, 2009). Thus, many government and non-government organizations have called for an increase in youth tobacco education programs. Two such campaigns are the Campaign for Tobacco-Free Kids and the American Lung Association. The key to reducing the negative impact of tobacco use in Kentucky is to provide tobacco use prevention and cessation education programs for our youth. Since most of the youth in Kentucky attend public schools, these are ideal avenues/settings to educate that population about tobacco use prevention and cessation. However, in Kentucky tobacco use prevention and cessation are not mandatory topics for education in public schools.

In 1990 Kentucky passed House Bill 940, the Kentucky Education Reform Act (KERA). This law was created from a Kentucky Supreme Court case that ruled education in Kentucky was inefficient and inequitable. The law made sweeping changes to funding, educational processes, grading and measuring outcomes for education in Kentucky. A part of this law decentralized the curriculum for the state. Each school has a council that sets its own curriculum. Since that time education in Kentucky has been through major reforms. The “No Child Left Behind Act” of 2001 focused teachers and principals on math and science scores. President Barak Obama granted a waiver to Kentucky in 2012 to move away from standardized benchmarks to evaluating progression of outcomes for each school (U.S. Department of Education, 2012). These changes have placed tremendous pressure on schools to perform academically, thus the focus on tobacco

education has become less of a priority. Academic instruction time and financial resources are lacking for tobacco education in the classroom.

The Centers for Disease Control and Prevention [CDC] conducts the School Health Policies and Programs Study every six years to evaluate school health policy and practices at the state level. In 2006, although Kentucky required students who took a health or practical living class to receive tobacco use prevention education, no funding was provided for teachers' staff development regarding tobacco use prevention, nor was any tobacco cessation services offered for students who requested help (CDC, 2006). Per the Kentucky Department of Education Program Review for Practical Living/Career Studies in 2012, health classes were ranked as proficient in health curriculum but not as distinguished. The inferior academic ranking was achieved because students were not required to take a health class every year while enrolled in school. In Kentucky, only students who are enrolled in a health education or practical living classes receive tobacco use prevention and cessation education. Students are required to have one half of a health education credit to graduate (Kentucky Department of Education, 2012). Since health teachers must cover a broad range of health topics, little time and attention may be given to tobacco if it is addressed at all. Kentucky schools have legislative recommendations that they are encouraged to follow which address these health topics but they are not mandatory. In 2005 75% of Kentucky schools had at least one evidence-based curriculum to prevent alcohol, tobacco and other drug use, yet only 30% of Kentucky schools offered smoking cessation services (Hahn et al., 2005). It is obvious that schools choose to not focus their resources on providing students with the necessary tobacco education and cessation services to reduce tobacco use.

Kentucky is ranked 51st in the nation in youth tobacco use (Tobacco Environmental Strategies, 2004) and is a tobacco growing state, which carries huge social and economic factors.

Generations of Kentucky families have raised and sold tobacco as a cash crop. A culture of resistance to anti-tobacco laws can still be found in the bluegrass state. Kentucky needs a state law that mandates annual tobacco use prevention and cessation education in public schools. Kingdon's (2011) conceptual framework provides insight into the possibility of passing a Kentucky state law mandating annual tobacco use prevention and cessation education for middle and high school students.

Conceptual Framework

John Kingdon's (2012) *Agendas, Alternatives, and Public Policies* describes how problems or issues become recognized and move onto the national policy agenda, where they may eventually become public policy. His conceptual framework is called the "three streams metaphor." This process is described as three separate streams of problem, policy and politics that move independently and simultaneously. However, when two or more of the three streams converge through a window of opportunity then political problems and potential legislative solutions gain attention.

The *problem stream* depicts how political problems are recognized and from whose point of view the problem is interpreted. Problems can gain attention through routine monitoring of outcomes or budgets, research studies, focusing events or feedback from constituents. The *policy stream* is described as a community of policy specialists who may take years to "soften up" the public and decisions makers about a particular topic. This group is made up of bureaucrats, budget overseers, researchers, academics, staffers, and special interest groups. This group of policy specialists pushes their pet ideas or policies to be recognized. Or they may block opposing positions by testing the survival criteria of ideas. This includes testing technical

feasibility, value acceptability and political feasibility of potential solutions. Kingdon (2012) suggests that many times the solution is looking for a problem to attach itself, instead of finding a solution for a particular problem. For example, an environmental action group wants a certain percentage of all counties designated as green space, so they wait for a problem for which they can offer their idea as the solution. Kingdon describes the process of consensus building and debate as policy primeval soup.

The third stream, *politics*, in Kingdon's metaphor describes the tangible and intangible current characteristics of the country. The intangible characteristics include the moods, feelings, opinions of the nation, power, resources and timing of current events. The tangible characteristics include election results and special interest group activities.

To summarize, two or more of the three streams must come together at a critical time. Then the problem will be recognized and a solution identified; the political climate makes the time ripe for change and there are no barriers to action. Kingdon gives the impression that getting problems on the political agenda is nothing short of a miracle. This three streams metaphor can be useful in an analysis of the possibility of placing mandatory annual youth tobacco use prevention and cessation education on the Kentucky public policy agenda.

Problem Stream

According to Kingdon (2011), a problem can be recognized as a national problem in several different ways. Certainly the physical and economic consequences of tobacco use have been well monitored, studied, and documented for individuals and for the nation in government, medical and academic papers. The nation has invested millions of dollars in treatment and prevention and saw a decrease in tobacco use in the early 1990's; however, that trend has slowed

down (U.S. Department of Health and Human Services, 2012). In Kentucky more than 8,000 residents die each year of tobacco related illnesses, including cardiovascular disease and lung cancer. Medicaid and Medicare spend \$1.2 billion annually in Kentucky on smoking related diseases, which equals \$300 for each of Kentucky's four million residents (Kentucky Cabinet of Health and Family Services, 2012). Moreover, health issue discussions usually occur in a one-on-one doctor to patient relationship and it takes compelling evidence and statistics to move health care problems into the national spotlight (Kingdon, 2011). Statistics like "according to the CDC, six million kids who are alive today will ultimately die from smoking" (Substance Abuse and Mental Health Services Administration, 2011) are shocking and the statistics from Kentucky are just as sobering. However, it was not pain, suffering, and loss of life that allowed the problem of tobacco use to be recognized, but rather the national recession and increased focus on the cost of health care.

As Kentucky searches for evidenced-based solutions for the problem of tobacco use, the solution must include an effective and cost efficient way to prevent tobacco use and provide cessation education to youth in schools. *Ending the Tobacco Epidemic: A Tobacco Control Strategic Action Plan by the U.S. Department of Health and Human Services* (2010) designed a plan to achieve four central tobacco-related objectives of *Healthy People 2020* (U.S. Department of Health and Human Services, 2010b):

- Reduce tobacco use by adults and adolescents
- Reduce the initiation of tobacco use among children, adolescents, and young adults
- Increase smoking cessation success by adult smokers
- Reduce the proportion of nonsmokers exposed to secondhand smoke

Clearly, the answer to the tobacco epidemic is multi-faceted. Interventions recommended to achieve these objectives include raising taxes on cigarettes, public policy that creates smoke-free areas, community interventions that limit advertising and promotion of access to tobacco products, mass-media based counter advertising, and comprehensive school based tobacco-use prevention policies and programs (CDC, 2012).

Some of these interventions have been met with resistance in Kentucky because of its tobacco growing culture. Hahn et al. (2005) found that Kentucky schools were more likely than non-tobacco affiliated schools to provide prevention and cessation resources. Hahn and Rayen (2002) found that Kentucky leads the nation in smoking and is the second highest tobacco producing state in America (p.324). Due to increased tobacco use in the area, schools seem prompted to provided tobacco education and cessation services. Only 28% of schools in Kentucky offer some type of referral for outside smoking cessation counseling (CDC, 2006). Typical smoking cessation/prevention programs are lengthy and costly so the solution must be both effective and cost efficient. It is clear to see the economic recession and the pervasive tobacco culture in Kentucky are two strong economic and social factors that have a large impact on future tobacco policy in Kentucky.

The problem stream focuses on tobacco use being the number one cause of preventable disease in the United States. Tobacco use places a huge financial burden on America's health care system and Kentucky is leading the nation in tobacco use. Tobacco use prevention and cessation education has been identified as a possible solution to the tobacco epidemic. Tobacco education is not mandatory in Kentucky as each school has academic freedom to set their own curriculum. The only way to make tobacco education a mandatory and an annual requirement for all middle and high school students in Kentucky is to pass a state law. Passing a law that

requires annual tobacco use prevention and cessation education in a tobacco growing state plunges this issue into the deep waters of the policy primeval soup and political stream as stated by Kingdon (2012 p. 116).

Window of Opportunity and the Political Stream

It is an exciting time in the political arena as the nation has just elected Barack Obama to a second term as President of the United States. One of the key features of his first term in office was the Patient Protection and Affordable Care Act of 2010 or “Obamacare”. The Supreme Court of the United States upheld the constitutionality of this law in June 2012. During the republican primary all of the candidates said they would repeal “Obamacare” if they were elected. The Republican Party is generally against increased involvement of the federal government in lives of American citizens and was thus against a national healthcare plan. The Democratic Party tends to be more supportive of social policy and supported “Obamacare” and the national health coverage that would be afforded to all American citizens with this legislation.

Regardless of partisan perspective, “Obamacare” brought the nation’s attention to the crisis of the cost of healthcare. Individual American citizens who had health insurance were paying huge premiums and many Americans were under or uninsured. Citizens and legislators were concerned about the cost of health care on our growing national debt. Many groups began to look for ways to decrease the cost of health care. Tobacco use (personal lifestyle choices and cost of associated chronic diseases) was again identified as a major contributor to the nation’s health crisis (Adler, Hoagland, Jennings, & Lieberman, 2012). Thus, a window of opportunity has been opened in the political stream.

Since the country is embarking in a new direction of affordable health care it is the opportune time to push public policy that mandates health education that reduces the financial burden of tobacco use. The Campaign for Tobacco-Free Kids is a national movement that targets youth tobacco use prevention and cessation. The American Lung Association also strongly supports policy and educational programs that prevent youth tobacco use. Both of these organizations call for increased tobacco education. President Obama has been instrumental in passing public policy regarding the tobacco epidemic. He signed into law five important tools that will protect America from the dangers of tobacco with the American Recover and Reinvestment Act, the Children's Health Insurance Program and Reauthorization Act, the Family Smoking Prevention and Tobacco Control Act, the Prevent All Cigarette Trafficking Act, and the Affordable Care Act.

These laws give federal agencies the authority and funding to a) restrict the sale, distribution, and promotion of cigarettes and smokeless tobacco to make them less accessible and attractive to youth; b) deter people from smoking; c) help people quit; d) reduce exposure to secondhand smoke; and e) promote an overall culture of health and prevention. (U.S. Department of Health and Human Services, 2012, p. 4).

The federal government appears to be well suited to discuss potential problems and solutions regarding tobacco use prevention and cessation education, but will these federal laws provide windows of opportunity in the Kentucky state government?

The 2012 Kentucky election resulted in a Republican majority in the Senate (<http://www.lrc.ky.gov/senate/senmembers.htm>), and a Democratic majority in the House (<http://www.lrc.ky.gov/house/hsemembers.htm>) with an incumbent democratic governor. Thus

the window of opportunity for social public health policy may be as open in Kentucky as in Washington D.C. One other motivator that could open a window of opportunity for this policy in Kentucky would be monies awarded to states funded from the federal legislation to research and implement evidence based tobacco education programs. The indirect cost savings of decreased tobacco use in Kentucky residents could also motivate stake holders to focus on the benefit of tobacco education.

As part of the Recovery Act, the Department of Health and Human Services (HHS) invested \$225 million to support tobacco prevention and control efforts in states. These investments were made in communities that have used evidence-based tobacco interventions and will eventually become models for the rest of the country (U. S. Department of Health and Human Services, 2012). The Tobacco National Settlement Agreement and other policies have provided millions of dollars in grant money to fight the tobacco epidemic. The potential to use these monies for personal agendas is a driving force for many of the key stakeholders. There are many federal and state organized political forces that seek to earn these grant monies to push public policy that will decrease the impact of tobacco on the community (see Appendix A for a list of U.S. and Kentucky pro tobacco control groups). There are also U.S. and Kentucky groups which would oppose tobacco control (see Appendix B). One would assume that the line drawn between these two groups is very distinct. The logical assumption is that health, and tobacco control groups would support tobacco use prevention and cessation education for Kentucky and that the pro tobacco groups would plan to block this legislation, but that assumption would be false. This paradoxical situation will be explained further by the policy stream.

In summary, the recent election gave power to the Democratic Party in Kentucky which has an incumbent Democratic governor. Historically, the Democratic Party supports public social

health policy; which bodes well for the proposed legislation. The federal government, under Democratic president Barack Obama, has provided resources to fund this type of legislation. Due to recent legislation passed by President Obama the national mood is focused on finding effective, cost efficient, and evidence based interventions to decrease the financial burden of health care on the nation. It would appear that a window of opportunity for tobacco education legislation is open; however, the timing of this legislation in Kentucky is poor because the organized forces of tobacco policy are focused on different tobacco legislation issues at this time. This scenario will be evaluated further in the policy stream.

Policy Stream

Policy communities and special interest groups have already been identified. The policy community groups are health, education, and pro-tobacco rights groups. These groups have all been softening up the communities and legislators with news articles, academic papers and presentations, rallies and press releases. Kentucky has recently seen several counties choose to pass smoke-free legislation for public places to reduce exposure to second hand smoke. Many hospitals in the region have also become smoke-free after legislation was passed that all government building should become smoke-free. The pro-tobacco group has also seen more activity with attention to smoke alternatives including the e-cigarette. There have been articles on Kentucky.com documenting the debate over e-cigarettes between Ellen Hahn and Carol Riker of the Kentucky Tobacco Policy Research Program and Kristin Noll-Marsh of the Consumer Advocates for Smoke-free Alternatives Association (www.kentucky.com/2011/05/16/174183/non-profit-fights-to-educerm.htm#storylink=misearch).

When the Kentucky Tobacco Research Program was contacted regarding a bill to mandate annual tobacco-use prevention and cessation education in Kentucky middle and high

schools, they were not eager to support that bill. Though they agreed tobacco education was a good idea they said most of the anti-tobacco groups were focused on passing smoke-free legislation at this time. The introduction of a bill mandating tobacco use education may pull support away from any potential smoke-free legislation. Tobacco control groups need to focus all of their resources on one particular bill so that it has the most potential to pass. Dividing efforts between two tobacco control bills at the same time leads to a greater chance of failure for both bills. Since the supposed tobacco control groups do not find this bill currently politically salient, it may be a reason to delay introducing the tobacco education bill at this time.

Conversely, some pro-tobacco groups may support this bill because it would take away support and attention from smoke-free legislation. By passing a weak, preemptive tobacco control bill it prevents tobacco control groups from gaining stronger legislation. The Americans for Non Smoker's Rights website made this statement.

The industry wants to undermine effective, meaningful smoke free air laws because the majority of their power lies at the state level and they know that the only business harmed by these public health measures is their own. Once a preemptive law is enacted, it can halt tobacco control efforts throughout the state and it is extraordinarily difficult to restore local control (<http://www.nosmoke.org/pdf/preemptionenemy.pdf>).

Also, the education special interest groups may oppose this legislation because it would add to their growing list of expectations. As stated earlier, educators must provide the burden of proof that children in Kentucky are meeting their academic objectives. Mandatory tobacco education may take time away from that pursuit.

Jamie Sparks, project director of Coordinated School Health in the Kentucky department of education reports that 26/176 school districts have adopted tobacco free campus policies.

When Jefferson County adopted a tobacco control policy that meant a quarter of Kentucky's student population had a tobacco control policy. North Carolina passed a state law that prevents tobacco use on all public school campuses across the state. Like Kentucky, North Carolina is considered a tobacco state. Would the same type of policy advocate mandated annual tobacco education in Kentucky?

Mr. Sparks discussed the political climate for tobacco education in Kentucky. He confirmed that there is not a state law with penalties that mandates annual tobacco education for students in Kentucky. Students must earn .5 credits in Health and Practical Living Studies prior to graduation from high school. The curriculum for that course covers a multitude of recommendations, none of which can be enforced since the schools have local control over their curricula. The current monitoring system for school curricula is a self-assessment with inherent problems of embellishing reports. He did mention that in 2010 Kentucky passed House Bill 51

- (6) **(a) By August 1, 2010, the Kentucky Cabinet for Health and Family Services shall post on its Web page suicide prevention awareness information, to include recognizing the warning signs of a suicide crisis. The Web page shall include information related to suicide prevention training opportunities offered by the cabinet or an agency recognized by the cabinet as a training provider.**
- (b) By September 1, 2010, and September 1 of each year thereafter, every public middle and high school administrator shall disseminate suicide prevention awareness information to all middle and high school students. The information may be obtained from the Cabinet for Health and Family Services or from a commercially developed suicide prevention training program.** (KRS 156.095)

This legislation circumvented Kentucky education's local control law. Perhaps this same method could be used for a tobacco education law in Kentucky.

Legislators who may support this bill would include Representative Susan Westrom. She is a Democrat from Lexington who was the primary sponsor of the bill calling for a statewide ban on smoking in or near certain public places (Cheves, Jan 7, 2011). Other supporters were Dave Adkisson, President of the Kentucky Chamber of Commerce. This bill had bi-partisan support from Kentucky legislators. Other legislators who have supported tobacco control legislation in the past include Representatives Tom Burch, Mary Lou Marzian, and Ruth Ann Palumbo all of whom served with Westrom on the 2012 House Standing Committee on Health and Welfare ([www.lrc.ky.gov/committee/standing/h&w\(h\)/members.htm](http://www.lrc.ky.gov/committee/standing/h&w(h)/members.htm)). Representative Marzian is a nurse who has been a leader on health related legislation in Kentucky. Julie Adams is a Republican from Louisville who has also been instrumental in introducing tobacco control bills. Other key players would be Terry Holliday who is the current Commissioner of Education for Kentucky, Stephanie Mayfield Gibson who is the Kentucky Commissioner of Public Health and Randy Gooch who is president of the Kentucky Public Health Association. All have gone on record supporting tobacco control policy.

Rayens, York, Adkins, Kaufman and Hahn (2012) found that in rural Kentucky, communities' legislators were more likely to support smoke-free legislation if they had support from the local board of health and leaders, low adult smoking rates, and established smoke free hospitals. Also, promoting community readiness by working with hospitals and local cessation programs it improved the climate for smoke-free legislation (p. 95). These finding may be generalized for tobacco education at the state level as well. In a study on regional differences in legislators' views on tobacco policy, Hahn and Rayens (2002) found that health advocates should look first to lawmakers from Jefferson County and the Mountain Region to find support for tobacco control legislation through increased taxes. Lastly, Hahn and Rayens (2000), using a

Delphi method of consensus building, found that Kentucky legislators were not keeping up with their constituents' views on tobacco control policies (p.72). This last study is twelve years old so it may be beneficial to use a structured group communication method, such as the Delphi Method, to measure current legislators' views on tobacco education policy and build consensus.

Kingdon (2012) recommends testing the survival criteria for prospective policies. Survival criteria include, assessing value acceptability, value congruence and technical feasibility of an idea. A policy that mandates annual tobacco use prevention and cessation education for Kentucky middle and high school students certainly has value acceptability in that most people agree that children should not use tobacco. Research has shown that smokers and non-smokers have supported school tobacco control policies (Hahn & Rayens, 2000), so the addition of education should not harm anyone and would be beneficial for individuals and the state. There may also be some value incongruence, or when a person's values are inconsistent with the group's values. This can be seen in some tobacco farmers in tobacco producing rural counties, as tobacco is a cultural symbol of financial income in those communities. Technical feasibility of tobacco use prevention and cessation education in schools is being tested in preliminary research across the state. Debra Armstrong with the Kentucky Cancer Program is in the second phase of testing of a web based self-paced module that has been shown to decrease tobacco use and assist in cessation attempts (Prokhorov et al, 2010).

Kingdon's (2012) three streams metaphor requires that two or more streams must converge through a window of opportunity for a problem to move onto the public policy agenda. Due to the intense focus on smoke-free legislation, a bill that mandates tobacco use prevention and cessation education may not be politically feasible at this time. Smoke-free legislation has been introduced to the state three times but failed to move forward. However, there has been

success on the local level. All tobacco control efforts need to support smoke-free legislation so this bill will move forward. The politics and policy stream will not converge for tobacco use prevention and cessation education at this time in Kentucky.

Policy options and outcomes.

As discussed above, the tobacco policy climate in Kentucky is focused on smoke-free legislation at this time. When considering the best political or policy approach to reaching the overall goal of mandated annual tobacco use prevention and cessation education for middle and high school students in Kentucky there are several options. One could try to rally support for standalone legislation based solely on the problem of youth tobacco use consequences, but that is likely to fail. One could champion for education reform so that the curriculum reflects the goal of providing annual tobacco use prevention and cessation education to all middle and high school students. However, legislators are not likely to amend the Kentucky Education Reform Act. The new high-stakes topics of math and reading are a priority which leaves little support and resources for tobacco education. One could consider trying to use the mental health education approach as the Make a Difference for Kids group did with successful legislation passed for bullying, cyber-bullying and suicide prevention education in Kentucky. They were able to pass legislation that circumvented Kentucky education's local control laws with legislation mandating two hours of teacher training on the subjects of suicide prevention, bullying and cyber bullying. The legislation requires the teachers to communicate what they had learned in the training session to the students in the classroom. However, this legislation carries no penalty for failure to perform, and the only monitoring system is by self-report.

Best policy option with implementation and enforcement issues.

Kentucky has growing momentum with local schools passing their own tobacco control policies. Jamie Sparks reported that 14.7% (26 of 176) of school districts in Kentucky have tobacco control policies with penalties already in place. As the school based tobacco control policies are mostly about smoke-free school grounds this may be the best option to garner support from the tobacco control special interest groups since smoke-free policy is their priority at this time. Perhaps it would be possible to use the momentum created by the smoke-free policy supporters to attach tobacco education to the school Tobacco Control Policy to increase its comprehensiveness. There is evidence to support that tobacco control policies with tobacco education reduce tobacco use rates in teens (Proescholdbell, Summerlin-Long, & Goldstein, 2009). In May of 2013 North Carolina Department of Health and Human Services announced that teen smoking in North Carolina had reached historically low rates with their comprehensive tobacco control legislation (North Carolina Department of Health and Human Services, 2012). There is evidence to support that tobacco control policies with tobacco education reduce tobacco use rates in teens (Proescholdbell, Summerlin-Long, & Goldstein, 2009).

Strategy.

The best strategy to obtain annual, mandated tobacco use prevention and cessation education for middle and high school students in Kentucky at this time is patience and a long softening up period of tobacco control special interest groups. Their current focus is on smoke-free legislation. Tobacco education supporters must align themselves to also support smoke-free policy. Tobacco education supporters need to appeal to the smoke-free supporter's fundamental values of 'doing what is best for the children will protect our future'. Smoke-free supporters need to view tobacco education as a natural consequence of smoke-free policy. The goal of smoke-free and tobacco education supporters should be to see strong, comprehensive tobacco

control policies passed at the local level. These policies should mandate that school grounds are tobacco free for students and, adults; as well as provide the education and cessation programs that would stay with the students once they graduate. The idea of a comprehensive tobacco control policy must include provisions for education and cessation services for students and adults. Therefore, as the smoke-free supporters rally their political strength the education policy will follow without the need for new legislation that focuses solely on education. Implementation and enforcement of these policies have already been set as a standard for most schools in Kentucky by requiring a \$100 fine for anyone caught smoking on school grounds. Tobacco education and cessation programs must be linked to smoke-free school policies.

To accomplish building consensus between the smoke-free groups and tobacco education groups, the policy champion could use the delphi method. Rayens and Hahn (2000) successfully used this method to build consensus between Kentucky legislators regarding tobacco policy. The delphi method is a multi-stage process of gathering both parties' opinions, analyzing the data, structuring a new questionnaire and re-evaluating the opinions. If the results are favorable for coupling tobacco education to smoke-free legislation then it will be feasible to proceed. After coupling the idea of smoke-free legislation to tobacco education the next step would be to adopt the strategy of the smoke-free legislation party since they have the momentum. Their current mode of operation is to focus on the local school district level. Even though this is not the ultimate goal of a state law it moves us in the right direction.

It took North Carolina seven years to gather enough school districts to gain the majority so that legislators would look at the issue of a state-wide tobacco control policy for schools (North Carolina Department of Health and Human Services, 2012). This approach may be suitable in Kentucky since the curriculum is managed at the local level. Tobacco control policies

for schools are championed by health educators, principals, teachers, parents, and special interest groups like American Cancer Society, the Kentucky Cancer Program, the Kentucky Tobacco Policy Research Center, the American Association of School Administrators and the National School Boards Association.

These groups can hold press conferences detailing the problem and solutions of adolescent tobacco use, write editorials for local news papers, and provide presentations at school board meetings and local government council meetings.

Some of the loudest voices for tobacco control policy are those of organized adolescent groups asking for policies that protect them from the dangers of tobacco. Health professionals can also support these media campaigns by collecting and presenting white papers at local forums with data from the area. This makes the problem and solution real for local residents. If naysayers complain about the lack of funds necessary to add tobacco use education to the current tobacco control law then the multiple financial resources provided by the federal government in recent legislation coupled with the Tobacco Settlement Agreement funds can be identified as financial resources. Twenty-five percent of Kentucky's tobacco settlement agreement fund is allocated to the Kentucky Health Care Improvement Fund created in KRS 194A.055 (Kentucky Revised Statutes).

As momentum grows and the majority of Kentucky school districts create comprehensive tobacco control school policies that include education and cessation programs, the focus may need to change to include policy makers at the state level. As local constituents see smoking rates decline in areas with smoke-free school policies, they will contact their state leaders and ask for state wide legislation. At the same time local and national special interest groups could

contact legislators, staffers, lobbyists and bureaucrats to ask for meetings or, lunch dates to discuss the growing trend of smoke-free school policies across the state and the nation. They will target Representative Susan Westrom and Democrat Tom Burch on the Kentucky committee on Health and Welfare to consider talking to Mary Lou Marzian and Ruth Palumbo to sponsor a bill for comprehensive tobacco control and education legislation for Kentucky. They could also ask the Kentucky Medical Association, Kentucky Nurses Association, and educator special interest groups to join forces in support of this legislation by contacting their representatives and senators through email, phone calls, visits and rallies at the capital in Frankfort. Hopefully, with enough support Representative Westrom will sponsor the bill and ask for a reading. Then the legislative process churns at an unpredictable pace as school tobacco control policy and education supporters continue their barrage of communication with law makers in Frankfort until the bill passes successfully into committee.

Conclusion

Youth tobacco use in Kentucky is a devastating problem that places a heavy financial and health burden on all of the residents of the Commonwealth. Tobacco use prevention and cessation education is an evidence based solution to this problem; however, only 25% of students in Kentucky receive tobacco education. Kentucky law allows each school local control over their curriculum. It appears that Kentucky needs a new state law that mandates this education but an analysis using Kingdon's three streams metaphor finds that Kentucky does not have the political or policy climate to support that legislation at this time. The solution to providing tobacco use prevention and cessation education to the youth of Kentucky is to partner with special interest groups that are championing smoke-free legislation such as school tobacco control policies. Using research, health and education special interest groups, and local residents

local school policies should be implemented. As momentum for these policies grow across Kentucky legislators may be moved to look at the possibility of passing state wide legislation that would provide comprehensive school tobacco control policies that mandate tobacco use prevention and cessation education for the youth of Kentucky.

References

Adler, H. M., Hoagland, B. S., Jennings, C., and Lieberman, S. Bipartisan Policy Center

(2012). *What is driving U. S. Health Care Spending: America's unsustainable health care cost growth*. Washington, DC.

American Lung Association: Fighting for Air (2012). *Kentucky: Smoking restrictions*. Retrieved from <http://www.lungusa2.org/slati/statedetail.php?stateId=21#jump0>

American Lung Association: Fighting for Air (2012) *State of tobacco control: Kentucky*. Retrieved from <http://www.stateoftobaccocontrol.org/state-grades/kentucky/>

Americans for Non Smokers Rights. *Preemption. Tobacco control's #1 enemy*. Retrieved from <http://www.no-smoke.org/document.php?id=397>

Campaign for Tobacco-Free Kids. (2012). *Smoking and kids*. Retrieved from <http://www.tobaccofreekids.org/research/factsheets/pdf/0001.pdf>

Campaign for Tobacco-Free Kids. *U. S. state and local issues: Prevention and cessation programs*. Retrieved from http://www.tobaccofreekids.org/what_we_do/state_local/prevention_cessation/

Centers for Disease Control and Prevention. (2006) *School health policies and programs study: School health program report card-Kentucky*. Retrieved from http://www.cdc.gov/healthyyouth/shpps/2006/summaries/pdf/HE_State_Level_Summariss_SHPPS2006.pdf

Centers for Disease Control and Prevention. (2008). Smoking-attributable mortality, years of potential life lost, and productivity losses—United States, 2000–2004. *MMWR: Morbidity and Mortality Weekly Report*, 57(45), 1226-1228.

Centers for Disease Control and Prevention. (2010, August 27). *MMWR Morbidity and Mortality Weekly Report*. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5933a2.htm>

Centers for Disease Control and Prevention. (2012). *Youth risk behavior surveillance system—United States, 2011*. Retrieved from <http://www.cdc.gov/mmwr/pdf/ss/ss6104.pdf>.

Cheves, J. (2011, January 7). 2011: *General Assembly: Lexington lawmaker proposes statewide smoking ban*. Kentucky.com. Retrieved from <http://www.kentucky.com/2011/01/07/1589411/lexington-lawmaker-proposes-statewide.html>

Dobbins, M., DeCorby, K., Manske, S., and Goldblatt, E., (2008). Effective practices for school-based tobacco use prevention. *Preventive Medicine*, 46. 289-297.

Givel, M. S., and Glantz, S. A. (2001). *Tobacco lobby political influences on US state legislatures in the 1990's*. *Tobacco Control* (10)2. 124-134 doi:10.1136/tc.10.2.124

Hahn, E. J. and Rayens, M. K. (2000, February). *Public opinion and legislators' views on tobacco policy*. *Kentucky Medicine*. 67-73.

Hahn, E. J. and Rayens, M. K. (2002). Legislators' views on tobacco policy: Are there regional differences in Kentucky? *Southern Medical Association* 95(3). 324-330).

Hahn, E. J., Rayens, M. K., Rasnake, R., York, N., Okoki, C. T., & Riker, C. (2005). School tobacco policies in a tobacco-growing state. *Journal of School Health, 75*(6), 219-225.

Hahn, E. J., Toumey, C. P., Rayens, M. K., & McCoy, C. A. (1999). Kentucky Legislators' views on tobacco policy. *American Journal of Preventive Medicine, 16*(2), 81-88.

Institute of Medicine of the National Academies. *Recommendations from ending the tobacco problem: A blueprint for the nation*. Retrieved from <http://www.apha.org/membergroups/newsletters/sectionnewsletters/alcohol/spring07/iom.htm>

Kentucky Cabinet for Health and Family Services. Department for Public Health. *Kentucky tobacco prevention and cessation program*. Retrieved from <http://c.hfs.ky.gov/dph/mch/hp/tobacco.htm>

Kentucky Department of Education (2012, August). *KDE program review for practice living/career studies*. Retrieved from <http://education.ky.gov/curriculum/pgmrev/documents/09-12%20pl-cs%20final%20-%20revised%20oct%20%202012.pdf>

Kentucky Legislature. (2012, November 19). *2012 House standing committee on health and welfare members*. Retrieved from [http://www.lrc.ky.gov/committee/standing/H&W\(H\)/members.htm](http://www.lrc.ky.gov/committee/standing/H&W(H)/members.htm)

Kentucky Revised Statutes. 248.654. Tobacco settlement agreement fund-source of moneys-distribution of funds. Retrieved from <http://www.lrc.state.ky.us/krs/248-00/654.PDF>

Kentucky Revised Statutes. (2010). Professional development programs -- Professional development coordinator -- Long term improvement plans -- Suicide prevention awareness information -- Electronic consumer bulletin board -- Training to address needs of students at risk -- Teacher academics. Retrieved from <http://www.lrc.state.ky.us/krs/156-00/095.pdf>

Kentucky.Com (2011, July 6). Editorial: *Time for state to help smokers*. Retrieved from <http://www.kentucky.com/2011/07/06/1801370/time-for-state-to-help-smokers.html#storylink=misearch>

Kingdon, J. W. (2011). *Agendas, alternatives, and public policies*. Glenview, IL: Pearson Education, Inc.

Levy, D. T., Tworek, C., Hahn, E. J., and Davis, R. E. (2008). The Kentucky *Sim Smoke* tobacco policy simulation model: Reaching Healthy People 2010 goals through policy change. *Southern Medical Journal* 101(5). 503-507.

Library of Congress. Bill Summary & Status 112th Congress (2011-2012).H. R. 2954 CRS Summary. Health Equity and Accountability Act of 2011. Retrieved from <http://thomas.loc.gov/cgi-bin/bdquery/z?d112:h.r.2954>:

Library of Congress. Bill Summary & Status 112th Congress (2011-2012). H. R. 3055 CRS Summary. National Parents Corps Act of 2011. Retrieved from <http://thomas.loc.gov/cgi-bin/bdquery/z?d112:h.r.3055>:

Noll-Marsh, Kristin. (2011, May 16). *Non-profit fights to reduce harm rather than to prohibit tobacco*. Kentucky.com. Retrieved from

<http://www.kentucky.com/2011/05/16/1741853/non-profit-fights-to-reduce-harm.html#storylink=misearch>

North Carolina Department of Health and Human Services. (2012, May 17). *Teen smoking rates drop to historic low*. Retrieved from http://www.ncdhhs.gov/pressrel/2012/2012-05-17_teen_smoking_drops.htm

North Carolina Department of Health and Human Services. *Create, adopt, implement, communicate, and enforce 100% tobacco-free policy*. Retrieved from www.nctobaccofreeschools.org.

Prevention and Public Health fund: Open government at HHS (2012, March, 31) Fiscal Year 2012 Allocation of Funds. Retrieved from <http://www.hhs.gov/open/recordsandreports/prevention/index.html>

Proescholdbell, S. K., Summerlin-Long, S. K., Goldstein, A. O., (2009). Declining tobacco use among North Carolina middle and high school students: 1999-2007. *North Carolina Medical Journal* 70(3). 205-212.

Prokhorhov, A., Kelder, S., Ross, S., Conroy, J. L., Murray, N., Peters, R.,...& Ford, K. (2010). Project ASPIRE: An interactive, multimedia smoking prevention and cessation Curriculum for culturally diverse high school students. *Substance Use & Misuse*, 45, 983-1006. doi: 10.3109/10826080903038050

Rayens, M. K. and Hahn, E. J. (2000). Building consensus using the policy Delphi method. *Policy, Politics, & Nursing Practice*. 1(4). 308-315.

Rayens, M. K., York, N. L., Adkins, S. M. Kaufman, E. L. and Hahn, E. J. (2012). Political climate and smoke-free laws in rural Kentucky communities. *Policy, Politics, & Nursing Practice* 13(2) . 90-97.

Sherman, E. J. and Primack B. A. (2009). What works to prevent adolescent smoking? A systematic review of the National Cancer Institute's research-tested intervention programs. *Journal of School Health* 79 (9). 39-399.

Substance Abuse and Mental Health Services Administration. (2010). *State Estimates of Substance Use from the 2007-2008 National Surveys on Drug Use and Health* (Office of Applied Studies, NSDUH Series H-37, HHS Publication No. SMA 10-4472). Rockville, MD.

Tobacco Environmental Strategies. (2004, September 7). *A review of the commonwealth of Kentucky tobacco control laws*. Retrieved from http://dbhidid.ky.gov/dbh/files/sa_tobaccolaws_ky.pdf

U. S. Department of Education. (2012, May 29). Obama approves eight more state for no child left behind waivers. Retrieved from <http://www.ed.gov/news/press-releases/obama-administration-approves-eight-more-states-nclb-waivers>

U. S. Department of Health and Human Services. (2012, August). *Ending the tobacco epidemic: Progress towards a healthier nation*. Retrieved from <http://www/hhs.gov/ash/initiatives/tobacco/>

U.S. Department of Health and Human Services. (2012). *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National

Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012.

Appendix A

U. S. and Kentucky Pro Tobacco Groups

National Pro Tobacco Groups

American Cancer Society

American Heart Association

American Dental Education Association

American Lung Association

Campaign for Tobacco-free Kids

Ending the Tobacco Problem

Tobacco Control Network

American Medical Association

American Nurses Association

American Hospital Association

National Education Association

National School Boards Association

National Consortium on Tobacco Use Prevention

American Federation of Teachers

Kentucky Pro Tobacco Groups

Kentucky Policy Research Program

American Lung Association of Kentucky

Kentucky Action

Kentucky Department for Public Health

Kentucky Medical Association

Kentucky Office of Drug Control Policy

Kentucky Public Health Association

Save Kentucky Kids

Action on Smoking and Health

Foundation for a Healthy Kentucky

Make a Difference for Kids, Inc.

Kentucky Coalition of Nurse Practitioners
and Nurse Midwives

Appendix B

U.S. and Kentucky Groups Who Oppose Tobacco Control

National	Kentucky
The Tobacco Industry	Heritage Tobacco Group
Tobacco Farmers	Kentucky Tobacco Group
Friends of Tobacco	Clear the Air to Aid Smokers
Smoker's Right's Group	The Bluegrass Institute
American's for Prosperity	Consumer Advocates for Smoke-free
Get Off Of My Back	Alternatives
Tobacco Institute	
National Smokers Association	
Women in Farm Economics	
Citizens Freedom Alliance	
National Licensed Beverage Association	
Altria Group	

Improving the Quality of School-based Tobacco Education Programs

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Abstract

A critical review of the literature identified nine elements of an evidence-based tobacco education program that should be used for adolescents in a high school setting. Tobacco education programs should be tailored to the individual, and include technological and educator methods of delivery. It should include elements of peer support with motivational enhancement, education regarding refusal skills, social influences and acceptability with information about short and long term physical effects of smoking. Lastly, the programs should be accessible, cost-effective and have long-term evaluation of success. The ASPIRE (A Smoking Prevention Interactive Experience) program is identified as a program which meets these criteria. School nurses should be able to identify and recommend effective tobacco education programs.

Keywords: school-based, tobacco, education, evidence-based, adolescents, school nurse

Improving the Quality of School-based Tobacco Education Programs in High Schools

Smoking has been the leading cause of preventable death in the United States for forty years and is responsible for nearly 443,000 deaths annually (Centers for Disease Control and Prevention [CDC], 2011). Nearly ninety percent of all adult smokers begin smoking before the age of 18. Currently, the CDC estimates that 3,800 youth across America smoke their first cigarette each day with almost 1000 youth becoming daily smokers (U.S. Department of Health and Human Services [HHS], 2012). Through health policy and education, the rate of youth smoking declined from 1997 to 2003; however, the rate has plateaued since that time (HHS, 2012). This has prompted the CDC, Healthy People 2020, the U.S. Surgeon General and the National Guideline Clearinghouse to recommend effective school-based tobacco education programs as an integral component of the complex plan to address youth smoking (CDC, 2012; HHS, 2012; Healthy People 2020, 2011; National Guideline Clearinghouse, 2008). School nurses understand the impact of youth smoking and are looking for interventions to address the problem in their patient population. School nurses should be able to identify and recommend effective, evidence-based, tobacco education programs to implement in their schools.

Statement of the Problem

The United States of America has been tracking youth smoking rates since 1964 with the first U. S. Surgeon General's Report on smoking. The nation is well aware of the effects of tobacco use in adults. It is important to prevent and decrease youth tobacco use since most adult smokers begin smoking as children. Currently, most children smoke their first cigarette between the ages of 11 and 13 years old (Campaign for Tobacco Free Kids, 2013). Schools seem to be the most logical places to provide tobacco education to youth as provide a "captive audience;" however, there are barriers to providing tobacco education in a school setting.

Barriers to school-based tobacco prevention programs include scheduling time to have the program, undervaluing of these programs by administration, lack of funding, lack of knowledge of effective programs, and the insecure nature of adolescents. Academic excellence is the rightful priority of all schools, yet scheduling a tobacco prevention program during the day takes time away from academic instruction (Kohler, Schoenberger, Beasley, & Phillips, 2008). Flay (2009) stated “in these days of high demands on schools, they are unlikely to address prevention unless they have to, or unless it can be shown to also improve achievement, and they are unlikely to adopt a program unless they have the funding for it”. School administrators may undervalue such programs, giving preference to athletic or arts programs. In addition, tobacco education programs are not always implemented in the manner they were intended, resulting in decreased effectiveness. School staff and even school nurses feel under equipped to implement some programs (Hamilton, O’Connell, & Cross, 2004). Adolescent traits such as feelings of insecurity, the need to conform or rebel, and a general lack of responsibility make any intervention for the adolescent population more difficult to successfully implement and complete. Students who currently smoke may not want their friends to know they want to quit, while some students are hiding their addiction and desire anonymity, making participation in a school-based intervention unattractive (Kealey et al., 2009). Unfortunately, many school systems lack resources such as finances, personnel, equipment, space and time to devote to tobacco education (Price, Yingling, Dake & Telljohann, 2003).

Youth smoking is a high risk health behavior that can be addressed with school-based interventions. However, the barriers to tobacco education programs must be addressed prior to implementation of the program. Effective tobacco education programs are vital to improving the health of the U.S. by reducing the devastating consequences of tobacco use.

Background

The consequences of smoking are well documented for the adult population. Premature death, many cancers, respiratory diseases, cardiovascular disease, diabetes, autoimmune disorders, eye diseases and reproductive health are complicated by smoking (U.S. Department of Health and Human Services [HHS], 2014). The devastation due to smoking is estimated to cost the U. S. \$96 billion annually in direct medical costs (HHS, 2012). The Surgeon General's report, *Preventing Tobacco Use among Youth and Young Adults* (2012), increases awareness of the short-term effects of smoking on youth. Evidence supports a causal relationship between smoking and nicotine addiction in youth. Data also suggest that youth tobacco use leads to marijuana use, reduced lung function and lung growth in youth, and severe wheezing leading to asthma (HHS, 2012). Previous reports state that students who smoke are likely to drink alcohol, earn lower school grades, have low self-esteem, and have peers who smoke (CDC, 2004). It is clear why smoking is considered a national crisis. The financial and physical health burden that smoking places on the U. S. must be addressed in the adolescent population.

School-based programs are an important part of a complex plan to address youth tobacco use. In a critique of meta-analyses and published reviews of smoking prevention programs in schools, Flay (2009), found methodological problems with a few review studies that purported the ineffectiveness of school-based tobacco prevention programs. Flay (2009) argued that sound meta-analyses of school-based tobacco prevention programs found that such programs could have significant short and long-term effects on students. Moreover, the reviews that found ineffectiveness often excluded many of the studies that demonstrated positive benefits (Flay, 2009). As a variety of tobacco prevention education program interventions are described in the literature, specific elements school-based tobacco education programs can become recurring

themes which may lead to the identification of critical elements for effective school-based tobacco education programs. Nine critical elements of such effective school-based tobacco education programs will be discussed below.

Problem Formation

The purpose of this article is to report a critical review of the literature to identify elements of effective school-based tobacco prevention and cessation programs and to recommend a program that best meets those criteria.

Method of Review

A critical review of the literature was conducted. PubMed, CINAHL, and the Cochrane Library databases were accessed for quantitative and qualitative articles that described interventions or programs that targeted adolescent tobacco or smoking use prevention and or cessation from 2001-2012. Government databases were accessed as well as websites of tobacco focused special interest groups from 2004-2012.

Results

A review and synthesis of the literature identified nine critical elements that should be included in an effective school-based tobacco use prevention and cessation education program. (Table 1). These key elements closely resemble the components of effective drug prevention programs identified by Tobler (2000). She identified these components as: education regarding short and long term health effects, social and peer influences, refusal skills, coping skills with goal setting and problem solving, interactive sessions, and peer support. Over the last decade researchers have given increased attention to outcomes evaluation and cost-effectiveness of

interventions. This attention to outcome and cost-effectiveness, coupled with the adolescent population's increased use of personal technology, is the basis for the additional components of effective tobacco use prevention programs.

Theoretical Framework

A review of the literature found that most of the effective programs have a theoretical basis. It is generally expected that most programs which involve human behavior will have theoretical and scientific underpinnings. Most of the reviewed studies were based on Prochaska's transtheoretical model of behavior change. This theory identifies the subject's intent to change their behavior and tailors the intervention to the appropriate stage of change. The use of Bandura's social cognitive theory is reflected in a subsequent element that includes interactive peer support (Dalum, Schaalma, & Kok, 2011; Fritz, Gore, Hardin, & Bram, 2008; Grimshaw & Stanton, 2010; Hackbarth, 2012; Jannone & O'Connell, 2007; Kealey et al., 2009; Pbert et al., 2011; Peterson et al., 2009; Prokhorov et al. 2008). One study used Rogers's diffusion of innovations theory which attempts to explain how a new idea is communicated through a culture (Franks et al., 2007). Although many of the effective programs have a theoretical basis, based on this review it does not appear that the presence of a theoretical basis necessarily improves smoking outcomes and therefore is not considered a critical element of effective tobacco use prevention programs.

Individually Tailored

Tobacco use prevention programs for adolescents must be age appropriate, address the appropriate stage of change and be culturally relevant (Fritz, Wider, Hardin, & Horrocks, 2008; Kealey et al., 2009; Pbert et al., 2011; Peterson et al., 2009; Prokhorov et al., 2008; Shahab &

McEwen, 2009). Programs that work to decrease tobacco use in adults are not necessarily effective in adolescents. A one-size-fits-all approach does not work in the adolescent population. A Cochrane review by Civljak, Sheikh, Stead, and Car (2012) found “that some internet-based interventions can assist smoking cessation, especially if the information is appropriately tailored to the users” (p. 2). Interventions that are tailored to the participant’s stage of change, age and culture are more effective than a standard curriculum. If a participant does not want to quit smoking, then the intervention must be focused to educate on the benefits cessation and harms of continued tobacco use. If a participant is ready to stop smoking then the intervention must be focused on providing resources and instructions to assist in cessation.

Short and Long Term Health Effects

Multiple studies have shown that adolescents respond to factual information regarding the real short and long-term physical effects of smoking. This concept is the basis for the powerful media campaign from the CDC, *Tips from Former Smokers*. This campaign is a series of television commercials of real people showing their devastating physical consequences of smoking, like the loss of the ability to speak. Including information on the short and long-term health effects of tobacco use is an important element in tobacco use prevention programs for adolescents (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Fritz, Gore, Hardin, & Bram, 2008; Fritz, Wider, Hardin, & Horrocks, 2008; Jannone & O’Connell, 2007; Latimer et al., 2012; Pbert et al., 2011; Price, et al., 2003; Prokhorov et al., 2010).

Social Influences and Acceptability

It is important for adolescents to understand the impact social media and advertising by the big tobacco companies can have on their attitude towards tobacco. Adolescents who have

peers who smoke are more likely to smoke. When students learn the facts regarding the social acceptability of tobacco use, they will apply that information to the social influences in their own personal lives (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Flay, 2009; Fritz, Gore, Hardin, & Bram, 2008; Hackbarth, 2012; Latimer et al., 2012; Prokhorov et al., 2008; Sherman & Primack, 2009). Murnaghn, Leaherdale, Sihvonen, and Kekki (2009) found that close family and friends had a greater impact on adolescent smoking behavior than school policy restrictions, emphasizing the importance of including information on social influences and acceptability in school-based tobacco use education programs. School policies that ban the use of tobacco on campus are not sufficient in and of themselves to prevent tobacco use. Tobacco prevention education programs should also provide information on the social acceptability of tobacco use.

Interactive with Peer Support and Motivational Enhancement

Adolescents prefer interactive learning experiences. This can include live role-play or computer based quizzes, games and self-assessments. Peer support and interaction is an important component of interactive learning for adolescents. “We recommend such interventions that highlight interactive components, including peer-based discussion and support” (Patten et al., 2007). Peer support and interaction can be in the form of live, face-to-face interaction or virtual interaction through multi-media sources. Regardless of the mode of delivery, peer support and interaction are critical elements of effective adolescent tobacco use education programs (Dobbins, DeCorby, Manski & Goldblatt, 2008; Flay, 2009; Kealey et al., 2009; Latimer et al., 2012; MacDonald, Rothwell, & Moore, 2007; Prokhorov et al., 2008; Shahab & McEwen, 2009; Woodruff, Edwards, Conway, & Elliott, 2001).

The importance of motivational enhancement should also be emphasized. This includes providing information and encouraging adolescents to build on their personal strengths to change their smoking behavior. Using a non-judgmental approach, motivational enhancement aids adolescents to draw on their own resolve to make healthy decisions. Motivational enhancement is a key component in many effective tobacco education programs (Grimshaw & Stanton, 2010; Hackbarth, 2012; Peterson et al., 2009).

Refusal Skills Education

As students begin to comprehend the influence and opinion of society on their smoking habits, they will need coping mechanisms to activate when faced with real life scenarios to smoke. Providing students with refusal skills is an important element in effective tobacco use education programs for adolescents (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Flay, 2009; Fritz, Gore, Hardin, & Bram, 2008; Hackbarth, 2012; Kealey et al., 2009; Prokhorov et al., 2008; Sherman & Primack, 2009). Providing students with an opportunity to practice refusal skills in different social scenarios by role play may be beneficial.

Technological and Educator Delivery

Cutting edge technology is a part of adolescent culture today, thus they tend to prefer a virtual or technology based education session over a traditional classroom setting. However, an experienced educator such as a school nurse acting as a facilitator is feasible and acceptable in addition to the technology component (Fritz, Wider, Hardin, & Horrocks, 2008; Woodruff, Edwards, Conway, & Elliott, 2001). Internet-based interventions for smoking cessation have been found to be effective and acceptable (Civljak, Sheikh, Stead, & Car, 2012; Fritz, Gore,

Hardin, & Bram, 2008; Shahab & McEwen, 2009) but require professional guidance and or prompting to access the program (Patten et al., 2006; Prokhorov et al., 2008).

Accessibility

Effective tobacco use education programs must be accessible. Adolescents are transitioning into independence and do not like to be told how to spend their free time. Structured after school tobacco programs compete with academic, athletic and social events. MacDonad, Rothwell, and Moore (2007) found that adolescents prefer flexible support which fits into their social activities. To reduce scheduling conflicts, some interventions have computer or web based components which allow students to access tobacco education programs and to progress at their own pace. This is an attractive option for many students since the Internet is available seven days a week, twenty-four hours a day (Fritz, Gore, Hardin, & Bram, 2008; Patten et al, 2006; Prokhorov et al., 2008; Woodruff, Edwards, Conway, & Elliott, 2001).

Cost Effectiveness

In the current recession and budget restraints, any school program must be both effective and cost-effective. Tobacco use education programs have been found to be cost-effective in the long run (Chen et al., 2012; Fritz, Gore, Hardin, & Bram, 2008; Woodruff, Edwards, Conway, and Elliott, 2011). Policy makers and program planners must use fiduciary discretion when evaluating school tobacco use prevention programs (Franks et al., 2007). Wang, Crossett, Lowery, Sussman, and Dent (2001) found that school-based tobacco education programs can be highly cost-effective and cost-saving. Some web-based programs are free of charge, making them an attractive option for schools (Prokhorov et al., 2008).

Long-term Program and Evaluation

It is recommended that programs must be long-term and evaluated for abstinence at least six months after completion of the program. Hackbarth (2012) found that a five session intervention was sufficient for tobacco use cessation while Flay (2009) suggested that prevention programs should include at least 15 sessions. Many of the studies reviewed defined effectiveness as abstinence at one month post intervention. However, evidence suggests that school based prevention or cessation programs should be evaluated at a minimum of six months after completion and again at 12th grade or 18 years of age (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Prokhorov et al., 2008; Wiehe, Garrison, Christakis, Ebel, & Rivara, 2005). It is important to note that lengthy programs as well as short term interventions should contain some element of evaluation to measure effectiveness.

Limitations

This article is not intended to be a meta-analysis or integrative review of the literature. The purpose of this article is to identify the critical elements of effective school-based tobacco use prevention programs. Studies were chosen which could only be applied in a school setting for an adolescent population. Some of the studies reviewed focused on prevention alone, cessation alone, or a combination of both prevention and cessation. An inherent problem with many studies of adolescent behavior is being underpowered due to high drop-out rates.

Implications for School Nursing Practice

School nurses are revered as the health experts in their schools and may be called upon to recommend a school-based tobacco use education program for their schools. As school nurses turn to the literature to identify programs that contains the critical elements described above, they should consider the ASPIRE (A Smoking Prevention Interactive Experience) program

(Prokhorov et al., 2008). ASPIRE contains all of the critical elements found in effective school-based tobacco use education programs (Prokhorov et al., 2010). ASPIRE is a computer-based program developed for use in a school setting for adolescent tobacco use prevention and cessation education. It is based on Prochaska's transtheoretical model of behavioral change. Five sessions with two booster sessions lead the student through stage appropriate, interactive self-assessments, games, quizzes, and videos of culturally diverse peer testimonies. The program provides information regarding social influences, acceptability, short and long term health effects of smoking, and refusal skills. Effectiveness of the program is measured at 18 months. ASPIRE study results found that the program was effective in preventing smoking initiation, and that it improved cessation (Prokhorov et al., 2008).

The modules of the ASPIRE program are guided by a champion, which could be the school nurse. The school nurse can use the ASPIRE program in multiple venues. The nurse can implement a school wide education program or target individual students or classes. Health teachers can use ASPIRE as a tobacco education curriculum so the students could earn a grade for completion of the program. It is critical for the nurse to market the availability of the program to students and teachers. When students request access to the program the nurse will provide the student with login information. The nurse should also be available as a resource should the student request referral for other smoking related services. The nurse should make school administrators aware of the program as well. School administrators would likely support ASPIRE because it is free and easily accessible on the M.D. Anderson website.

Early implementation of the ASPIRE program in some rural areas of Kentucky encountered the barriers of taking away from class time and poor completion rates due to inclement weather barring computer access. To reduce those barriers, technologically advanced

schools should consider offering the program via advance technological modalities like the iPad. Many schools are allowing or requiring students to bring their own mobile technology devices to school to access the Internet for academic purposes. If students use their own mobile devices they will have increased access to technology, thus eliminating the barrier of lack of access to technology. Also, if students use their own devices they can access the program at home, eliminating the barrier of missed academic time and the impact of missed school days due to harsh weather.

Conclusion

In 2011, 15.8% of high school students smoked cigarettes and 23.2% of high school students used some form of tobacco (HHS, 2012). The Surgeon General recommends comprehensive, sustained, multi-component programs to address youth tobacco use. One of the strategies of this comprehensive plan is the implementation of evidence-based school programs. This article has identified nine evidence-based elements that should be included in a school-based tobacco use education program. The ASPIRE program is one program that contains all the required critical elements. School nurses are the ideal leaders to choose, implement, and evaluate school-based tobacco use prevention programs. For more information on ASPIRE visit the MD Anderson Cancer Center website at <http://www.mdanderson.org/patient-and-cancer-information/cancer-information/cancer-topics/prevention-and-screening/studies-and-programs/additional-prevention-resources/aspire/index.html>

References

- Campaign for tobacco-free kids. How schools can help students stay tobacco-free. Retrieved November 19, 2012 from <http://www.tobaccofreekids.org/research/factsheets/pdf/0153.pdf>
- Campaign for tobacco-free kids. (2013). The path to smoking addiction starts at very young ages. Retrieved November 19, 2012 from <http://www.tobaccofreekids.org/research/factsheets/pdf/0127.pdf>
- Centers for Disease Control and Prevention. (2004). *The health consequences of smoking: A report of the surgeon general*. Retrieved February 7, 2013 from http://www.cdc.gov/tobacco/data_statistics/sgr/2004/pdfs/28reports.pdf
- Centers for Disease Control and Prevention. (2011, September 11). Vital Signs: Current cigarette smoking among adults aged > 18 years---United States 2005-2010. *MMWR. Morbidity and Mortality Weekly Reports*, 60(35), 1207-1212. Retrieved November 19, 2012 from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6035a5.htm?s_cid=mm6035a5_w
- Chen, Y-F., Madan, J., Welton, N., Yahaya, I., Aveyard, P., Bauld, L.,...& Munafo, M. R. (2012). Effectiveness and cost-effectiveness of computer and other electronic aids for smoking cessation: A systematic review and network meta-analysis. *Health Technology Assessment*, 16(38), 1-205. doi:10.3310/hta16380
- Civiljak, M., Sheikh, A., Stead, L F., & Car, J. (2012). Internet-based interventions for smoking cessation. *Cochrane Database of Systematic Reviews*, 9. doi:10.1002/14651858.CD007078.pub3

- Dalu, P., Schaalma, H. & Kok, G. (2011). The development of an adolescent smoking cessation intervention-an Intervention Mapping approach to planning. *Health Education Research*, 27, 172-181. doi: 10.1093/her/cyr044
- Dobbins, M., DeCorby, K., Manske, S., & Goldblatt, E. (2008). Effective practices for school-based tobacco use prevention. *Preventive Medicine*, 46, 289-297. doi:10.1016/j.ypmed.2007.10.003
- Flay, B. (2009). School-based smoking prevention programs with the promise of long-term effects. *Tobacco Induced Diseases*, 5(6), 1-18. doi:10.1186/1617-9625-5-6
- Franks, A. L., Kelder, S. H., Dino, G. A., Horn, K. A., Gortmaker, S. L. Wiecha, J. L., & Simoes, E. J. (2007). School-based programs: Lessons learned from CATCH, Planet Health, and Not-on-Tobacco. *Preventing Chronic Disease*, 4(2), 1-9.
- Fritz, D. J., Gore, P. A., Hardin, S. B. & Bram, D. (2008). A computerized smoking cessation intervention for high school smokers. *Pediatric Nursing*, 34(1), 13-17.
- Fritz, D. J., Wider, L. C., Hardin, S. B., & Horrocks, M. (2008). Program strategies for adolescent smoking cessation. *The Journal of School Nursing*, 24(1), 21-27.
- Grimshaw, G. & Stanton, A. (2010). Tobacco cessation interventions for young people. *Cochrane Database of Systematic Reviews*, 1, doi:10.1002/14651858.CD003289.pub4
- Hackbarth, D. P. (2012). Preventing adolescent tobacco use and assisting young people to quit: population, community, and individually focused evidence-based interventions. *Nursing Clinics of North America*, 47, 119-140. doi:10.1016/j.cnur.2011.10.004

- Hamilton, G., O'Connell, M., & Cross, D. (2004). Adolescent smoking cessation: Development of a school nurse intervention. *The Journal of School Nursing, 20*(3), 169-174.
- Jannone, L., O'Connell, K. A. (2007). Coping strategies used by adolescents during smoking cessation. *The Journal of School Nursing, 23*(3), 177-184.
- Kealey, K. A., Ludman, E. J., Marek, P. M., Mann, S. L., Bricker, J. B., & Peterson, A. V. (2009). Design and implementation of an effective telephone counseling intervention for adolescent smoking cessation. *Journal of National Cancer Institute, 101*(20), 1393-1405. doi:10.1093/jnci/djp318
- Kohler, C. L., Schoenberger, Y. M., Beasley, T. M., & Phillips, M. M. (2008). Effectiveness evaluation of the N-O-T smoking cessation program for adolescents. *American Journal of Health Behavior, 32*(4), 368-379.
- Latimer, A. E., Krishnan-Sarin, S., Cavallo, D. A., Duhig, A., Salovey, P., & O'Malley, S. A. (2012). Targeted smoking cessation messages for adolescents. *Journal of Adolescent Health, 50*, 47-53. doi:10.1016/j.jadohealth.2011.04.013
- MacDonald, S., & Rothwell, H., Moore, L. (2007). Getting it right: Designing adolescent-centered smoking cessation services. *Addiction, 102*, 1147-1150. doi:10.1111/j.1360-0443.2007.01851.x
- Murnaghan, D. A., Leatherdale, S. T., Sihvonen, M., & Kekki, P. (2009). School-based tobacco-control programming and student smoking behavior. *Chronic Disease in Canada, 29*(4), 169-177.

- National Guideline Clearinghouse. (2008). Treating tobacco use and dependence: 2008 update. Rockville (MD): U.S. Department of Health and Human Services, Public Health Service; 2008 May. p. 257. Retrieved November 19, 2012 from <http://guideline.gov/content.aspx?id=12520&search=tobacco>
- Patten, C. A., Croghan, I.T., Meis, T. M., Decker, P.A., Pingree, S., Colligan, R., C.,...Gustafson, D. H. (2006). Randomized clinical trial of an internet-based versus brief office intervention for adolescent smoking cessation. *Patient Education and Counseling*, 64, 249-258. doi:10.1016/j.pec.2006.03.001
- Pbert, L., Druker, S., DiFranza, J. R., Gorak, D., Reed, G., Magner, R., ...Osganian, S. (2011). Effectiveness of a school nurse-delivered smoking-cessation intervention for adolescents. *Pediatrics*, 128, 926-936. doi:10.1542/peds.2011-0520
- Peterson, A. V., Kealey, K. A., Mann, S. L., Marek, P. M., Ludman, E. J., Lu, J. & Bricker, J. B. (2009). Group-randomized trial of a proactive, personalized, telephone counseling intervention for adolescent smoking cessation. *Journal of National Cancer Institute*, 101(20), 1378-1392. doi:10.1093/jnci/djp317
- Price, J. H., Yingling, F., Dake, J. A., & Telljohann, S. K. (2003). Adolescent smoking cessation services of school-based health centers. *Health Education and Behavior*, 30(2). doi:10.1177/1090198102251032.
- Prokhorov, A., Kelder, S., Ross, S., Conroy, J. L., Murray, N., Peters, R.,...& Ford, K. (2010). Project ASPIRE: An interactive, multimedia smoking prevention and cessation curriculum for culturally diverse high school students. *Substance Use & Misuse*, 45,983-1006. doi:10.3109/10826080903038050

- Prokhorov, A. V., Kelder, S. H., Shegog, R., Murray, N., Peters, R., Agurcia-Parker, C.,...& Marani, S. (2008). Impact of a smoking prevention interactive experience (ASPIRE), an interactive, multimedia smoking prevention and cessation curriculum for culturally diverse high-school students. *Nicotine & Tobacco Research, 10*(9), 1477-1485. doi:10.1080/14622200802323183
- Shahab, L, & McEwen, A. (2009). Online support for smoking cessation: A systematic review of the literature. *Addiction, 104*, 1792-1804. doi:10.1111/j.1360-0443.2009.02710.x
- Sherman, E. J., & Primack, B. A. (2009). What works to prevent adolescent smoking: A systematic review of the National Cancer Institute's research-tested intervention programs. *Journal of School Health, 79*(9), 391-399.
- Wang, L. Y., Crossett, L. S., Lowery, R., Sussman, S., and Dent, C. W. (2001). Cost-effectiveness of a school-based tobacco-use prevention program. *Archives of Pediatric Adolescent Medicine, 155*. 1043-1050.
- Woodruff, S. I., Edwards, C. C., Conway, T. L. & Elliott, S. P. (2001). Pilot test of an internet virtual world chat room for rural teen smokers. *Journal of Adolescent Health, 29*(4), 239-243.
- Wiehe, S. E., Garrison, M. M., Christakis, D. A., Ebel, B., E., & Rivara, F. (2005). A systematic review of school-based smoking prevention trials with long-term follow-up. *Journal of Adolescent Health, 36*, 162-169. doi:10.1016/j.jadohealth.2004.12.003

United States Department of Health and Human Services, Healthy People 2020. (2011, June 29).

Tobacco Use: Overview. Retrieved November 19, 2012 from

<http://www.healthypeople.gov/2020/topicsobjectives2020/overview.aspx?topicid=41>

U.S. Department of Health and Human Services. (2014). *The Health Consequences of Smoking,*

50 Years of Progress: A Report of the Surgeon General Executive Summary. Atlanta,

GA: U.S. Department of health and Human Services, Centers for Disease Control and

Prevention, National Center for Chronic Disease Prevention and Health Promotion,

Office on Smoking and Health, 2014. Retrieved from

http://www.cdc.gov/tobacco/data_statistics/sgr/50th-anniversary/

U.S. Department of Health and Human Services. (2012). *Preventing Tobacco Use Among Youth*

and Young Adults: A Report of the Surgeon General. Atlanta, GA: U.S. Department of

Health and Human Services, Centers for Disease Control and Prevention, National

Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and

Health, 2012. Retrieved November 19, 2012 from

<http://www.surgeongeneral.gov/library/reports/preventing-youth-tobacco-use/full-report.pdf>

U.S. Department of Health and Human Services, public health service. (2008). Treating tobacco

use and dependence. *National Guideline Clearinghouse*. Rockville, MD. Retrieved

November 19, 2012 from

<http://www.guideline.gov/content.aspx?id=12520&search=tobacco>

U.S. Department of Health and Human Services, Centers for Disease Control. Youth risk

behavior surveillance-United States, 2011. *Morbidity and Mortality Weekly*, 61(4), 1-168.

Retrieved February 7, 2013 from <http://www.scribd.com/doc/98894386/CDC-Youth-Risk-Behavior-Surveillance-2011>

Table 1. Elements of an Effective Smoking Cessation/Prevention Program for Adolescents

- Individually tailored.
 - Contains information regarding long and short-term effects.
 - Teaches social influences and acceptability of smoking.
 - Interactive with peer support with motivational enhancement.
 - Teaches refusal skills.
 - Technology based with educator guidance.
 - Accessible.
 - Cost effective.
 - Long-term program & evaluation.
-

Adolescent Satisfaction with the Tobacco Free Teens Mobile Application: A Pilot Study

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Abstract

This article describes a pilot study to examine adolescent satisfaction with a mobile application designed to prevent and decrease adolescent tobacco use. Based on the Transtheoretical Model the mobile application uses animated mentors to provide education and interactive games to assist adolescents to resist or stop smoking. A convenience sample of thirty-two adolescents downloaded the mobile application, and then completed an on-line satisfaction survey. The Tobacco Free Teens mobile application was found to be satisfactory to both boys and girls, however, girls were more likely to rate the mobile application as good or excellent. These results suggest that this mobile application may be an acceptable and cost-efficient way to deliver smoking prevention and cessation education to school-aged adolescents.

Keywords: adolescent, smoking, mobile application, school-based, education

Tobacco use continues to be the leading cause of preventable death in the United States (Centers for Disease Control and Prevention [CDC], 2011). New reports reveal that in 2014 nearly one half million American adults will die prematurely due to smoking, and care for tobacco related diseases is estimated to cost over \$289 billion annually (U.S. Department of Health and Human Services [HHS], 2014). The United States continue to search for solutions to the tobacco epidemic. As nearly ninety percent of all adult smokers begin smoking before the age of 18, interventions focused on youth have been identified as an important part of the solution (HHS, 2012). It is estimated that each day 3,800 youth across America smoke their first cigarette, with almost 1000 youth becoming daily smokers (HHS, 2012). Changes in health policy and improved education led to a decline in youth smoking rates from 1997 to 2003; however, that rate has since plateaued (HHS, 2012). School nurses are aware of the impact of youth smoking and need convenient, cost-effective and acceptable interventions to address the problem in their unique patient population. A recent study found that 78% of American youth age 12-17 access the internet on a mobile device at least occasionally (Madden, Lenhart, Duggan, Cortesi & Gasser, 2013). Since youth embrace mobile technology, a mobile application that prevents youth tobacco use may be a useful resource for the school nurse. This article describes a pilot study on the acceptability of a mobile application for preventing adolescent tobacco use.

School-Based Tobacco Prevention Education Programs

School nurses face a unique challenge to provide effective tobacco use prevention interventions for the adolescent population. Barriers to tobacco use education include, the difficulty of scheduling time for the intervention during the school day, undervaluing of these interventions by administration and staff, lack of funding (Flay, 2009), lack of knowledge of effective programs (Hamilton, O'Connell, & Cross, 2004), and the insecure nature of

adolescents. Adolescent traits such as feelings of insecurity, the need to conform or rebel, and a general lack of responsibility make any intervention designed for the adolescent population more challenging to implement and complete (Kealey et al., 2009). Thus, school nurses are searching for effective and user friendly tobacco prevention interventions for the adolescent population.

Many school nurses are using some type of tobacco education curriculum or program. The long term effectiveness of school based tobacco education programs has been debated in the medical literature for forty years. However, a recent Cochrane systematic review found that school-based tobacco use prevention programs that included social skills competence and social influences interventions had a significant effect on smoking behavior when measured at one year post intervention (Thomas, McLellan, & Perera, 2013). This important recent finding is consistent with the systematic review conducted by Flay (2009), who found that effective school-based smoking prevention programs are available and can be successfully implemented.

A review of the literature identifies nine key characteristics of effective school-based tobacco use prevention interventions or programs (Table 1). The intervention should be accessible, individually tailored to the student, and cost effective. The content of the intervention should include information on short and long term health effects of smoking, refusal skills training and, should teach social influences and acceptability. Finally, the intervention should be interactive with peer support, and delivered via technology with educator guidance and contain an evaluation component. Identifying school-based tobacco education interventions that contain these nine characteristics can be challenging.

School-based tobacco education interventions do not have to be delivered on the school campus. Interventions delivered on campus may compete with academic, athletic and social

events. Adolescents prefer flexible support which fits into their social activities (MacDonald, Rothwell, & Moore, 2007). Computer based interventions offer the scheduling flexibility desired by adolescents. Shahab and McEwen (2008) found that computer based programs designed to decrease adolescent tobacco use should be interactive and tailored to the individual user. Tobacco use prevention interventions for adolescents should also be age appropriate, address the appropriate of change and be culturally relevant (Fritz, Wider, Hardin, & Horrocks, 2008; Kealey et al., 2009; Pbert et al., 2011; Peterson et al., 2009; Prokhorov et al., 2008). Multiple studies have shown that adolescents respond to factual information regarding the real short and long-term physical effects of smoking. This explicit information should be included in tobacco use education interventions for adolescents (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Fritz, Gore, Hardin, & Bram, 2008; Fritz, Wider, Hardin & Horrocks, 2008; Latimer et al., 2012; Pbert et al., 2011). Another important component of the intervention content is teaching the adolescent how to use refusal skills when pressured by peer or social influences to smoke (Dobbins, DeCorby, Manske, & Goldblatt, 2008; Flay, 2009; Hackbarth, 2012). Finally, current budget restraints require all school-based interventions to be cost-effective and cost efficient. School-based tobacco use education interventions have been found to be highly cost-effective in the long run (Chen et al., 2012, Woodruff, Edwards, Conway, & Elliott, 2011).

Adolescents prefer interactive learning experiences that can include live or virtual role-play, computer-based quizzes, games and self-assessments or shared experiences with their peers. Regardless of the mode of delivery, peer support and interaction are critical elements of effective adolescent tobacco use interventions (Flay, 2009; Kealey et al., 2009; Latimer et al., 2012; Prokhorov et al., 2008). Internet-based interventions for have been found to be effective and acceptable for smoking cessation (Civljak, Sheikh, Stead, & Car, 2012; Fritz, Gore, Hardin,

& Bram, 2008; Shahab & McEwen, 2009) but may require professional guidance to access the program (Patten et al., 2006; Prokhorov et al., 2008). All school-based tobacco use prevention and education programs or interventions should contain an evaluation component to measure effectiveness. School nurses assess for these characteristics when evaluating potential school-based tobacco prevention interventions.

Mobile Technology

School nurses should also consider the best vehicle to deliver tobacco use education in their patient population. Adolescents are eager to have the latest technology. In 2013, 78% of adolescents owned cell phones, with 47% of those being smartphones (Madden et al., 2013). Researchers have studied the use of the mobile phone to deliver SMS (short message service) or text messaging to assist in smoking cessation. A Cochrane review found that there is a benefit from mobile phone based smoking cessation interventions (Whittaker, McRobbie, Bullen, Borland, & Rodgers, 2012). However, adolescents use their mobile devices for more than text messaging their peers. Three out of four adolescents access the internet primarily from their mobile devices. Adolescents living in lower-income or lower-education households use their mobile devices as their primary mode to access the internet, more than adolescents living in higher-income and higher-education households (Madden et al., 2013). Smart, Parker, and Lampert (2012) found that adolescents desire discretion when accessing health information and feel that the internet offers easy and private answers to their health questions. More adolescents are accessing the internet for health information on mobile devices than ever before (Madden et al., 2013). It makes sense to incorporate access to reliable tobacco use prevention education in a way that is attractive for adolescents.

Mobile applications are attractive and interactive computer programs that are chosen by the user to use on a mobile phone, tablet, or pad. There are thousands of medical or health related mobile applications available in the iTunes market via the internet. Some mobile applications are free while others can cost more than one hundred dollars. Mobile applications have been designed to help users with a wide range of health topics, including stress management, diet, exercise, and chronic health problems. The major barriers for users of mobile applications for health information include concerns regarding security, and accuracy and legitimacy of the information provided (Fisher & Clayton, 2012; Dennison, Morrison, Conway, & Yardley, 2013). In fact, an evaluation of 47 smoking cessation mobile applications found that very few adhered to established guidelines for smoking cessation (Abroms, Padmanabhan, Thaweethai, & Phillips, 2011). More rigorous research is needed to evaluate existing and new mobile applications for smoking cessation and prevention. Valdivieso-Lopez et al. (2013) plan to evaluate the efficacy of a mobile application for smoking cessation in young adults. No study has assessed the efficacy of mobile smoking cessation applications in adolescents.

This article describes a pilot study to determine the acceptability of the Tobacco Free Teens mobile application by adolescents. This mobile application has the potential to be used by school nurses, teachers, parents, peers and other health care providers to provide evidence based interventions to decrease smoking in adolescents.

Methods

Application of the Transtheoretical Model

The mobile application evaluated in this pilot study is based on the transtheoretical model (TTM). TTM focuses specific interventions on the subject's readiness to change their behavior (Prochaska & Velicer, 1997). The model stipulates that a person will change their behavior as

they progress through six stages. The first stage is precontemplation where the individual has not realized that they need to make a change. In the next stage, contemplation, the individual is aware that a change in their behavior would be beneficial. In the stage of preparation the individual makes a plan to change their behavior. The action stage finds the individual actually changing their behavior, which will improve their health. Finally, in the maintenance stage the individual has successfully maintained their new health behavior for six months. For example, if a nurse planned an intervention for a patient who did not know that they were obese, the nurse would not start by providing a list of suggested exercises. This patient is in the pre-contemplation stage; therefore the nurse would begin the intervention with education regarding the ideal body mass index for that patient and how this will affect their health.

Description of the Intervention Components

Tobacco Free Teens is a mobile application developed by Alexander Prokhorov, MD, PhD at MD Anderson Cancer Center in Texas. The mobile application is available at no cost from the Apple iTunes Market. The content of the mobile application is based on Dr. Prokhorov's work with ASPIRE which is an interactive, multimedia smoking prevention and cessation curriculum (Prokhorov et al., 2008). ASPIRE was shown to be effective in preventing smoking initiation at 18-month follow up and showed partial evidence to increase smoking cessation when tested in high school students. The ASPIRE curriculum contains 5 CD-ROM based sessions and two booster sessions based on TTM. Participants initiate the computer based session by logging in and answering questions to identify their stage of change. The program takes the participant to stage-appropriate interventions in each module. The tailored educational content includes interactive games, quizzes and feedback. Each of the modules contains a role

model that the subject can relate to. On completion of the program the student participant is provided with information regarding internet, walk-in and telephone tobacco resources.

The Tobacco Free Teens mobile application closely resembles the same content but takes less time to complete. The mobile application has bright and attractive graphics with modern background music. Once the adolescent downloads the mobile application, they answer a question about their smoking status which reflects their stage of change. Next the adolescent is introduced to the peer mentors. After working through important stage related content, the user will take quizzes, and play fun and informative games.

Pilot Testing

This program evaluation used a cross-sectional descriptive design to examine adolescents' satisfaction with the Tobacco Free Teens mobile application. The thirty-two participants were adolescents, 12 to 18 years of age, living in Kentucky. They were recruited using a convenience and snowball sampling technique. Inclusion criteria required participants to provide written parental consent, and be able to read, speak, and write in English.

Procedures

During one week in February of 2014, adolescents known by the primary researcher were invited to participate in a research study to evaluate a mobile application focused on teen smoking. Interested participants were given a parental consent form explaining the study. When the signed parental consent form was returned, then the primary researcher sent an email inviting participants to the study. The email contained information on how to download the Tobacco Free Teens mobile application from the iTunes market onto their mobile devices. Participants were instructed to work through the mobile application. Then students read an electronic assent form and were provided a link to an on-line survey. By entering the survey subjects gave their assent.

The survey data were collected and stored by REDCap, a secure, on-line survey and data program; which was protected behind the University of Kentucky College of Pharmacy firewall. All procedures were approved by the University of Kentucky Institutional Review Board.

Measures

Demographic variables consisted of participants gender (male vs female), age (in years), ethnicity (white nonhispanic, black nonhispanic, other), and smoking status (never smoker, former smoker, current smoker). A modified Client Satisfaction Questionnaire (CSQ-8) was used to evaluate the adolescents' satisfaction with the Tobacco Free Teens mobile application. The CSQ-8 is a self-administered questionnaire based on a 4 point Likert scale. Subject responses are coded 1-4 with a response range of 8 to 32. The eight questions address: quality of service, kind of service, needs met, recommendation to a peer, amount of help, coping with problems, overall satisfaction, and re-use potential. It is a reliable measure with an internal consistency Cronbach's alpha of 0.92-0.93 (Nguyen, Attkisson, & Stegner, 1983). An additional question was added which addressed the subject's satisfaction with accessing the Tobacco Free Teens mobile application on their mobile device. All nine questions for analysis were collapsed into two categories each. For example, question four asked participants how likely they would be to recommend the Tobacco Free Teens mobile application to a friend in need of help. The answers of yes, definitely and yes, generally were collapsed into one response and given a value of 2. The answers of no, not really and definitely no were collapsed into one response and given the value of 1.

Results

Sample Characteristics

The sample which was an average age of 15 years, was mostly female (65.6%), Caucasian (84.4%), and had never smoked (see Table 2). Although girls were older than boys (15.2 years vs. 14.6years), these variations were not statistically different. There were no other differences between boys and girls in demographic variables.

Evaluation of the Tobacco Free Teens

To evaluate the Tobacco Free Teens mobile application, a modified version of the CSQ-8 was used. The mean satisfaction score was 24.3 (sd=4.1). There were significant gender differences in specific evaluation questions related to the Tobacco Free Teens mobile application (see Table 3). Specifically, girls were more likely to report that they found the quality of the Tobacco Free Teens mobile application as good/excellent (85.7% vs. 45.5%, $p=.035$), were more satisfied with the amount of help that they received (85.7% vs. 45.5%, $p=.035$), and that the mobile application had helped them with their problems (90.5% vs. 54.5%, $p=.032$). Girls were more likely to be satisfied with the Tobacco Free Teens mobile application as compared to boys (mean=25.6 vs. mean=21.8, $p=.011$, see Figure 1).

Discussion

Both boys and girls were generally satisfied with the Tobacco Free Teens mobile application; however, it had greater appeal to girls than boys. This is an interesting finding, because boys are more likely to smoke than girls (CDC, 2012). Perhaps future updates to this mobile application should include features that are more appealing to boys. One could speculate that girls were drawn to the bright colors and music in the application more than the boys. Bouca (2012) looked at gender homogeneity with the Angry Birds mobile application. It also has bright colors and music. She found that users, both boys and girls, played the game with similar focus,

frequency and situations; and labeled the Angry Birds mobile application a-gendered. Therefore, it may be unlikely that the Tobacco Free Teens mobile application appealed more to girls than to boys based on the colors and music alone.

The Tobacco Free Teens mobile application was found to be satisfactory to the 32 subjects in this pilot study. This mobile application is another potential tool to decrease adolescent tobacco use. Adolescents may be more inclined to experiment with a mobile application than ask an adult or read a pamphlet about smoking. Mobile applications can place useful health information in the hands of today's youth. This pilot study offers valuable information regarding the use of mobile applications to decrease adolescent tobacco use.

Limitations and Recommendations

Limitations for this pilot study include utilization of a convenience sample with relatively low numbers. Although this study addressed subject satisfaction, the next step should include focus groups to gain insight to the adolescents' reasons for their answers, particularly what the boys didn't like about the mobile application. This was a cross-sectional study which only addressed subject satisfaction with the app. Future research should include a randomized, controlled trial over 18 months to test for effectiveness in smoking prevention and cessation.

Implications for School Nursing Practice

The Tobacco Free Teens mobile application contains many of the characteristics of effective tobacco interventions for adolescents. This mobile application is free in the iTunes internet market, can be accessed any time, in any location where there is internet access, and provides anonymity, thus eliminating many barriers to school-based tobacco use prevention programs. School nurses may consider using this valuable mobile application when they learn that a student is smoking, if a student asks for help to quit smoking, or if a student is facing

discipline for having tobacco products on school grounds. School nurses can recommend this mobile application to counselors, teachers and parents as a reliable resource for adolescent smoking education and prevention. The Tobacco Free Teens mobile application is also a great way to introduce students to the concept of smoking prevention. Using a mobile application is a fun, and acceptable vehicle to introduce sensitive topics like substance abuse to adolescents.

References

- Abroms, L. C., Padmanabhan, N., Thaweethai, L., & Phillips, T. (2011). iPhone apps for smoking cessation: A content analysis. *American Journal of Preventive Medicine, 40*(3), 279-285. doi: 10.1016/j.amepre.2010.10.032
- Bouca, M. (2012, June). Angry birds, uncommitted players. Paper presented at DiGRA Nordic 2012 Conference: Local and Global-Games in Culture and Society. Tampere, Finland. Retrieved from <http://www.digra.org/wp-content/uploads/digital-library/12168.54008.pdf>
- Centers for Disease Control and Prevention. (2011, September 11). Vital signs: Current cigarette smoking among adults aged > 18 years---United States 2005-2010. *MMWR. Morbidity and Mortality Weekly Reports, 60*(35), 1207-1212. Retrieved from http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6035a5.htm?s_cid=mm6-35a5_w
- Chen, Y-F., Madan, J., Welton, N., Yahaya, I., Aveyard, P., Bauld, L.,...& Munafo, M. R. (2012). Effectiveness and cost-effectiveness of computer and other electronic aids for smoking cessation: A systematic review and network meta-analysis. *Health Technology Assessment, 16*(38), 1-205. doi:10.3310/hta16380
- Civiljak, M., Sheikh, A., Stead, L F., & Car, J. (2012). Internet-based interventions for smoking cessation. *Cochrane Database of Systematic Reviews, 9*. doi:10.1002/14651858.CD007078.pub3
- Dennison, L., Morrison, L., Conway, G., & Yardley, L. (2013). Opportunities and challenges for smartphone applications in supporting health behavior change: Qualitative study. *Journal of Medical Internet Research, 15*(4). doi: 10.2196/jmir.2583

- Dobbins, M., DeCorby, K., Manske, S., & Goldblatt, E. (2008). Effective practices for school-based tobacco use prevention. *Preventive Medicine, 46*, 289-297. doi:10.1016/j.ypmed.2007.10.003
- Fisher, J., & Clayton, M. (2012). Who gives a tweet: Assessing patients' interest in the use of social media for health care. *Worldviews on Evidence-Based Nursing, (2)*, 100-108. doi: 10.1111/j.1741-6787.2012.00243.x
- Flay, B. R. (2009). School-based smoking prevention programs with the promise of long-term effects. *Tobacco Induced Diseases 5*(6), 1-18. doi 10.1186/1617-9625-5-6
- Fritz, D, J., Gore, P. A., Hardin, S. B. & Bram, D. (2008). A computerized smoking cessation intervention for high school smokers. *Pediatric Nursing, 34*(1), 13-17.
- Fritz, D. J., Wider, L. C., Hardin, S. B., & Horrocks, M. (2008). Program strategies for adolescent smoking cessation. *The Journal of School Nursing, 24*(1), 21-27
- Hamilton, G., O'Connell, M., & Cross, D. (2004). Adolescent smoking cessation: Development of a school nurse intervention. *The Journal of School Nursing, 20*(3), 169-174.
- Kealey, K. A., Ludman, E. J., Marek, P. M., Mann, S. L., Bricker, J. B., & Peterson, A. V. (2009). Design and implementation of an effective telephone counseling intervention for adolescent smoking cessation. *Journal of National Cancer Institute, 101*(20), 1393-1405. doi:10.1093/jnci/djp318
- Latimer, A. E., Krishnan-Sarin, S., Cavallo, D. A., Duhig, A., Salovey, P., & O'Malley, S. A. (2012). Targeted smoking cessation messages for adolescents. *Journal of Adolescent Health, 50*, 47-53. doi:10.1016/j.jadohealth.2011.04.013

- Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (March 13, 2013). *Teens and Technology 2013. Pew Research Internet Project*. Retrieved from <http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/>
- MacDonald, S., & Rothwell, H., Moore, L. (2007). Getting it right: Designing adolescent-centered smoking cessation services. *Addiction, 102*, 1147-1150.
doi:10.1111/j.1360-0443.2007.01851.x
- Nguyen, T. D., Attkisson, C. C., & Stegner, B. L. (1983). Assessment of patient satisfaction: Development and refinement of a service evaluation questionnaire. *Evaluation Program Planning, 6*(3), 299-313.
- Patten, C. A., Croghan, I.T., Meis, T. M., Decker, P.A., Pingree, S., Colligan, R.C., Gustafson, D. H. (2006). Randomized clinical trial of an internet-based versus brief office intervention for adolescent smoking cessation. *Patient Education and Counseling, 64*, 249-258. doi:10.1016/j.pec.2006.03.001
- Pbert, L., Druker, S., DiFranza, J. R., Gorak, D., Reed, G., Magner, R., ... Osganian, S. (2011). Effectiveness of a school nurse-delivered smoking-cessation intervention for adolescents. *Pediatrics, 128*, 926-936. doi:10.1542/peds.2011-0520
- Peterson, A. V., Kealey, K. A., Mann, S. L., Marek, P. M., Ludman, E. J., Lu, J. & Bricker, J. B. (2009). Group-randomized trial of a proactive, personalized, telephone counseling intervention for adolescent smoking cessation. *Journal of National Cancer Institute, 101*(20), 1378-1392. doi:10.1093/jnci/djp317
- Prochaska, J. O., & Velicer, W. F. (1997). The Transtheoretical Model of health behavior change. *American Journal of Health Promotion, 12*(1), 38-48.

doi: 10.4278/0890-1171-12.1.38

Prokhorov, A. V., Kelder, S. H., Shegog, R., Murray, N., Peters, R., Agurcia-Parker, C.,... & Marani, S. (2008). Impact of a smoking prevention interactive experience (ASPIRE), an interactive, multimedia smoking prevention and cessation curriculum for culturally diverse high-school students. *Nicotine & Tobacco Research, 10*(9), 1477-1485.

doi:10.1080/14622200802323183

Shahab, L., & McEwen, A. (2009). Online support for smoking cessation: A systematic review of the literature. *Addiction, 104*, 1792-1804. doi:10.1111/j.1360-0443.2009.02710.x

Smart, K. A., Parker, R. S., Lampert, J. (2012). Speaking up: Teens voice their health information needs. *The Journal of School Nursing, 28*(5), 379-388. doi:

10.1177/1059840512450916

Thomas, R.E., McLellan, J., & Perera, R. (2013). School-based programmes for preventing smoking. *Cochrane Database of Systematic Reviews, 4*,

doi:10.1002/14651858.CD001293.pub3.

U.S. Department of Health and Human Services. (2012). *Preventing Tobacco Use Among Youth and Young Adults: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2012. Retrieved from http://www.cdc.gov/tobacco/data_statistics/sgr/2012/

U.S. Department of Health and Human Services. (2014). *Best Practice for Comprehensive Tobacco Control Programs-2014*. Atlanta, GA: U.S. Department of Health and Human

Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014.

Retrieved from http://www.cdc.gov/tobacco/stateandcommunity/best_practices/

Valdiviseo-Lopez, E., Flores-Mateo, G., Mokina-Gomez, J., Rey-Renones, C., Uriate, M.B., Duch, J., & Valverde, A. (2013). Efficacy of a mobile application for smoking cessation in young people: Study protocol for a clustered, randomized trial. *BMC Public Health*, 13. doi:10.1186/1471-2458-13-704

Whittaker, R., McRobbie, H., Bullen, C., Borland, R., Rodgers, A., & Gu, Y. (2012). Mobile phone based interventions for smoking cessation. *Cochrane Database of Systematic Reviews*, 11. doi: 10.1002/14651858.CD006611.pub3

Woodruff, S. I., Edwards, C. C., Conway, T. L. & Elliott, S. P. (2001). Pilot test of an internet virtual world chat room for rural teen smokers. *Journal of Adolescent Health*, 29(4), 239-243.

Table 2. Characteristics of Effective School-Based Tobacco Use Prevention Interventions

- Accessible.
 - Individually tailored.
 - Cost-effective.
 - Contain information on short and long term health effects.
 - Teaches refusal skills.
 - Teaches social influences and social acceptability.
 - Interactive and offers peer support.
 - Technology based with educator guidance.
 - Evaluation component
-

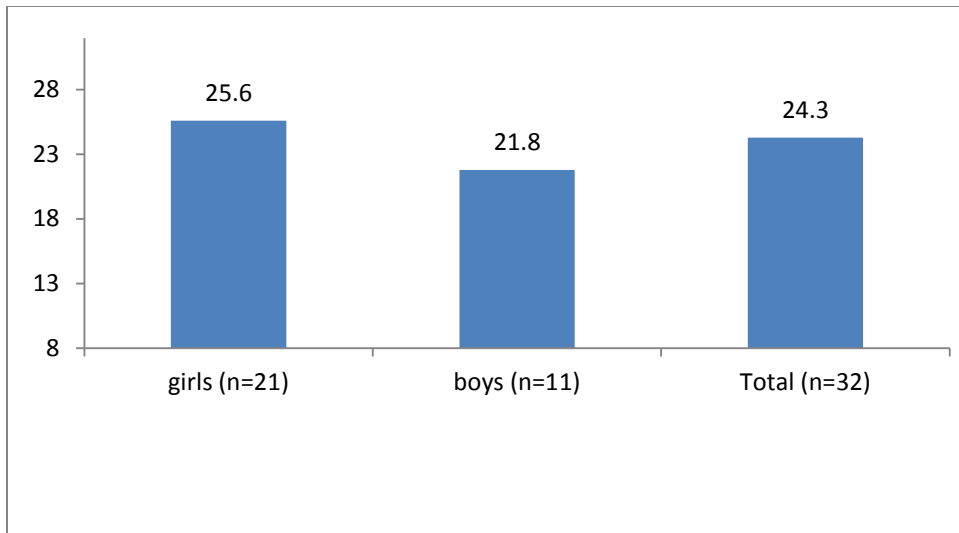
Table 3. Sample Characteristics (N=32)

Gender (n, %)	
Male	11 (34.4)
Female	21 (65.6)
Ethnicity (n, %)	
White, non-Hispanic	27 (84.4)
Black, non-Hispanic	3 (9.4)
Other	2 (6.3)
Age (Means. Standard Deviation)	15.0 (1.7)
Smoking status (n, %)	
Never smoked	30 (93.8)
Former smoker	1 (3.1)
Current smoker	1 (3.1)

Table 4. Differences in specific evaluation questions related to the “Tobacco Free Teens” mobile application by gender

	Total		Female		Male		Differences Chi-Square (df), p-value
	n	%	n	%	n	%	
Quality of tobacco free teens app							5.8(1), .035
Poor/Fair	9	28.1	3	14.3	6	54.5	
Good/Excellent	23	71.9	18	85.7	5	45.5	
Get the kind of help you wanted							1.5(1), .266
Definitely/Generally	29	90.6	20	95.2	9	81.8	
No/Definitely Not	3	9.4	1	4.8	2	18.2	
What extent app met your needs							4.29(1), .056
None/Few	10	31.3	4	19.0	6	54.5	
Most/Almost All	22	68.8	17	81.0	5	45.5	
Would you recommend app to friend							0.08(1), 1.0
Definitely/Generally	27	84.4	18	85.7	9	81.8	
Not Really/Definitely Not	5	15.6	3	14.3	2	18.2	
How satisfied with amount of help							5.8(1), .035
Very/Mostly Satisfied	23	71.9	18	85.7	5	45.5	
Indifferent/Quite Dissatisfied	9	28.1	3	14.3	6	54.5	
Has app helped with problems							5.5(1), .032
Worse/Not helped	7	21.9	2	9.5	5	45.5	
Some Help/Great	25	78.1	19	90.5	6	54.5	
Overall Satisfaction with app							0.0(1), 1.0
Quite Dissatisfied/Indifferent	12	37.5	8	38.1	4	36.4	
Mostly Satisfied/Very Satisfied	20	62.5	13	61.9	7	63.5	
Would you use the app again							2.1(1), .197
Definitely Yes/Generally	25	78.1	18	85.7	7	63.6	
Not Really/Definitely No	7	21.9	3	14.3	4	36.4	
Satisfaction with accessing the app on the mobile device							0.8(1), .390
Dissatisfied/Indifferent	6	18.8	3	14.3	3	27.3	
Mostly/Very dissatisfied	26	81.3	18	85.7	8	72.7	

Figure 1. Total Satisfaction Score with the “Tobacco Free Teens” Mobile Application



Conclusion

For the last 50 years tobacco use has placed a tremendous health and financial burden on Americans (HHS, 2014). Committed individuals and organizations from diverse professional disciplines have committed themselves to understanding and fighting the tobacco epidemic through evidence-based research. These efforts have produced a knowledge base that has resulted in a dramatic decrease in smoking rates, yet the problem of tobacco use remains. An important aspect of the tobacco epidemic is identifying the best methods to decrease adolescent tobacco use. Many school-based tobacco prevention interventions have been evaluated in the literature, however, the dynamic nature of adolescents require on-going evaluation of current and potential future interventions. Although mandatory tobacco education is not regulated in all states, schools continue to provide the best opportunity to reach this population. School nurses have a unique opportunity to impact adolescent tobacco use by identifying and implementing effective and cost-efficient tobacco education interventions. Since adolescents have mobile devices and are technologically advanced, mobile applications offer a potential avenue to provide tobacco use education. The Tobacco Free Teens mobile application was found to be generally acceptable to girls more than boys in a pilot study. Future research is needed to identify specific content that appeals equally to boys and girls and decreases tobacco use in the adolescent population.

Appendix A

Survey Questions

Demographics

1. Are you: Male _____ Female _____
2. How old are you? 12 13 14 15 16 17 18
3. What is your race/ethnicity?
White non-Hispanic
Black non-Hispanic
White Hispanic
Black Hispanic
Other
4. Please enter your other race/ethnicity in the space provided

Smoking: Adolescent Stages of Change (Short Form)

1. Are you currently a smoker?

Yes, I currently smoke
No, I quit within the last 6 months (ACTION STAGE)
No, I quit more than 6 months ago (MAINTENANCE STAGE)
No, I have never smoked (NONSMOKER)
2. (For smokers only) In the last year, how many times have you quit smoking for at least 24 hours?
3. (For smokers only) Are you seriously thinking of quitting smoking?

Acceptability of Program Delivery

1. How would you rate the quality of the app “Tobacco Free Teens”?

1. Poor
2. Fair
3. Good
4. Excellent

2. Did you get the kind of help you wanted from the app “Tobacco Free Teens”?

1. Yes, definitely
2. Yes, generally
3. No, not really
4. No, definitely not

3. To what extent did the app “Tobacco Free Teens” meet your needs?

1. None of my needs have been met
2. Only a few of my needs have been met
3. Most of my needs have been met
4. Almost all of my needs have been met

4. If a friend were in need of similar help, would you recommend the app “Tobacco Free Teens” to him or her?

1. Yes, definitely
2. Yes, generally
3. No, not really
4. No, definitely not

5. How satisfied are you with the amount of help you have received from the app “Tobacco Free Teens”?

1. Very satisfied
2. Mostly satisfied
3. Indifferent or mildly dissatisfied
4. Quite dissatisfied

6. Has the help you received from the app “Tobacco Free Teens” helped you to deal more effectively with your problems?

1. No, they seemed to make them worse.
2. No, they really didn’t help.
3. Yes, they helped somewhat.
4. Yes, they helped a great deal.

7. In an overall general sense, how satisfied are you with the app “Tobacco Free Teens”?

1. Quite dissatisfied
2. Indifferent or mildly dissatisfied
3. Mostly satisfied
4. Very satisfied

8. If you were to seek help again, would you use the app “Tobacco Free Teens” again?

1. Yes, definitely
2. Yes, generally
3. No, not really
4. No, definitely not

9. How satisfied were you with accessing the app “Tobacco Free Teens” on your mobile device?

1. Quite dissatisfied
2. Indifferent, or mildly dissatisfied
3. Mostly satisfied
4. Very satisfied

References

- Campaign for Tobacco Free Kids. (2014). *The toll of tobacco in Kentucky*. Retrieved from:
http://www.tobaccofreekids.org/facts_issues/toll_us/kentucky
- Campaign for Tobacco Free Kids. (2013). *How schools can help students stay tobacco-free*. Retrieved from: <http://www.tobaccofreekids.org/research/factsheets/pdf/0153.pdf>
- Kingdon, J. W. (2011). *Agendas, alternatives, and public policies*. Glenview, IL: Pearson Education, Inc.
- Madden, M., Lenhart, A., Duggan, M., Cortesi, S., & Gasser, U. (March 13, 2013). *Teens and Technology 2013. Pew Research Internet Project*. Retrieved from
<http://www.pewinternet.org/2013/03/13/teens-and-technology-2013/>
- Sebelius, K. (2014). *Message from Kathleen Sebelius* in U.S. Department of Health and Human Services. (2014). *The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Retrieved from:
<http://www.surgeongeneral.gov/library/reports/50-years-of-progress/exec-summary.pdf>
- U.S. Department of Health and Human Services. (2014). *The Health Consequences of Smoking-50 Years of Progress: A Report of the Surgeon General*. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2014. Retrieved from:

<http://www.surgeongeneral.gov/library/reports/50-years-of-progress/exec-summary.pdf>