TOWARD THE DEVELOPMENT OF A PHYSICIAN TRAINING CURRICULUM TO IMPROVE DISCUSSIONS ABOUT ELECTRONIC CIGARETTES WITH ADOLESCENT ATHLETE PATIENTS

by

Emily Bylund Peterson
A Dissertation Submitted to the Graduate Faculty of George Mason University in Partial Fulfillment of The Requirements for the Degree of Doctor of Philosophy Communication

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Date: ________________________________ Spring Semester 2016
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Toward The Development of a Physician Training Curriculum to Improve Discussions about Electronic Cigarettes with Adolescent Athlete Patients

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DEDICATION

This work is dedicated to my two beautiful children, Luke and Victoria. Being your mother is the greatest achievement and most important work of my life.
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ABSTRACT

TOWARD THE DEVELOPMENT OF A PHYSICIAN TRAINING CURRICULUM TO IMPROVE DISCUSSIONS ABOUT ELECTRONIC CIGARETTES WITH ADOLESCENT ATHLETE PATIENTS

Emily Bylund Peterson, Ph.D.
George Mason University, 2016
Dissertation Director: Dr. Xiaoquan Zhao

Electronic cigarettes – also known as e-cigarettes or electronic nicotine delivery systems (ENDS) – are battery-operated devices that dispense nicotine through vapors inhaled by the user. E-cigarette use, or “vaping,” has been rapidly increasing the in United States since its introduction to the market in 2008, especially among adolescents (Stimson, Thom, & Costall, 2014). While only 1-3% of high schoolers reported vaping in 2011, 13.4% reported vaping in 2014 – more than any other tobacco product (Arrazola et al., 2015). The potential harm of e-cigarettes for adolescents is two-fold. First, public health scholars are concerned that e-cigarette use may renormalize cigarette use among youth (Fairchild, Bayer, & Colgrove, 2013). Second, while marketed as a “healthy tobacco alternative,” e-cigarettes often contain nicotine and other hazardous substance which may be detrimental to health (Dwyer et al., 2009; Jensen, Luo, Pankow, Strongin, & Peyton, 2015). Primary healthcare providers (PHP) have played an important role in decreasing
the prevalence of other risky behaviors among adolescents, and also have the potential to decreasing vaping prevalence among this demographic (Merzel et al., 2004). Providers may have an especially strong influence on adolescent athletes, who both see their PHP more frequently than non-athletes and are also at higher risk of using alternative tobacco products (Woolf, Rimal, & Sripad, 2014). However, PHPs cite a lack of knowledge about e-cigarettes and insufficient efficacy for successfully initiating and managing discussions about e-cigarettes with patients (Pepper et al., 2014).

This dissertation consisted of three studies, unified in their goal to support the development of an on-line PHP training curriculum to provide the knowledge and tools to help providers effectively discuss e-cigarettes with their adolescent athlete patients. In Study 1, adolescent athletes (N = 448) completed a survey to determine the strongest determinants of e-cigarette use, grounded in Fishbein and Ajzen’s (2010) reasoned action approach. The survey also questioned athletes on their experiences and preferences for provideratient communication about tobacco products. In Study 2, PHPs (N = 25) completed one-on-one interviews to explore their knowledge, and beliefs about e-cigarettes, as well as their perceived barriers to e-cigarette clinical discussion. Finally, in Study 3, adolescent athletes (N = 25) participated in focus groups to pilot test potential messages and to further explore their perspectives and experiences with clinical interactions.
Results from Study 1 revealed that athletes’ positive health outcome beliefs, perceived approval from friends, and their estimation of peers who vape were all significantly associated with participants’ vaping behavior and intention. Additional motivations included trying new flavors and performing “vape tricks.” Almost all athletes reported that they had not discussed e-cigarettes with their PHPs, but reported wanting to talk to their PHPs most about discussing e-cigarettes’ relationship to their athletic performance and to tobacco cigarettes. Differences in age and risk groups were also found. In Study 2, provider cited lack of knowledge and time, feeling uncomfortable, and vague screening tools as barriers to e-cigarette discussion. Providers also discussed successful techniques to facilitate psychosocial counseling with teens. Study 3 revealed that messages about e-cigarettes were most successful when they aroused cognitive dissonance about the potential health effects of vaping, and/or evoked fear. Participants also reported they would be more likely to adhere to their PHP’s advice about vaping if they had an established clinical relationship, and felt their provider cared for them and was knowledgeable about e-cigarettes.

Content recommendations for an on-line training curriculum targeted to PHPs was developed based on the findings of these three studies. Modules for the proposed curriculum emphasize providing necessary background information on e-cigarettes, improving psychosocial counseling with adolescents, and adequately screening for e-cigarette use.
INTRODUCTION

One of the most well-researched and heavily funded areas in health communication focuses on tobacco prevention, control and cessation (US Department of Health and Human Services, 2014). Tobacco cigarette usage has been steadily declining in the United States, following decades of public health campaigns targeted toward adults (Durkin, Brennan, & Wakefield, 2012) and adolescents (Farrelly, Nonnemaker, Davis, & Hussin, 2009). Nationwide tobacco cigarette usage rates are now at an all time low, with 17% of adult Americans currently smoking, down from 21% in 2005 (Ahmed et al., 2015). Additionally, 9.2% of high school students reported smoking tobacco cigarettes in 2015, a decrease from 15.8% in 2011 (Arrazola et al., 2015). These declining usage rates are encouraging, given the well-documented and widely-known health consequences of smoking, such as cancer, respiratory and cardiovascular diseases, and reproductive complications (US Department of Health and Human Services, 2014). In particular, the fewer number of adolescent smokers is an important improvement, given the fact that most smokers initiate use before age 18 (Chassin, Presson, Pitts, & Sherman, 2000; Riggs, Chou, Li, & Pentz, 2007).

However, the tobacco problem is far from extinct. Alongside the decline of conventional smoking, a plethora of alternative tobacco products has thrived in the shifting public health landscape. Other tobacco products such as electronic cigarettes,
hookah, small cigars, and pipes have been quickly increasing in popularity, particularly among youth and young adults (Gilreath et al., in press). Little is known about the addictive qualities and true harm potential of these alternative products, or how they are used and modified among adolescents. In particular, electronic cigarette usage, commonly known as “vaping” (Oxford Dictionary, 2014) has quickly become a popular tobacco product of choice in America and abroad (Stimson, Thom, & Costall, 2014).

E-cigarettes are battery-operated devices designed to mimic the look and feel of tobacco cigarettes. The quality, cost, and ingredients of e-cigarettes and associated solutions vary greatly. Public health officials have expressed concern over e-cigarettes for two main reasons. First, the relationship between e-cigarettes and tobacco cigarettes is unclear. While many view e-cigarettes as a way to quit smoking, they have not be found to be more effective than the patch with short-term or long-term cessation in adults (Bullen et al., 2013). Also, some teens who vape have either never smoked tobacco cigarettes (Carroll Chapman & Wu, 2014) or engage in e-cigarette/tobacco cigarette dual usage with no intention to quit smoking (Cardenas et al., 2016). A related concern is that e-cigarettes may renormalize tobacco cigarette smoking, which has become increasingly stigmatized in recent years through public smoking bans and public health campaigns (Fairchild, Bayer, & Colgrove, 2013).

Second, and independent to its relationship with cigarettes, e-cigarettes are not entirely harmless devices, particularly for adolescents. Most e-cigarette solutions still contain nicotine – up to 50% more than declared on the package (Callahan-Lyon, 2014) – which has both acute and chronic effects specific to adolescents’ growing brains (Dwyer
E-cigarettes have also been found to contain heavy metals, carcinogenic formaldehyde and acetaldehyde (Jensen, Luo, Pankow, Strongin, & Peyton, 2015). Reported complaints from e-cigarette users include hospitalization for pneumonia, congestive heart failure, seizure and disorientation (U. S. Food and Drug Administration, 2015). The labeling on e-cigarettes has also been found to be inconsistent, with one study finding as much as 50% more nicotine than what was declared (Callahan-Lyon, 2014).

Despite these concerns, e-cigarettes are becoming popular to the point that they have been described as a “disruptive innovation” in the tobacco industry, fundamentally challenging existing power relationship and conventional wisdom regarding the safety of tobacco products (Stimson et al., 2014). The United States is currently witnessing a meteoric rise of e-cigarettes usage among teens and young adults. Sales of e-cigarettes in the United States have doubled every year since 2009 and now are estimated to be over $1 billion (Robehmed, 2013), and stock analysts estimate that sales of e-cigarettes will outpace sales of conventional cigarettes within the next decade (Craver, 2013).

Questionable marketing techniques by electronic cigarette companies (Grana & Ling, 2014) combined with the lack of federal regulation and little long-term medical research has created a situation where adolescents are likely receiving misinformation about the safety of e-cigarettes from marketing efforts, without being corrected by medical professionals and other objective sources. Adolescents are quickly turning to vaping: the most recent National Youth Tobacco Survey found that teens use e-cigarettes more often than any other tobacco product, including cigarettes (Arrazola et al., 2015). Teens who participate in organized sports may be at an even higher risk of e-cigarette
use. Adolescent athletes are less likely to smoke tobacco cigarettes, but more likely to use other tobacco products (e.g., smokeless tobacco) than their non-athlete counterparts. As e-cigarettes are now the most common alternative tobacco product for adolescents, there is a need to study athletic athletes’ specific knowledge, attitudes and beliefs about e-cigarettes.

Past research has suggested that physicians can play a key role in deterring adolescents’ risky behavior such as sexual health (Merzel et al., 2004), alcohol and tobacco use (Hum, Robinson, Jackson, & Ali, 2011). Despite the opportunity that physicians have to discuss the risks and facts about e-cigarette use, the majority of physicians have reported that they do not discuss vaping with patients (Pepper, Gilkey, & Brewer, 2015; Pepper, McRee, & Gilkey, 2014).

To unlock the potential that physicians have in this context, more research needs to be done to assess the reasons why adolescents vape, what is preventing primary care providers from initiating e-cigarette conversations with teens, and what messages will be most effective for the adolescent population. Adolescent athletes are an appropriate population to study in this context, both because they may be at increased risk of using alternative tobacco products and because they interact with physicians on a more regular basis than most teens do, due to required annual sports physicals and check-ups.

In this dissertation, the term adolescent is used to describe individuals that are 13-19 years old, consistent with previous definitions and classifications (Erikson, 1985). As this dissertation takes a developmental life-span approach, distinctions will be made throughout the studies to understand the unique behaviors, beliefs and preferences of
different segments of this developmental arc, including young adolescents (ages 13-15), middle adolescents (ages 16-17) and late adolescents (ages 18-19).

The overall goal of this dissertation was to understand adolescent and provider perspectives through an adolescent surveys and physician one-on-one interviews to develop e-cigarettes messages that would be presented in a clinical interaction. These messages were then pilot tested with adolescent athletes. More specifically, the aims of the dissertation are to:

**Aim 1.** Assess e-cigarette-related attitudes, beliefs and motivations of adolescent athletes who are either currently vaping or at risk for vaping.

**Aim 2.** Evaluate adolescent athletes’ clinical communication experiences and preferences about e-cigarettes and other tobacco products.

**Aim 3.** Assess the levels of e-cigarette knowledge and efficacy among primary health care providers that care for an adolescent population – including pediatricians, family care physicians and nurse practitioners.

**Aim 4.** Develop initial recommendations for an on-line training curriculum, which will assist physicians in initiating and facilitating e-cigarette discussions with adolescent athletes, pilot-test proposed main talking points with adolescent athletes and propose final content recommendations.

With these aims in mind, this dissertation was carried out in three sequential studies, with each study building on the previous data. In Study 1, I conducted a survey of 448 adolescent athletes in the Washington DC metropolitan area. The items on the questionnaires focused primarily on three key areas: (1) uses and motivations of e-
cigarette use, (2) interest and preferences discussing vaping with physicians, and (3) knowledge and beliefs about e-cigarettes. Study 2 consisted of in-depth one-on-one interviews with 25 physicians, pediatricians and other primary care providers who regularly engage in psychosocial counseling with adolescents. These discussions were focused on understanding physicians’ levels of knowledge and efficacy discussing e-cigarettes, as well as their response to the findings from Study 1 data collection.

After the completion of Study 2 analysis, I create a series of potential messages that could be used in a physician-delivered intervention, drawing heavily from the results from Study 1 and Study 2, as well as the integrated model of behavioral change and prediction (Fishbein, 1992). Study 3 consisted of a series of focus groups with middle and late adolescents (ages 16-19), to pilot test these messages and create a refined list of best messages to be used in the intervention recommendations. The dissertation concludes with a general discussion further connecting the findings from the three phases of data collection and presenting recommendations for the development and implementation of a provider training curriculum about e-cigarettes.
REVIEW OF THE LITERATURE

As with any public health issue, before assessing the net effect of electronic cigarettes on population health, it is important to first understand what e-cigarettes are, who is using them, and why they are using them. The first major section of the literature review will provide relevant background information, explore extant research on vaping risk and toxicity, analyze the regulation and marketing of e-cigarettes, and finally describe the current vaping behaviors of adolescents and young adults. I will then turn to the integrated model (Fishbein, 1992) to evaluate adolescent risky behavior using a developmental approach. The second section of the review will then turn to explaining the vital role that providers can play in shaping adolescent risky behaviors and about e-cigarettes. It will also review the efficacy of provider training to improve clinical outcomes.

Electronic Cigarettes: An Introduction

Electronic nicotine delivery systems (ENDS), more commonly known as electronic cigarettes or e-cigarettes, are battery-operated devices that dispense nicotine through vapors inhaled by the user. The design and feel of e-cigarettes was developed to mimic the use of conventional tobacco cigarettes (Hildick-Smith, 2015). E-cigarettes generally contain three main components: an electronic heating element, a battery, and a fluid cartridge where users can refill solutions of varying flavors. The device is activated
when the heating element is turned on which subsequently aerosolizes the solution in the device, sending it to the lungs. Solutions that can be used with e-cigarettes vary greatly in flavor type, nicotine content, and solution base. Typically, the solution contains propylene glycol (PV) or vegetable glycerin (VG) which, when heated, creates the well-known smoke-like appearance created to mimic the look and feel of tobacco cigarettes.

There are significant differences in the amount of nicotine found in e-cigarette solutions. Reviews have found nicotine levels ranging from 0 to 36 mg/mL (Djordjevic, Stellman, & Zang, 2000; Farsalinos, Romagna, Tsiapras, Kyrzopoulos, & Voudris, 2013; Goniewicz, Kuma, Gawron, Knysak, & Kosmider, 2013; Schroeder & Hoffman, 2014; Talih et al., 2015), which is enough to maintain nicotine dependence (Schroeder & Hoffman, 2014). To make the taste and experience of e-cigarette more appealing to users, flavoring is often added to the solution. Some flavors seem to closely imitate conventional cigarettes such as tobacco, coffee and mint. Reminiscent of early tobacco cigarette marketing, many other flavors have a distinct youth appeal, including cotton candy, Kool-Aid, Hawaiian Punch, and gummy bears (Bach, 2016). These refill solutions are typically sold in 15-30 mL dropper bottles and range from $0.50-$1.00 per mL (Hildick-Smith et al., 2015). Figure 1 displays several types of common e-cigarette solutions.
There are three main types of electronic cigarettes found in the market today. The first option is the so-called “ciga-like” (Figure 2a). As the name suggests, these devices are made to imitate cigarettes as much as possible with a very similar look, feel and size. Ciga-likes even have the same filter pattern of cigarettes and the LED tip lights up red when activated. Disposable ciga-likes run about $10 while reusable versions cost $15-30. The second type, Vape pens (also known as eGos) are somewhat larger than ciga-likes, with hotter, more powerful batteries and larger fluid cartridges (Figure 2b). Vape pens have more features than ciga-likes and also allow for more user customization, such as variable voltage and replaceable tanks and atomizers. These pens typically cost between $50-100.

The third major type of e-cigarettes are advanced personal vaporizers, also known as “mods” or AVPs (Figure 2c). These devices allow for even more customization and
modifications, and have the power to create sizeable aerosol production. AVP users frequently manipulate the large amounts of vapor with their mouths and lips to make smoke rings and other “vape tricks.” As these devices are the most powerful, they can be expensive – typically ranging from $120-200.

The many types of electronic cigarettes and solutions vary considerably in both nicotine content, ability to heat and quality of ingredients. Because of this, accurately determining the safety and health risks of these products is complicated and difficult. The following section will explore the potential health consequences of electronic cigarettes and detail the obstacles that public health officials and scholars face in accurately determining the risks of vaping.

Figure 2. Three types of electronic cigarettes. (A) A reusable e-cigarette, known as a “ciga-like.” (B) A vape pen or eGo. (C) A mod or advanced personal vaporizer (Hildick-Smith, 2015).
**Risk and Toxicity of Electronic Cigarettes.** Commercial e-cigarettes have been available for purchase for less than a decade, so research on e-cigarettes generally – and its potential effects on adolescents specifically – is growing but still relatively light. In addition to the disclosed ingredients found on electronic cigarette packs (e.g., PV/VG, flavoring, and nicotine), chemists have also commonly found undisclosed harmful ingredients in e-cigarettes such as heavy metals, tobacco-specific nitrosamines (Pisinger & Døssing, 2014), and carcinogenic formaldehyde and acetaldehyde (Jensen et al., 2015), particularly when the element is heated at high-voltage levels (Kosmider et al., 2014). The chemicals used in some of the flavorings are also known to be hazardous to health, such diacetyl and acetyl propionyl used to create a buttery taste (Farsalinos, Kistler, Gillman, & Voudris, 2015).

However, it is the nicotine contained in e-cigarettes that may pose one of the most serious health consequences of e-cigarettes, particularly for adolescents. Research has posited that nicotine has both acute and chronic deleterious effects specific to adolescents’ growing brains (Dwyer et al., 2012). More research is needed to further understand how e-cigarettes affect teens’ growing bodies, although such research is hindered by the fact that different brands of e-cigarettes differ greatly in the amount of nicotine inhaled by the user (Goniewicz et al., 2013). The labeling of electronic-cigarettes is also often inaccurate, with e-cigarettes containing as much as 50% more nicotine than declared on the package (Callahan-Lyon, 2014). Many e-cigarettes are even inconsistent within itself, delivering vastly different levels of nicotine with each use (Goniewicz et al., 2013), and e-cigarettes that claim to be nicotine-free often do contain nicotine (Pisinger
These inconsistencies make it virtually impossible to accurately identify or control the actual amount of nicotine consumption inhaled by the user. This is of particular concern with an adolescent and young adult population, as these age groups display more sensitivity to nicotine and are more likely than adults to become addicted to nicotine, even at lower levels (Lydon, Wilson, Child, & Geier, 2014).

Various short-term and long-term health effects have been reported from e-cigarette users (Table 1). These complaints may be reported directly to the FDA, or discussed in electronic-cigarette online forums. Reported complaints occurred most often in the mouth and throat, followed by the respiratory, neurological, sensory, and digestive systems (Hua, Alfi, & Talbot, 2013). Among the more serious reports of negative electronic cigarette effects include hospitalization for pneumonia, congestive heart failure, seizure, and disorientation (U. S. Food and Drug Administration, 2015a).

Table 1.

<table>
<thead>
<tr>
<th>Reported Short-Term and Long-Term Health Effects of Vaping.</th>
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<td><strong>Short-Term Health Effects</strong></td>
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<td>Metallic aftertaste</td>
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<td>Choking</td>
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<td>Coughing</td>
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<td>Sneezing</td>
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<td>Nausea</td>
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<td>Dizziness</td>
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<td>Confusion</td>
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<td>Hypotension</td>
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While many of the health effects for electronic cigarettes are less severe than those of tobacco cigarettes, e-cigarettes appear to be far from the harmless devices that many users perceive them to be, particularly when they contain nicotine. It is also important to note that accurate long-term consequences of vaping cannot be determined until the products have been on the market long enough for more in-depth reporting and longitudinal evaluation.

**Electronic Cigarette Marketing & Adolescent Use Rates.** Electronic cigarettes were originally created as a smoking cessation tool, such as with the so-called “ciga-like” versions of the product. These first e-cigarettes hit the US market in 2007, and since then there has been limited regulation of its sales and marketing. In 2009, soon after e-cigarettes were introduced in the United States, the FDA attempted to block the importation of e-cigarettes after determining that they were “unapproved drug/device combination products.” The FDA was subsequently sued, and the U.S. Court of Appeals ruled that e-cigarettes do not fall under the Tobacco Control Act so long as they are not marketed for therapeutic devices. The FDA has proposed extending its authority to include regulation of e-cigarettes, which would allow the agency to “use powerful regulatory tools, such as age restrictions and rigorous scientific review of new tobacco products and claims to reduce tobacco-related disease and death” (U. S. Food and Drug Administration, 2015b). However, promotion and sales of e-cigarettes are not currently regulated or restricted by the FDA, leading to potential misunderstanding and misuse of the product. Indeed, there is mounting evidence that the health-based claims of e-cigarette companies are problematic and misleading.
Because of the current lack of federal regulation, e-cigarette marketing often contains messages and claims that are unsupported by scientific research. A content analysis of e-cigarette retail Web sites found that e-cigarettes are commonly marketed online as a healthier and cheaper alternative to cigarettes, and that nearly two-thirds of sites had a smoking cessation-related claim (Grana and Ling, 2014). These official marketing messages have been echoed through social networking sites, both by e-cigarette companies and increasingly by individual users (McKee, 2014). A common health claim found in e-cigarette marketing and on-line discussion is that e-cigarettes are healthy as they contain only “healthy” ingredients of water, water, glycerin, propylene glycol, nicotine and flavoring (Harris, 2014).

E-cigarettes are commonly advertised as tobacco cessation tools, and adult usage frequently follows in accordance with its intended use. In the adult population, the group most likely to try and regularly use e-cigarettes were those attempting to quit smoking or former smokers (Carroll Chapman & Wu, 2014). A randomized trial with adults found e-cigarettes to be equally effective as nicotine patches in its effectiveness as a short-term smoking cessation tool, but significantly more participants continued to use e-cigarettes (29%) after six months than patch users (8%), which suggests that e-cigarettes may not be as effective as the patch with long-term with total cessation (Bullen et al., 2013).

Even with e-cigarettes’ modest effectiveness as a smoking cessation tool, research has suggested that the use of e-cigarettes is not primarily motivated by a desire to quit smoking for many teens and young adults, a quickly growing market segment for e-cigarettes (Cardenas et al., 2016; Saddleson et al., 2016). Also, Korean (Lee, Grana, &
Glantz, 2014) and American teens (Cardenas et al., 2016) have reported engaging in “dual use,” or simultaneously using e-cigarettes and conventional cigarettes without an intention to quit conventional cigarettes.

Adolescents’ use of e-cigarettes has been increasing at a rapid rate. In the past few years, e-cigarettes have been consistently gaining popularity and social acceptance in middle schools and high schools across America. Although rates vary, the percentage of adolescents that had ever tried e-cigarettes increased from 1-3% in 2011 to 6.8% in 2012 (with 10% of high school students reporting ever-use in 2012) (Corey et al., 2013). In 2014, 13.4% of high school students reported using e-cigarettes, officially making it the most popular tobacco product being used among American youths (Arrazola, et al., 2015). Young vapers may also experiment with e-cigarettes outside of their intended and legal purpose. For example, some young adult e-cigarette users used the device for substances beyond nicotine, such as to deliver cannabis and alcohol (Etter & Bullen, 2011). More research is needed to determine if younger adolescents similarly experiment with the devices, as well as how alternative uses affect the toxicity of the product. Other unintentional uses, such as exposure to the skin or accidental ingestion could be fatal (Durmowicz, 2014).

With these risks in mind, there appears to be a disconnect between the perceived health risks of e-cigarette usage among teens, and the growing evidence for potential health consequences of vaping. The next section will explore adolescents’ behaviors and beliefs from a developmental perspective.
Understanding the Adolescent Athlete

Throughout history, adolescence has been a turbulent period of human development, characterized by a “heightened potential for recklessness” (Arnett, 1992, p. 339). The data about risk-taking are clear – nearly every risky behavior from drug use to unsafe sex to seatbelt use tend to peak during this phase of life (Eaton et al., 2012). This section of the literature review will define and explore the characteristics of adolescence, review a neurobiological developmental model that attempts to explain increased risk-taking during adolescence, utilize the integrated model to explore teens’ smoking behaviors, and profile the unique characteristics and risks of adolescents involved with organized sports teams.

A definition or age range for adolescence varies considerably in developmental and psychology research, with common definitions ranging from “the onset of puberty to early 20s” (Arnett, 1992), the “second decade of life” (Lerner & Steinberg, 2004), “initial changes of puberty to high school graduation” (Arnett, 2012, p. 225) and 12-19 years old (Erikson, 1985). In the end, any specific age range is somewhat arbitrary. Because life-span developmental psychology recognizes behavioral development as a continually-changing life-long process (Baltes, 1987), there is not a clear cut-off point where one developmental period ends and another begins. Instead, the lines between these periods are fuzzy, and are often affected by cultural, religious or other factors.

In this research I define adolescence as the teen years, extending from ages 13-19. The older end of this selected age range, which I call late adolescence (18-19) is a noteworthy period where teens begin the transition to young adulthood.
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transition age from adolescent to young adult varies. To compare two prominent lines of research, Arnett’s (2000) work suggests that adolescents begin transitioning to “emerging adulthood” at age 18, while Erikson (1985) categorizes the transition to “early adulthood” as occurring somewhat later, at age 20.

As noted earlier, developmental scholars stress that developmental features are “entered and exited not discretely but gradually” (Arnett, 2007, p. 69) and Arnett’s configuration of how emerging adulthood can be viewed in the life course (Figure 3) highlights the gradual passage from one developmental period to the next. From this viewpoint, the early stages of emerging adulthood overlaps considerably with the late stages of adolescence. In this research, I classify participants aged 18-19 as “late adolescents,” to denote this “overlapping” period of transition out of adolescence and into emerging adulthood.

Because participants in this age range are straddled between the adolescence and young adult developmental periods, they may exhibit cognitive and developmental characteristics that differ from their younger adolescent peers. Arnett’s seminal work on emerging adulthood highlights some of these changes, including greater parental freedom, accepting more responsibility for oneself and becoming financially independent (Arnett, 2007).
In general, tobacco behavior in the adolescent age range is of particular concern because it is when the majority of smoking initiation occurs. Most adult smokers report that they started smoking before age 18 (Chassin et al., 2000). It is clear that in order to reduce the life-long health burden of smoking, the teenage years are an important time to invest in intervention efforts (Strang, Chein, & Steinberg, 2013).

There are many contributing factors and theories as to why adolescent smoking behavior differs from adult smoking behavior. More pronounced peer and social pressures clearly contributes to increase in tobacco usage among adolescents, such as the behaviors and influence of friends (Mercken, Sleddens, de Vries, & Steglich, 2013) and parents/siblings (Kelly et al., 2011). Additionally, from a neurobiological developmental perspective, there are clear differences between the brain functioning of adolescents and adults. This in turn may lead to adolescents being more vulnerable to smoking initiation and addiction, including heightened approach motivation (Lydon et al., 2014).
Adolescent smokers also may have a stronger neurobiological response to smoking stimuli than adults (Do & Galván, 2016), and of particular importance to e-cigarettes, adolescents in animal studies exhibited increased sensitivities to nicotine rewarding effects and decreased sensitivities to the negative effects of nicotine (Shram & Lê, 2010). The smoking trajectory research that focuses on this developmental period of interest (middle adolescence to emerging adulthood) has corroborated animal research, suggesting that smoking as little as two cigarettes a week during adolescence is associated with nicotine dependence as an adult (Riggs et al., 2007).

The traditional explanation of adolescent behavior is that they cannot accurately evaluate the risks of their risky behaviors (e.g., Arnett, 1992), and that describing adolescent behavior as “decision making” is oxymoronic (Rivers, Reyna, & Mills, 2008). However, this has failed to be supported by research (Lydon et al., 2014). In fact, while there is some concern over the validity of adolescent responses in a “cold” context (i.e., answering questions in social settings that differ from real-life “hot” contexts of peer/social influence), some research has found that adolescents have often been found to be as rational as adults in their decision-making process (Reyna & Brainerd, 2011). The fuzzy-trace theory has been used to explain risk taking in adolescents, and it has been found that adolescents are able to quickly identify and reasonably respond to danger even when experiencing emotions (Reyna & Brainerd, 2011; Rivers et al., 2008). Thus, a reasoned action approach (Fishbein & Azen, 2010) is an appropriate lens from which to understand adolescent intentions and behavior regarding electronic cigarette usage, even though their decision-making process may differ from adults.
The Reasoned Action Approach to Decision Making

The integrative model is the latest iteration in a line of behavioral theories with the objective of identifying key determinants of behavior and behavior change, developed by Martin Fishbein and Icek Azjen. Nearly 50 years ago, Fishbein (1967) proposed the theory of reasoned action in an effort to better explain how attitudes are associated with intention and behavior. A key assumption to the theory of reasoned action (TRA) as well as the integrative model is that intention is the best predictor of behavior. That is, the most accurate way to understand why someone has or has not performed a behavior is to understand what they intend to do. This assumption has been widely tested and validated in various contexts (O'Keefe, 2002).

TRA posits that the best determinants of intention are one’s attitudes toward the behavior and normative beliefs about the behavior. Attitudes toward the behavior can be described as a function of salient beliefs about the act, which can further be described as a function of one’s beliefs about behavioral outcomes and evaluation of such outcomes. The second determinant of intention specified in the theory of reasoned action was normative beliefs. Injunctive norms are based on the expectations/support of salient others (such as parents, friends, teachers, peers). This type of norms is influenced by the individual’s motivation to comply with the referent (e.g., “how much I want to do what my friends think I should”). Another element of normative beliefs that was not
adequately captured in the initial development of theory of reasoned action is *descriptive norms*, which relate to one’s beliefs concerning what most people do (O'Keefe, 2002).

The integrated model includes one other crucial determinant of behavior, namely, self-efficacy (Ajzen, 1991). Efficacy is determined by beliefs about the presence or absence of (perceived) barriers to enacting the behavior, and it is weighted by the individual’s perceived power to facilitate/inhibit the behavior. This added construct emphasizes that volitional control is sometimes reduced. In these situations, attitudes and norms will not be enough to accurately predict intention. In situations where volitional control is high, however, the constructs put forward by theory of reasoned action (i.e. attitudes and normative beliefs) will be sufficient predictors of intention and behavior. The theory additionally posits that other factors outside of intention can directly affect behavior. Assuming intention is high, behavior is likely to occur if the person has acquired the necessary skills and has few if any environmental constraints. Other additional elements directly affecting behavior include if the person has performed the behavior previously (habit), and if the behavior is salient to the person.

Another important element of the integrative model is the inclusion of background variables into the model. The integrative model posits that while many other factors may influence intention, this influence is mediated by attitudes, norms and efficacy. For example, there are significant differences between men and women’s intention to perform many health behaviors. The integrative model posits that these differences do not influence intention *per se*, but through men and women having

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1 Ajzen named this determinant “perceived behavioral control,” but it is largely analogous to the concept of self-efficacy proposed by Bandura (1997).
different attitudes, normative beliefs and self-efficacy toward the behavior. *Figure 4* provides a graphic representation of the theory.
Figure 4. Elements of the integrative model.
**Relevant Application of Theory.** Given the limited data concerning the determinants of adolescent vaping behavior, understanding the determinants of related harmful behaviors, especially conventional cigarette initiation is useful. Studies using the reasoned action approach unsurprisingly point to intention as the strongest predictor of initiation (Van De Ven, Engels, Otten, & Van Den Eijnden, 2007).

A meta-analysis found that attitudinal beliefs were the strongest predictor for adolescents’ intention to abstain from smoking, but noted that the theory did not fully predict abstinence from cigarettes in an adolescent population (McEachan, Conner, Taylor, & Lawton, 2011). Consistent with the integrated model, many studies utilizing the reasoned action approach note that background predictors unrelated to smoking-related cognitions should not be overlooked. (Lazuras, Eiser, & Rodafinos, 2009; ter Doest, Dijkstra, Gebhardt, & Vitale, 2009; Wilkinson & Abraham, 2004). These include extraversion, socioeconomic status and past behavior (Wilkinson & Abraham, 2004) and self-esteem (Lazuras et al., 2009). Additionally, smoking-related cognitions explained significantly more variance in some specific groups of adolescents (e.g., asthmatic adolescents, Van De Ven et al., 2007) than others. One often overlooked group of adolescents that may have differing determinants of substance abuse are athletes that are actively involved in organized sports teams.
Health Risk Behaviors of Adolescent Athletes

While many specific demographics have been studied for smoking use and risk, there has been relatively little research on adolescent athletes specifically, and none using the integrative model or earlier iterations of the model. This relative lack of research on athletes may be due to the fact that they are generally not considered to be a high-risk group, due to their desire to remain fit and to maintain their athletic ability (Terry-McElrath, O'Malley, & Johnston, 2011). Indeed, most research has found participation in sports to be associated with lower risk of illegal drug and tobacco cigarette use. A recent quantitative review found that 14 of 15 studies documented an inverse relationship between athletics and tobacco smoking usage, and 9 of 16 studies found athletics to be protective against illicit drugs (e.g., cocaine, crack, heroin, LSD) (Lisha & Sussman, 2010).

However, the relationship between athletic identification and risk taking behaviors is more nuanced than it may initially appear. While athletes commonly work to maintain a fit and healthy body, a primary sport ethic commonly accepted by athletes is that “being an athlete involves accepting risks and playing through pain” (Hughes & Coakley, 1991, p. 309). In fact, athletes who do not “give up their bodies” by risking injury or playing while injured may be judged negatively by their coaches, teammates and fans (Messner, 1992). Because of this, athletes – particularly those that are involved with high-contact sports – may see their bodies as something that can be gambled with, and view this risk and pain as normative features that may affect their risky behaviors both on and off the playing field (Veliz et al., 2015).
This risk-oriented normative belief and culture that is inherent in some types of sports may be a contributing factor to substance abuse and other risky behaviors. For example, adolescent athletes who participated in high-contact sports, such as football or lacrosse, were more likely to smoke than athletes that participate in low-contact sports, such as tennis or swimming (Veliz, Schulenberg, Patrick, Kloska & McCabe, 2015), and athletes competing in both team and individual sports reported greater lifetime tobacco use compared to individual or team sports alone (Kulesza, Grossbard, Kilmer, Copeland, & Larimer, 2014).

Other research has found that young athletes are at unusually high risk for other risky behaviors such as alcohol consumption (Veliz, Boyd, & McCabe, 2015), steroid use or “doping” (Lisha & Sussman, 2010) and – most relevant to this research – alternative tobacco products. In particular, smokeless tobacco rates continues to have strong links to athletic status (Woolf, Rimal, & Sripad, 2014). From the period 2001-2013, while non-athlete use of smokeless tobacco stayed constant at 5.9%, athlete usage significantly increased from 10.0% to 11.1% (Agaku et al., 2015; Walsh, Ellison, Hilton, Chesney, & Ernster, 2000).

A federal report hypothesized that alternative tobacco products may be popular among athletes because they think of the products as being harmless and socially acceptable, perhaps with the potential to improve (or at least not hinder) their athletic performance (Agaku et al., 2015). Past research supports this, as many high school baseball players who used smokeless tobacco reported not knowing that nicotine was addictive and perceived no or little risk associated with chewing tobacco (Walsh et al.,
An additional concern is that alternative tobacco products are not subjected to the same marketing restrictions that tobacco cigarettes are, and they are often marketed to teens at live or televised sporting events (Carpenter, Connolly, Ayo-Yusuf, & Wayne, 2009). Because of the unique substance abuse risks of adolescent athletes, the Centers for Disease Control has called for tobacco education programs tailored specifically to high school athletes to increase awareness of the harmfulness of “all forms of tobacco products, irrespective of whether they are combustible, noncombustible, or electronic” (Agaku et al, 2015, p. 937 emphasis added).

Adolescent athletes typically consult with their health care providers on a more regular basis than non-athletes because of required sports clinics and yearly physical exams. Due to the increased contact and opportunities for preventive counseling, health care providers can provide key information to adolescent athletes regarding electronic cigarettes and other risky behaviors and provide tailored health education that adolescent athletes need. The following section will review primary care physician’s important role in educating these adolescents about e-cigarette and tobacco use and other risky behaviors.

**Primary Health Care Providers’ Role in Adolescent Tobacco Use and Cessation**

Health care providers may not be initially considered to be an important source of health information to teens and young adults, perhaps due to adolescents’ stereotypical reputation for ignoring authority figures. However, research has consistently suggested that adolescents listen to and trust their physician’s advice regarding a wide range of
risky behaviors, such as sexual health (Merzel et al., 2004) and alcohol use (Hum, Robinson, Jackson, & Ali, 2011).

Health care providers (HCPs) may be an especially important source of information for teen tobacco interventions. The 2008 update of Clinical Practice Guidelines (CPG) produced by the US Department of Health and Human Services recommends that clinicians “ask pediatric and adolescent patients about tobacco use and provide a strong message regarding the importance of totally sustaining from tobacco use” (p. 157) as well as counseling on smoking cessation and secondhand smoke. The same report encourages physicians to counsel current tobacco users on cessation using the popular 5As approach including: asking about the tobacco use, advice to quit, assess willingness to make a quit attempt, assist in quit attempt, and arrange follow-up (Whitlock, Orleans, Pender, & Allan, 2002).

The research on the effectiveness of HCP-based tobacco counseling in teens is mixed, but generally positive. A meta-analysis developed for the same CPG report found that provider cessation counseling approximately double long-term abstinence rates in teen smokers. Physician screening and counseling may be particularly important for some subgroups. For example, one study found African-American teens who discussed tobacco with their providers were less likely to initiate smoking, were more likely to try to quit smoking and were seven times more likely to report successfully quitting than African-American teens whose doctors did not screen and counsel about tobacco use (Clawson, Robinson, & Ali, 2016).
Equally important, research has suggested that teens want to discuss these issues with their providers. While physicians were more likely to bring up less sensitive topics in preventive counseling, such as healthy dietary habits, weight and exercise, adolescents more frequently cited a stronger preference to discuss drugs and smoking (Klein & Wilson, 2002). When these sensitive topics are discussed, teens have more positive perceptions of their health care providers, as well as report more responsibility and confidence for making good health choices (Brown & Wissow, 2009).

Despite this potential and preference, adolescents currently do not receive sufficient counseling about smoking and other tobacco use from their providers (Fairbrother et al., 2005). Reports have found only between 15-35% of adolescents report being screened for tobacco use from their health care provider (Klein & Wilson, 2002; Merenstein, Green, Fryer, & Dovey, 2001). The causes of this lack of screening are complex and varied, but can be broadly conceptualized as patient barriers and provider barriers.

Turning first to patient barriers, a main consideration is that meaningful discussions about risky behaviors are unlikely to happen with the adolescent’s parent present in the exam room. Up to 27% of adolescents have reported that they missed important counseling that they felt they needed, and 35% of these teens reported that counseling was missed predominately because they didn’t want their parents to find out about their behaviors (Ford, Bearman, & Moody, 1999). This can be a struggle for providers who must “balance the need to maintain a relationship of trust with their patients, and the occasional need to break confidentiality and reveal [drug] use to parents,
particularly when problems may be severe enough to warrant referral to specialty treatment” (Sterling, Kline-Simon, Wibbelsman, Wong, & Weisner, 2012, p. 9)

Adolescents have also reported being embarrassed or uncomfortable discussing sensitive topics with providers even without their parent present (Ackard & Neumark-Sztainer, 2001). Disclosure in the clinical setting is a complex social phenomenon. Clinical interactions represent a unique interpersonal context, “particularly when considering issues of equality, power balance, expectation of tasks to be accomplished, and specific interests or expected outcomes” (Bylund, Peterson, & Cameron, 2012, p. 261). As an example, social penetration theory highlights this difference. An underlying tenet of the theory is the norm of reciprocity, or that in relationships we feel a social obligation to disclose when others disclose to us. Interactions in a clinical context violate this rule with unequal and rapid penetration by the patient and little to no disclosure by the physician (Bylund & Peterson, & Cameron, 2014). The subconscious recognition of this communication rule violation may contribute to the discomfort that adolescents feel in disclosure interactions. Regardless of the cause, adolescent discomfort means it is often left up to the provider to introduce, facilitate and manage discussions about risky behaviors (Ackard & Neumark-Sztainer, 2001). Unfortunately, providers often also face their own set of barriers when discussing risky behaviors with teenagers.

Time constraints often emerge as a key barrier to effective adolescent counseling. One study found the length of consultation increased from 13.8 to 17.6 minutes when consultation on adolescent health issues was included (Merenstein et al., 2001). With the limited time that is available, there are often competing needs and other issues that need
to be addressed. For example, a recent focus on adolescent vaccine counseling and administration may “crowd out” the delivery of other preventive health counseling, such as substance abuse (Broder et al., 2008).

Provider adolescent counseling on risky behaviors may also be challenging due to the constantly evolving list of potential risky behaviors to screen for, and the fact that there aren’t clear guidelines as to what exactly constitutes a “risky behavior.” While no nationwide, systematic guideline exists for screening for risky behavior in teens, some basic clinical guidelines and suggestions have been developed from major medical organizations to assist physicians as they screen for behaviors among this age group (e.g. American Medical Association (Elster & Kuznets, 1994) and the American Academy of Pediatrics (1998)). Other screening tools have also been created by researchers and medical professionals including Rapid Assessment for Adolescent Preventive Services (Darling-Fisher, Salerno, Dahlem, & Martyn (2014), and the HEEADSSS (Klein, Goldenring, & Adelman, 2014) and CRAFFT (Knight, Sherritt, Shirer, Harris & Change, 2002) assessments. Many of these guidelines recommend focusing the screening on issues such as the home environment, education, tobacco, drugs/alcohol, sexual health and mental health. While an abundance of screening tools are available, as low as 16% of pediatric fellows report using standardized instruments (Sterling et al., 2012).

Low use of these guidelines may be due to lack of training in the tools specifically and/or a lack of communication skills training generally. In other words, even when providers know what behaviors to screen for and have the time to do so, they still may lack the confidence to initiate and facilitate the discussions. Research has suggested that
provider efficacy may be an especially salient factor in preventive counseling for tobacco. Several studies have found that provider efficacy was significantly related reported tobacco screening in teenagers (Ozer et al., 2004). In many cases, providers fear alienating the patient or appearing too intrusive or culturally insensitive (Sterling et al., 2012; Zapka et al., 1999).

Because e-cigarettes are a new product, there has been less research on provider-adolescent communication in this area. However, available research is largely consistent with other tobacco research previously discussed. A recent nationwide sample of pediatricians and family care physicians found that only one-third (34%) of physicians reported having ever discussed e-cigarettes during an adolescent’s visit. Moreover, when e-cigarettes were discussed, the conversation was more likely to be initiated by an adolescent patient/parent than by the physician, with only 14% of physicians reporting that they routinely screened adolescent patients for e-cigarettes (Pepper et al., 2015).

A factor that may be unique to e-cigarette discussion is the general lack of knowledge regarding the health risks of vaping. Unlike tobacco cigarettes, the majority of physicians’ knowledge about e-cigarettes comes from anecdotal sources, primarily patients (Pepper et al, 2014). This is troubling, as information coming from patients may be inaccurate or heavily influenced by marketing messages. Like other risky behaviors, physicians additionally report low levels of efficacy in discussing e-cigarettes with their patients, and note that they feel uncomfortable bringing up the topic in consultations (Pepper et al., 2015).
Provider Communication Skills Training for Adolescent Counseling. As low efficacy and knowledge have emerged as key barriers for providers to initiate conversations about risky behaviors generally and electronic cigarettes specifically, provider training on both e-cigarettes basics and interpersonal communication skills is a promising solution to improve these consultations. The use of provider communication skills training generally has been increasing in popularity over the last two decades. Since 1999, communication skills training for physicians has been integrated into medical school curriculum and some residency programs (Makoul & Schofield, 1999). In the past two decades, many communication skills training programs have been developed for physicians and other providers. Trainings have been successfully developed for other specialties (e.g., oncology (Brown et al., 2010); surgery, (Falcone, Claxton, & Marshall), and other specific communication challenges such as breaking bad news (e.g., SPIKES model (Baile et al., 2000); COMFORT model (Villagran, Goldsmith, Wittenberg-Lyles, & Baldwin, 2010).

Typically, provider training models do not advocate specific wordings or scripts, but provide a path for providers to follow to encourage improved interactions. Although the specifics of the trainings differ, they typically focus on areas such as building empathetic skills, learning to reinforce shared-decision making with the patient and trying to elicit more patient participation/understanding.

More provider training is needed for improving communication skills with pediatric patients specifically. Past research has called for training to destigmatize counseling conversations and increase health care providers’ confidence and self-efficacy.
discussing risky behaviors with adolescents and young adults and improving consultations with “difficult” or unwilling patients (Sterling et al., 2012). These advanced communication skills have traditionally been taught via in-person training, with low teacher-student ratios and role play modules with standardized patients (Ravitz et al., 2014). While these are effective, they are costly to implement and limit the number of clinicians who can be trained. Additionally, it may be difficult to access certain providers in-person, such as those who live in rural areas (Kemper, Foy, Wissow, & Shore, 2008).

Another approach to provider training is internet-based curriculum, which has had success in adult behavioral counseling (Badger, Robinson, & Farley, 1999) and other areas of provider training (Stoner, Mikko, & Carpenter, 2014; Wagner, Pfeiffer, & Harrington, 2011). Computer-based learning has been found to be as effective as in-person training for teaching evidence-based medicine (e.g., Beal, Kemper, Gardiner, & Woods, 2006; Roter et al., 2012; Davis et al., 2007), and one study found that Internet-based education improved physician’s efficacy discussing violence in clinical interactions as well as in-person training (Harris, Kutob, Surprenant, Maiuro, & Delate, 2002). An on-line approach to training has also been effective in addressing knowledge deficits, another key area needed for provider e-cigarette training (Mojtahedzadeh, Mohammadi, Emami, & Rahmani, 2014). Given these benefits, an on-line curriculum has great potential to increase a large number of primary health care providers’ efficacy about e-cigarettes which, in turn, can help slow the meteoric rise of vaping among American adolescents.
HYPOTHESES AND RESEARCH QUESTIONS

Providers can significantly influence adolescent tobacco behaviors through behavioral counseling (Clawson et al., 2016; Whitlock, Orleans, Pender, & Allan, 2002), and government and medical organizations have called for frequent, consistent provider screening for tobacco products with adolescents, including alternative tobacco products such as e-cigarettes (Arrazola, 2015). Despite these recommendations, e-cigarette counseling is often overlooked in psychosocial interviews (Pepper et al., 2014). These missed opportunities may be especially important for adolescent athletes, who are more likely than non-athletes to use some alternative tobacco products (Walsh et al., 2000).

To address these issues, the overall aim of this dissertation was to develop recommendations for an on-line training curriculum targeted to providers, which will help them effectively screen for and facilitate discussions about e-cigarettes with adolescent athletes. This dissertation encompassed three studies, unified in their goal of better understanding vaping-related motivations, communication preferences and barriers to discussion for both adolescent athletes and the providers who care for them. I utilize a reasoned action approach to first identify the beliefs most salient for adolescent intention to vape, then to identify providers’ preferences and perceived barriers to e-cigarette discussion, and finally to pilot test messages developed from the first two studies. Each
study is associated with a different set of hypotheses and research questions, which will be presented below.

Study 1 Hypotheses and Research Questions

In any health message campaign, maximizing the message-recipient match is of vital importance (Yzer, 2012). Doing this requires a thorough understanding why a specific population engages in a behavior, and it is only once these determinants have been identified that an intervention can be properly designed to address them (Fishbein, 2008). Specific to this study, the first step of developing the training for physician-delivered messages should be to understand which beliefs are most strongly correlated with adolescent athletes’ intention to vape. A few studies (e.g., Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2014) have investigated reasons for adolescents’ vaping behaviors, but none of them have (a) utilized a reasoned action approach or (b) focused on variables most salient for athletes specifically. Thus, a primary goal for Study 1 was to investigate determinants of vaping behavioral intention among adolescent athletes.

Consistent with a reasoned action approach, the first hypothesis posited that adolescent athletes’ current vaping behavior and intention to vape in the next year would be significantly associated with the three main determinants of behavioral intention, after controlling for relevant demographic variables: normative beliefs (including both injunctive and descriptive normative beliefs), self-efficacy and attitudes toward vaping. These factors have previously been found to be significant predictors of risky behaviors among adolescents generally (ter Doest et al., 2009; Wilkinson & Abraham, 2004).
**H1.** Normative beliefs, self-efficacy and attitudes toward e-cigarettes will be significantly associated with reported e-cigarette use and behavioral intention among adolescent athletes.

Health messages do not affect attitudes, perceived norms or self-efficacy directly. Rather, they affect specific beliefs that people hold about performing a particular behavior. These beliefs then influence behavior via their influence on attitude, normative beliefs, and/or self-efficacy. Because of this, it is “necessary to identify which outcome, normative, or efficacy beliefs are the best candidates to address in a message” (O’Keefe, 2002). If a participant’s attitude toward e-cigarettes, for example, is found to be a primary determinant of vaping intention, then understanding which specific outcome beliefs are most strongly correlated with vaping intention is the next logical step in message development.

The goal of this study was not to test the integrative model only, but also generate insights for the development of a training curriculum. As such, this research builds upon both the components of the integrative model and also other motivations found in previous empirical research on e-cigarette among adolescents (e.g., Kong et al., 2014). Bringing these perspectives together, I hope to capture more fully the reasons for adolescent vaping. The next research question queried as to which beliefs and other motivations outside of the integrative model that participants self-report will have the most influence on their vaping behaviors.

**RQ1.** What specific beliefs and motivations will be most strongly associated with participants’ vaping intentions and behavior?
One study on tobacco smoking intention and behavior has found that those who are currently using cigarettes may differ in their motivations for use than for those who have not yet smoked, but are at risk for smoking (Backinger, Fagan, Matthews, & Grana, 2003). The same may also be true of e-cigarettes. For example, initial motivations such as curiosity or the novelty of the product may decrease over time as the consumer becomes used to the product, and subsequently be replaced by other motivations and addictions. The following research question addresses this question, using the series of self-report motivation items developed from previous research and the integrated model.

**RQ2.** How, if at all, do *current* and *prospective* adolescent athlete vapers differ in their self-reported motivations for vaping?

The second goal of Study 1 was to learn about adolescent athletes’ current experiences with provider screening, their preferences for provider communication and the potential impact of provider counseling on behavioral intention. First, there is little research on the rates of e-cigarette screening specifically, given the novelty of the product. For overall tobacco screening, rates of provider tobacco screening among adolescents is thought to be between 15-35% (Fairbrother et al., 2005). It is unclear whether, or how, these screening rates would change for athletes specifically. On one hand, due to required sports check-ups, athletes generally visit with providers more frequently, and thus would have more opportunities for screening questioning. On the other hand, athletes have consistently been found to be less likely to use tobacco products than non-athletes (Lisha & Sussman, 2010). It is possible that providers may not see this group as at-risk for tobacco use and subsequently not screen for it.
RQ3: How often do adolescent athletes’ primary care providers screen them for tobacco and e-cigarette use?

Next, previous research has suggested that the topics that adolescents want to discuss with their providers may substantially differ than the actual conversations they actually have with physicians (Klein & Wilson, 2002). As the training module will instruct physicians on specific topics to discuss with this population, it would be helpful to know which specific topics adolescents are most interested in discussing to help keep them engaged and involved in e-cigarette counseling discussions.

RQ4: What topics regarding e-cigarettes do at-risk adolescent athletes most frequently report they want to discuss with their providers?

With the notable behavioral development that occurs during the adolescent period of development, it would follow that younger adolescents (middle school), middle adolescents (early- to mid-high school) and late adolescents/emerging adults (late high-school and early college) may differ in regards to the saliency of specific beliefs, and subsequently the topics they want to discuss with their providers. The next research question segmented the population by age and was derived from this developmental perspective:

RQ5a. How, if at all, do young, middle and late adolescents differ in their reported beliefs and other motivations about e-cigarettes?

RQ5b. How, if at all, do young, middle and late adolescents differ in their self-reported preferences for e-cigarette conversation topics with their providers?
Study 2 Research Questions

The major goal of the training curriculum is to help providers discuss e-cigarette using effective message strategies that will resonate with adolescents. The training curriculum will be more useful if the providers’ perspective is also incorporated in the development process. To that end, Study 2 sought to understand electronic cigarette discussions from the providers’ perspective. In Study 1, RQ4 and RQ5b queried on adolescent topic preferences for e-cigarette discussions. The following research question similarly focuses on topic preferences, this time from the providers’ perspective.

**RQ6:** What information about e-cigarettes do providers report discussing or wanting to discuss with adolescent patients?

One quantitative study found that while providers believed it was important to discuss e-cigarettes with adolescents, the majority of providers reported feeling either “somewhat” or “very” uncomfortable initiating the conversation (Pepper et al., 2014). However, the reasons for this lack of efficacy were not addressed, nor were the effects of other types of barriers included (e.g., perceived lack of time). The following inquiry sought to better understand this issue from a qualitative approach:

**RQ7:** What challenges do primary health care providers face with initiating and navigating conversations about electronic cigarettes with adolescent patients?

Finally, while RQ7 focuses on provider barriers, the final research question for Study 2 investigates perceived patient barriers to e-cigarette discussion. Although adolescents feel that it is important to discuss tobacco use and other risky behaviors, they often feel embarrassed or uncomfortable discussing these topics with health care providers (Ackard & Neumark-Sztainer, 2001). This barrier, when coupled with
providers’ unwillingness or inability to discuss electronic cigarettes with adolescents, can lead to ineffective discussions or no discussion at all. The third research question for Study 2 sought to discover “best practices” or the techniques and tools that providers can use to help adolescents feel comfortable discussing electronic cigarette use and other risky behaviors in a clinical setting.

**RQ8:** What are the most effective techniques that providers can use to encourage honest and comfortable discussion about e-cigarette use with adolescents?

**Study 3 Research Questions**

After preliminary analysis for the first two studies is concluded, I will create a library of e-cigarette related messages to be included in the training curriculum for providers. These messages will be developed based on the areas that athletes (Study 1) and providers (Study 2) most frequently reported as wanting to discuss, as well as addressing the beliefs that were most strongly correlated with adolescent vaping intention (Study 1).

Study 3 will then test these messages via focus group discussions with middle- and late-adolescents (ages 16-19). Pilot testing messages among the intended demographic is a critical component of message development and implementation (Parvanta et al., 2002). Pre-testing messages here, before the development of the training curriculum, will save “time and money by ensuring that [the interventionist] does not go through the entire developmental process with an ineffective message” (U.S. Department of Health & Human Services, 1992, p. 54). The purpose of this formative evaluation will be to select the content that adolescents rate as most likely to change their vaping
behavioral intention. These messages will then be included in the final curriculum recommendations. An equally important part of message testing is to understand what makes messages not effective for a specific population – perhaps by offending, alienating or boring the target audience.

**RQ9a:** What message characteristics are rated high in perceived efficacy by adolescent athletes?

**RQ9b:** What message characteristics are rated low in perceived efficacy rating by adolescent athletes?

Finally, unlike a traditional media campaign, the messages delivered here will ultimately be presented to adolescent athletes through interpersonal communication in the context of clinical interaction. The way that the message is delivered, and the adolescent-provider relationship may be just as important to effective counseling as the message itself. The final research question, and the second aim of the focus groups, is to better understand what discourse and/or relationship factors would encourage or discourage the acceptance of the provider-initiated messages presented in Study 3.

**RQ10:** What factors might influence adolescent athletes’ receptivity to their provider’s advice about e-cigarette use?
STUDY 1

Knowledge, Attitudes, Beliefs and Behaviors of Electronic Cigarettes
And Clinical Communication Preferences among Adolescent Athletes

Study 1 consisted of a cross-sectional survey of adolescent athletes in the Washington DC region. The goal of the study was two-fold. First, to identify relevant variables significant to vaping behavioral intention, consistent with Fishbein’s (2008) integrative model. Second, to understand adolescents’ communication experiences and preferences in a clinical setting. This survey included adolescents in all phases of this developmental range – from middle-school to early college.

Methodology

Recruitment. Recruitment for Study 1 occurred in two waves. First, following institutional approval through George Mason University’s Office of Research Integrity and Assurance, middle-school and high-school recruitment was conducted through youth sports organizations in Northern Virginia: Chantilly Youth Association and the Northern Virginia Swimming League. Prior to initiating contact with adolescents, and in accordance with IRB requirements, I contacted coaches and administrators to obtain written and/or e-mailed permission from parents. I then attended team practices to discuss the study with the adolescents and to administer the survey to willing student athletes. As compensation for completing the survey, each team was given $5 per completed study,
and each participant was given a donut. The parental consent form can be found in Appendix A and the minor assent form can be found in Appendix B.

Next, recruitment for the late-adolescent (college) sample was done through George Mason University’s communication Basic Courses (Comm100/101). This research study was one of several options that students were given to earn research credit points in their class. A vague description and link to the study was posted to the course Blackboard page. To avoid respondent bias, the study was presented as a “health communication study” with no specific mention of e-cigarettes in the title. The consent form for the college-aged participants can be found in Appendix C.

**Sampling.** In the first wave of data collection, a convenience sample was recruited from adolescents who (1) were currently in middle school or high school (grades 7-12²) (2) participated in at least one organized sports team in the past year, and (3) were able to read and understand the survey in English. Convenience sampling was also utilized for the late adolescent (college) sample, with age and grade parameters set to approximate the adolescent into young adult transition period (beginning of “emerging adulthood”). This sample included students who: (1) were currently in their first two years of college³, (2) 18-19 years old, and (3) had participated in at least one organized sports team in the past year.

**Participants.** Four hundred forty-eight young athletes completed the study. There majority of participants were male (56.7%) and White/Caucasian (61.6%). Participants

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² For studies that were administered over the summer, participants were asked to report the grade they would be entering in the fall
³ Respondents who indicated their grade as junior/senior were excluded from analysis.
were evenly divided between secondary education (grades 7-12) and college/university. For the secondary education athletes, fewer younger athletes (grades 7-9) (42.8%) participated than older athletes (grades 10-12) (57.2%). The mean age for the entire sample was roughly a high school junior ($M = 16.87, SD = 1.98$). Respondents reported participating in between one to six organized sports teams/leagues in the previous 12 months. The mean number of sports participated in during this time period was 1.83 ($SD = .982$). The first column of Table 2 presents the full sample characteristics of the sample.
Table 2.

*Adolescent Demographic Characteristics of E-Cigarette Users, Non-Users, and At Risk for Use.*

<table>
<thead>
<tr>
<th></th>
<th>Sample</th>
<th>Users/Tried</th>
<th>High Risk Non-Users&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Low Risk Non-Users</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>448 (100%)</td>
<td>143 (31.9%)</td>
<td>80 (17.9%)</td>
<td>220 (49.1%)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>259 (57.8%)</td>
<td>95 (66.4%)</td>
<td>46 (57.5%)</td>
<td>114 (51.8%)</td>
</tr>
<tr>
<td>Female</td>
<td>189 (42.2%)</td>
<td>48 (33.6%)</td>
<td>34 (42.5%)</td>
<td>106 (48.2%)</td>
</tr>
<tr>
<td><strong>Age (M, SD)</strong></td>
<td>16.87 (1.98)</td>
<td>17.87 (1.25)</td>
<td>16.54 (1.82)</td>
<td>16.39 (2.17)</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White/Caucasian</td>
<td>276 (61.6%)</td>
<td>88 (61.5%)</td>
<td>55 (68.8%)</td>
<td>131 (59.5%)</td>
</tr>
<tr>
<td>Black/African American</td>
<td>44 (9.8%)</td>
<td>11 (7.7%)</td>
<td>10 (12.5%)</td>
<td>23 (10.5%)</td>
</tr>
<tr>
<td>Asian</td>
<td>54 (12.1%)</td>
<td>15 (10.5%)</td>
<td>6 (7.5%)</td>
<td>30 (13.6%)</td>
</tr>
<tr>
<td>Latino/Hispanic</td>
<td>44 (9.8%)</td>
<td>16 (11.2%)</td>
<td>2 (2.5%)</td>
<td>26 (11.8%)</td>
</tr>
<tr>
<td>Preferred Not to Say/Other&lt;sup&gt;c&lt;/sup&gt;</td>
<td>25 (5.6%)</td>
<td>13 (9.1%)</td>
<td>7 (8.7%)</td>
<td>6 (2.7%)</td>
</tr>
<tr>
<td><strong>Grade</strong>&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Middle-School/Young HS (7-9 grade)</td>
<td>96 (21.4%)</td>
<td>6 (4.2%)</td>
<td>22 (27.5%)</td>
<td>64 (29.01)</td>
</tr>
<tr>
<td>High School (10-12 grade)</td>
<td>128 (28.6%)</td>
<td>34 (23.8%)</td>
<td>31 (38.8%)</td>
<td>63 (28.6%)</td>
</tr>
<tr>
<td>College (Freshmen-Sophomore)</td>
<td>224 (50%)</td>
<td>103 (75.5%)</td>
<td>27 (33.75%)</td>
<td>93 (42.3%)</td>
</tr>
<tr>
<td><strong>Number of Sports</strong>&lt;sup&gt;e&lt;/sup&gt; (M, SD)</td>
<td>1.83 (.982)</td>
<td>1.80 (1.00)</td>
<td>1.80 (.89)</td>
<td>1.85 (.99)</td>
</tr>
</tbody>
</table>
Plays at Competitive Level

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th></th>
<th>No</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>275 (61.4%)</td>
<td>82 (57.3%)</td>
<td>49 (61.3%)</td>
<td>140 (63.6%)</td>
</tr>
<tr>
<td></td>
<td>168 (37.5%)</td>
<td>61 (42.7%)</td>
<td>29 (36.3%)</td>
<td>80 (35.9%)</td>
</tr>
</tbody>
</table>

*Notes:* N=448. Not all categories equal 100% due to non-response. aHigh-risk defined as answering any option but “highly unlikely” to an item asking if they intend to use e-cigarettes in the next year, but at the current time have never tried e-cigarettes. bOf the participants in this category, (21.7%) reported using e-cigarettes in the past month. cOther responses included preferred not to say/no response (*n* = 9), multiracial (*n* = 6), Middle Eastern (*n* = 5), American Indian (*n* = 2), Iranian (*n* = 1), Hawaiian (*n* = 1) and Arabian (*n* = 1). dCollege includes only college freshmen and sophomores due to age parameters. eItem refers to number of sports that the respondent has participated in during the last 12 months.
Procedures. Prior to administration of the final survey, a preliminary version of the study was pre-tested with adolescent athletes not included in the sample \((n = 4)\) for relevancy and accuracy, which resulted in minor revisions. Middle school and high school surveys were completed using hard copies of the questionnaire. Participants typically completed the surveys immediately before or after a sports practice session. The first page of the document explained the study using developmentally-appropriate language. With IRB approval, youth assent was assumed if the participant completed the study. The survey began by obtaining basic demographic information (sex, age, race/ethnicity and grade) and tobacco experience. Further sections of the study then queried on adolescents’ knowledge, attitudes and beliefs about electronic cigarettes as well as about their recent provider visits if applicable and their provider communication preferences. The survey concluded with questions on intentions for future e-cigarette use.

The college survey was administered on-line using Qualtrics. This survey was nearly identical to the adolescent hard-copy survey described above. The college survey contained some additional measures (e.g., athlete identification scale) that were excluded from analysis in this dissertation. The survey questionnaire used for Study 1 can be found in Appendix D.

Key Measures.

E-Cigarette History. Participants’ history with e-cigarette use was tapped with a dichotomous measure, asking participants, “have you ever tried e-cigarettes, even just one time?” Participants who indicated that they had tried e-cigarettes were then asked the follow-up question, “in the past month, on how many days have you used e-cigarettes”
Behavioral Intention. The final set of outcome measures asked participants how likely they would smoke e-cigarettes (a) occasionally, and (b) every day in the next year. These items were assessed on a 5-point scale (1 Extremely Unlikely to 5 Extremely Likely). The mean score for occasional vaping was 1.96 ($SD = 1.31$) and the mean score for everyday vaping was 1.20 ($SD = .70$).

E-Cigarette Risk Status. Based on answers from e-cigarette use and behavioral intention, participants were divided into three groups. Users ($n = 143, 31.9\%$) were classified as those who had tried e-cigarettes at least once. The At Risk category ($n = 80, 17.9\%$) included participants who had not tried e-cigarettes previously, but indicated some possibility of using e-cigarettes in the next year by answering anything but Extremely Unlikely for the intended occasional or daily e-cigarette use. The Low Risk category ($n = 220, 49.2\%$) contained participants who had not tried e-cigarettes previously and reported it was extremely unlikely that they would initiate use in the next year. It was not possible to ascertain e-cigarette risk status for four participants due to missing data. The latter columns of Table 2 present the demographic characteristics segmented by risk status group.

Normative Beliefs about E-Cigarettes. Consistent with the integrated model, participants were asked about their injunctive and descriptive normative beliefs regarding e-cigarettes. Injunctive norms were captured by asking participants the degree to which

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4 Smoking history data of participants was also gathered, but there were not enough current smokers in the study (>5%) to analyze data by tobacco cigarette smoking status.
they felt each of the following groups would approve of their use of e-cigarettes (1 Strongly Disapprove to 5 Strongly Approve): parents (M = 1.34, SD = .70), close friends (M = 2.23, SD = 1.12), and teammates (M = 2.49, SD = 1.06). These groups were selected based on pilot testing feedback and the groups for which adolescents have demonstrated the strongest motivation to comply in past research (Kong et al., 2014; Mercken et al., 2013; Pentz et al.). The athletes’ motivation to comply was not explicitly measured in this study, as past work has suggested that explicit measurement of this component may decrease the predictive power of subjective norms (Doll & Orth, 1993).

Descriptive normative beliefs was also assessed by asking the participant to “estimate the percentage of teens my age who use e-cigarettes” on a scale of 0-100% (M = 26.72, SD = 21.23).

**E-Cigarette Behavioral Outcome Beliefs.** Participants were asked a series of six questions related to their beliefs about the various outcomes of vaping: how harmful they perceived e-cigarettes with short-term and long-term use, the effect of e-cigarettes on athletic and academic performance, the extent to which they thought e-cigarettes were addictive and the association between e-cigarette use and tobacco cigarettes. Participants rated their outcome beliefs on a 5-point scale (1 Strongly Disagree to 5 Strongly Agree), with a higher number indicating stronger health risk beliefs about e-cigarettes. One additional item, asking participants to compare the health risk of e-cigarettes to conventional cigarettes (1 Much less harmful to 5 Much more harmful) was also included. The seven items were averaged to create a negative belief outcome index (M = 3.54, SD = .91, α = .77).
**Vaping Efficacy Beliefs.** Participants’ efficacy was tapped by asking participants: “If I wanted to smoke e-cigarettes, getting access to them through a store or friend would be” with answers ranging from 1 *Very Easy* to 5 *Very Difficult* (*M* = 2.01, *SD* = 1.34).

**Motivation for E-Cigarette Use.** Participants who were classified as users or at risk were asked to assess to what extent various motivations would affect their decision to vape in the next year on a scale from 1 (*Not at all*) to 4 (*A lot*). These items were not necessarily based on the integrated model, and were developed from previous research (Kong, Morean, Cavallo, Camenga, & Krishnan-Sarin, 2014) and instrument pre-testing. Items included: curiosity, liking the look/design, being seen as cool, doing vapor “tricks,” trying interesting flavors, helping to quit smoking and using as a healthier alternative to cigarettes.

**E-Cigarette as Tobacco Product.** College-aged participants only (n = 224) were asked “do you consider electronic cigarettes to be a tobacco product?” Of this sample, approximately half (n = 114, 50.9%) indicated that they did not consider electronic cigarettes to be a tobacco product.

**Provider Experience and Preferences.** Participants were asked if they had seen a doctor in the last 12 months for any well visit, including sports physicals and general check up. If they had, participants were then asked if their physician screened and/or advised them on tobacco cigarettes and electronic cigarettes. Previous research has

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5 Data for this item was not analyzed for respondents who indicated no intention to vape in the next year, as the question was not applicable to them.
6 This question was added to the college iteration of the survey after the middle-school and high-school data collection was completed.
supported the validity of adolescent recall for screening and preventive services (Klein et al., 1999).

The potential influence of physician counseling on e-cigarette use was tapped by asking participants, “Imagine that a doctor or nurse advised you not to use e-cigarettes. Overall, how much would their advice influence your decision to use them or not?” on a 4-point scale (1 Not at All to 4 A Lot; M = 2.87, SD = 1.01). This section concluded with participant preferences regarding discussing a variety of topics related to electronic cigarettes and ranking how they would prefer the messages to be presented (face-to-face, written, pictures or multimedia).

Data Analysis. Frequencies, bivariate correlations, t-tests, ANOVA and hierarchical regression was used with the software SPSS (Version 19) to test the hypotheses and research questions for this phase.

Results

The goal of Study 1 was two-fold: first, to investigate adolescent athletes’ behaviors and opinions about e-cigarettes. The hypothesis and RQs 1-2 addressed this overarching goal and were answered quantitatively. The second goal of Study 1 was to assess the current level of provider discussion about e-cigarettes and learn about athletes’ communication preferences. RQs 3-4 spoke to this goal and were again answered quantitatively. Finally, RQ5 addressed differences between young, middle and late
adolescents in both their beliefs about vaping and their clinical communication topic preferences.

**Attitude, Norms, and Efficacy.** The first hypothesis predicted that the three main components of the integrative model (self-efficacy, attitudes, normative beliefs) would be significantly associated with participants’ risk group (ever use, at risk⁷, or low risk). A hierarchical regression model was created to test this hypothesis. After controlling for social and athletic demographics, the three components significantly added to the model (p < .001), and accounted for an additional 19% of variance in risk group. Results suggest that older participants, those who estimated that more of their peers vape (p < .001) and those who thought their peers would approve of them vaping (p < .001) were more likely to be in a higher risk group. Negative outcome beliefs about e-cigarettes were negatively associated with vaping risk (p < .001); those who believed that vaping would have negative health outcomes were at lower risk of vaping. Finally, self-efficacy beliefs and parental/teammate approval were not significantly associated with risk group.

Hypothesis 1 was largely supported: overall the components of the integrative model explained a significant portion (19%) of the variance in risk group, with two of the three determinants (attitudinal beliefs and peer use/approval) significantly associated with e-cigarette risk. Table 3 presents the results of the hierarchical regression model.

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⁷ At risk defined as participants who had not yet tried e-cigarettes but indicated some degree of intention to vape in the next year.
Table 3.

Multiple Regression of E-Cigarette Risk Group on Integrative Model Components.

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE B</th>
<th>β</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step 1</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>-.12</td>
<td>.11</td>
<td>-.05</td>
</tr>
<tr>
<td>Age</td>
<td>.06</td>
<td>.03</td>
<td>.13*</td>
</tr>
<tr>
<td>Competitive/Travel Team (v. Recreation League)</td>
<td>.01</td>
<td>.05</td>
<td>.01</td>
</tr>
<tr>
<td>Race (v. White)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black/African-American</td>
<td>-.20</td>
<td>.13</td>
<td>-.07</td>
</tr>
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<td>Asian-American</td>
<td>-.12</td>
<td>.12</td>
<td>-.04</td>
</tr>
<tr>
<td>Hispanic</td>
<td>-.04</td>
<td>.13</td>
<td>-.01</td>
</tr>
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<tr>
<td><strong>Step 2</strong></td>
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<tr>
<td>Descriptive Norm Belief</td>
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<td>.01</td>
<td>.15**</td>
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<td>.05</td>
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<tr>
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<td>.05</td>
<td>.22***</td>
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<td>.01</td>
<td>.04</td>
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<td>.05</td>
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<tr>
<td>Efficacy Beliefs</td>
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<td>.04</td>
<td>.08</td>
</tr>
</tbody>
</table>

Note. $R^2 = .14$ for Step 1; $\Delta R^2 = .19$ for Step 2 ($p < .001$); *p < .05, **p < .01, ***p < .001. Betas are from the final model (step 2).

**Specific Outcome Beliefs and Motivations.** Because outcome beliefs were found to be significantly associated with e-cigarette risk group, the next step in message development is to identify which of these specific behavioral outcome beliefs were most strongly correlated with both current use and future behavioral intention.

In addition to outcome items derived using the integrative model, correlations with other motivations previously found to be associated with e-cigarette use were also included. A bivariate correlation table (Table 4) found that trying new flavors was most strongly correlated with current use status, $r(443) = .41$, $p < .001$ and behavioral...
intention, $r(443) = .49$, $p < .001$. Believing that e-cigarettes would negatively impact the athlete’s ability to play sports was also significantly correlated with lower use ($r(443) = .35$) and intention ($-.38$, $p < .001$) as was using e-cigarettes as a safer or healthier alternative to smoking ($r(443) = .36$, $p < .001$ for current use; $r(443) = .40$, $p < .001$ for intention).

Table 4.

*Bi variate correlations between outcome beliefs/motivations and e-cigarette use and intention.*

<table>
<thead>
<tr>
<th>Motivation</th>
<th>Current Use</th>
<th>Behavioral Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Behavioral Outcome Beliefs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using e-cigarettes would be harmful to my health in the next few years.</td>
<td>-.29</td>
<td>-.34</td>
</tr>
<tr>
<td>Using e-cigarettes would be harmful to my health when I am older.</td>
<td>-.16</td>
<td>-.13</td>
</tr>
<tr>
<td>Using e-cigarettes would impact my current ability to perform sports</td>
<td>-.35</td>
<td>-.38</td>
</tr>
<tr>
<td>Using e-cigarettes would be addictive.</td>
<td>-.31</td>
<td>-.31</td>
</tr>
<tr>
<td>Using e-cigarettes would affect the development of my brain, or my ability to perform in school.</td>
<td>-.34</td>
<td>-.35</td>
</tr>
<tr>
<td>Using e-cigarettes would make me more likely to try regular cigarettes or other substances.</td>
<td>-.28</td>
<td>-.20</td>
</tr>
<tr>
<td>Using e-cigarettes would make me look cooler to my classmates/teammates.</td>
<td>.21</td>
<td>.21</td>
</tr>
<tr>
<td><strong>Other Motivations for Use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being curious about what it tastes or feels like to vape</td>
<td>.21</td>
<td>.29</td>
</tr>
<tr>
<td>Liking the look/design of e-cigarettes</td>
<td>.34</td>
<td>.32</td>
</tr>
<tr>
<td>Being able to do “smoke/vape tricks” with the e-cigarette vapor</td>
<td>.36</td>
<td>.30</td>
</tr>
<tr>
<td>Trying out interesting flavors like pineapple, chocolate or margarita.</td>
<td>.41</td>
<td>.49</td>
</tr>
<tr>
<td>Helping me quit smoking regular cigarettes or other substances.</td>
<td>.18</td>
<td>.19</td>
</tr>
<tr>
<td>Using as a safer/healthier alternative to conventional cigarettes.</td>
<td>.36</td>
<td>.40</td>
</tr>
</tbody>
</table>
Current and Prospective Vapers Reported Motivations for Use. RQ 2 asked if there were differences in motivations for users and those current non-users classified as high-risk for vaping. A series of independent sample t-tests were performed. Participants who had already used e-cigarettes reported significantly stronger motivations for several items, including liking the look/design of e-cigarettes (users $M = 1.78$, $SD = .95$; at-risk $M = 1.45$, $SD = .75$; $t(220) = -2.69$ $p = .004$), doing smoke/vape tricks (users $M = 2.10$, $SD = 1.08$; at-risk $M = 1.86$, $SD = .91$; $t(220) = -2.34$, $p = .02$), trying novel/interesting flavors (users $M = 2.33$, $SD = 1.00$; at-risk $M = 1.88$, $SD = .96$; $t(221) = -3.28$, $p < .001$), and using cigarettes as a safer/healthier alternative to cigarettes (users $M = 2.19$, $SD = .95$; at-risk $M = 1.55$, $SD = .78$; $t(220) = -4.51$, $p < .001$). Figure 4 presents a bar graph of reported motivations for us among at-risk and current vapers.
Figure 5. Common motivations for intention to vape among current users and at-risk non-users. Participants were asked how likely it would be for each item to affect their vaping behavior. Response choices ranged from 1 (Not at all) to 4 (A lot).

**E-Cigarette Discussion Experiences.** RQ 3 (Table 5) queried on the degree that athletes’ providers screened them for tobacco and e-cigarette use. Nearly all participants ($n = 421, 94\%$) reported seeing a physician at least once for a well-visit in the past year, The remaining 27 participants who reported not seeing a physician in the past year were excluded for research question 3. Looking first at tobacco screening, about two-thirds ($n = 292, 68.2\%$) reported that their physician screened them for tobacco cigarette use, and fewer ($n = 197, 46\%$) reported receiving advice or counsel on tobacco cigarettes.
Screening for e-cigarettes was much lower, with only 26 participants (6.1%) reporting that their physician asked them about their e-cigarette use.
Table 5

Adolescent Athlete Experiences of Physician Communication about Tobacco Products.

<table>
<thead>
<tr>
<th>Sample</th>
<th>Users</th>
<th>At Risk Non-Users</th>
<th>Low Risk Non-Users</th>
</tr>
</thead>
<tbody>
<tr>
<td>448</td>
<td>143</td>
<td>80</td>
<td>220</td>
</tr>
</tbody>
</table>

**Physician Tobacco Discussions**

**Visited Physician in Past 12 Months**
- Yes: 421 (94%), 128 (89.5%), 79 (98.8%), 209 (95%)
- No*: 27 (6%), 15 (10.5%), 1 (1.3%), 11 (5%)

**Physician Screened for Tobacco Use**
- Yes: 292 (68.2%), 101 (70.6%), 57 (71.3%), 131 (61.5%)
- No: 129 (30.1%), 27 (18.9%), 22 (27.5%), 78 (36.6%)

**Physician Advised on Tobacco Use**
- Yes: 197 (46%), 67 (51.5%), 41 (51.2%), 85 (39.9%)
- No: 224 (52.3%), 61 (46.9%), 38 (47.5%), 124 (58.2%)

**Physician Screened for E-Cigarette Use**
- Yes: 26 (6.1%), 7 (5.4%), 7 (8.8%), 11 (5.2%)
- No: 393 (91.8%), 121 (93.1%), 71 (88.8%), 197 (92.5%)

*Notes: *Responses excluded from next three questions, as they are non-applicable.
Communication Topic Preferences. RQ4 addressed which topics about e-cigarettes that adolescent athletes reported they wanted to discuss with their providers. Overall, athletes reported wanting to discuss how vaping influenced their athletic performance the most \((M = 2.64, \text{SD} = 1.07)\) followed by comparing the safety of e-cigarettes to tobacco cigarettes \((M = 2.50, \text{SD} = 1.00)\) and discussing ways to build confidence and skills \((M = 2.41, \text{SD} = 1.04)\). RQ5b then looked for differences in communication topic preferences between age groups. ANOVA tests revealed several significant differences between these age groups. In particular, late-adolescents were less likely to want to discuss how e-cigarettes affect physical health \((p < .001\) for both middle and young adolescents), and young adolescents were more likely to want to discuss descriptive norms, or the behaviors of the “average teen” \((p < .001\) for both middle- and late adolescents). Figure 5 displays communication topic preferences segmented by age group.
Figure 6. Young, middle, and late adolescent preferences for e-cigarette related discussion topics with providers. Note: Participants were asked how interested they would be in discussing each topic with their healthcare provider. Response choices ranged from 1 (Not at all) to 4 (A lot).

Association between Age and E-Cigarette Normative, Attitudinal and Efficacy Beliefs. Finally, RQ5a asked if there were differences in beliefs/attitudes about e-cigarettes among young, middle and late adolescents.

Negative Outcome Beliefs. An analysis of variance showed that the main effect of grade group (middle-school, high-school or college) was significant on negative outcome beliefs, $F (2, 444) = 28.45, p < .001$. Post hoc analyses using the Tukey post hoc criterion for significance indicated that significant differences existed between all three groups.
Risk perceptions appeared to decrease with age, with young adolescents reporting the greatest risk ($M = 3.98, SD = .67$), followed by middle adolescents ($M = 3.63, SD = .85$) and late adolescents ($M = 3.27, SD = .79$).

**Normative Beliefs.** The descriptive norm question, asking participants to indicate what percentage of their peers they estimated used e-cigarettes again showed a significant main effect of age groups ($F (2, 444) = 25.10, p < .001$). Post hoc Tukey indicated that the middle-school group ($M = 14.35, SD = 18.42$) reported significantly lower estimates of peer use than the other groups ($p < .001$) and there were no significant differences between the high school ($M = 27.18; SD = 24.08$) and college groups ($M = 31.77, SD = 18.37$).

Finally, analyses of variances for the injunctive normative beliefs between the three grade groups showed significant differences, including parental approval ($F (2, 444) = 15.58, p < .001$) and friend approval ($F (2, 444) = 26.39, p < .001$). For parental approval, Tukey post hoc analyses indicated that college athletes ($M = 1.51, SD = .78$) reported significantly more parental approval than both high school ($M = 1.20, SD = 1.20, p < .001$) and middle-school ($M = 1.11, SD = .54, p < .001$) athletes, but no significant differences were observed between high school and middle school athletes ($p = .53$). Friend approval Tukey post hoc analyses found significant variation between all three groups. Young adolescents were least likely to report friend approval ($M = 1.63, SD = .85, p < .01$), with middle adolescents ($M = 2.10, SD = 1.21$) and late adolescents ($M = 2.55, SD = 1.05, p < .001$) reporting more approval from their friends.
Efficacy Beliefs. An analysis of variance showed that the main effect of grade group was significant on efficacy beliefs, $F(2, 443) = 97.2$, $p < .001$. Post hoc analyses using the Tukey post hoc criterion for significance indicated that significant differences existed between all three groups. Efficacy beliefs, or the extent that participants believed they could access and vape if they wanted to, increased with age, with young adolescents reporting the most perceived difficulty for access ($M = 3.98$, $SD = .67$), followed by middle adolescents ($M = 3.63$, $SD = .85$) and late adolescents reporting little difficulty ($M = 3.27$, $SD = .79$). Table 6 presents the results showing differences in e-cigarette beliefs segmented by age group.
Table 6.

**Age Groups and E-Cigarette Attitudinal, Normative and Efficacy Beliefs.**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Negative Outcome Beliefs Mean (SD)</th>
<th>Descriptive Normative Beliefs Mean (SD)</th>
<th>Friend Approval Mean (SD)</th>
<th>Parental Approval Mean (SD)</th>
<th>Efficacy Beliefs Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Young Adolescents (N = 96)</td>
<td>3.98 (.67)</td>
<td>14.35 (18.42)</td>
<td>1.63 (.85)</td>
<td>1.11 (.54)</td>
<td>3.35 (1.32)</td>
</tr>
<tr>
<td>Middle Adolescents (N = 128)</td>
<td>3.63 (.85)</td>
<td>27.18 (24.08)</td>
<td>2.10 (1.21)</td>
<td>1.20 (1.20)</td>
<td>2.31 (1.41)</td>
</tr>
<tr>
<td>Late Adolescents (N = 224)</td>
<td>3.27 (.79)</td>
<td>31.77 (18.37)</td>
<td>2.55 (1.05)</td>
<td>1.51 (.78)</td>
<td>1.46 (.79)</td>
</tr>
</tbody>
</table>

**ANOVA Test between age groups**

\[
F (2, 444) = 28.45^{***} \\
F (2, 444) = 25.10^{***} \\
F (2, 444) = 26.39^{***} \\
F (2, 444) = 15.58^{***} \\
F (2, 443) = 97.2^{***}
\]

*Notes:***p > .001
Discussion and Directions for Study 2

The data from Study 1 revealed important insights into adolescent athletes’ motivations and beliefs about smoking, as well as their communication experiences and preferences with their primary care providers.

A central tenet of the integrative model is that a small number of variables can explain a significant portion of variance of any behavior (Fishbein & Azjen, 2010). Hypothesis 1 therefore posited that the main tenets of the reasoned action approach, attitudes, perceived norms and self-efficacy would be significantly associated with adolescents’ vaping intentions. The hierarchical regression model supported this hypothesis – adding these components into the model accounted for an additional 19% of variance in the participant’s risk status.

Previous research has suggested that, generally speaking, adolescents’ normative beliefs play an important role in their risky behavior decisions (Grigsby et al., 2016; Kelly et al., 2011). This remained true for adolescent athletes; the perceived acceptance from their close friends was a significant predictor of their degree of e-cigarette risk. Surprisingly, perceived teammate approval did not significantly predict use risk level. However, additional study into the role of perceived teammate approval to substance behavior is warranted, particularly for sports where team self-identification tends to be higher (e.g., football), and for highly competitive/elite players (Veliz et al., 2015). Additionally, parental approval did not emerge as a significant predictor in this study, which is consistent with previous work that has suggested that peer influences tend to be
stronger than parental influences during the adolescent years (Liao, Huang, Huh, Pentz, & Chou, 2013).

This study explicitly measured descriptive norm beliefs, which is often excluded from studies using the reasoned action approach despite past research showing that it plays an important role in behavioral intention prediction, separate and distinct from subjective injunctive norms (Rivis & Sheeran, 2003). Results suggest that adolescent athletes’ descriptive normative beliefs – how popular they perceived e-cigarettes to be among their peers – were significantly associated with their own vaping risk. All groups believed e-cigarette usage to be higher than reported usage from nationwide surveys. The most recent National Youth Tobacco Survey (NYTS) found that 3.9% of middle school students and 13.4% of high school students currently use e-cigarettes (Arrazola et al., 2015), while middle school participants believed that 8.4% of their peers vape and high school participants believed 18.2% of their peers vape. This descriptive normative error could be a result of pervasive marketing techniques from e-cigarette companies, or influenced by the athletes’ own social circle. This finding is also consistent with past research that found overestimation of norm to be a common phenomenon in risk judgments among adolescents, for behaviors such as drinking alcohol (McMillan & Conner, 2003), and substance use (Elek, Miller-Day, & Hecht, 2006).

Finally, the results established a significant relationship between adolescents’ negative outcome beliefs and their e-cigarette risk. This suggests that addressing health risk beliefs can play an important part in intervention efforts. While a physician may not be able to easily alter perceived approval from important referents, (s)he can review
outcome beliefs and correct descriptive normative misconceptions with adolescent athletes. In turn, this may result in measurable impact on adolescents’ future e-cigarette behavior. Overall, findings from hypothesis 1 provide support for the need to develop a training curriculum that focuses on issues found to be most strongly correlated with e-cigarette behavior and risk, including outcome beliefs, descriptive normative beliefs and injunctive normative beliefs.

This study did not find perceived self-efficacy to be significantly correlated with e-cigarette risk group. While the efficacy item in this study was limited to a single item and may not have sufficiently captured the range of participants’ efficacy beliefs, the training curriculum will focus more heavily on outcome beliefs and normative beliefs as they were found to be weighted more heavily for vaping use and intention.

Common motivations for vaping found in previous research included: (1) curiosity, (2) appealing flavors, and (3) vape/smoke tricks (Kong et al., 2014). Athletes’ reported reasons for experimentation in this study were similar, with appealing flavors reported as the top reason for e-cigarette usage. However, the belief that e-cigarettes would negatively impact their ability to play sports was the second strongest correlation for use among those who currently vape/have vaped, but an uncommon motivation for non-athletes (Kong et al., 2014). Additionally, the third strongest correlation among the athletes were using e-cigarettes as a safer/healthier alternative to smoking. These findings suggest that athletes, more so than non-athletic adolescents, use e-cigarettes as a perceived healthy alternative to tobacco cigarettes. This is unsurprising given athletes’ concern with maintaining physical health and athletic ability. It is also in line with past
research on alternative tobacco products usage (e.g., smokeless tobacco) among adolescent athletes, suggesting that athletes use these products more often and for different reasons than non-athletes (Walsh et al., 2000).

The latter part of Study 1 examined the current tobacco screening practices of physicians. The data show that the topics that athletes most wish to discuss with their providers revolve around understanding how e-cigarettes could affect athletic performance and comparing e-cigarettes with other tobacco products. This again points to athletes’ concern with physical health/athletic ability, and their motivation for using e-cigarettes as a seemingly health alternative to tobacco cigarettes.

Together, these findings point to the importance of maintaining top physical condition and athletic ability to this group, and suggest that these concerns are both significantly influencing their decision to vape, and that they are interested in discussing these topics with their providers. These two areas should be the foundation of any intervention effort aimed for adolescent athletes.

RQ2 looked at differences in self-reported motivations for vaping among current users and at-risk users. Results showed that participants who were already using e-cigarettes were more likely to report wanting to vape because they liked the look of e-cigarettes, they liked doing smoke/vape tricks, they wanted to try new flavors and that they were using e-cigarettes as a safer alternative to cigarettes. Although not significant at p < .05, non-users were more likely to report that they would be interested in vaping because they were curious about what it feels or tastes like to vape. This suggests that vaping motivations may change as adolescents become more familiar with the device.
For example, while curiosity may initially motivate an adolescent to vape, other motivations that encourage social rewards (e.g., doing smoke tricks for their friends) and physical addictions (e.g., trying each new flavor as it is released) may take over as primary motivations as users become more comfortable with vaping. In a clinical context, it would be useful for providers to tailor an intervention to address the specific motivations of current vapers and those who have not yet tried e-cigarettes.

Athletes’ normative beliefs, descriptive beliefs, outcome beliefs about e-cigarettes differed by age group, as did their topic communication preferences. This is unsurprising, as the life-span approach sees behavioral development as a continually-changing process (Baltes, 1987). These findings are important in that they suggest that a training curriculum should address how age affects the relative importance of behavioral intention components, and what topics may be most relevant. For example, discussing descriptive norms (the behaviors of “the average teen”) for a younger population may be an effective message strategy, but less effective for older adolescents.

Finally, the data show that e-cigarette screening among this group was very low, at about 6%. This is lower than statistics reported in a representative national study, which found a 14% screening rate among adolescents (Arrazola et al., 2015). One explanation for this difference is that providers may screen athletes less than non-athletes for e-cigarette use because they (mistakenly) believe that they are less likely to engage in any sort of risky behavior. Another explanation could be that this study used patient self-report for screening, while previous studies have used provider self-report. Regardless,
further data is needed to understand why the screening rate is so low, and how this conversation can be better managed. The second study will focus on these issues.
STUDY 2

Primary Care Providers (PCP) Knowledge about E-Cigarettes and Levels of Efficacy in Adolescent Clinical Interactions

The goal of Study 2 was to understand electronic cigarette discussions from the providers’ perspective. There were three main aims guiding this study: first, understanding what information about e-cigarettes that providers report discussing or wanting to discuss; second, investigating the challenges and barriers that provider face in initiating and managing discussions about e-cigarettes; and third, compiling a list of techniques and practices that healthcare providers successfully utilize to encourage an open and comfortable atmosphere with adolescents during psychosocial screening and counseling.

Methods

Recruitment and Sampling. Before recruitment began, Institutional Review Board approval was obtained from George Mason University’s Office of Research Integrity and Assurance (Appendix E). Following approval, initial participants were recruited through my social and professional networks, as well as contacting several large pediatrician offices in the Northern Virginia area (Children’s Medical Associates, The Pediatric Group, and Northern Virginia Pediatric Associates) and the family medicine
department of the Fort Belvoir Community Hospital (FBCH). Upon completion of these initial interviews, participants were asked to share information about the study with their co-workers, colleagues and friends across the country. Additional interested participants then contacted me and set up a time to conduct the interview. Grounded theorists recommend between 20-30 participant interviews when using the constant comparison methodology (Creswell, 1998). Recruitment for this phase concluded after it met this criterion and, more importantly, when theme saturation was reached.

Purposive sampling was used to recruit primary care providers who regularly counsel adolescents in preventive care interactions. The initial recruitment search specifically sought out pediatricians, but this was later expanded to include other primary care providers including family practice physicians, nurse practitioners, and experienced physician’s assistants as it was determined that adolescents regularly engage in preventive counseling with these other types of primary care providers. During the recruitment process, several individuals were excluded from participation in the study. Reasons for study exclusion included: (1) practicing outside of the United States, (2) providers who spent less than 10% of clinical time with adolescents, and (3) health care professionals who do not regularly counsel adolescents or conduct psychosocial interviews.

Participants. Twenty-six providers initiated in-depth interviews. The interview from one provider was excluded from analysis because it was revealed partway through the interview that she did not regularly counsel adolescents. Of the remaining 25 participants, a majority (n = 11) were family medicine physicians, with fewer
pediatricians \((n = 9)\), nurse practitioners (NPs) \((n = 2)\) and physician assistants (PAs) \((n = 3)\). Slightly more male \((n = 13)\) than female \((n = 12)\) providers participated in the study with the majority \((n = 20, 80\%)\) identifying as White/Caucasian. The providers had been practicing medicine anywhere from 2 to 31 years, with an average of 8.24 years of practice. On average, participants spent around a quarter (22.4%) of their clinical time with adolescent patients, with providers reporting anywhere from 10-90% of their appointments to be with teenagers.

Because geographic variation in provider knowledge, recommendations and behaviors in others areas of healthcare have been documented (e.g., Henke, Wier, Marder, Friedman, & Wong, 2014), efforts were made to include providers who practiced in various parts of the United States to avoid regional bias. While the majority of the providers practiced in the Northeast \((n = 13, 52\%)\), 12 states (and all geographic regions) were represented in the sample, including Virginia, Maryland, District of Columbia, Ohio, Nebraska, Kansas, Washington, Utah, Florida, Tennessee, and Oregon and New Mexico. Provider participant characteristics are further described in Table 7.
Table 7.

**Sample Characteristics of Providers.**

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>13</td>
<td>52</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>20</td>
<td>80</td>
</tr>
<tr>
<td>Black</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
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<td>4</td>
</tr>
<tr>
<td>Asian</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Number of years practicing (M, SD)</td>
<td>(8.2)</td>
<td>(6.54)</td>
</tr>
<tr>
<td>% of clinical time spent with adolescents (M, SD)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>(22.4)</td>
<td>(18.26)</td>
</tr>
<tr>
<td>Medical Title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Care Physician (M.D.)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>Pediatrician (M.D.)&lt;sup&gt;c&lt;/sup&gt;</td>
<td>9</td>
<td>36</td>
</tr>
<tr>
<td>Nurse Practitioner (N.P.)</td>
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<td>8</td>
</tr>
<tr>
<td>Physician’s Assistant (P.A.)</td>
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<td>Geographical Region</td>
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<td>52</td>
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<tr>
<td>Southwest</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>West</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Southeast</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Midwest</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

*Notes: Total n=25. <sup>a</sup> For the purposes of this study, *adolescent* was defined as patients between ages 13-19. <sup>b</sup> One family care physician reported a sub-specialty of adolescent medicine. <sup>c</sup> One pediatrician reported a sub-specialty of sports medicine.*

**Procedures.** Interviews were conducted using semi-structured interview scripts.

Twenty interviews were conducted via Skype or phone, and five interviews were conducted in person. Following a semi-structured script (shown in Appendix F), interviews loosely followed five sections: (1) background and demographic information, (2) tobacco and other risky behavior screening and counseling, (3) electronic cigarette
screening and counseling, (4) perceived levels of efficacy and barriers to electronic cigarette clinical discussions, and (5) provider reaction and simulated responses to the main findings from phase 1 data. The interviews lasted anywhere from 12 to 38 minutes (M = 21.2 minutes, SD = 8.23 minutes). All interviews were audio-recorded and transcribed at the completion of the discussion, which resulted in 103 pages of single-spaced data.

**Analytical Process.** For this phase of data collection, I turned to the constant comparative method (Glaser & Strauss, 1967) and conducted a thematic analysis for each of the three research questions that guided this phase. An underlying principle of this method is that the data “are discovered or emergent as the open coding begins on the first interviews and observations,” and continue to be refined as “a core variable emerges and saturation begins to occur” (Glaser, 1992, p. 21). After an initial immersion and engagement with the data, I began the analytical coding process of selecting, separating and sorting data (Chamaz, 2006).

During the first phase of analysis, I engaged in open coding, characterized by the initial discovery of the categories and their properties (Gibbs, 2007). During this phase, I read through the transcriptions several times and assigned categories and properties to the explanations and experiences described by physicians in the interviews, avoiding preconceived codes and allowing concepts to emerge naturally. Throughout this process, I summarized key ideas and wrote abbreviated codes alongside the interview transcripts.

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8 While relatively short, this length of interview time was sufficient to answer proposed research questions, and was consistent with the interview length of previous work using physician in-depth interviews (e.g., Simmons et al., 2009).
in an effort to “see beyond the detail of the individual cases” and detect themes (Harding, 2013, p. 84). Following this process, I next examined these codes to look for commonality, connections and ideas that addressed similar ideas to develop larger themes (Harding, 2013). In this process, I developed categories and sub-categories, changing the constant comparative units from “comparison of incident with incident to comparison of incident with properties of the category” and thus modified, revised and developed new categories to best fit the data (Glaser, 1994, p. 188). This process continued until clear and distinguishable themes were developed and ready to be presented.

At the conclusion of the analytic process, validity was tested in this study through member validation or members checks (Lincoln & Guba, 1985). In this process, I presented the findings and analysis from this study to three providers who participated in the study to determine if they “recognized the findings as true and accurate” (Lindolf & Taylor, 2002, p. 242). Discussions were based around the questions: “Is there anything about this that I got wrong, or anything that you particularly liked?” and “Is this a fair description of your experience?” Providers largely reported that the findings were representative of their experiences, and none of the providers raised significant concerns about the validity of the results.

Results

The main purpose of Study 2 was to qualitatively examine health care providers’ knowledge, attitudes, and beliefs about e-cigarettes, as well as to better understand barriers and efficacy concerns regarding discussing e-cigarettes with adolescent patients.
The first research question investigated what facts and details about e-cigarettes providers felt was most important for adolescents to know. The second research question explored specific barriers that providers face with initiating and navigating these complex discussions.

A second goal of Study 2 was to gather a list of techniques and “best practices” for discussing risky behaviors generally, and e-cigarettes specifically, with teenagers. The literature has suggested that both providers and adolescents feel uncomfortable in these conversations (Ackard & Neumark-Sztainer, 2001). Part of the recommendations for this dissertation will focus on developing the interpersonal communication skills necessary for providers to effectively and comfortably manage these discussions, so it was important to collect effective techniques directly from medical providers. The third research question arose for this purpose, and queried for providers’ best techniques and tools to help teens feel more comfortable in interactions about risky behaviors and to facilitate an open convivial environment for accurate and complete screening.

**Research Question 6: Most Important Facts about Electronic Cigarettes.**

The first research question focused on what information about e-cigarettes that the providers either currently discusses with patients or that they would like to discuss with patients. One provider declined to answer, citing his own lack of knowledge about e-cigarettes. For providers who did not currently discuss e-cigarettes with patients, they were asked to imagine a hypothetical conversation with an adolescent to be able to answer the question. The responses from the remaining 24 providers focused on three
dominant categories: *electronic cigarettes not safe, unknown health risks, and gateway to other risky behaviors*.

**Electronic Cigarettes Not Safe.** Providers emphasized the importance of educating adolescents that electronic cigarettes are not safe, often by likening them to the harms of tobacco cigarettes. Providers discussed the fact that e-cigarettes still often contain nicotine as well as heavy metals and other potentially harmful chemicals, and also focused on the risks of accidental usage and ingestion of the liquid cartridges. Some providers noted that education about the harmfulness of e-cigarettes is paramount partially because many teens may not be getting this information from other sources, due to the lack of regulation and questionable marketing techniques of electronic cigarette companies. Indeed, providers reported hearing from teens that, “It’s the new thing coming out, so it must be safer. There must not be any risks, because I haven’t heard anything” (3).

Providers commonly used the fact that nicotine is commonly found in e-cigarettes to convince teen patients that vaping is indeed a risky behavior. One provider described e-cigarettes to his teen patients this way, “when I’ve had conversations with different patients, we’ve talked about how there’s still a bunch of chemicals in it. Most importantly, there’s still nicotine. We’ve known for a long time that nicotine is bad for you. Just think about it – it can’t possibly be good for you.” (8). Another provider emphasizes the addictive quality of nicotine in interactions with patients: “It’s still an addictive quality. While it may not be cigarettes, it still smoking and it still has
detrimental effects. And it’s going to be another thing that’s going to be hard to quit” (19).

Discussions about the addictive quality of nicotine were particularly apropos to discussions with teens who reported wanting to use e-cigarettes as a smoking cessation device. Here, providers emphasized that they believed e-cigarettes to be an ineffective smoking cessation device, as was reported to them by other patients. To these patients, one provider explains it this way, “I tell them, ‘they have not been shown to enhance permanent smoking cessation. They don’t break your nicotine dependence or smoking behaviors. And therefore I don’t recommend them as a method of choice for tobacco cessation’” (11).

Most providers (n = 20) discussed nicotine specifically as a something they felt like they should discuss with adolescents. Fewer (n = 6) discussed the potential effects of other ingredients found in e-cigarettes. While nicotine discussions usually explicitly stated the harm of the product (addictive, constrict blood vessels, etc.), simulated counseling about the other ingredients of e-cigarettes were less complete. Providers’ hypothetical conversations with teens mostly consisted of simply stating the ingredient was in e-cigarettes, but not how it was potentially harmful to teens’ bodies. The following was a typical response for how the provider would discuss other ingredients: “It’s not a regulated industry right now, so the heavy metals and some of the e-cigarette containers, they are still doing a lot of harm to their body. There’s also other chemicals and things like glycerin that is bad for you” (14). Only one provider stated specific potential health consequences of ingredients besides nicotine:
“I think it comes down to knowing that these things have so many chemicals. With these chemicals, we don’t know the long-term health effects of these on your body. Besides lung cancer, we are talking about oral cancer, changes in the mucus membranes. Yeah, it’s not a cigarette, but who knows? In the end it may be worse for you” (9).

In addition to the potential risks of the intended use of vaping, two providers also highlighted the risks of improper ingestion, particularly for teens that regularly interact with toddlers and babies. He puts it this way, “The risks of ingestion are also important. There have been several case reports of kids who have gotten their hands on the concentrated liquid and had, you know, poisoning from that. Especially if the teenager is a mom, which I see frequently, they need to know those kind of risks” (12).

Lack of Medical Information. While most providers cited the need to disabuse teens of the notion that e-cigarettes are without risk, many were weary to make definitive claims about the degree of harm associated with e-cigarettes. One provider who worked primarily with high-school aged male athletes reported: “I think knowing that the kid likely will be looking this up on Google and whatnot, you do need to be careful with not overplaying your hand and saying, you know, this is proven! This is horrible!” (16).

While some risks are known, providers lamented the lack of long-term, longitudinal studies on e-cigarettes. Due to this novelty, many providers reported that conversations about e-cigarettes are more complex than other, more established, risky behaviors. Providers brought up three techniques to deal with the complexity and uniqueness of e-cigarette discussions: (1) emphasizing honesty about the extent of current (lack of) evidence, (2) comparing the current situation with the tobacco cigarette timeline, and (3) stressing the lack of e-cigarette regulation.
First, several providers highlighted the need of honesty and transparency in conversations where the provider doesn’t have all the answers, or even access to all the answers. One provider describes e-cigarettes this way to teen patients: “I think with the teenage population, you have to be honest. Because they can see right through you trying to be pompous about everything. So you have to just say, ‘I don’t know all the answers. It’s something that I will be following as we learn more about it’” (19). This need for transparency was highlighted not just in the lack of medical information generally, but also the lack of knowledge and awareness that providers individually had on the topic. One provider reported being quick to tell adolescent patients that she doesn’t know everything: “Well, if it was cigarettes, I can talk to them for hours about it. I know lots about that. But for e-cigarettes, I tell them right off the bat, ‘this isn’t something that I know a lot about. I can research it and get you better answers.’ But I’m not going to make something up on the spot” (2).

Other providers found success in these conversations by linking the medical community’s lack of knowledge about e-cigarette safety with the lack of knowledge that physicians used to have about tobacco cigarettes. Providers reported this was an effective parallel because their teen patients are usually well aware of how knowledge of tobacco cigarette toxicity has evolved over the last century. As one provider puts it, “I talk to them about the importance of waiting until we have better-understood studies. And I say, the same thing kind of happened, back in the 50s, everyone was smoking cigarettes. They thought it was healthy, good for anxiety and those sorts of things. Whereas now, we know 50 years later that it is causing cancer and people are dying from it” (21).
Finally, a third way to explain the lack of knowledge about e-cigarettes was to emphasize how the lack of regulation with the product hinders their ability to accurately assess the risks associated with vaping. Here, providers discussed the inconsistent or incorrect labeling on e-cigarette products. One provider describes it to patients this way, “They’re not regulated, so it’s hard to know anything really for certain, even if it’s not the package. It’s not regulated by the FDA at all” (16). Another provider modified a common cliché: “what you see isn’t [necessarily] what you get” (21).

**Gateway to other Risky Behaviors.** A final dominant area that providers thought teens should know is that e-cigarettes may be a gateway drug to tobacco cigarette smoking and other harmful substances. This concern calls into question not the safety of the devices themselves, but its relationship with other dangerous substances and activities. According to one provider, “We know that rates of progressing on to smoking tend to be much higher for individuals using e-cigarettes. So you know, they need to know that this isn’t a benign activity in several different ways” (14). Another provider described e-cigarettes as “the first step to smoking cigarettes or other drugs” (16).

Providers highlighted the importance of providing this information particularly because e-cigarettes are often marketed as a way to end tobacco dependence. They reported that teens that come to their offices don’t consider the potential ripple effect that vaping could have on future behavior. One provider talks to patients about it this way, “it’s an addictive substance that could be a transition to regular cigarettes. So I make sure they know what they are seeing from advertisements isn’t the truth. It’s not leading you away from cigarettes, it’s leading you towards cigarettes” (14).
**Research Question 7: Barriers to Electronic Cigarette Conversations.** While almost all providers felt that there were facts about e-cigarettes that teens *should* know, only 20% ($n = 5$) reported specifically screening for e-cigarettes in regular well check-ups, preventive visits, and sports clinics. The second research question queried about the primary barriers for meaningful discussions about e-cigarettes with teenage patients. For those ($n = 20$) who did not adequately screen for vaping use, the dominant reasons fell into four core categories: *lack of knowledge and awareness, feeling uncomfortable, screening tools too vague* and *lack of time*.

**Lack of Knowledge and Awareness about Electronic Cigarettes.** The most common reason cited for not discussing electronic cigarettes was that providers felt they did not have sufficient medical information about the toxicity and risks of electronic cigarettes. Nearly all providers ($n = 23$), even those that reported that they do currently screen, indicated that they wish they knew more about electronic cigarettes. Providers cited the lack of information from several sources, including formal medical training (e.g., pharmacist lectures, medical school training, continuing education courses), medical journals and co-workers/colleagues. As one provider put it: “The big thing is that e-cigarettes are kind of difficult because there isn’t a lot of research about them. I don’t really know what toxins or what chemicals are in there, so it makes it difficult to talk about them. I just don’t really know what’s in them” (4). It was also common for providers to negatively compare their knowledge about electronic cigarettes to tobacco cigarettes. They expressed frustration for not being able to deliver the same level of counseling for electronic cigarettes as they traditionally have done for tobacco cigarettes:
“I think knowing, I think probably down the road when we know the science of it, that will help. So we know, X, Y, and Z, and that’s why it’s bad. And maybe it’s not as bad as cigarettes, or maybe it is as bad as cigarettes. But knowing what to do with all of these people doing e-cigarettes, knowing that information is what is really going to drive a lot of that. Right now I don’t know enough about it to do anything really” (13).

Another provider similarly explained:

It’s hard for me as a provider, I don’t have access to the same kind of studies that we have for smoking and have information off the tip of my tongue. When a patient asks me, ‘what are the detrimental effects of e-cigarettes?’ I’m like, ‘well it’s gotta be bad!’ but I’m really just winging it. And knowing that’s bad, I don’t have any solid facts at my fingertips like I do with cigarettes” (9).

In addition to lacking knowledge about the ingredients of e-cigarettes, providers also expressed confusion regarding adolescent usage of e-cigarettes. Some common items of puzzlement cited were the motivation for adolescent usage, how teens’ use of e-cigarettes interact with their use of tobacco cigarettes (e.g., smoking cessation for smokers vs. dual usage vs. usage among non-smokers), how teens talk about e-cigarettes and how prevalent vaping is among teens. One provider described how this lack of knowledge prevents her from being able to discuss e-cigarettes with her adolescent patients: “I think it’s always easier to bring up something using their language, and I don’t know their language at all on this subject. So just [not] knowing how kids talk about it is a huge barrier. So just knowing what they call it, knowing how they use it would be really helpful” (10).

As a natural result of the lack of knowledge and training, providers reported a general lack of awareness about electronic cigarettes while asking screening questions and navigating the psychosocial interview. A common barrier cited was simply forgetting
that electronic cigarettes should be screened for, or even that they exist. One provider describes her experience as follows:

“I think that the thing is that they are relatively new, compared to how long we have had cigarettes and alcohol. So I don’t think that I’ve had any statistics or training about it. So one thing would be to take the social history – it’s not brought up there. So that’s why I don’t bring it up, it just isn’t part of my training. Oftentimes they will offer it, and then it will trigger my memory like, ‘oh right! Of course we need to talk about this!’ But I just forget it about it otherwise” (16).

Additionally, given the common marketing technique of labeling electronic cigarettes as a smoking cessation tool, some providers supposed that only adult smokers would use electronic cigarettes and did not consider screening for it with teenage patients. As one provider noted, “I don’t think of it as a teenage thing, just a smoking cessation tool for my older adult patients. I didn’t even know that teens liked it or thought it was cool. Me just being more aware of the issue with that population would help a lot.” (19)

**Not Comfortable Discussing.** Closely related to not having sufficient information about e-cigarettes, many providers reported that they do not feel comfortable or lacked the efficacy to discuss e-cigarettes with teens. Some providers reported the need to save face, fearing that they would appear unprepared and be rattled if a conversation did occur: “I’m pretty sure that I sound like an idiot when I’m talking about e-cigarettes. Like, I uh, don’t even really know what it looks like. So I just don’t bring it up” (14).

Adding to this concern, many providers assumed that their teenage patients would know a great deal about e-cigarettes, with knowledge from personal experience, Internet research, e-cigarette advertisements, and their peers prior to a clinical discussion. While teens may share apocryphal information, providers didn’t always feel comfortable questioning patients’ apparent understanding of the device. One provider summed up this
concern, “If I had a teen in my office, they almost certainly would know more about e-cigarettes than I do” (9). Another similarly noted, “I just don’t feel comfortable about it. If I felt like I knew more about them, then I would feel more comfortable bringing them up. Now, it’s like, I’m sort of afraid to because if they ask follow-up questions then I wouldn’t be able to answer them” (3).

Several providers recalled negative experiences with adolescents who initiated conversations about electronic cigarettes during the psychosocial interview period of a well-visit. One reported being “blind-sided” (4) by the conversation. Another described a conversation with a 16-year-old male patient:

“The first time I heard about it was from this kid, and it’s totally caught me off-guard. I was like, ‘yes, that’s still bad’ and he was like, ‘no I read on-line that it wasn’t.’ And then I was like, ‘you’re confused because you are not actually inhaling this smoke, you’re just puffing on this strange vapor thing. But it’s still bad.’ And I could tell that he wasn’t sold, but I didn’t want to talk about it anymore because I didn’t feel comfortable. I didn’t feel prepared” (9).

Despite this common barrier, a few providers emphasized the importance of not waiting until they had all the answers to talk about e-cigarettes with teens. As one provider put it: “even though we don’t know everything, it’s still important to talk about. I think that a lot of times we as healthcare providers are kind of behind the times for what we screen for. I think that by the time that we started screening for it, if we waited until we knew about it then there would be so many more people that would already be doing it” (22).

Another cause for this barrier was a general feeling of discomfort bringing up sensitive topics with adolescent patients. This seemed to be especially prevalent when the
patient’s parent is in the room. One provider, a physician’s assistant, describes her experience: “I don’t ask the parent to leave, but I should. I mean, it’s always so awkward when they’re there, and I never really get a clear or honest answer. So I basically don’t screen for anything, e-cigarettes or otherwise. It’s too weird” (13).

**Screening Too Vague.** Interestingly, one barrier to adequate electronic-cigarette screening was simply that providers erroneously thought they were screening for use by using a general, vague screening question of: “do you smoke?” or “do you use tobacco products?” However, some providers indicated later on in the interview or through other follow-up questions that teens may not consider electronic cigarette to be applicable to the general tobacco screening question. As one provider put it, “I think the [barrier] for me is probably just remembering to bring [e-cigarettes] up specifically. Because I often would just discuss smoking. And I’m realizing recently that a lot of teens probably think, ‘no I’m not smoking because e-cigarettes don’t count’” (7, emphasis added).

Some providers additionally reported that they forgot to screen for electronic cigarettes because it was not specifically mentioned on the psychosocial screening forms or conversation cues/starters provided by their practice and/or electronic medical records. Because they were not specifically listed, it was easy for providers to quickly gloss through the tobacco screening question without proper follow-up. One provider describes the psychosocial history taking process:

“On the forms that I would fill out when going through and bringing everything up, there was a spot for tobacco generally. And so it was just part of my normal physical, I would just fill in the words there. So if there were a way to add that it, I would probably end up discussing it on a regular basis. And then I would be sure to ask that question and have that discussion. Whereas, prior to this, it probably wouldn’t be on the front of my mind because it’s not on the sheet” (25).
**Lack of Time.** As with many issues in clinical interactions, several providers cited lack of time as a barrier for meaningful conversations about e-cigarettes. The providers reported only having around 15-20 minutes with the patient to complete all portions of the appointment, including the psychosocial interview, all behavioral counseling, physical examination and any patient- or parent-initiated concerns. Many had trouble squeezing in e-cigarette discussions in an already rushed visit. One provider discussed her frustration:

“Time is always the hard thing. I usually try to let them know, you know, I screen for them and give them my one-liner, about generally recommending against nicotine and tobacco products. I want them to hear at least from someone that it’s not something that we recommend. But it’s usually all that I have time for. I wish I had more time” (12).

A unique time consideration with e-cigarette discussions was that e-cigarette users may not have all the necessary background or knowledge that they often do with other substances. One provider summed it up this way: “with smoking, you know it’s bad, I know it’s bad. That conversation is quick. With e-cigs, we have to make sure we’re on the same page. That takes a lot longer” (3). Another provider added:

“Time is always a factor. When I’m thinking about counseling, that’s something that I have to keep in mind – thinking about how much time I’m spending counseling. And making sure that I can get everything done. Especially if it’s new and people don’t know a lot about it, it probably would take more time to provide counseling for it” (9).

Related to the issue of time, a few providers felt like e-cigarettes were a low priority to discuss, given the plethora of other risky behaviors to screen and counsel for. One provider discussed his priorities this way: “In a visit where there are several risky
behaviors, if we are comparing e-cigarettes with you know heavy alcohol use or risky sexual behaviors. Probably e-cigarettes would take a backseat to those other two things for me, in terms of what to counsel them about. And then I may not have time to talk about e-cigarettes” (14).

Another provider noted that she finds it counterproductive to counsel on everything at once, which often results in delaying potential e-cigarette counseling:

“So, I feel like if I can almost – not validate their use [of e-cigarettes] by any means – but not beat them down on every problem, and try to focus on one or two issues and them overcome and try to figure it out. But I feel like it’s useless to try to solve [every] problem at the same time. So I usually just focus on other things first and then hope to get to e-cigarettes at another visit” (11).

**Lack of Brochures/Handouts.** In addition to having access to more knowledge generally, some providers reported that not having visual brochures and handouts to share with teens in a clinical interaction or to have in the waiting rooms was a barrier to conversations. Many described how it was easier for them to initiate and navigate the conversations generally with the built-in discussion guides and information found in these types of brochures and handouts. Some of the most commonly requested items and facts to have in these materials included, (1) current facts and evidence, as well as websites that providers and patients could go to for the most up-to-date information, (2) a quick 1-2 line summary of the risks and/or website links to include in patient instruction printouts at the conclusion of the visit, (3) information specific to teen use and teen motivation, and (4) a brochure to be read just by providers with information about how to talk about e-cigarettes with adolescents.
One of the primary reasons why providers requested these materials was because they lacked the time to keep themselves up to date on the newest or most important information about e-cigarettes. One provider described his difficulty, “In my world there’s so much that we have to keep up with. I simply don’t have the time to be an expert in every area. Having up-to-date information that the research has been showing about it not being healthier would be really helpful” (8).

It was important for providers that the information contained in these brochures and handouts were succinct, bulleted and easy to read, citing teens’ stereotypical short attention span. One provider described how she successfully utilizes these tools for other risky behaviors:

“With our screening tools with alcohol, it’s always nice to have our questions, but also on the reserve side of the card, [which only I can see,] there is kind of a go-to pointer of ‘oh, alcohol causes cirrhosis, it causes this, it causes that.’ You can show that to a patient and be like, ‘this is the health detriments. This is what the research is showing.’ Something like that would be really helpful” (8).

Finally, providers highlighted the need to include information that was relevant to both the way that teens use e-cigarettes, and the adolescent mentality. Providers emphasized the importance of avoiding medical jargon for these materials, and some stressed the need to include statistics and citations that are specific to the teenage population. Another provider discussed tailoring the material to be most effective this way, “Teens are so concrete. I feel like if I had a few really good facts about e-cigarettes that would be good. Kind of like concrete evidence as to why they are harmful. And not just harmful generally, but harmful to them. Teens are very concrete about a lot of things and certain ideas and I think that would help” (1, emphasis in original).
Research Question 8: Best Practices to Improve Conversations about Risky Behaviors. The last research question for this phase of data collection shifted focus and investigated providers’ techniques and tools to facilitate interactions about risky behaviors with adolescents. The following list is intended to act as a resource to improve the accuracy and effectiveness of risky behavior discussions generally, and to help with discussions about e-cigarette discussions specifically. Providers’ responses fell into five primary categories: emphasize confidentiality, focus on relationship building, normalize the behaviors, provide resources and education, and use appropriate language.

Emphasize Confidentiality. Providers described the importance of emphasizing confidentiality to teens while discussing vaping and other risky behaviors (n = 22). By law, physicians must keep information obtained in clinical interactions private, unless the patient indicates that they will be harmed or intend to harm someone else. Despite this compulsory confidentiality, providers believed that it was important to thoroughly explain this confidentiality regulation to adolescents, as teens often assume that the provider will discuss disclosed behaviors with their parent or guardian. As one provider put it,

“I try to root it in medicine and not law. So when the parent steps out of the room, I tell that kid, ‘Look, I’m here for you, and I want you to feel comfortable coming back to me. I want to earn your trust, and that means that I’m going to respect your privacy. I’m not going to tell anyone what you say’” (23).

Another provider stated, “I joke with them. I first say to them that if it has anything to do with sex, drugs, or rock ‘n’ roll, that they are allowed to see me at any time without their parents’ permission. That they are allowed to have confidentiality with those issues” (4). Many providers indicated that by stressing this privacy, they believed
patients would be more willing to disclose their thoughts and behaviors regarding risky behaviors.

Several providers indicated the difficulty of obtaining an accurate psychosocial history if the adolescent’s parent is in the room, which essentially makes confidentiality impossible. One provider likened conducting the psychosocial interview under the gaze of parents to “pulling teeth” (3) as many teenagers clam up, afraid of parental repercussions. Another provider described his experience attempting to ask a teenage patient questions while his mother was sitting next to him:

“We would be going through the list, and I would say something like, ‘do you smoke?’ and the kid would pause for a second too long, and then give [his mom] a sideways glance and then say, ‘no, I don’t do that. Of course not.’ And I’m pretty sure that I could smell cigarette smoke on his clothes. Since then I pretty much just kick the parent out. I tell them it’s standard practice. It’s too hard otherwise” (24).”

Focus on Relationship Building. Despite the importance of discussing confidentiality, providers reported that discussion alone is often not sufficient to create an open and comfortable discussion about risky behaviors. In addition to privacy discussions, many providers also found it beneficial to begin the psychosocial history by either beginning or continuing to develop a personal, non-medical relationship with the patient. Several physicians noted that taking the time to focus on a personal relationship was well worth the time investment, as it made the adolescent more relaxed which in turn allowed for quicker, more accurate screening and improved counseling.

“The biggest thing is of course if they know you or have a relationship with you. One of the things that I always try to do is ask them about what they like to do, or their hobbies, or something that they would hopefully like to talk about. To show them that you are actually interested in learning more about them. I try to relate as much as I can” (16).
Providers described several different approaches to focus on relationship building. One provider reported how he utilized common interests to encourage a relational bond prior to beginning the psychosocial history: “I skateboarded for 15 years, so if there’s a skateboarder in my office, we’ll kind of talk and relate and just kind of get down on his level. Just try to get some sort of connection going where he says, ‘okay, he kind of gets this.’” (8). Another provider explained how she used small talk techniques to seamlessly segue into the psychosocial questioning period of the exam, avoiding the potentially awkward transition into requesting patient disclosure:

“And I’ll ask them what their dream is, what their goal is in their life. And if they smoke or have other risky behaviors, and there is something that they really want to achieve, I’ll bring it back to the risky behavior and say, ‘hey, the next time this cigarette is presented to you, or you’re in the heat of the moment and don’t feel like necessarily using a condom, just remember that goal of yours. All it takes is a split second and that could be gone forever.’” (14).

Other providers explained that first focusing the discussion on the patient’s friends is another way to effortlessly transition into the patients’ own behaviors. She states:

“I first focus on the things that their friends do. Because I feel like sometimes if they are going to hold out, then they might first admit that their friends are doing things. And then we come to find out that they are doing things. And this lets you give them out to talk about some of this stuff without actually admitting that they are doing it” (4).

Normalize the Behavior. Several providers indicated that normalizing the risky behaviors was important to facilitating an open, in-depth conversation with adolescents. Providers described normalizing the behaviors as, “making it a non-issue” (8), “putting it as a matter-of-fact” (21) and emphasizing that “I ask all my patients this – not just you”
Similar to confidentiality discussions, providers noted that adolescents may be embarrassed, ashamed, or worried about the provider’s reaction if they disclosed participation in risky behaviors. As one provider put it, “sometimes they think we are going to shame them, or say, ‘why would you ever do that? Don’t you know better than that? Didn’t your parents teach you better?’” (24).

To combat this, some providers emphasized the fact that these behaviors, although risky, are common among teens. One provider stresses, “‘Hey high school is crazy. Lots of things are going on. I’ve been there’” (6). Others tell patients, “‘A lot of kids your age are having sex. Is that something that you’re doing now?’ That helps them save face” (8) and, “I talk about things that I was thinking about when I was their age, and that it’s normal, and to let them know that those risks are out there. And that they shouldn’t be embarrassed to be talking about those things” (14).

However, a few providers stressed that there is a fine line between normalizing the behavior and being perceived as condoning the behavior: “I do always try to be careful though that they understand that I’m not saying ‘it’s okay for you to do this’ when I say ‘a lot of kids are doing this.’ It’s hard because I don’t want them to get the wrong idea that I’m okay with it.” (8).

**Emphasize Education.** Another common theme among providers to improve sensitive conversations was to frame the discussion in terms of education instead of perceived moral judgment. This theme included educating the patient as to the importance of the psychosocial interview, educating the patient on risks of behaviors, and educating the patient on available resources.
The most common form of education cited was on the rationale for asking the questions. By framing the discussion on the patient’s own safety, providers were able to disabuse teens of the notion that they are asking out of suspicion or morbid curiosity. One provider described the importance of telling patients why the history was needed: “I try to emphasize the importance of making sure that they open up to me about their full history. And that is how we can give them the best medical care. I tell them, ‘you telling me the truth allows me to take the best care of you and give you the best information’” (21). This education often overlapped with framing the discussion in terms of educating on potential risks and patient empowerment. One provider put it this way: “I try to explain to them why we want to know the questions. So if there are any specific reasons, but also just general risk, I say, ‘If you are talking risks, we just want to help you be as safe as you can be’” (15, emphasis in original).

Similarly, another provider explained, “I tell them that it’s not my job to make a decision for them. It’s my job to educate them and help them understand their healthcare choices, and I want to empower them to make the decisions that are in their best interest. I want them to be educated on the consequences and risks of their health behaviors” (5).

Two providers additionally reported that they often give adolescent patients a variety of pamphlets, brochures, links to web sites and other resources to take home with them. They noted that tech-savvy teens are often more comfortable pursuing information at home and that they saw their role, at least initially, as providing them with accurate, evidence-based resources to begin their search. One provider describes her success with this technique:
“I give [my patients] resources. Because a lot of times, they won’t open up or they won’t tell you something while they’re there. But they’ll come back and say, ‘oh I used that website,’ or ‘I did look that up like you asked me to.’ So the resources when they’re not actually in the office are helpful for conversations down the road” (1).

**Use Developmentally Appropriate Language.** A final technique that providers reported using was being conscious of their use of medical jargon and non-verbal communication while in the clinical interaction. Several providers reported modifying their rhetoric to use slang terms commonly adapted by teens, such as “sleeping together” for sexual activity, “pot” for marijuana, and “lighting up” for smoking. One physician described it this way:

> “I always try to talk using the language that they use. So saying to an adolescent, ‘are you sexually active?’ is not very effective because that’s not what they call it. So I try to use the language that they might call it. So instead, I would say something like ‘have you slept with anybody?’” (10).

While providers felt this accommodation was necessary, some noted that a potential for patient perceived overaccommodation could conceivably cause this technique to backfire. Providers discussed the need for this language to appear natural and to not “dumb it down” (8). One provider reported, “I direct the language that I use to the appropriate maturity level. Kids don’t want to be treated like their opinion doesn’t matter, or that they’re not intelligent, because they are. So using words that they understand, but words that make it clear that you respect them.” (16)

In addition to the need of developmentally-appropriate language, one provider additionally described how she adapted her non-verbal communication to help her patients feel more comfortable. She says,
“I always try to sit down now on the stool when talking to patients. I feel like if I’m standing, I find that they feel like they’re kind of being put on the spot. … And of course making eye contact with the patients instead of staring at my computer, and then just trying to smile and being approachable helps” (19).

**Discussion and Directions for Study 3**

Little research has been conducted on provider behaviors and efficacy with e-cigarette discussion with teens, and the work that has been done has used quantitative methodology (Pepper et al., 2014). The data from this phase considerably added to the body of research on physician knowledge and efficacy with e-cigarette discussions by using in-depth interviews to further explore these issues.

The first research question in Study 2 investigated what providers are currently counseling on regarding e-cigarettes, and/or what they feel is the most important facts that adolescents should know. The most common reasons cited were that electronic cigarettes are not safe, the health risks associated with vaping are unknown, and that electronic cigarette use can be a gateway to other risky behaviors and substances.

The majority of the facts related to electronic cigarettes not being safe centered around the health risks of nicotine. There are several reasons that this may be the case. One factor may be that nicotine is a common ingredient to both electronic cigarettes and tobacco cigarettes, and providers use the presence of nicotine to psychologically connect the products. Additionally, the risks of nicotine on the body are more researched and understood than other ingredients found only in electronic cigarettes, such as propylene glycol, vegetable glycerin and other chemicals flavoring the solutions. While discussing nicotine-related health risks is important, relying solely on it as an argument for the
health risks of vaping could be problematic for adolescents that purchase nicotine-free solutions. Additionally, the risk information that providers reported was often vague and focused on the addictive nature of nicotine, rather than adverse physical outcomes. This was closely related to the discussion of e-cigarettes as a gateway to other substances, particularly tobacco cigarettes. Finally, many providers emphasized the lack of medical knowledge on long-term health consequences of e-cigarettes. These foci will guide the initial development of messages to be shared with adolescent athletes in Study 3.

The second research question investigated the barriers that providers feel hinder their ability to adequately discuss e-cigarettes with adolescents. Many of the reported barriers (lack of knowledge and awareness, feeling uncomfortable, screening tools too vague and lack of time) could be directly addressed through provider intervention training. Based on these responses, key elements of the training would include providing bulleted, key facts and health risks about e-cigarettes, discussion of how to effectively and quickly conduct the psychosocial interview.

Perhaps the easiest barrier to address is to instruct providers to screen specifically for e-cigarette use. Data from Study 1 found that half (50.9%) of college-aged athletes generally, and 58% of e-cigarette users specifically, did not consider e-cigarettes to be a tobacco product. Yet, almost all providers in Study 2 indicated that they would screen for e-cigarettes as a tobacco product. In essence, these providers think they are screening for e-cigarette use, when in fact, they aren’t. This phenomenon has created missed opportunities for screening in the clinical encounter, which in turn has hindered e-cigarette discussion initiation and counseling.
The final research question for this phase focused on what providers felt were the best techniques for fostering a positive environment to discuss risky behaviors with adolescents. The techniques that the physicians discussed can be categorized from Mead and Bower’s (2000) seminal paper on patient-centeredness, which outlined five dimensions of patient-centeredness: (a) a biopsychosocial perspective where health is considered on a number of psychological and social factors in addition to biological factors, (b) The patient-as-person, which underscores the importance of understanding the subjective meaning the individual attributes to the illness, (c) sharing power and responsibility, which calls for an egalitarian relationship between provider and patient, (d) therapeutic alliance, which notes the importance of a positive personal relationship between doctor and patient, and (e) doctor-as-person, which emphasizes the personal attributes of the doctor and how that can affect care.

First, the importance of the psychosocial interview itself is rooted in the biopsychosocial perspective. Mead and Bower discuss these themes primarily in the context of illness and disease, although the underlying tenets remain relevant here. In the interviews, the doctors emphasized the importance of being willing “to be involved in the full range of difficulties patients bring to their doctors, and not just the biomedical problems” (p. 1088) by screening and discussing a wide variety of issues and concerns with their patients, including substance abuse, mental illness, and other risky behaviors not directly relevant to a biomedical model (e.g., risky driving behaviors).

Additionally, many of the techniques listed by providers emphasized the patient-as-person theme. Overall, providers stressed the importance of focusing on non-medical
relationship building – including friends, dreams and goals – to better gain a full understanding of the patients’ unique motivations and context for risky behaviors. Doing this not only created a welcoming environment, but it allowed providers to better understand the context of the patient’s decisions to engage in risky behaviors.

Next, providers reported emphasizing confidentiality to build trust with patients, key to a therapeutic alliance, which largely rests on the patient perception of the doctor as a trusted medical ally. Here, participants also stressed the importance of educating patients about the need for psychosocial screening by saying things like, “you telling me the truth allows me to take the best care of you and give you the best information.” Finally, providers were also sensitive to the fact that their influence may serve to help or hinder the interaction, as described in the doctor-as-person dimension. In order to capitalize on this, some providers reported discussing their own high-school/college experiences with patients to develop rapport, while others subtly changed their verbal and non-verbal behaviors to become more relatable and encourage conversation. The techniques and examples gathered from this research question will be key for providing training recommendations to improve provider efficacy.

The next and final phase of data collection will use the information gleaned from Studies 1 and 2 to develop, test, modify and improve messages to provide the most effective intervention for providers to share with adolescent athlete patients.
STUDY 3

Focus Group and Message Pre-Testing Among Adolescent Athletes

Study 3, the final phase of data collection, focused primarily on pre-testing potential messages among at-risk and current e-cigarette users that could be later used in a physician-led intervention. Pilot testing messages and materials among the intended demographic is an important part of message development and implementation (USDHHS, 1992), and a necessary step before providing recommendations for the provider training curriculum. Studies 1 and 2 informed much of the content, themes and framing of the messages tested in this study.

Data for Study 3 were collected through adolescent focus groups. Focus groups were an appropriate method of data collection for Study 3, as this methodological approach allows for group interaction to expand and clarify an individual’s own experience and thoughts. Important details are gained by the interactions between members as they discuss ideas and relate to one another, beyond what could be gained in one-on-one interactions (Krueger & Casey, 2000). Focus group methodology is a common and appropriate for message testing and evaluation of new designs and strategies (Carey & Asbury, 2012), which is the primary purpose of this phase.
A secondary goal of Study 3 was to better understand factors that influence adolescent athletes’ willingness to accept or reject behavioral counseling from their primary care providers. As the messages tested here will be delivered interpersonally through healthcare providers, it is necessary to consider how the influences of discourse and the provider-adolescent relationship affect how these messages will be received.

In this study, adolescents who were classified as low-risk based on past usage and intention to use were excluded from the study. Additionally, only middle (16-17 years old) and late (18-19 years old) adolescent athletes were considered for inclusion in the focus groups, as Study 1 found that early adolescents (13-15 years old) were rarely at risk for vaping.

**Methods**

**Recruitment.** College (late adolescent) recruitment for this phase was embedded within the survey administered to college adolescents in Study 1. At the end of the survey questionnaire on Qualtrics, all participants were informed that survey was part of a larger study that also included focus groups. They were then asked to provide their contact information if they were interested in participating in the focus groups. High school (middle adolescent) recruitment was completed through contacting track/cross-country teams and using snowball and social network techniques. Parental approval was obtained for all adolescents under age 18 prior to their participation in the study.

All interested participants were provided with a link to a screening survey, where they indicated their availability, confirmed their athletic status, and reported their risk status via a screening question: “Which of the following describes you: (a) I have never
tried e-cigarettes, and I never plan to (classified as low-risk); (b) I have never tried e-cigarettes, but I may try them in the future (classified as at-risk), (c) I have tried e-cigarettes, but don’t use them regularly (classified as user), and (d) I have tried e-cigarettes and use them regularly (classified as user).9” Selected participants were notified and sent a reminder e-mail the evening before the study to lower no-show rates. Recruitment concluded when data reached saturation.

In return for successfully completing the study, participants were given $20 cash and a pizza dinner during the study. Food generally, and pizza specifically, has been shown to improve pre-session conversation and support an informal and relaxed atmosphere during focus group discussions for high-school and college-aged students (Krueger & Casey, 2000).

Members were recruited and selected based on purposive sampling. Reasonable homogeneity of demographic characteristics is encouraged for focus groups, as individuals are more likely to share information with those that they perceive to be similar to them (Carey & Asbury, 2012). Consistent with the target demographic, potential participants were excluded if they: (1) were classified as low-risk via the screening question, (2) older than age 19 or younger than 16, (3) had not participated in an organized sport in the past year. However, the design of the groups aimed for group members to also represent a range of experiences with e-cigarettes, thus both at-risk and current users were included in all focus groups. Efforts were made to keep the group size

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9 The subcategories of occasional users (C) and regular users (D) were collapsed into a broader “user” category, given the small number of participants in the focus groups.
to 6-8 participants per session, as groups of nine and larger can be difficult to manage and lead to less depth of data (Carey & Asbury, 2012).

**Participants.** Focus group participants \((n = 25)\) included 12 late-adolescent athletes (ages 18-19) in two focus groups \((n = 6, n = 7)\) and 13 middle-adolescent athletes (ages 16-17) in two other focus groups \((n = 5, n = 7)\). The majority of participants self-identified as White \((n = 17)\) and male \((n = 16)\). Most participants \((n = 19)\) had tried e-cigarettes at least one time, with the remaining participants \((n = 6)\) indicating some degree of intention to vape in the next year. Participants reported participating in a wide range of organized sports in the past year, including soccer, swimming/diving, rowing, football, track/cross-country, dancing, cheerleading, basketball, tennis and baseball.

**Message Development.** The development of the message library was grounded in the integrated model, and informed by salient beliefs that accounted for a large proportion of variance in e-cigarette behavioral intention in Study 1, as well as feedback from providers in Study 2. A wide variety of themes, messages and delivery styles were tested. Specifically, Study 1 found that some primary motivations for adolescent athlete vaping included wanting to try new and interesting flavors (message 9), curiosity about what it feels or tastes like to vape (message 4), wanting to perform smoke/vape tricks (message 12), and using as an alternative to tobacco cigarettes (messages 11, 13).

Study 1 also asked adolescent athletes which topics they most preferred to discuss with their providers. Some messages were also developed based on athletes’ topic preferences, including: connection to athletic ability (message 7), discussing the
ingredients of e-cigarettes (messages 3, 4, 8, and 13) and comparing the safety of e-cigarettes to other tobacco cigarettes and other substances (message 5). Finally, a normative message was developed because Study 1 showed that normative beliefs were significantly associated with e-cigarette risk and intention (message 10).

Findings from Study 2 also influenced the development of messages. The first research question for this study (RQ 6) asked providers what information they felt was most important for adolescents to know about e-cigarettes, based on their clinical experience. Providers emphasized the need for adolescents to know that the long-term health effects of e-cigarettes are not well understood (messages 1 and 2), that e-cigarette marketing and labeling is not regulated by the FDA (message 3) and how e-cigarettes are not necessarily an effective smoking cessation tool (messages 6 and 11).

Finally, some factual information and other framing of messages were adapted from an existing campaign created by the Alaska Department of Health and Social Services (2015) (e.g., message 4), American Cancer Society (2015) and a government fact sheet (Centers for Disease Control and Prevention, 2016). A full list of the messages tested in Study 3, along with their message development and average rating can be found in Table 8.
<table>
<thead>
<tr>
<th>Message #</th>
<th>Message Text</th>
<th>Message Development and Rationale</th>
<th>Overall Average Rating M (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The long-term health effects of e-cigarettes are not well understood. There are no long-term studies of exposure to these productions – including their solutions, cartridges, or flavors.</td>
<td>Provider Topic Preference (Study 2): Long-term health effects of e-cigarettes are not well understood</td>
<td>1.53 (.92)</td>
</tr>
<tr>
<td>2</td>
<td>Think there are no health effects from vaping? That’s what we [doctors] thought about tobacco cigarettes, too. In the 1950s, we thought cigarettes were healthy and were prescribed for anxiety. Big tobacco won’t fool us again, don’t let them fool you either.</td>
<td>Provider Topic Preference (Study 2): Long-term health effects of e-cigarettes are not well understood</td>
<td>3.31 (.63)</td>
</tr>
<tr>
<td>3</td>
<td>Think you know what’s in e-cigarettes? Did you know that e-cigarette companies are not mandated to disclose product ingredients or health effects, and many companies provide insufficient and/or incorrect information about the contents of their products.</td>
<td>Adolescent Topic Preference (Study 1): Discussing the ingredients of e-cigarettes Provider Topic Preference (Study 2): Marketing and labeling of e-cigarettes not regulated</td>
<td>3.09 (.59)</td>
</tr>
<tr>
<td>4</td>
<td>You don’t need to be curious about e-cigarettes: You see the ingredients every day:</td>
<td>Vaping Motivation (Study 1): Curiosity about what it feels or tastes like to vape</td>
<td>3.38 (.70)</td>
</tr>
</tbody>
</table>

The ordering of messages here was created at random and does not imply a conceptual order. Participants were asked to “grade” each message – a developmentally-appropriate methodological approach for an adolescent population. For the purposes of quantitative analysis, the grades were then converted to a numeric scale, using the following metric: A+=4, A=3.67, A-=3.33, B+=3, B=2.67, C+=2.33, C=2, C-=1.67, D+=1.33, D=1, D-=.67, F=0.
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<tbody>
<tr>
<td><strong>Acetone:</strong> Found in e-cigarettes and nail-polish remover.</td>
<td><strong>Propylene glycol:</strong> Found in e-cigarettes and antifreeze.</td>
<td><strong>Formaldehyde:</strong> Found in e-cigarettes and embalming fluid.</td>
</tr>
<tr>
<td>5 Just because there’s no tobacco in e-cigarettes doesn’t make it healthy. Besides nicotine, chemical flavorings in e-cigarettes have been linked to lung disease, altering blood pressure, arterial disease and brain damage.</td>
<td><strong>Adolescent Topic Preference (Study 1):</strong> Comparing the safety of e-cigarettes to other tobacco cigarettes and other substances.</td>
<td><strong>2.73 (.61)</strong></td>
</tr>
<tr>
<td>6 E-cigarettes may be marketed as a smoking cessation device, but did you know that there is no research showing that it is an effective way to stop smoking? They don’t break your nicotine dependence. There are other proven methods available to help you quit, including pure forms of inhalable nicotine, as well as nasal sprays, gums, lozenges, and patches.</td>
<td><strong>Provider Topic Preference (Study 2):</strong> Not recommended as a smoking cessation tool.</td>
<td><strong>2.05 (1.06)</strong></td>
</tr>
<tr>
<td>7 You may think vaping won’t affect your athletic goals, but studies have shown that e-cigarettes may decrease lung performance and constrict arteries. Is it worth the risk?</td>
<td><strong>Adolescent Topic Preference (Study 1):</strong> Connection to athletic ability.</td>
<td><strong>3.23 (.63)</strong></td>
</tr>
<tr>
<td>8 Studies have found that the aerosol contains at least 9 chemicals that are known carcinogens and toxins, including nicotine, formaldehyde, lead and acetone.</td>
<td><strong>Adolescent Topic Preference (Study 1):</strong> Discussing the ingredients of e-cigarettes.</td>
<td><strong>2.85 (.48)</strong></td>
</tr>
<tr>
<td>9 For decades, big tobacco has been altering the taste of e-cigarettes to get youth addicted to nicotine. They are doing the same thing now with e-cigarettes. Don’t be fooled by “fun” flavors, like chocolate, margaritas or coconut.</td>
<td><strong>Vaping Motivation (Study 1):</strong> Wanting to try new and interesting flavors.</td>
<td><strong>3.04 (.78)</strong></td>
</tr>
<tr>
<td>10 Sometimes it seems like people are vaping everywhere,</td>
<td><strong>Study 1:</strong> Normative belief message.</td>
<td><strong>1.94 (.90)</strong></td>
</tr>
</tbody>
</table>
but it’s not as popular as you think. 80% of adolescents have never vaped before.

11 You may think that e-cigarettes are a healthy substitute to cigarettes, and that vaping will keep you from smoking. But studies have shown that a lot of teens who start vaping later end up addicted to tobacco cigarettes. Vaping leads you toward not away from cigarettes.

12 Doing vape tricks with e-cigarette vapor may be enjoyable, but that fun has serious health risks. There are lots of other ways to have fun without risking your health.

13 There are still a lot of chemicals in e-cigarettes – especially nicotine. It’s just going to be one more thing that you’ll have to quit.
Procedures. After informed consent was obtained, the in-person focus groups began with introductions and explanation of the study. Ground rules were also established, including speaking one at a time, and emphasizing that there are “no right answers.” Additionally, while focus groups are an effective tool for message testing primarily because of the opportunity to capitalize on group dynamics, it also has the potential to hinder data quality when dominant, disruptive or quiet/shy participants are present. To avoid the potential of the bandwagon effect common in focus group research, I began the sessions by emphasizing that group consensus was not needed, and that instead the goal of the session was to “uncover a range of perspectives and experiences” (Carey & Asbury, 2012; Hennink, 2014, p. 2). Additionally, I utilized verbal (e.g., “Would you like to add something?” and “Let’s see what other people think about this”) and non-verbal (e.g., (lack of) eye contact) to encourage equal participation and input among the group members (Krueger, 1998b).

The focus groups began by reviewing athletes’ own motivations for vaping experimentation and how they viewed others who vaped. They also discussed their recent interactions with physicians and how they internalized any counseling given by their providers. The remaining time was spent gathering feedback on the message library to determine which messages might be most effective in a clinical interaction. To accomplish this, participants were first given paper surveys and instructed to read the messages as if it were being presented to them by their primary care provider. Participants then rated each potential message using the popular four-point grade scale.
(A-F) for how effective they felt the messages would be at changing their behavioral intention. These ratings were later converted into numeric grades, as outlined by the National Center for Education Statistics (2011).

The grading exercise was followed by a structured focus group session that gathered open-ended feedback on messages, with an emphasis on messages that were rated very highly or lowly. Discussions on message quality focused on the issues of comprehension (e.g., is the message clearly understood?), liking (e.g., what elements of each message do they like or dislike?), personal relevance (e.g., do they perceive the messages to be relevant to themselves and their peers?), believability (e.g., is the message perceived as credible and realistic?), acceptability (e.g., is there anything in the messages that is perceived as offensive or unacceptable?), and perhaps most important, behavioral intent (e.g., do they believe that hearing the message will result in changing their/their peers’ intentions to use e-cigarettes in the next year?) throughout the focus groups (Parvanta, Maibach, Arkin, Nelson, & Woodward, 2002). Appendix J provides the semi-structured outline for the focus groups.

One benefit of conducting several focus groups is that it allows for data comparison between sessions. In the later focus groups, the primary objective was to amplify and confirm results with what had already been established earlier and to uncover reactions to emerging findings from previous groups. Because of this, for later focus groups, less time was spent on ideas that had already reached saturation and the focus shifted toward building on or modifying these ideas.
At the end of the focus group, I offered a summary of the discussion, and allowed participants to amend or change the summary. If an individual offered new suggestions, the group confirmed or further discussed these ideas (Krueger, 1998a). The focus groups all lasted approximately one hour. Focus groups were audio-recorded and transcribed at the completion of the discussion, which resulted in a total of 81 pages of single-spaced data.

**Analytic Process.** Data reduction for Study 3 followed a similar process as in Study 2, and again utilized the constant comparative method (Glaser & Strauss, 1967). Because rich details of the session – such as non-verbal communication and group interaction – are not captured well through audio-taping, I conducted a brief, preliminary analysis of each focus group soon after the conclusion of the session, including reading through study notes and listening to transcripts to develop research memos. These memos were then reviewed and included in the full analysis of the development of themes and messages.

The focus for Study 3 was not each message in its entirety but rather, various message characteristics that participants reported as making each message effective or not effective (e.g., tone, framing, specific content). The goal for this analysis was not to advocate that providers use the messages verbatim when counseling with patients, but to understand what information that athletes found to be most persuasive in the messages. Put another way, I wasn’t interested in which messages were successful as much as what *it was about* the messages that made them successful for this demographic.
Results

The main purpose of Study 3 was to pilot test various messages and framing with adolescent athletes to understand what message characteristics might be most useful in an intervention, as well as better understand the interpersonal factors that might influence the effectiveness of the messages among this demographic.

Research Question 9: Characteristics of Successful and Unsuccessful Messages

Successful Message Characteristics. Participants reported that messages were successful when they: (a) aroused uncertainty about vaping risks, (b) a linked to their athletic performance, (c) evoked strong imagery, (d) discussed tobacco industry manipulation, and (e) discussed e-cigarette flavoring. See Table 9 for a summary of findings for Research Question 9.

Arousing Uncertainty. Early in the focus groups, many participants self-reported a good deal of knowledge about e-cigarettes – including the ingredients they contain and any associated health risks. When message exposure introduced new information that challenged their vaping health beliefs, these participants cited the messages as effective primarily because of the cognitive discomfort that they aroused. Two successful statements that evoked this response included: (1) linking to the tobacco cigarette research timeline, and (2) discussing the lack of e-cigarette labeling regulation.

First, message 2, which explained the current lack of evidence about the long-term health effects of e-cigarettes in the larger context of what the medical community once thought about tobacco cigarettes, was rated highly ($M = 3.31, SD = .63$).
Participants rated this message as successful because they found it to be “alarming” and liked that it provided a familiar context for them to understand the amount of time it takes to develop evidence-based recommendations and medical consensus.

Overall, participants were unaware of the length of time required to develop medical recommendations about a potentially risky product and knew little about the peer-review process. For example, one participant explained that her low risk beliefs were based primarily on an anecdotal article that she had read on BuzzFeed (a social news and entertainment website). Rather than having physicians take the time to explain the peer-review process in a developmentally-appropriate way, connecting e-cigarettes to a familiar and related product (tobacco cigarettes) was an effective tool to explain the length of time and research rigor required to adequately determine health risks about a product (e.g., tobacco cigarettes, e-cigarettes). This message seemed to be received as intended; one late adolescent reported,

“I thought this message was good because it gave me a little more information [than message 1]. I mean, we all know that [tobacco] cigarettes are really, really unhealthy. Everyone knows that. So even the potential that this might be too – even if we don’t know it now – linking it to that was effective for me.”

Similarly, another middle adolescent put it this way, “I liked how it basically said, hey, even doctors thought cigarettes were healthy back…back in the day. So if they didn’t know that was so bad right away, then maybe we won’t know for e-cigarettes either, for a little while.”

Message 3 exemplified the second avenue for arousing dissonance, as it described how e-cigarette companies are not mandated to fully disclose product ingredients or potential health risks and that research has found e-cigarette labeling to be misleading.
Again, participants cited this message as effective when it introduced uncertainty about their e-cigarette risk beliefs. Prior to message exposure, few participants were aware that e-cigarettes are not fully regulated by the FDA, and the uncertainty of not knowing the precise ingredients or amount of nicotine they were inhaling added a new level of uncertainty beyond the potential, general health risk uncertainty outlined above in message 2. As one late adolescent put it, “I always thought that I was okay because I was vaping with no nicotine or not very much nicotine. It’s a little scary that I don’t actually know what I’m vaping.” Another late adolescent reported,

“I thought that they had to put everyone on the label. That’s pretty [messed] up that I don’t really know if there’s stuff like acetone (see message 4) in it. Or whatever else they decide to put in there. Especially if it’s not being made in the United States. Like in China or something.”

**Strong Imagery.** Athletes expressed interest in messages that contained information that they reported evoked strong imagery. Message 4, which included providing information about other purposes of ingredients in e-cigarettes, was most commonly cited as successful for this reason. The fact that e-cigarettes have been found to contain acetone, propylene glycol and formaldehyde was again often new information for participants, but beyond the sheer novelty of information, several participants reported that they thought the message was effective because it created a visual image in their minds.

Often the message triggered a personalized image. For example, one participant reported, “when I read this, I sort of imagined me drinking embalming fluid, that that creeped me out.” Another middle adolescent similarly said, “I paint my nails and take off nail polish all the time. I do not like the smell of it. [laughs] So the thought of inhaling
that… that part right there got to me. I would never in a million years want to inhale that, and the thought of it kind of makes me sick.”

Another message that less commonly evoked imagery was message 5 which discussed potential health risks of e-cigarettes like lung disease, altering blood pressure, arterial disease and brain damage. While this message was not intended to directly compare to cigarettes, two participants indicated that this message reminded them of past tobacco campaigns that featured a smoker’s lung and a healthy lung side-by-side. One other participant reported that this message “made me think of me having a heart attack or something – like my heart exploding.”

**Connection to Athletic Ability.** Messages were also reported effective when they related to the participants’ own athletic performance. This seemed to resonate more strongly among competitive or elite athletes than among those enrolled in recreation leagues or teams. As one college-aged male swimmer put it, “I’ve worked so hard to get to where I am now, that it really made me think. I mean, I’m not willing to risk [my athletic performance] on something as dumb as e-cigarettes.”

Participants reported this message as effective in part because they often avoided tobacco cigarettes and other drugs because they thought it would hinder their athletic goals – either by the actual physical harm to their bodies or fear of suspension/drug testing. Because of this, it was concerning for them to hear that e-cigarettes may have some of the same problems that they were trying to avoid. For example, one participant said: “I’m a runner, and that’s something that’s important to me. I never really thought about e-cigarettes as being something that might hurt that. That makes me think. … I
mean, I always just thought it was just water vapor and nothing else. That it was just hydrating me [laughs].”

Others reported side-stepping this concern by focusing on potential short-term consequences and strategically deciding when they would vape. For example, one participant reported, “well, I only vape in the off-season. Or maybe right after a big meet before a break.” Some athletes were also suspicious that e-cigarettes would have any noticeable effect on their athletic performance. One participant described his personal experience with smoking: “I run track [in high school], and I have smoked [tobacco cigarettes] all through the season and I didn’t have any trouble. So I doubt vaping would actually do anything.” Thus, while these messages are effective, it is important that they appear believable and relevant to this population.

Anti-Industry Themes. Anti-industry themes were effective among some adolescent athletes. Two messages (message 2, 9) were specifically cited as being effective because of the anti-industry themes they included. Many participants found the messages to be effective, largely due to the fact that they were previously unaware that the tobacco industry was invested in e-cigarette brands and companies. For some participants, including tobacco industry manipulation messages reminded them of past tobacco cessation campaigns that they had seen. One late-adolescent participant reported:

“I remember when I was younger seeing commercials of like, smokers in body bags. And then there was a white guy in a corner office looking out at them but not caring. For some reason, that really stuck with me, like… I don’t know, like we are pawns to them. So knowing that they are now behind e-cigarettes. That just makes me mad.”
Some participants reported a negative, but effective, reaction the messages, particularly in response to the wording of “fooling” them. The use of the word “fooling” seemed to be particularly jarring, as participants reported thinking of themselves as savvy consumers who are unaffected by marketing techniques. One participant boasted about his typical response to marketing techniques, “I mean, I guess the ads that tobacco companies use… they could work on some people. On sheep [those who mindlessly follow trends], you know? But that stuff, it never works on me. I can see right through it.” Because of this general perception that they were impermeable to marketing ploys, participants reported discomfort that tobacco companies might be successfully tricking them into thinking that e-cigarettes were healthy. As one participant put it: “I really don’t like the word of tobacco companies ‘fooling me.’ I mean, that word, it just kind of makes me mad because, I mean, no one likes to think of themselves as being fooled.”

**E-Cigarette Flavoring.** Finally, messages that discussed e-cigarette flavoring were seen as effective among some participants. The message that most explicitly discussed this theme was message 9, which cautioned participants to avoid the trap of being “food by ‘fun’ flavors, like chocolate, margarita or coconut.”

Overall, this message was rated as effective as it was perceived as being highly relevant to participants’ own motivations for vaping. One participant described his personal experience with vaping as follows: “so I don’t really vape all the time. Only when a new flavor drops [goes on the market]. On the weekend [at parties] we will be like, ‘oh hey, what new flavor did you bring this week?’ It makes it fun to pass it around.” In response to message 9, the participant reported, “that message is the closest
to why I actually vape. The other one [in reference to message 6, related to smoking cessation] didn’t really have anything to do with me. I don’t smoke and never have. But this one would be more effective for me.”
<table>
<thead>
<tr>
<th>Message Characteristic</th>
<th>Characteristic Description</th>
<th>Group(s) Cited as Effective</th>
<th>Exemplary Quote(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arousing uncertainty</td>
<td>New information that challenged their positive vaping health beliefs</td>
<td>Middle adolescents Late adolescents</td>
<td>“It’s a little scary that I don’t actually know what I’m vaping.”</td>
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<td></td>
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<td></td>
<td>“I thought that they had to put everyone on the label. That’s pretty [messed] up that I don’t really know if there’s stuff like acetone in it.”</td>
</tr>
<tr>
<td>Strong Imagery</td>
<td>Evoked a negative visceral reaction through imagery</td>
<td>Middle adolescents</td>
<td>“The thought of inhaling [nail polish]… that part right there got to me.”</td>
</tr>
<tr>
<td>Connection to athletic ability</td>
<td>Linked potential health consequences of e-cigarettes to the participants’ ability to athletically perform</td>
<td>Middle adolescents Late adolescents</td>
<td>“I’ve worked so hard to get to where I am now, that it really made me think. I mean, I’m not willing to risk it.”</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>“I’m a runner, and that’s something that’s important to me. I never really thought about e-cigarettes as being something that might hurt that.”</td>
</tr>
</tbody>
</table>
| Tobacco industry manipulation | Predatory marketing practices of the tobacco industry | Late adolescents | "Knowing that [tobacco companies] are now behind e-cigarettes. That just makes me mad."

"I really don’t like the wording of tobacco companies ‘fooling me.’ … I mean, no one likes to think of themselves as being fooled."

| E-cigarette flavoring | ‘Fun’ or novel e-cigarette flavors | Middle adolescents | "So I don’t really vape all the time. Only when a new flavor drops [goes on the market]."

"That message is the closest to why I actually vape."
Unsuccessful Message Characteristics. Some of the messages tested poorly among high-school and college-aged students. Commonly cited reasons for this included: (a) “preachy” or overly negative message tone, (b) perceived absence of valuable information or “hard facts”, and (c) information about normative beliefs. Table 10 summarizes the unsuccessful messages.

Preaching or Negative Message Tone. Messages that participants thought were preaching or lecturing them were quickly dismissed or discounted. Participants described some messages as being overbearing, self-righteous or irritating. As a female participant put it, “I hate when messages are like, telling me what to do. I’ll just ignore it.” Another middle-adolescent male participant similarly added: “When I think someone, a doctor or my parents or whoever, is lecturing me then I just shut off. Shut down. So messages that seem like that to me… I’m not going to even finish reading them.”

In particular, the rhetorical questions that began or concluded some messages came off to strongly for participants, such as “is it worth the risk?” (message 7) and “think there are no health effects from vaping?” (message 2). One participant said, “I really hate the ‘think there are no health effects from vaping?’ In my head, if I imagine someone saying that, then I’m like, you’re basically telling me that I’m an idiot, and that makes me not want to listen to you.”

Another reason why participants described that they didn’t like messages was because they found the tone or framing of the message too negative. For example, in response to the message “There are still a lot of chemicals in e-cigarettes – especially nicotine. It’s just going to be one more thing that you’ll have to quit” (message 13) one
high-school swimmer’s response was: “[The last sentence] too depressing. It makes me just want to not read it or pay attention. I really didn’t like it.” This participant preferred changing the last sentence to “it will be easier to quit cigarettes using nasal sprays, gums, lozenges, and patches [information provided in message 6],” which she thought ended the message in a more positive way.

Not Enough Information. While messages that included uncertainty messages along with additional information were seen as effective, messages that presented uncertainty messages alone were often rated lowly. For example, in response to the message 1: “The long-term health effects of e-cigarettes are not well understood. There are no long-term studies of exposures to these products, including their solutions, cartridges or flavors,” one participant said, “I gave this one a D [rating] because it doesn’t really say anything. Or at least I didn’t get anything out of it. … There wasn’t any information.” Another participant from the same focus group then added, “Messages like this are more likely to make me use e-cigarettes. It’s like, if they haven’t found anything bad yet, then it must not be bad at all. If it was really bad, they would have found something already.” In contrast, participants preferred messages that provided additional health risk information, such as message 5, which discussed specific health consequences (e.g., lung disease, altering blood pressure) that have been reported by those who vape.

When directly comparing these two messages (message 1 and message 5), one athlete reported, “I like that message a lot more, because it was like, okay we don’t know everything. But this is what we do know now. That last part, what we do that, that is important to me.”
**Normative messages.** Finally, messages were reported to be unsuccessful because of the normative message it included. Message 10 was a normative message that focused on descriptive norms, informing adolescents that 80% of adolescents have never vaped before. This normative message was reported to be unsuccessful for two reasons: first, participants did not believe the statistic; and second, they did not believe themselves to be affected by the actions of their peers.

While this statistics presented in this message was collected from a recent NYTS report (Arrazola et al., 2015), participants perceived it to be grossly inaccurate. Participants reported believing the number of their peers who have vaped before to be between 30-80%, as opposed to the 20% reported in this message. They discounted the message as being “out of touch,” and concluding that those who filled out the survey for the report must have misrepresented the truth. Second, participants reported that their own vaping behavior is not primarily driven by others’ actions. As one participant put it, “Even if it was the right number, I wouldn’t care. I wouldn’t vape or not vape because some kid in my chemistry class was doing it. That just wouldn’t affect me.”
Table 10.

Unsuccessful Message Characteristics.

<table>
<thead>
<tr>
<th>Message Characteristic</th>
<th>Characteristic Description</th>
<th>Group(s) Cited as Effective</th>
<th>Exemplary Quote(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative message tone</td>
<td>Perceived to be overbearing, self-righteous or irritating</td>
<td>Middle adolescents</td>
<td>“I hate when messages are like, telling me what to do. I’ll just ignore it.” “When I think someone…is lecturing me then I just shut off. Shut down. So messages that seem like that to me… I’m not going to even finish reading them.”</td>
</tr>
<tr>
<td>No real facts</td>
<td>Uncertainty information that did not contain other health risk information</td>
<td>Middle adolescents Late adolescents</td>
<td>“I gave this one a D [rating] because it doesn’t really say anything. Or at least I didn’t get anything out of it. … There wasn’t any information.” “Messages like [message 1] are more likely to make me use e-cigarettes. It’s like, if they haven’t found anything bad yet, then it must not be bad at all. If it was really bad, they would have found something already.”</td>
</tr>
<tr>
<td>Normative messages</td>
<td>Focusing on the vaping behaviors of participants’ peers</td>
<td>Late adolescents</td>
<td>“Even if it was the right number, I wouldn’t care. I wouldn’t vape or not vape because some kid in my chemistry class was doing it. That just wouldn’t affect me.”</td>
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<td>---------------------</td>
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</tbody>
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Research Question 10: Factors that Affect the Potential Influence of Provider on E-Cigarette Behavior

A secondary goal of this phase of data collection was to better understand what factors might influence the degree that athletes would listen to and heed the advice of their primary care physician, which in turn may influence the effectiveness of the messages in the context of a clinical interaction. Four dominant themes were uncovered: (a) perception of caring, (b) longevity of relationship, (c) perceived provider knowledge about e-cigarettes and (d) having their parent present.

Perception of Caring. The strongest reported influence for athletes’ willingness to heed their provider’s counsel was how much they thought their provider cared about them. When athletes perceived providers to be rushed, lacking empathy or rude, they reported immediately dismissing the providers’ counsel. For example, a high school football player described a recent sports clinic experience: “I don’t really think that [the provider] cared that much about me. He was just checking off a box. So I just nodded my head and agreed while I was there. But that’s about it. I didn’t really care.” Another participant similarly explained, “I feel like it’s a one-way street. They talk; I listen. I say ‘uh-huh, uh-huh.’ I mean, if it were more like a conversation then I might listen. I mean, take their advice.”

On the other hand, participants who did believe that their providers cared reported a greater willingness to take their advice into consideration. For example, a high school
cross-country runner explained, “I can tell that he cares. He never really rushes me. I feel like I can, like, ask him questions about things and we can talk about it.”

One reason why participants were so heavily influenced by perceived caring was that it was closely linked to the perceived objectivity of the information that the providers gave them. Those who reported having caring providers believed that the motivation for counseling about e-cigarettes and other risky behaviors was for the athletes’ own health or benefit. This was interpreted similarly to a parent or friend offering advice.

However, when the provider was perceived as not caring, the same advice was interpreted suspiciously and was psychologically discounted. Athletes here commonly described the process of the psychosocial screening as a formality, and something that their doctors just “wanted to get through.” For example, one participant who reported that she would not be influenced by her provider’s recommendation describes her perception of her doctor’s motivations as follows:

“I think that my doctor cares more about stats and what not, more than me. I mean, I sort of think he has to report his numbers to someone, so he can say, ‘yeah, I did that. I screened her,’ or whatever. I think if I were to say, ‘yeah I vape,’ then he would be like, ‘okay – what do the drug companies, or tobacco companies or whoever want me to tell her.’ He’s got their best interest at heart, not mine.”

**Longevity of Relationship.** A similar factor that would change the degree of provider influence was the longevity of the athlete’s relationship with their provider. In particular, athletes noted that if they were seeing a provider for the first time, they would almost certainly discount their recommendation. One former swimmer reported, “It takes awhile for me to warm up to people, to listen to people, you know? Right now I only
listen to my mom’s advice [laughs]. I would only really take advice to heart if I had known them for awhile. A few months at least.” Another participant who reported her doctor’s recommendation would heavily influence her decision to use e-cigarettes cited the length of the relationship with her pediatrician as the biggest contributing factor. She said, “I’ve had the same doctor since the day I was born. She knows my [medical] history, and she knows me. I’d really believe her, trust her for anything. If she says it’s bad for me, then I wouldn’t do it.”

Most participants in the middle adolescent (high school) range reported having a continuous relationship with their primary healthcare provider. It was rare for participants in this age group to have been seeing their current provider for less than a year. These participants were more likely to cite their relationship as a contributing factor to their willingness to accept advice from the provider. However, late adolescents (college) more frequently described their most recent sports physical as being given by a provider they were meeting for the first time – and by someone who was often assigned to them by their school or coach. One late adolescent compared her current experience with providers with what she had in high school:

“When I was in high school, my parents would take me to same pediatrician all the time, every year. I knew him really well. But now, it’s like, every time I’m supposed to go get some forms filled out, I see a different person every time. It’s whoever is working that day. I think I’ve gone 2-3 times in the past year for different reasons, but I’ve never seen the same person.”

**Perceived Provider Knowledge about E-Cigarettes.** Athletes reported that how much they thought their providers knew about e-cigarettes played a key role in how influential the providers’ advice would be on their future behavior. Several participants
expressed doubt that their providers would be able to give them new information about e-cigarettes. As one high-school football player put it, “I would be surprised if my doctor even know what e-cigarettes where. He’s like 80 years old.” Another female college rower similarly said, “I might listen to her if she talked to me about it, but I don’t think she would really know what she’s talking about.”

A couple of participants reported that they had tried to have conversations with physicians about e-cigarettes, but the physician did not have enough information to provide counseling. One high school participant discussed a recent experience with a psychosocial interview:

“So okay, he was going through it and he got to the smoking question and was like, ‘do you smoke?’ and I was like ‘no, I vape.’ And then he kind of looked at me like ‘what the hell does that mean?’ I had to laugh. I mean, if he doesn’t even know what vaping is – I mean, what the word is – how am I even supposed to have a conversation with him? It would just be me explaining things to him, not the other way around.”

Another participant similarly reported:

“When I talked about e-cigarettes with my doctor, he was like, hold on a sec. And then he went to his computer. I guess to look up what it was. And then he was like, ‘okay, um, okay, I don’t think you should do that.’ That was it. He didn’t really know anything about it, or that it doesn’t even have nicotine in it.”

**Having a Parent Present.** While having their parent present in the room was not specifically cited as a factor for provider influence, many high-school athletes reported that having their parent in the room prevented any meaningful discussion from happening in the first place. Athletes nearly unanimously reported that their parents were present during the psychosocial interview, and also that they wished their parent had left. One high-school swimmer reported that having his mom in the room with him creates an
atmosphere where he automatically shuts down. He reports, “I automatically say no to everything. No, no, no, no. It doesn’t matter what they ask. My mom [isn’t] going to learn about any of that.”

When this issue occurred, it overrode any interpersonal influence of the provider. This is, even when athletes felt their providers cared about them or had meaningful relationships with them, they still reported not being willing to discuss behaviors in front of their parents. As a high school football player put it, “I don’t care how nice he is. I’m not going to get into trouble over [risky behaviors].”

This issue was unique to the high school focus groups, as the late-adolescent college groups (aged 18-19) are legally considered adults, and thus were usually not accompanied to provider visits by their parents. However, they too recalled feeling uncomfortable in physicals when they were younger and had their parent present for the duration of the visit.

**Discussion**

One goal of Study 3 was to uncover message characteristics that were perceived to be most effective by adolescent athletes classified as e-cigarette users or at-risk non-users. Focus group data revealed that participants reported messages to be successful when they aroused uncertainty, discussed anti-industry themes, evoked visceral negative images, connected to athletic ability and/or discussed e-cigarette flavorings. Two central features were interwoven throughout these successful message characteristics – the success of messages was largely dependent on the magnitude of **dissonance** it created and the amount of **fear** that it induced in participants.
First, many successful message characteristics included some degree of arousing uncertainty or cognitive dissonance in participants, whether it be about the health risks of vaping, their athletic performance or their self-identification as a savvy consumer. The effectiveness of messages that arouse cognitive dissonance is rooted in its disruption of cognitive consistency – the idea that “persons seek to maximize the internal psychological consistency of their cognitions (beliefs, attitudes, etc.)” (O'Keefe, 2002, p. 77). At its core, cognitive dissonance theory (Festinger, 1957) is concerned with the relationship among cognitions (any belief, opinion, attitude, etc.) related to a focal element. Consonant elements are consistent with each other and create no internal discomfort. On the other hand, dissonant elements are inconsistent with other cognitions and create an aversive motivational state. Once enough dissonance is created, there will be sufficient internal pressure to reduce the discomfort – either through adding new consonant elements, discounting dissonant elements or changing behavior (O’Keefe, 2002). Festinger posited that the magnitude of dissonance relies on two things: first, the proportion of consonant to dissonant elements, and second, the relative importance of the element or issue (Festinger, 1957). Cognitive dissonance theory is thought of as a postdecisional phenomenon, occurring after the behavior has been chosen. For this reason, the current discussion applies most directly to current vapers (76% of participants); however, at-risk non-users’ dissonance arousal and responses closely mirrored those who had already engaged in the behavior.

Put in context of this study, the proportion of dissonant to consonant elements related to vaping was generally small for participants prior to message exposure.
Participants initially reported several clusters of consonant elements related to health beliefs (e.g., e-cigarettes contain only healthy ingredients, I only vape low-nicotine solutions, e-cigarettes are healthier than tobacco cigarettes) and few, if any, dissonant elements. If dissonant elements were successfully introduced via message exposure (e.g., e-cigarettes contain gross/unhealthy ingredients [message 4, 8], you may be smoking more nicotine than you think [message 3]), participants reported the message to be effective largely because of the aversive motivational state it created.

The presence of cognitive dissonance was woven throughout the successful message characteristics found in Study 3. In addition to creating dissonance about general health risks, other successful messages effectively aroused dissonance about their self-identification as a critical consumer and as an athlete. First, messages using the industry manipulation theme included phrases such as, “big tobacco won’t fool us again; don’t let them fool you either” (message 2) and “don’t be fooled by [big tobacco’s] ‘fun’ flavors like chocolate, margarita or coconut” (message 9). The use of industry manipulation messages, which focus on predatory business practices of tobacco companies, has been a popular message strategy in past tobacco cessation and prevention campaigns aimed at youth, particularly when coupled with a health consequence message (Allen et al., 2015. A notable example of this is the national truth℠ campaign, which promoted the idea that the tobacco industry manipulates youth to start smoking, and subsequently takes away their independence (Douglas Evans et al., 2004; Farrelly, Davis, Haviland, Healton, & Messeri, 2005).
A similar approach was taken in this study, framing e-cigarettes as yet another technique from the tobacco industry to get teens addicted to nicotine and subsequently hooked on tobacco cigarettes. The arousal of dissonance in this context occurred when participants who believed that they were savvy consumers were exposed to a message (e.g., the tobacco industry owns many e-cigarette brands) which resulted in them feeling they were being “fooled” or tricked by tobacco companies. Participants verbalized this dissonance with statements such as: “…I mean, that word, it just kind of makes me mad because, I mean, no one likes to think of themselves as being fooled.”

The connection to athletic ability was another successful message characteristic among participants, and specifically for participants that seemed to self-identify more strongly as athletes. Festinger (1957) posited that the importance of the issue to the message receiver would play a key role in the magnitude of their dissonance. It is therefore unsurprising that those who reported playing on elite or competitive teams would have a stronger reaction to messages that discussed athletic ability (e.g., message 7). An example of dissonance in this context was reported by an athlete who discussed doing everything he could to stay in top physical condition, and who then expressed discomfort that vaping (an act that he thought was healthy), may be risking his athletic ability.

However, when the proposed dissonant element was not strong enough to arouse dissonance (such as message 1), the message was rated as unsuccessful because, as participants put it, it “gave no new information.” Thus, Study 3 revealed that the framing of these uncertainty messages from providers is crucial to effective messaging.
Specifically, the cognitive clusters introduced in the messages need to be strong enough to put the participant in an uncomfortable internal state, which subsequently may change adolescents’ (future) behavior through the process of dissonance reduction. Importantly, when participants perceived dissonance messages as unsuccessful (such as the response to message 1), they often reported an increased intention to vape. In effect, some participants perceived the proposed dissonant element as a new consonant element (e.g., “if they haven’t found it to be bad yet, it must really be good!”), strengthening the consonant cluster and subsequently creating a boomerang effect. Table 11 provides an outline of relationships among various focal, dissonant and consonant elements related to e-cigarettes that were relevant to the messages in this study.
Table 11.

*Reported focal, dissonant and consonant e-cigarette elements.*

<table>
<thead>
<tr>
<th>Focal Element</th>
<th>Dissonant Elements (Introduced in messages)</th>
<th>Participant Reported Consonant Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>I smoke (or may smoke) e-cigarettes.</td>
<td>We do not know the potential health effects of e-cigarettes; they may have serious health risks like tobacco cigarettes (message 2).</td>
<td>E-cigarettes contain only healthy ingredients.</td>
</tr>
<tr>
<td></td>
<td>E-cigarette labeling is not regulated – you can’t be sure precisely what you are inhaling (message 3)</td>
<td>I only vape nicotine-free or low-nicotine solutions.</td>
</tr>
<tr>
<td></td>
<td>“Gross” ingredients are commonly found in e-cigarettes (message)</td>
<td>E-cigarettes are healthier than tobacco cigarettes.</td>
</tr>
<tr>
<td></td>
<td>We don’t know the long-term health effects of vaping (unsuccessful, message 1)</td>
<td>E-cigarettes must be healthy because they haven’t found anything bad yet (boomerang response to message 1)</td>
</tr>
<tr>
<td>I have not smoked tobacco cigarettes (for non-smokers) OR I have stopped smoking (for former smokers)</td>
<td>Big Tobacco may still be manipulating you to use tobacco products (message 2, 9).</td>
<td>I have not been swayed by tobacco manipulation – they have not convinced me (or no longer convince me) to smoke tobacco cigarettes.</td>
</tr>
<tr>
<td>I play on sports teams and am an athlete.</td>
<td>Using e-cigarettes may hinder my ability to perform at my best. (message 7)</td>
<td>I do not do anything that would risk my athletic performance.</td>
</tr>
</tbody>
</table>

Another way to understand some of the successful and unsuccessful message characteristics in Study 3 is by examining the amount of fear participants reported after message exposure. Fear – a negatively-valenced emotion characterized by a high level of
arousal – is a discrete emotion that differs from the internal discomfort that results from cognitive dissonance discussed previously. The extended parallel process model (EPPM) developed by Kim Witte (1992) is commonly used in fear-based health communication campaigns. Briefly, EPPM predicts that the likely outcome of a campaign is determined by two appraisals. In the first, susceptibility (how likely the threat is to impact them) and severity (the perceived magnitude of the threat) are considered. When sufficient fear is felt, the second appraisal determines the nature of that response. There, response and self-efficacy are considered to determine if the receiver will engage in danger control (accepting the messages) or fear control (e.g., denial, defensive avoidance, reactance).

Because adolescent athlete self-efficacy did not emerge as a major predictor of adolescent vaping intention in Study 1 and was also not reported as an important message topic by physicians in Study 2, the messages developed for Study 3 did not include explicit efficacy messages relevant to the second appraisal of EPPM. However, some messages were reported to be successful because it increased participants’ perceived susceptibility and severity vaping. Put another way, successful messages in Study 3 tended to increase the perceived threat (the first appraisal of EPPM) of potential negative consequences of vaping to participants.

Primarily, participants reported some messages to be successful when they increased participants’ perceived severity to the consequences of vaping. This could be seen most strongly among messages that triggered negative visceral responses. For example, in response to message 4, which listed alternate uses for e-cigarette ingredients, participants reported being “grossed out” by inhaling substances they called “disgusting.”
Participants reported thinking that e-cigarettes contain only water vapor, and said that understanding additional potentially harmful chemical contained in e-cigarettes increased their perceived risks of vaping. Often this negative visceral response was heightened through imagery, such as imagining themselves inhaling nail polish remover. The reported personalized nature of this response – imagining themselves doing it as opposed to a person generally – may have additionally served to increase the perceived susceptibility of the threat.

The use of intense imagery is another strategy used in past tobacco campaigns targeted to youth. For example, the recent national campaign The Real Cost includes messages that depict startling images such as youth removing teeth with pliers and peeling away layers of skin (US Department of Health and Human Services, 2016). Graphic images have previously been found to be most effective among adolescents aged 16-18, also the age range of the middle-adolescent group in the current study (Niederdeppe, 2005).

The findings from this study add to the body of work in this area as it shows that the power of graphic images among youth has the potential be tapped even when no actual images are displayed. In fact, it was the absence of graphics in the messages that allowed participants to imagine or create personalized images, such as the participant who reported, “when I read this, I sort of imagined me drinking embalming fluid, and that creeped me out.” Thus, there appears to be value to integrate this message feature into interpersonal counseling as well as traditional media campaign advertisements.
To a lesser extent, perceived severity of vaping was increased after exposure to other messages presented in Study 3. For example, in addition to dissonance felt to the message about how e-cigarette could hinder athletic ability (message 7), some participants also reported fear in relation to being suspended from competitions for drug use or fear of letting themselves or their team down by not performing to the best of their ability.

Finally, while not directly related to either cognitive dissonance or fear, it should be noted that message related to e-cigarette flavorings were also rated as highly effective. This message may have been effective simply due the sheer relevance to adolescents’ motivations for vaping. Using appealing flavoring is a common tactic to encourage youth tobacco initiation, and has also been found in e-cigarette marketing (Tobacco Free Kids, 2014). Earlier, Study 1 found that trying interesting flavors was correlated most strongly with current e-cigarette use and vaping intention. Participants’ reaction to the e-cigarette flavoring message in Study 3 strengthened this finding from Study 1 and further suggests that this motivation should be adequately addressed in provider counseling and other public health campaigns.

Participants also reported unsuccessful message characteristics. Some messages were rated poorly because they had a negative or preachy tone or focused too heavily on normative beliefs. These message may have lacked perceived believability, such as the descriptive normative message that 80% of adolescents had never tried vaping – participants felt that the percentage of their peers who had vaped in the past was much higher than the number represented here (message 10). Others were perceived to be
irrelevant to their own motivations for vaping, such as smoking cessation (message 11) among middle adolescents.

Finally, participants were sometimes put off by the wording of some messages, or simply didn’t like them, such as those they perceived to have a negative tone (e.g., “There are still a lot of chemicals in e-cigarettes – especially nicotine. It’s just going to be one more thing that you’ll have to quit”). This last point, which is focused on the framing as opposed to the content of the message, speaks to the importance of message packaging and delivery, one of the key areas of recommendation for the provider training curriculum outlined in the following chapter.

The importance of appropriate framing also cautions against hasty rejection of messages that were rated poorly. Perceived effectiveness through focus group message testing is only one of several ways to measure message effectiveness, and it may not always strongly correlate with actual message impact on behavioral intention/behaviors. For example, one study found a low correlation between the perceived effectiveness of anti-smokeless tobacco messages and the actual effects of the ads (as measured by actual changes in attitude and interest in a free sample of smokeless tobacco) (Popova, Neilands, & Ling, 2014). In other words, messages that participants rated as most effective in the focus group discussions were not the messages that actually changed their attitudes and behavioral intentions. The authors conclude that “these findings demonstrate the necessity to measure ad efficacy by looking at the actual outcomes, rather than relying solely on how viewers rate them” (Popova et al., 2014, p. 8).
An additional consideration for this study is that the messages tested here were meant to simulate a provider interaction – participants were instructed to imagine that their primary care provider was interpersonally delivering the message. The act of rating perceived efficacy in a simulated interaction may substantially differ than rating perceived efficacy in public service advertisements or other media campaigns.

That is not to say that the practice of message testing is unnecessary or pointless. The importance of focus group message testing for formative evaluation lies in its ability to uncover potentially offensive or unclear messages, direct further strategic and creative development and obtain insights as to how target audience members view the problem or issue (Maibach & Parrott, 1995). However, measures of perceived effectiveness should be augmented by measures of actual effectiveness to uncover potential inconsistencies, as a strong correlation between the two should not be taken for granted. It is outside of the scope of this dissertation to implement and then fully test all of the messages presented here, but findings from this focus group testing should continue to be evaluated once message implementation is complete. In particular, provider-adolescent discussion on normative beliefs should not be ruled out for future studies based on the low perceived effectiveness from focus group data, given its strong relationship to e-cigarette behavioral intention found in Study 1.

For all messages evaluated, it is important to remember that there is more to provider-led interpersonal counseling than just the content and framing of the messages. While all the messages presented here could be easily adapted or tested for a mass or
social media campaign targeted toward this demographic, interpersonal interventions are also heavily affected by discourse and relationship-centered factors.

Put another way, the delivery of a message through media campaigns is fairly consistent—an advertisement is developed and then disseminated among the target audience. However, a message delivered through interpersonal communication is more nuanced, and can be understood as “a joint action behaviorally enacted between persons” (Braithwaite & Baxter, 2008, p. 5) which focuses on developing, sustaining or terminating relationships – here, the relationship between a provider and his/her adolescent patient. The second aim of the focus groups was to better understand what discourse and/or relationship factors would encourage or discourage the acceptance of the provider-initiated messages presented in Study 3.

RQ 10 asked what factors influenced how much a provider recommendation would affect the actual behavior of adolescent athletes. Overall, participants reported that a provider’s recommendation had the potential to strongly influence their decision to vape. This is consistent with Study 1’s finding that a provider’s recommendation would moderately influence athletes’ decision to vape ($M = 3.03$ on a scale of 1-5, $SD = .94$). The most important factor for provider influence that athletes reported was if they felt that their provider personally cared for them. The importance of perception of caring has been widely researched in past provider-patient communication research. Both experimental (Cousin, Schmid Mast, Roter, & Hall, 2012) and survey-based research (Quirk et al., 2008) have linked perception of provider caring with critical patient outcomes, such as satisfaction, treatment adherence and lower malpractice. Perceived
caring is closely related to a patient-centered approach. In fact, patient-centered care is often used as a proxy measure for caring (Hatem et al., 2008).

Like Study 2, many athletes’ preferences again touched on Mead and Bower’s (Mead & Bower, 2000) seminal paper which outlined five dimensions of patient-centeredness: (a) a biopsychosocial perspective, (b) The patient-as-person, (c) sharing power and responsibility, (d) therapeutic alliance, and (e) doctor-as-person. In particular, the patient-as-person and biospsychosocial perspective dimensions were commonly reported as important to this demographic. Athletes commonly cited the importance of wanting their doctor to see them as a person that they care about, as opposed to just “checking off boxes on a form.” When this perception of caring was not present, the message was discounted and not effective.

The perception of caring was closely related to the continuity of care, as athletes typically did not consider providers to have a relationship with them or care about them during the initial visit. Participants discussed the link between continuity of care and the longevity of relationship and with their provider and their willingness to listen to provider recommendations. This again is consistent with previous provider-patient communication literature (Baker, Mainous Iii, Gray, & Love, 2003; Ettner, 1999). Provider continuity is thought to affect provider behavior “because of heightened awareness of the patient’s health behaviors and problems and more frequent opportunities to discuss these behaviors, disseminate information, or treat problems” (Ettner, 1999, p. 548). Applied to this dissertation, it is hoped that with improved communication skills training, providers
will become more adept at developing and maintaining long-term relationships with their adolescent athlete patients.

Additionally, there were differences in reported continuity of care for middle adolescents and late adolescents. While middle adolescents frequently reported being with the same provider for years, it was common for late-adolescents to report having no regular provider. Because student athletes on college campuses are required to counsel with physicians so frequently for sports clinics and well check-ups, there are clear opportunities to build these relationships over a relatively short period of time. Providing or assigning each athlete a regular provider that (s)he meets with frequently, as opposed to meeting with many different providers, may work toward improving continuity of care for this group.

Athletes also cited low perceived provider knowledge about e-cigarettes as a reason they may not accept provider counsel. Some athletes reported that they wouldn’t listen to their doctors’ advice if they felt they knew more about the devices than their providers. This perceived unbalance – where the athlete knows more about e-cigarettes than the provider who is supposedly educating the athlete – was also reported by physicians in Study 2. In other words, when both the provider and the athlete feel like the latter knows more about e-cigarettes than the former, effective counseling is nearly impossible. Properly educating physicians on the potential health risks of e-cigarettes is crucial to address this issue and will be included in the training curriculum outlined in the following chapter.
GENERAL DISCUSSION

The purpose of this dissertation was to better understand adolescent athletes’ and providers’ beliefs, preferences, attitudes and knowledge about e-cigarettes in order to develop an on-line training curriculum to assist providers in discussing e-cigarettes with adolescent athlete patients. Sports engagement can be very stressful for individuals, particularly those on competitive or travel teams (Veliz et al., 2015). Electronic cigarettes may be introduced as a coping mechanism to manage the stress athletes may feel, particularly when they contain nicotine, a substance widely-known to reduce anxiety. Providers can play a critical role in counseling youth athletes about e-cigarettes, but this potential has not yet been reached.

The overall goal of this dissertation was to develop recommendations for a provider on-line training curriculum, which will help providers effectively screen for and facilitate discussions about e-cigarettes with adolescent athletes. To this end, three studies were completed: In Study 1, I surveyed 448 adolescent athletes about their motivations and beliefs about e-cigarettes, as well as their communication preferences for interaction with providers. Following that, in Study 2, I conducted in-depth interviews with 25 primary care providers to better understand their perspective, perceived challenges and successful communication techniques. Following the analysis of Studies 1 and 2, I developed preliminary messages to be included in provider-delivered counseling
discussion recommendations, which were then tested in focus group sessions with adolescent athletes in Study 3.

Taken as a whole, the three studies revealed gaps of knowledge and misunderstandings between these two groups that can be addressed through this training and curriculum. Important findings from each study were individually discussed at the conclusion of those chapters. However, taken together, these studies suggest four overarching findings, including: (a) adolescents and providers differ in their classification of e-cigarettes, (b) framing of e-cigarette uncertainty messages should be nuanced, (c) effective patient-provider communication is key to effective message development, and (d) athletes do not currently see providers as a credible source of information about e-cigarettes. Each of these findings will be further explored below, followed by specific recommendations for an on-line training curriculum. Finally, limitations for the studies and areas for future research will be noted.

**Adolescent and Provider Differences in E-Cigarette Tobacco Classification**

In Study 1, data from late adolescent athletes found that – more often than not among those using or at risk for e-cigarette use – adolescents do not consider e-cigarettes to be tobacco products, citing the fact that e-cigarettes do not involve the burning of tobacco and inhalation of its smoke. However, Study 2 found that physicians do frequently consider e-cigarettes to be under the umbrella term “tobacco products,” as it is commonly classified as such by medical and government agencies (e.g., Centers for Disease Control, 2016).
A natural result of this divergence in classification was that the data showed probable miscommunication in e-cigarette screening during the psychosocial interview. In Study 2, one-fifth of providers indicated that they screened for e-cigarettes, but this screening was often limited to asking patients, “do you use any tobacco products?” or “do you smoke?” If a patient does not consider e-cigarettes to be a tobacco product, they would likely respond in the negative to this question – regardless of their vaping behavior – which may result in missed opportunities for e-cigarette clinical counseling.

From a practical standpoint, a clear solution to this miscommunication would be to instruct providers to screen for electronic cigarette use (and other alternative tobacco products) separately from traditional tobacco products, like cigarettes and cigars. Either a separate screening “box” for e-cigarettes or a clarification of “tobacco products” should be included in the electronic medical record, or adolescent screening tools should be updated to include e-cigarettes and other new devices (e.g., RAAPS, Darling-Fisher et al., 2014). This simple change could easily and significantly improve the quantity and quality of e-cigarette discussion, as one of the barriers reported by the providers was simply forgetting to screen specifically for e-cigarettes.

These results also provide methodological insights. Tobacco screening rates can be obtained through many methods, such as patient self-report, provider self-report, medical record reviews and direct observation (Darling-Fisher, Salerno, Dahlem, & Martyn, 2014). While each method has its own strengths and limitations, patient- and provider-reported measures from the same interactions have previously been found to be different, with providers reporting significantly higher rates than their patients for
tobacco cessation counseling (Conroy et al., 2005; Panda, Persai, Venkatesan, & Ahluwalia, 2015). In this dissertation, 20% of providers reported screening for e-cigarettes among adolescents in Study 2, while only about 6% of adolescents reported being screened for e-cigarette use in Study 1.

It is important to note that in this study, athletes and providers were not matched or recruited through the same efforts and therefore most of the athletes in this study do not receive care where the provider participants work. However, the results are in line with previous research and suggest that providers may be over reporting e-cigarette screening efforts, due to poor recall and/or the social-desirability bias. Past work has advised against provider self-report for screening measures, and advocated triangulating provider-report with other methods such as patient surveys. (Panda et al., 2015). These findings support that recommendation, particularly in areas such as e-cigarettes where screening behaviors are often vague and can be easily missed or misinterpreted by patients.

**Improving Conversations about E-Cigarette Risk Uncertainty**

Because e-cigarettes have been on the market in America for less than a decade, the health risks associated with vaping are not well understood. Unlike tobacco cigarettes, there are ample opportunities for providers to provide new information about e-cigarettes to adolescent users, given that many users lack basic knowledge about the toxicity of the device and that medical evidence is quickly accumulating. However, both athletes and providers in these studies displayed confusion about the health risks associated with e-cigarette use – and they are not alone. There is still confusion and controversy among
public health experts and the medical community as to whether e-cigarettes can be best thought of as a harm reduction tool for current smokers, a “gateway” to nicotine dependence and tobacco use, and/or a dangerous substance in and of itself (Pepper et al., 2014). While new research on e-cigarettes is being published at a rapid rate – a recent PubMed search found 167 articles on e-cigarettes published in January-February 2016 alone – the long-term health consequences can’t be completely understood until e-cigarettes have been on the market long enough for longitudinal studies to be completed. Until that time, government and medical agencies recommend against the use of e-cigarettes – particularly for those who are not currently smoking and for adolescents (Centers for Disease Control, 2016).

In Study 1, athletes reported wanting to discuss information with providers that would decrease their uncertainty about e-cigarettes, including knowing more about the ingredients about e-cigarettes, how it might affect their health and athletic performance, and e-cigarettes’ relationship with other substances. In Study 2, many providers indicated that the best way to discuss e-cigarettes with patients was to emphasize the uncertainty about long-term health consequences associated with vaping. They stressed the need to discuss the fact that they did not have all the answers. However, focus group results from Study 3 indicated that some reported physician message presentation is ineffective and could create a boomerang effect. Specifically, when the uncertainties of health risks were presented without additional information, participants understood that to mean that no health risks were currently known, and reported that the message made them more likely
to want to vape, a phenomenon known as the boomerang effect (Cho & Salmon, 2007; Fishbein, Hall-Jamieson, Zimmer, von Haeften, & Nabi, 2002).

However, when paired with other messages that sufficiently created dissonance for athletes, uncertainty messages were effective. Two successful messages that were reported by physicians in Study 2 and tested with athletes in Study 3 included comparing e-cigarette and tobacco cigarette timelines, and stressing the misleading labeling on e-cigarette packages. Uncertainty messages about labeling may be a particularly effective message for adolescent vapers who are using what they believe to be nicotine-free or low-nicotine versions of e-cigarettes. When a statement on uncertainty was coupled with additional information about deceptive labeling, known health risks, or comparing to tobacco products, it addressed athletes’ beliefs that there are currently no known negative health effects of vaping while also emphasizing that other health consequences could be discovered in the future.

Taken together, these findings suggest that while provider-athlete discussions about the uncertainty about health risks is an important topic, the framing of the messaged should be nuanced and carefully constructed. Specifically, the message has to be strong enough to arouse sufficient cognitive dissonance in the athlete who may consider e-cigarettes to be a harmless alternative to tobacco cigarettes. When managed effectively, discussing uncertainty can be an effective tool to discuss potential e-cigarette health risks.
Importance of Patient-Centered Care

In Studies 2 and 3, both physicians and athletes reported the importance of patient-centered care to create a comfortable environment and have meaningful discussions about e-cigarettes. One of the biggest buzzwords in patient-provider communication is “patient-centered communication” or “patient-centered approach.” Generally speaking, patient-centered care is seen as an alternative approach to a conventional, biomedical model of care that is wholly concerned with health signs and disease symptoms that need to be investigated.

Responses to physician’s successful techniques in Study 2 and athletes’ expressed preferences in Study 3 both matched closely with five dimensions of patient-centeredness outlined by Mead and Bower (2000), particularly the dimensions of the biopsychosocial perspective, the patient-as-person and therapeutic alliance. Key to these dimensions is a commitment to understanding the individual’s perspectives and experiences and an emphasis on the partnership between patient and provider that should occur as part of the medical interview. Generally speaking, patient-centered communication is thought to affect outcomes indirectly through other measures, such as patient empowerment, patient satisfaction and increased adherence (Robinson, 2013).

However, the notion of “caring” or “patient-centered care” is an elusive concept that lacks a clear definition, so it can be difficult to incorporate this factor into provider training curriculum. For example, a set list of caring “talking points” is impossible to teach or even obtain, as “caring behavior such as giving the ‘appropriate’ amount of information suggests that caring is truly in the ‘eye of the beholder’” (Hatem, Mazor,
A more appropriate and effective approach is to work toward maintaining a good relationship with the patient, through expressing empathy, adapting to patient needs, and developing trust. These issues will be among those addressed in the proposed training curriculum.

It is important to note that having communication skills specific to an adolescent population is key to the successful implementation of the messages developed through this dissertation. While the content and framing of the message itself are inherently important for any intervention, messages that will be developed interpersonally are heavily affected by discourse and relationship-centered factors and should be addressed in the provider training curriculum.

The Parent-Adolescent-Provider Triad in Clinical Interactions

Studies 2 and 3 highlighted that the fact that the presence of a parent during the psychosocial interview often prevented the possibility of effective e-cigarette counseling and candid discussion because it created an uncomfortable environment. In Study 2, many providers reported addressing this issue by asking parents to leave the room before initiating the interview period of the exam; however, adolescents in Study 3 overwhelmingly reported that their parent was never asked to leave. Encouraging providers to have parents to leave the room during the psychosocial interview is a first step to effective e-cigarette counseling and should be included in any provider training on pediatric and adolescent counseling.
Several health care professional organizations have formally supported and highlighted the importance of confidentiality in adolescents, including the American Medical Association (2015), the American Academy of Pediatrics (2012) and the American Academy of Child and Adolescent Psychiatry (Morreale, Stinnett, & Dowling, 2005). However, this step may be necessary but not sufficient to make adolescents feel that their confidentiality is secure. For example, some parents may be unwilling to leave the room or may become suspicious if the provider asks to speak to the adolescent alone, and private conversations between providers and adolescents may seem foreign or suspicious in some cultures (Ford, English & Sigman, 2004). Also, system-level factors like billing practices may inadvertently break confidentiality.

In order to combat this issue, several additional practical issues must be addressed. In a position paper published in Journal of Adolescent Health, the Society for Adolescent Medicine outlined additional key steps to ensure the confidentiality in the delivery of health care services for adolescents (Ford, English & Sigman, 2004). One recommendation includes *routinely* spending part of each visit alone with the adolescent patient beginning early adolescence “to convey to parents that this is a standard part of adolescent health care” (p. 161). Doing so may address potential parental mistrust and suspicion, and may also reassure parents that the provider is available to discuss topics that they may have a difficult time addressing personally with their child. A related recommendation is for providers to routinely discuss both the protections and the limitations of confidentiality with both adolescents *and their parents*. In these discussions, clinicians should be clear about what can and cannot be managed privately.
and educate adolescents and their parents about laws and guidelines for this aspect of care.

While the issue of confidentiality is most salient for minor adolescents, some older adolescents and young adults may also have concerns related to confidentiality protections. Under the Affordable Care Act, many adolescents and young adults are covered as dependents under a family’s health insurance plan until age 26. Because of this, policies should be enacted to ensure confidential health care for adolescents, even when the parent is not present in the clinical interaction. In their position papers, the Society for Adolescent Medicine and the American Academy of Pediatrics recommend that clinicians ensure their billing and recordkeeping procedures maintain the confidentiality of adolescents’ health information to the extent possible. Other specific steps that should be taken include requesting special privacy protections in the Health Insurance Portability and Accountability Act (HIPPA) Privacy Rule, not requiring explanation of benefit (EOB) notifications when individuals obtain sensitive services, and simplifying internal mechanisms within health insurance plans that will allow individuals insured as dependents to obtain confidential care.

**Lack of Perceived Physician Credibility on E-Cigarettes**

Taken together, the three studies suggest a lack of perceived credibility of physicians as experts in e-cigarettes. In Study 2, providers themselves reported feeling unequipped to discuss e-cigarettes with patients, and sometimes reported cutting the conversation short or being unwilling to initiate a discussion on e-cigarettes. In Study 3, some athletes reported that a key factor in their provider’s influence on their own vaping
behavior was the degree to which they felt their physicians understood e-cigarettes and were perceived as a credible, knowledgeable source of information.

Perceived credibility as a source factor has been widely studied in persuasion research, and stems from Aristotle’s concept of ethos (Aristotle, 2004). Credibility has three distinct components: competence (the degree that the individual knows what he is discussing), trustworthiness (the extent that the source is perceived as being honest) and goodwill (how much the receiver believes the source cares about them) (McCroskey & Teven, 1999). Past research has suggested that when patients perceive their physicians as being knowledgeable, honest, and truly caring about their welfare, they are more likely to adhere to medical counsel (Wrench & Booth-Butterfield, 2003).

In provider-adolescent clinical interactions about e-cigarettes, the three studies show that there is a need to improve all three elements of credibility as outlined by McCroskey and Teven (1999). First, perceived provider competence or knowledge about e-cigarettes was reported to be low by both the patients and the providers themselves. There is clearly a need to educate providers on e-cigarette background and potential risks by synthesizing existing governmental and academic research. Gaining a stronger understanding of e-cigarettes will not only improve perceived competence but also increase provider efficacy for discussing e-cigarettes.

Next, athletes in Study 3 sometimes reported provider trustworthiness and goodwill to be low. Scholars have noted that the reason uncomfortable conversations are often unsatisfactory is typically not because doctors lack compassion, but because they lack the knowledge for how to address the topics most appropriately (Ozer et al., 2004).
Thus, there is a need to help physicians appropriately discuss e-cigarettes and increase adolescent athletes’ perception of them as caring, sensitive and trustworthy – elements that participants in Study 3 reported as important factors for adhering to counsel from their providers. In Study 2 (RQ8), providers reported on techniques they use to improve their trustworthiness and goodwill among adolescent patients, including emphasizing confidentiality, focus on relationship building, normalize the behavior, provide resources and use appropriate language. These tools can build the foundation for improving provider trustworthiness and goodwill among their adolescent patients, which may subsequently lead to better psychosocial counseling.

**Content Recommendations for the Training Module**

Although the actual development and evaluation of an on-line training module is outside the scope of this dissertation, this section will outline recommendations for the content and presentation of a course aimed for primary care providers, to be taken as a continuing medical education (CME) course. The proposed core curriculum would consist of six sections: (1) training introduction and rationale, (2) e-cigarette background and risks, (3) understanding adolescent athletes, (4) improving screening conversations, (5) presenting correct screening for e-cigarettes, and (6) additional resources and downloadable pamphlet to share with adolescents. A description of each proposed module is listed below, as well as proposed screen shots of various topics.

**Module 1: Background, Rationale and Learning Objectives.** The training curriculum would begin by providing a rationale for the course, brief information about
the history of e-cigarettes and learning objectives. The learning objectives for this on-
line curriculum may include being able to: (1) summarize the evidence base for electronic
cigarettes, (2) understand the motivations for use of e-cigarettes among adolescent
athletes, (3) comfortably and accurately conduct psychosocial screening for e-cigarette
use among this group, (4) deliver targeted and effective brief interventions when
necessary, and (5) identify and successfully refer patients to additional resources if
requested/needed.

Module 2: E-Cigarette Background and Risks. The rationale for the
development of this module was to first give providers the necessary evidence base to
feel knowledgeable enough to discuss e-cigarettes with patients. Possible sub-categories
include: (1) Summary of Evidence, meant to give providers bulleted, up-to-date
information about e-cigarettes risk and toxicity. Information included here could include
nicotine risks for adolescents specifically, harms of other chemicals/flavoring in e-
cigarettes like propylene glycol or vegetable glycerin, and e-cigarette’s similarity to and
difference from other substances like conventional cigarettes; (2) Myths & Realities,
meant to give providers the tools to disabuse athletes of common e-cigarette myths, such
as: nicotine isn’t addictive, e-cigarette labeling is regulated/correct, most of my peers are
using e-cigarettes, using e-cigarettes won’t affect my health/athletic ability, and e-
cigarettes are not a tobacco product; and (3) Frequently Asked Questions, with evidence-
based answers and research links to questions that providers often have about e-
cigarettes, like how much nicotine it contains, laws governing e-cigarette marketing and
distribution to minors, and cost of varying products. Figure 7 displays a screen shot that would be included in this section.

**Module 2: Background & Risks**

**Frequently Asked Questions about E-Cigarettes**

**E-Cigarette Ingredients**

**Q: How do e-cigarettes work?**

**A:** E-cigarettes generally contain three main components: an electronic heating element, a battery, and a fluid cartridge where users can refill solutions of varying flavors. The device is activated when the heating element is turned on which subsequently aerosolizes the solution in the device, sending it to the lungs.

Solutions that can be used with e-cigarettes vary greatly in flavor type, nicotine content, and solution base. Typically, the solution contains propylene glycol (PG) or vegetable glycerin (VG) which, when heated, creates the well-known smoke-like appearance created to mimic the look and feel of tobacco cigarettes.

**Q: How much nicotine do e-cigarettes contain? Is it enough to maintain addiction?**

**A:** There are large differences in the amount of nicotine found in e-cigarette solutions. Reviews have found nicotine levels ranging from 0 to 36 mg/mL [hyperlink to: Djordjevic, Stellman, & Zeng (2000)], which is enough to maintain dependence [hyperlink to: Schroeder & Hoffman, 2014].

**Q: Are all e-cigarettes basically the same? What differences are there?**

**A:** The photo to the right shows the three main types of e-cigarettes: A) ciga-likes ($10-30), B) eGos or vape pens ($50-100), and C) advanced personal vaporizers ($120-200). The more expensive products allow for greater customization and have stronger heating elements.

**Figure 7.** Screenshot for Module 2. Describes frequently asked questions and answers about e-cigarette ingredients.

**Module 3: Adolescent Athletes’ Motivations for Usage.** The content for this module would include the results of Study 1 and past research, and is meant to specifically instruct physicians on the psychology and motivations for use among adolescent athletes. Some key areas to be addressed would be: trying new and interesting
flavors, using e-cigarettes as an alternative to tobacco cigarettes, doing smoke/vapor tricks, peer influence, and athletes’ descriptive normative beliefs. Along with each motivation for use, providers are given a set of responses that they can use to initiate counseling in a clinical interaction. This section will also discuss differences between age groups, as found in Studies 1 and 3, including communication topic preferences, determinants of vaping intention and responses to messages. Figure 8 provides an example screen shot that would be included in this section.

Module 3: Common Vaping Motivations

Why Adolescent Athletes Vape:
Trying New and Interesting Flavors

➤ The Facts:
- Studies have found that trying new and interesting flavors was the most common reason cited for why adolescent athletes wanted to vape (link to dissertation cite), and the second most common reason for e-cigarette experimentation among all adolescents (Kong, 2014).
- Common flavorings aimed to kids include cotton candy, Kool-Aid, Hawaiian Punch, and gummy bears (Tobacco Free Kids, 2014)

➤ You could respond:
“Did you know that cigarette companies used to do the same thing, use flavorings that kids like to get you to start smoking? They’re up to their old tricks -- don’t fall for it.”

“Just because something tastes good doesn’t mean it’s good for you. If you’re interested in the flavor, could you consider trying that flavor in another way, like ice-cream or candy?”

Figure 8. Sample screen shot for Module 3. Includes important facts/background about the motivation for experimentation, tools to help the provider respond to this motivation and an exemplary video showing an effective counseling session.
Module 4: Improving Risky Behavior Discussions. This module was developed primarily from the themes of RQ8 from Study 2 and previous research. The module could include sub-categories with simulated exemplary videos such as: (1) asking the parent to leave the room, (2) emphasizing confidentiality, (3) asking questions indirectly (e.g., “how does that make you feel?”), (4) focusing on relationship building, (4) normalizing, without condoning, the behaviors, and (5) using appropriate language. The section would interweave recorded fictional case examples throughout the module, utilizing exemplary videos. Figure 8 provides an example screen-shot from this module, with ideas, information, tips and examples on the left-hand side of the screen, and an exemplary video on the right-hand side.
Module 4: Screening Discussions

Figure 9. Sample screen shot for Module 4. The left side includes tips and information relevant to the implementation of the technique, and the right-hand side includes a vignette showing an exemplary video of the technique. Klein, D. A., Goldenring, J. M., & Adelman, W. P. (2014)

Module 5: Discussing E-Cigarettes. The development for this module was initiated in response to the cited barrier of providers not feeling comfortable or knowledgeable enough to discuss e-cigarettes. First, this module will instruct physicians to screen specifically for electronic cigarette use, using phrases such as “do you use any sort of tobacco products – including tobacco cigarettes, e-cigarettes or smokeless tobacco” and teaching providers about the phrases associated with e-cigarettes, such as “vaping” and “smoke tricks.”
Then, much of the framing and messaging for this section would be developed from the first two studies, and on focus group feedback in Study 3. Key areas to be included in this section would be to teach providers to arousing dissonance through (a) linking current knowledge about e-cigarettes with what the medical community thought about tobacco cigarettes in the 1950s, (b) providing surprising facts pertaining to the ingredients commonly found in e-cigarettes (e.g., PV is also used for antifreeze), (c) discussing the lack of regulation on e-cigarette packaging (e.g., just because it says it doesn’t have nicotine doesn’t mean it’s nicotine-free”), and (d) discussing how nicotine could affect their athletic performance and health.

These message characteristics all received positive feedback from focus group discussions, and may give providers a way of discussing e-cigarettes that may be more effective than their current uncertainty framing techniques. The module will again end with an exemplary video that illustrates proper e-cigarette screening and counseling with a fictional adolescent athlete who vapes. Figure 9 displays a screenshot from this module.
Module 5: Discussing E-Cigarettes

Figure 10. Sample screen shot for Module 5. This sub-section includes information teaching providers how to appropriately frame e-cigarette health risk uncertainty discussions.

Module 6: Additional Resources. The final module in the training intervention will give providers additional resources that they can share with patients. This section could include a pamphlet that providers can print and review with patients, PDFs of academic or government papers on e-cigarettes or additional exemplary videos on the techniques taught throughout the training session.
Ecological Perspective

While past research has suggested that a training curriculum encouraging physicians to discuss adolescents’ knowledge, attitudes and beliefs about vaping may be a promising route to influence adolescent vaping behavior, it is not likely to be effective on its own and is not intended to be mutually exclusive to other interventions. Rather, it addresses one piece of a larger puzzle, and would be most successful if enacted concurrently with other interventions, campaigns and policies to properly address various individual and societal determinants for vaping behavior.

The ecological model for health promotion (McLeroy, Bibeau, Steckler & Glanz, 1988) cautions against focusing solely on individual choices to the extent that health promotion “ignores the larger social and organizational context of health-related behaviors” (p. 354). The vaping phenomenon among adolescents is a complex and multifaceted issue with a great deal of uncertainty both in e-cigarettes themselves and the best routes to take to combat its rise among adolescents. The ecological perspective views behavior as being determined by five factors: intrapersonal factors (knowledge, attitude, behavior), interpersonal processes and primary groups (including formal and informal social networks), institutional factors (social and organizational characteristics), and finally local, state, and national laws and policies.

Of these five determinants, the training curriculum outlined above aims to primarily influence the intrapersonal factors of vaping, where the purpose is to “change individuals, rather than to modify the social environment” (McLeory et al., 1998, p. 356). However, interventions, policies and campaigns should be implemented to address all of
the determinants, as success is more likely to be achieved with a multi-pronged, multi-level approach. Other key areas to be addressed include limiting access and marketing to teens through changes in athletic organizational, state, and national policies, changing vaping norms within athletes’ social networks and utilizing opinion leaders and key contacts in athletic and school organizations. Figure 10 outlines recommendations for various intervention and policy changes utilizing the ecological perspective, with the current study included in intrapersonal factors section.

Figure 11. Ecological Perspective for Vaping Behavior.
Potential for Unintended Consequences

A potential concern for the current study is the possibility for unintended consequences. In addition to the potential for the boomerang effect with ineffective risk messages discussed earlier, two other potential consequences include: (a) reactance against authority figures, and (b) further inflating descriptive normative beliefs for middle school students.

First, some past substance abuse campaigns and interventions have demonstrated adolescent pushback or reactance against authority figures. There are several explanations for dissatisfactory conversations and reactance that emerges from adolescent communication with authority figures, which includes their primary care providers. In many instances, adolescents are highly aware of and may be threatened by the power imbalance inherent in their interactions with authority figures (Drury et al., 1998). Adolescents may also feel their own point of view is not respected, and report feeling patronized and lectured to during interactions (Wrate, 1992; Drury, 2003). These factors may lead to adolescents feeling like their behavioral freedom is threatened and subsequently increase reactance arousal (Brehm & Brehm, 2013).

Indeed, in Study 3, athletes reported that they would disregard their providers’ advice concerning e-cigarettes if they did not have an established relationship with their provider, or felt that their provider did not care for them. The techniques that providers reported in Study 2 (RQ 8) to establish a welcoming, comfortable environment is essential to combat potential adolescent reactance to authority figures. Specifically, the techniques of establishing a personal relationship and taking steps to deemphasize their
own role as an authority figure (e.g., usually developmentally appropriate language, appropriate non-verbal cues) may be particularly relevant in combatting potential reactance from adolescent patients. Past research has suggested that while physicians are seen as authoritative figures, their advice can be influential on adolescents’ risk behavior decisions, including tobacco use, when a positive relationship is established (Ozer et al., 2011). Similar positive outcomes are likely with e-cigarettes discussions when a patient-centered approach outlined in this study is taken.

Next, results from Study 1 show that that middle-school students overall have inflated descriptive normative beliefs relative to actual reported use from the National Youth Tobacco survey. While only about 4% of middle-school students reported vaping in 2014, on average the middle-school students in the sample believed that about 15% of their peers vape. Given the low risk for vaping in the middle-school population coupled with their already inflated normative beliefs, physicians initiating conversations about e-cigarettes among this group may have the potential to do more harm than good for young, low-risk non-users. By further bringing attention to e-cigarettes, they may serve to strengthen the inflated descriptive normative beliefs of this group, potentially leading to higher risk of use. For this reason, it is suggested that more in-depth screening and conversations should be primarily focused on high-school and college-aged adolescents who are at significantly higher risk for use and demonstrate more positive health beliefs about vaping, unless the younger (middle-school) adolescent currently uses or is at high-risk for e-cigarette use.
**Limitations and Directions for Future Research**

There were several limitations in this dissertation which future work should seek to address. In Studies 1 and 3, all adolescent athletes were recruited in the same county, through private sports organizations, so the data may not capture potential geographic and sociodemographic differences in e-cigarettes use and motivations. Additionally, the context of private sports organizations may not have fully addressed the role of the team/sport culture which may be much stronger in other contexts (e.g., playing on a high school sports team with the same teammates for four years).

Due to recruitment limitations, most of the participants for Study 1 were primarily involved in swimming, a low contact sport. Additional research may consider exploring potential differences in e-cigarette use and motivation between low-contact (e.g., swimming, track) and high-contact sports (e.g., football, rugby), which has previously been shown to be a factor in use of tobacco products among adolescent athletes (Kulesza et al., 2014; Veliz et al., 2015). Finally, due to time limitations for the survey, some key psychosocial elements found to be associated with other forms of tobacco use were not fully captured in Study 1, but should be considered for future research. These include: athletic self-identification (Brewer & Cornelius, 2001), sensation seeking (Zuckerman, 1994), extraversion and self-esteem (Wilkinson & Abraham, 2004).

For Study 2, the sample size for providers was relatively low and highly concentrated in the Northeast. Future work in this area should look to obtain a more diverse sample. Additional research could also explore differences in knowledge and efficacy between provider types. For example, pediatricians who work primarily with
younger ages may be more comfortable conducting the psychosocial interview than
family medicine physicians who primarily consult with adult patients. Additional
research should conduct nationwide, probabilistic samples to be able to better generalize
results. In Studies 1 and 2, athletes and providers were not recruited through the same
efforts, and the athletes in Study 1 likely were not involved in clinical interactions with
the providers in Study 2. Future work in this area could match patients and providers,
which might capture more fully the dynamics in patient-provider communication,
particularly with issues related to initiating e-cigarette discussions and thoroughly
screening. Finally, the social desirability bias may have affected responses, or prompted
withholding information, related to how important providers felt e-cigarettes were to
discuss.

For Study 3, messages were pilot tested by asking athletes to imagine that their
physicians were delivering the messages in a clinical interaction. While this
methodological approach of rating a simulated interaction has precedent (Blanch-
Hartigan, Hall, Krupat, & Irish, 2013; Willson & McNamara, 1982), how well this
simulated exercise approximates a real-life clinical interaction is unclear. Additionally,
due to a relatively low sample size, current and at-risk users were combined into the same
focus groups, and middle and late adolescent data were largely analyzed together. Future
work should consider dividing these into distinct groups, as Study 1 and past research
suggested e-cigarette motivations and responses to messages may differ between both
risk groups and age groups. Conducting enough focus groups to be able to appropriately
segment participants would allow for more nuanced analysis of potential differences of perceived message efficacy throughout the adolescent development period.

**Conclusion**

Overall, this dissertation has provided important new insights into reasons for e-cigarette experimentation among adolescent athletes, barriers in physician counseling on this unique risk behavior, and the need for systematic support to promote physician engagement in e-cigarette prevention. The content recommendations for a provider training module suggests a comprehensive approach to understanding the provider-adolescent relationship. This approach includes not only providing needed information about the risk and toxicity of e-cigarettes, but also training in communication skills to conduct the psychosocial interview. Such an approach is well-suited to help unlock the potential that physicians have to reduce adolescent risk for electronic cigarette use.
APPENDIX A: PARENTAL CONSENT FORM (STUDY 1)

Adolescent Electronic Cigarette Study

INFORMED CONSENT FORM

RESEARCH PROCEDURES
This research is being conducted to better understand adolescents’ thoughts and attitudes toward using electronic cigarettes (also known as e-cigarettes or vaping). If you agree to have your child participate, your child will be asked to complete a survey lasting approximately 15 minutes at the beginning of his/her sports practice. In this survey, your child will be asked about electronic cigarettes and (if applicable), recent interactions with a doctor or nurse.

RISKS
There are no foreseeable risks for participating in this research.

BENEFITS
There are no benefits to your child as a participant other than to further research in understanding adolescents’ attitudes toward electronic cigarettes and to improve interactions between health care providers and adolescents.

CONFIDENTIALITY
The data in this study will be confidential. For the survey, your child’s name and other identifiers will not be placed on surveys or other research data.

PARTICIPATION
Your child’s participation is voluntary, and he/she may withdraw from the survey at any time and for any reason. If he/she decides not to participate or if he/she withdraws from the survey, there is no penalty or loss of benefits to which he/is is otherwise entitled. There are no costs to you, your child or any other party.
In compensation for completing the survey portion of the study, your team coach/leader will be given a lump sum of money to be used however the team wishes. The amount is dependent on the number of completed questionnaires received (approximately $3/student).
CONTACT
This research is being conducted by Emily Peterson in the Department of Communication at George Mason University. She may be reached at 703-993-1090 for questions or to report a research-related problem. You may also contact Emily’s dissertation committee chair, Dr. Xiaoquan Zhao, at 703-993-4008. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your child’s rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your child’s participation in this research.

CONSENT
I have read this form, all of my questions have been answered by the research staff, and I agree to have my child participate in the survey.

________________________________________________________________
Name

________________________________________________________________
Date of Signature
APPENDIX B: MINOR ASSENT FORM (STUDY 1)

Youth Electronic Cigarette Study

My name is Emily Peterson and I am from the department of communication at George Mason University.

I want to talk to you about a research study I am doing. In our study, we want to learn more about what you think about electronic cigarettes (also known as vaping). We would like to know about you and the things you do to affect your health. Your parents have already agreed that you may take part in the study, so feel free to talk with them about it before you decide whether you want to join the study.

What will happen to me in the study?
We would like you to participate because you are in either middle school or high school and you participate in an extracurricular sport. If you would like to participate in the study, you will be asked to answer some questions about your background, your communication with others and what you think about e-cigarettes. The questions will be presented as a survey and it will take you approximately 15 minutes to complete the survey.

What are the risks?
There are no foreseeable risks for participating in this research.

What are the benefits?
There are no benefits to you as a participant other than to further research in this area.

Will anyone know that I am in the study? (Confidentiality)
The data in this study will be confidential. Your name or any personally identifiable information will not be included in any portion of the research data. None of the research will be shared with your coach or your parents and you can’t be punished in any way because of your answers.

What if I do not want to participate or decide later to withdraw?
Being in this study is voluntary. You don’t have to be in this study if you don’t want to or you can stop being in the study at any time.

Will I receive anything for being in the study?
Yes, you will receive a small donut for your participation. Your team will also receive $5.

**Who can I talk to about this study?**
If you have questions about the study or have any problems, you can talk to your parents, or call me at 703-993-1090. If you have questions about the study but want to talk to someone else who is not a part of the study, you can call the Office of Research Integrity & Assurance at George Mason University at 703-993-4121.
APPENDIX C: CONSENT FORM FOR LATE-adolescent Athletes
(STUDY 1)

Public Health Study

INFORMED CONSENT FORM

RESEARCH PROCEDURES
This research is being conducted to better understand college students’ thoughts and attitudes toward using electronic cigarettes (also known as e-cigarettes or vaping). If you agree to participate, you will be asked to complete a survey lasting approximately 15-20 minutes. In this survey, you will be asked about your thoughts and experience with electronic cigarettes and other tobacco products, and (if applicable), recent interactions with a doctor or nurse.

RISKS
There are no foreseeable risks for participating in this research.

BENEFITS
There are no benefits to you as a participant other than to further research in understanding college students’ attitudes toward electronic cigarettes and to improve interactions between health care providers and college students.

CONFIDENTIALITY
The data in this study will be confidential. Your name or any personally identifiable information will not be included in any portion of the research data. Although we will collect your name and email addresses in order for you to receive credit, this identifiable information will be collected separately and will not be linked to your survey responses. While it is understood that no computer transmission can be perfectly secure, reasonable efforts will be made to protect the confidentiality of your transmission.
You will have the option to provide your e-mail address in the study if you would like to be contacted for further research opportunities. While this e-mail would be linked to your answers for the study, the researchers will not share your personal information with anyone outside of the research team.

PARTICIPATION
Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no
penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party. You must be 18-25 years old to take part in this study. If you complete the study, you will receive course compensation in the form of 10 instructor points in your Comm100 or Comm101 class.

ALTERNATIVES TO PARTICIPATION
All students enrolled in COMM 100 and COMM 101 are given several assignment options for earning the "instructor points" in their classes. This research study would be one of several options that you will be given to earn these points in your class.

CONTACT
This research is being conducted by Emily Peterson in the Department of Communication at George Mason University. She may be reached at 703-993-1090 for questions or to report a research-related problem. You may also contact Dr. Xiaoquan Zhao at 703-993-4008. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT
I have read this form and agree to participate in this study. Please click on the button below to indicate your consent.
APPENDIX D: SURVEY INSTRUMENT FOR ADOLESCENT DATA COLLECTION (STUDY 1)

Youth Electronic Cigarette 2015 Questionnaire

Welcome!

This survey is about adolescents’ experience with and opinions about tobacco and electronic cigarettes (also known as vaping). We would like to ask you some questions about yourself and your peers. Your answers will help us better understand why today’s adolescents choose to use or not use electronic cigarettes.

DO NOT WRITE YOUR NAME ON THE SURVEY. The answers you give will be kept private.

NO ONE (including your parents, coach and teammates) will know what you write. Please answer the questions based on what you really do and know.

The questions that ask about your background will only be used to describe the types of students completing this survey. The information will NOT be used to find your name. No names will EVER be reported.

Completing this survey is voluntary. Try to answer all the questions. If you do not want to answer a question, just leave it blank. There are no wrong answers.

When you are finished, please return it to the researcher.
1. Are you:
   - Female
   - Male

2. How old are you?
   ______ years old

3. What grade are you currently in?
   ______ grade

4. Which of these groups best describes your racial background?
   - White or Caucasian
   - Black or African American
   - Asian
   - Hispanic
   - Other ________________________________

5. In the past 12 months, which of the following sports have you participated in through a team/league setting? Include team(s) you are currently on. (You can CHOOSE ONE ANSWER or MORE THAN ONE ANSWER.)
   - Basketball
   - Baseball
   - Swimming
   - Football
   - Lacrosse
   - Soccer
   - Tennis
   - Rugby
   - Softball
   - Track
   - Volleyball
   - Other ________________________________

6. How would you describe your team at a competitive level?
   - Recreation team
   - Travel team

7. Have you ever tried cigarette smoking, even one or two puffs?
   - Yes
   - No

8. During the past 30 days, on how many days did you smoke cigarettes?
9. Have you ever **HEARD OF** e-cigarettes (electronic cigarettes), such as NJOY, Ruyan or Blu?
   - Yes
   - No

10. If you have ever heard of e-cigarettes, from what source did you hear about it? *(You can CHOOSE ONE ANSWER or MORE THAN ONE ANSWER).*
   - I have not heard about e-cigarettes
   - My close friends, in person
   - My family
   - Other acquaintances (such as a classmate or a teammate) in person
   - My friends or classmates through social media (such as Facebook or Twitter)
   - TV
   - The internet
   - Newspaper/magazine
   - Grocery store/gas station
   - Other (please specify: _________________)

11. Does anyone in your family use e-cigarettes (also known as “vaping”)?
   - Yes
   - No

12. Do any of your close friends use e-cigarettes?
   - Yes
   - No

13. Have you ever **TRIED** using e-cigarettes, even just one time?
   - Yes
   - No

14. In the past month, on how many days have you used e-cigarettes?
    ___________ (please enter a number between 0-30)
The next seven questions are about visits to a doctor, dentist, nurse or other health professional.

15. Have you visited a doctor or a nurse in the last 12 months for any reason? This could be for a physical examination related to sports, or a general check-up.
   a. Yes
   b. No

16. During any of these visits, were you asked if you smoked cigarettes?
   o I did not see a doctor or a nurse in the last 12 months.
   o Yes
   o No

17. During the past 12 months, did any doctor or nurse give you advice not to smoke cigarettes?
   o I did not see a doctor or a nurse in the last 12 months.
   o Yes
   o No

18. During the past 12 months, did you discuss e-cigarettes (or vaping) with a doctor or nurse?
   o I did not see a doctor or a nurse in the last 12 months.
   o Yes
   o No

19. Imagine that a doctor or nurse advised you not to use e-cigarettes. Overall, how much would their advice influence your decision to use them or not?
   o Not at all
   o A little bit
   o A moderate amount
   o A lot

20. If a doctor or nurse were to talk to you about e-cigarettes, how much would you be interested in discussing the following topics?
Discussing how e-cigarettes would affect my physical health, like my athletic performance
Comparing the safety of e-cigarettes to regular cigarettes, marijuana, hookah or other substances
Providing information about additional resources, like websites or people you can talk to for more information
Discussing the ingredients of e-cigarettes
Providing an explanation of how e-cigarettes actually work
Talking about the behaviors or attitudes of the “average teen” when it comes to e-cigarettes
Discussing ways to build my skills or confidence to make healthy choices
Other:

21. If a doctor were to share information about e-cigarettes with you, which message format would you prefer?

Please rank the following types of message in your order of preference. For example, write the number “1” next to the format that you like the best. Write a “2” next to the second best, a “3” next to the third best and a “4” next to the worst message format for you.

_______  Verbal (doctor just talking to you face-to-face)

_______  Written (like an information sheet)

_______  Pictures (like a graph or a chart)
A multi-media format (like a video)

The next eight questions are about your thoughts related to e-cigarettes and vaping.

22. To the best of your knowledge, please estimate the percentage of those in your grade at school that currently use e-cigarettes.

____________________ % (please enter a number between 0-100)

23. Compared to smoking regular cigarettes, would you say that e-cigarettes are:
   o Much less harmful
   o Less harmful
   o Just as harmful
   o More harmful
   o Much more harmful

24. Please indicate how much you agree or disagree with each of the following statements.

Using e-cigarettes would:

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
</table>

Be harmful to my health in the next few years.
Be harmful to my health when I am older.
Impact my current ability to perform sports.
Be addictive.

Affect the development of my brain, or my ability to perform in school.
Make me more likely to try regular cigarettes or other substances.
Make me look cooler to my classmates/teammates
25. If I wanted to use e-cigarettes, getting access to them through a store or a friend would be:
   o Very easy
   o Moderately easy
   o Neither easy nor hard
   o Moderately hard
   o Very hard

26. For each group below, please indicate how much the following groups would approve or disapprove of you using e-cigarettes:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disapprove</th>
<th>Slightly Disapprove</th>
<th>Neither Approve Nor Disapprove</th>
<th>Slightly Approve</th>
<th>Strongly Approve</th>
</tr>
</thead>
<tbody>
<tr>
<td>My parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My close friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My schoolmates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and teammates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My teachers at school</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>My coach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

27. How much would seeing people in TV/movies using e-cigarettes influence your own decision to try e-cigarettes?
   • Not At All
   • Slightly
   • Moderately
   • Extremely

28. Below is a list of words that some people use to describe how they feel about using e-cigarettes. How do you think YOU would feel about trying/continuing to use using e-cigarettes?
The final five questions will ask you about what you think you will do in the next year.

29. Only thinking about yourself, your using e-cigarettes **OCCASIONALLY**, even once or twice, in the next year would be:

<table>
<thead>
<tr>
<th></th>
<th>1 Extremely</th>
<th>2 Somewhat</th>
<th>3 Neutral</th>
<th>4 Some what</th>
<th>5 Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Good</td>
</tr>
<tr>
<td>Enjoyable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Unenjoyable</td>
</tr>
<tr>
<td>Cool</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not cool</td>
</tr>
</tbody>
</table>

30. How likely is it that you would use e-cigarettes, **EVEN ONCE OR TWICE**, in the next year?
   - Extremely unlikely
   - Somewhat unlikely
   - Neither unlikely nor likely
   - Somewhat likely
   - Extremely likely

31. Only thinking about yourself, your using e-cigarettes **EVERY DAY**, in the next year would be:
32. How likely is it that you would use e-cigarettes **EVERY DAY** in the next year?
   - Extremely unlikely
   - Somewhat unlikely
   - Neither unlikely nor likely
   - Somewhat likely
   - Extremely likely

33. How much would each of the following affect your decision to use e-cigarettes in the next year?

<table>
<thead>
<tr>
<th></th>
<th>Not At All</th>
<th>A Little Bit</th>
<th>A Moderate Amount</th>
<th>A Lot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being curious about what it tastes or feels like to vape.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liking the look/design of the e-cigarettes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being seen as cool by others around me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Being able to do “smoke/vape tricks” with the e-cigarette vapor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trying out interesting flavors, like pineapple, chocolate, and margarita.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helping me to quit smoking regular cigarettes or other substances</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Using as a safer/healthier alternative to conventional cigarettes.

Other:

Thank you for participating in the survey!
APPENDIX E: INFORMED CONSENT FOR PROVIDERS (STUDY 2)

Healthcare Providers’ Beliefs and Attitudes about Electronic Cigarettes and Preventive Counseling to Adolescent Patients

INFORMED CONSENT FORM

RESEARCH PROCEDURES
This research is being conducted to understand how healthcare providers feel about discussing electronic cigarettes with their adolescent patients. If you agree to participate, you will be asked to speak with a researcher for about 25 minutes about your experiences and thoughts about discussing electronic cigarettes and other tobacco products with adolescents. This interview will be audio recorded.

RISKS
There are no foreseeable risks for participating in this research. You may exit the study at any time if you feel uncomfortable.

BENEFITS
There are no benefits to you as a participant other than to further research in improving physician-patient communication regarding adolescent electronic cigarette use.

CONFIDENTIALITY
The data in this study will be confidential. If you agree to participate, you will be assigned a case number. This case number, rather than your name, will appear on both the audio-tape recording of this interview and the resulting transcription. Through the use of an identification key (i.e., a master list that matches case numbers to the names of interview subjects), only the researcher team will be able to link your interview to your identity, and only we will have access to this identification key. The identification key and the audio recording will be kept in the researcher’s password-protected computer. After the audio recordings have been transcribed, they will be erased/deleted. In research reports, you will be referred to by a pseudonym with no identifying information.

PARTICIPATION
Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no
penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party. If you complete the study, you will receive a $50 Amazon gift card either in person or through an eGift link that will be e-mailed to you immediately after completing the study.

CONTACT
This research is being conducted by Xiaoquan Zhao and Emily Peterson in the Department of Communication at George Mason University. Xiaoquan Zhao may be reached at 703.993.4008, and Emily Peterson may be reached at 703.993.1090 for questions or to report a research-related problem. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT
I have read this form, all of my questions have been answered by the research staff, and I agree to participate in this study.

_____ I agree to audio taping.
_____ I do not agree to audio taping.
APPENDIX F: SEMI-STRUCTURED INTERVIEW SCHEDULE FOR PROVIDER INTERVIEWS (STUDY 2)

Background

- How many years have you been practicing? What is your age? Where do you practice?

- Would you classify yourself as a family medicine physician, a pediatrician or a nurse practitioner or other?

- About what percent of your appointments are with adolescents (those in middle- and high-school)?

- When you consult with adolescents for well-visits, are their parents typically in the room? If so, how does that dynamic work?

- What are some techniques that you use to make adolescents feel more comfortable in discussions about risky behaviors?

Tobacco & E-Cigarette Counseling

- Do you currently discuss cigarette or tobacco use with adolescent patients during regular check-ups?
  - If yes: Can you explain what these conversations typically consist of?
  - If no: Why not?

- Can you briefly describe what you know about e-cigarettes or how you would describe them to a patient?

- In your professional opinion, do you think e-cigarettes are a safe product for adolescents to use?

- What, if anything, do you think are the most important facts that adolescents need to know about e-cigarettes?
• Do you currently discuss e-cigarettes with adolescent patients during regular check-ups?
  o If yes: Can you explain what these conversations typically consist of?

• To what extent do you think it is important to discuss e-cigarettes with adolescent patients?

• What challenges do you face regarding discussing e-cigarettes with adolescents?
  o (For each challenge): What can be done for you to help you to feel more comfortable?

• What do you think is the BIGGEST barrier to you having meaningful discussions about e-cigarettes with adolescent patients?

• How do you negotiate conversations where you may not have all the information that you would like?

**Response to Adolescent Dataset**

• Some recent data suggests that the three most prevalent reasons for adolescents trying e-cigarettes are: (1) being curious about what it feels/tastes likes; (2) trying out interesting flavors, and (3) Doing smoke/vape tricks with the vapor.
  o Given this information, what do you think that you can do as a physician to best advise on adolescent e-cigarette use?
  o Given what you know about adolescents, which one or more of these three areas might you choose to focus on if you were to advise them on e-cigarettes use?
APPENDIX G: PARENTAL CONSENT FORM (STUDY 3)

Adolescent Electronic Cigarette Study
INFORMED CONSENT FORM

RESEARCH PROCEDURES
This research is being conducted to better understand adolescents’ thoughts and attitudes toward using electronic cigarettes (also known as e-cigarettes or vaping). If you agree to have your child participate, your child may be asked to participate in a focus group lasting approximately 1-1.5 hours where he/she will be asked more questions about his/her attitudes toward e-cigarettes and may be asked to review and provide feedback on public health messages about e-cigarettes.

RISKS
There are no foreseeable risks for participating in this research.

BENEFITS
There are no benefits to your child as a participant other than to further research in understanding adolescents’ attitudes toward electronic cigarettes and to improve interactions between health care providers and adolescents.

CONFIDENTIALITY
The data in this study will be confidential. For focus groups, all data will be reported using pseudonyms only. Although focus group participants will be asked to keep the contents of the discussion confidential, due to the nature of a focus group, the researcher cannot control what participants might say outside of the research setting.

PARTICIPATION
Your child’s participation is voluntary, and he/she may withdraw from the focus groups at any time and for any reason. If he/she withdraws from the focus groups, there is no penalty or loss of benefits to which he/is is otherwise entitled. There are no costs to you, your child or any other party.

In compensation for completing the focus group portion of the study, your child will receive dinner (pizza and soda) and a $20 gift card to Amazon or iTunes.

CONTACT
This research is being conducted by Emily Peterson in the Department of Communication at George Mason University. She may be reached at 703-993-1090 for questions or to report a research-related problem. You may also contact Dr. Xiaoquan Zhao at 703-993-4008. You may contact the George Mason University Office of Research Integrity & Assurance at 703-993-4121 if you have questions or comments regarding your child’s rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your child’s participation in this research.

CONSENT
I have read this form, all of my questions have been answered by the research staff, and I agree to have my child participate in the focus group.

________________________________________________________________
Name

________________________________________________________________
Date of Signature
APPENDIX H: MINOR ASSENT FORM (STUDY 3)

Youth Electronic Cigarette Study

My name is Emily Peterson and I am from the department of communication at George Mason University.

I want to talk to you about a research study I am doing. In our study, we want to learn more about what you think about electronic cigarettes (also known as vaping). We would like to know about you and the things you do to affect your health. Your parents have already agreed that you may take part in the study, so feel free to talk with them about it before you decide whether you want to join the study.

What will happen to me in the study?
We would like you to participate because you are in either middle school or high school and you participate in an extracurricular sport. If you would like to participate in the study, you will be asked to answer some questions what you think about e-cigarettes. You may also be asked to share you thoughts and feedback about specific public health messages related to e-cigarettes. Questions will be answered as part of a focus group with other athletes, and the whole focus group will last 1-1.5 hours.

What are the risks?
There are no foreseeable risks for participating in this research.

What are the benefits?
There are no benefits to you as a participant other than to further research in this area.

Will anyone know that I am in the study? (Confidentiality)
The data in this study will be confidential. None of the research will be shared with your coach or your parents. Your real name will not be used when reporting any of the data. Although focus group participants will be asked to keep the contents of the discussion confidential, due to the nature of a focus group, the researcher cannot control what participants might say outside of the research setting.

What if I do not want to participate or decide later to withdraw?
Being in this study is voluntary. You don’t have to be in this study if you don’t want to or you can stop being in the study at any time.
Will I receive anything for being in the study?
Yes, you will receive dinner (pizza and soda) during the focus group. You will also be receiving a $30 gift card to either iTunes or Amazon as a thank you for participating in the focus group.

Who can I talk to about this study?
If you have questions about the study or have any problems, you can talk to your parents, or call me at 703-993-1090. If you have questions about the study but want to talk to someone else who is not a part of the study, you can call the Office of Research Integrity & Assurance at George Mason University at 703-993-4121.

Your signature below means that you have read the above information about the study, have had a chance to ask questions to help you understand what you will do in this study, and you are willing to be in the study. Your signature also means that you have been told that you can change your mind later if you want to.

_________________________   _____________
Child’s Name (printed) and Signature      Date
APPENDIX I: LATE-ADOLESCENT CONSENT FORM (STUDY 3)

INFORMED CONSENT FORM

RESEARCH PROCEDURES
This research is being conducted to better understand your thoughts and attitudes toward using electronic cigarettes (also known as e-cigarettes or vaping). If you agree to participate, you may be asked to participate in a focus group lasting approximately 1-1.5 hours where you may be asked questions about your attitudes toward e-cigarettes and may be asked to review and provide feedback on public health messages about e-cigarettes.

RISKS
There are no foreseeable risks for participating in this research.

BENEFITS
There are no benefits to you as a participant other than to further research in understanding adolescents’ attitudes toward electronic cigarettes and to improve interactions between health care providers and adolescents.

CONFIDENTIALITY
The data in this study will be confidential. For focus groups, all data will be reported using pseudonyms only. Although focus group participants will be asked to keep the contents of the discussion confidential, due to the nature of a focus group, the researcher cannot control what participants might say outside of the research setting.

PARTICIPATION
Your participation is voluntary, and you may withdraw from the focus groups at any time and for any reason. If you withdraw from the focus groups, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

In compensation for completing the focus group portion of the study, you will receive dinner (pizza and soda) and a $20 gift card to Amazon or iTunes.

CONTACT
This research is being conducted by Emily Peterson in the Department of Communication at George Mason University. She may be reached at 703-993-1090 for questions or to report a research-related problem. You may also contact Dr. Xiaoquan Zhao at 703-993-4008. You may contact the George Mason University Office of Research Integrity &
Assurance at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

**CONSENT**
I have read this form, all of my questions have been answered by the research staff, and I agree to participate in the focus group.

_______________________________________
Name

_______________________________________
Date of Signature
APPENDIX J: SEMI-STRUCTURED INTERVIEW SCHEDULE FOR FOCUS GROUPS (PHASE 3)

Introduction / Building Rapport

o Tell me a little bit about yourself (probe what sports and other extracurricular activities they are involved in).

E-Cigarette Prevalence, and Knowledge

o What have you heard about e-cigarettes?

o How did you first learn about e-cigarettes? Where did you get the information?

o What do you think is in an e-cigarette?

o How often do those around you vape and/or talk about vaping? How common is it to see other students vaping or talk about vaping at school?

o How do you think e-cigarette use is related to regular cigarettes use? Do you think someone who uses e-cigarettes would be more or less likely to use regular cigarettes? Why?

o Why do you think people your age would vape (use an e-cigarette)?

o Are there any problems or consequences that you think might happen if you use e-cigarettes?

Provider Communication

o Have you gone to see a doctor or a nurse anytime within the last year?
  o If yes: Tell me about that experience generally
  o Do you feel like they care about you?

o Has a doctor ever given you advice about any potentially risky area of your life, such as safe sex/condom use, tobacco, alcohol, or pot?
  o If yes, what did they say? How did you respond? How did you feel during that part of the interaction?
Were your parents in the room with you? How do you think that affected your interaction with the doctor?

Do you remember them ever bringing up e-cigarettes in any conversation?
   o If yes, what did they say? How did you respond? How did you feel during that part of the interaction?
   o Were your parents in the room with you? How do you think that affected your interaction with the doctor?

Let’s say, hypothetically, your doctor discussed e-cigarettes with you. Would you care about that conversation? Would that affect any of your decisions?
   o If yes: Why; if no: why not?

Would you ever bring up vaping with your doctor? Why or why not?

What things/factors in that conversation would make you more or less likely to listen to what your doctor has to say about e-cigarettes?

**Message Development**

[Items that were pretested can be found in Appendix K]

**Questions asked will focus on the following:**

**Comprehension**
   o Is the message clearly understood?
   o Are the teens able to identify and recall the main messages?

**Liking**
   o How much do they like the message?
   o What elements do they especially like or dislike?

**Personal Relevance**
   o Do they perceive the messages to be relevant to themselves and to their peers?

**Believability**
   o Is the message perceived as credible?
   o Does it portray the message realistically and convincingly?

**Acceptability**
   o Is there anything in the message that is perceived as offensive or unacceptable?

**Behavioral Intent**
Do they believe that seeing the message will result in changing their/their peers’ intentions to use e-cigarettes in the next year?
APPENDIX K: FOCUS GROUP MESSAGE GRADING FORM

NAME: ________________________________________________

Instructions: Imagine that you are having a conversation with your primary care physician, and they share the following messages to you. Please “grade” each message from A to F, for how much each message would influence your decision to use e-cigarettes.

1. The long-term health effects of e-cigarettes are not well understood. There are no long-term studies of exposure to these products, including their solutions, cartridges, or flavors.

   How would you grade this message from A-F?

2. Think there are no health effects from vaping? That’s what we [doctors] thought about tobacco cigarettes, too. In the 1950s, we thought cigarettes were healthy and were prescribed for anxiety. Big tobacco won’t fool us again, don’t let them fool you either.

   How would you grade this message from A-F?

3. Think you know what’s in e-cigarettes? Did you know that e-cigarette companies are not mandated to disclose product ingredients or health effects, and many companies provide insufficient and/or incorrect information about the contents of their products.
4. You don’t need to be curious about e-cigarettes. You see the ingredients every day:
   Acetone: Found in e-cigarettes and nail polish remover
   Propylene glycol: Found in e-cigarettes and antifreeze
   Formaldehyde: Found in e-cigarettes and embalming fluid

5. Just because there’s no tobacco in e-cigarettes doesn’t make it healthy. Besides nicotine, chemical flavorings found in e-cigarettes have been linked to lung disease, altering blood pressure, arterial disease and brain damage.

6. E-cigarettes may be marketed as a smoking cessation device, but did you know that there is no research showing that it is an effective way to stop smoking? They don’t break your nicotine dependence. There are other proven methods available to help you quit, including pure forms of inhalable nicotine as well as nasal sprays, gums, lozenges, and patches.
7. You may think vaping won’t affect your athletic goals, but studies have shown that e-cigarettes may decrease lung performance and constrict arteries. Is it worth the risk?

How would you grade this message from A-F?

8. Studies have found that the aerosol contains at least 9 chemicals that are known carcinogens and toxins, including nicotine, formaldehyde, lead and acetone.

How would you grade this message from A-F?

9. For decades, big tobacco has been altering the taste of cigarettes to get youth addicted to nicotine. They are doing the same thing now with e-cigarettes. Don’t be fooled by “fun” flavors, like chocolate, margarita or coconut.

How would you grade this message from A-F?

10. Sometimes it seems like people are vaping everywhere, but it’s not as popular as you think. 80% of adolescents have never vaped before.

How would you grade this message from A-F?
11. You may think that e-cigarettes are a healthy substitute to cigarettes, and that vaping will keep you from smoking. But studies have shown that a lot of teens who start vaping later end up addicted to tobacco cigarettes. Vaping leads you *toward* not away from cigarettes.

How would you grade this message from A-F?

12. Doing vape tricks with e-cigarette vapor may be enjoyable, but that fun has serious health risks. There are lots of other ways to have fun without risking your health.

How would you grade this message from A-F?

13. There are still a lot of chemicals in e-cigarettes – especially nicotine. It’s just going to be one more thing that you’ll have to quit.

How would you grade this message from A-F?
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BIOGRAPHY

Emily Bylund Peterson earned her Bachelor of Arts in Communications from Brigham Young University in Provo, Utah. She received her Master of Arts in Communication from George Mason University. Her research focuses on clinician-patient communication, tobacco prevention and cessation, persuasion, adolescent development and communication, and cancer screening promotion.

Her work appears in medical, public health and communication journals, including Health Communication, Communication Monographs, Communication Research, Patient Education & Counseling, Journal of Health Psychology, Journal of Drug Education and Journal of Creative Communications. She has also written chapters in edited volumes including Oxford textbook in communication in oncology and palliative care, SAGE encyclopedia of health communication, SAGE handbook of risk communication, and Routledge handbook on language and health communication.