

HPV VACCINE: OPPORTUNITIES FOR MOTHER-DAUGHTER  
COMMUNICATION ABOUT SEX

Annie-Laurie McRee

A dissertation submitted to the faculty of the University of North Carolina at Chapel Hill in  
partial fulfillment of the requirements for the degree of Doctor of Public Health in the  
Department of Maternal and Child Health.

Chapel Hill  
2011

Approved by:

Noel T. Brewer, PhD (Advisor)

Carol A. Ford, MD

Sami L. Gottlieb, MD, MSPH

Carolyn Tucker Halpern, PhD (Chair)

Jon M. Hussey, PhD

©2011  
Annie-Laurie McRee  
ALL RIGHTS RESERVED

## **ABSTRACT**

ANNIE-LAURIE MCREE: HPV vaccine: Opportunities for mother-daughter communication  
about sex

(Under the direction of Noel T. Brewer, PhD)

**Background.** Mother-daughter communication about sex is associated with healthier behavior during adolescence. This dissertation explores human papillomavirus (HPV) vaccine as a potential opportunity for communication about sexual health.

**Methods.** Data are from a national sample of mothers of adolescent girls aged 11-14 in the United States who completed an online survey in December 2009. Analyses incorporated sample weights to yield nationally-representative estimates. The first set of analyses examined HPV vaccine discussions as an opportunity for mothers ( $n=900$ ) to deliver messages about sexual health to their early adolescent children. The second set of analyses described mothers' ( $n=902$ ) communication with health care providers about HPV vaccine and assessed these conversations as an opportunity to offer mothers information about sexual health.

**Results.** Sixty-five percent of mothers reported talking with their daughters about HPV vaccine, of whom 41% said that talking about the vaccine led to a conversation about sex. Mothers who talked with their daughters about HPV vaccine were more likely to also have

talked with them about sex topics (92% vs. 74%, OR=3.07, CI=1.44-6.54.), in multivariate analyses. Just half (55%) of all mothers reported ever talking with their daughters' providers about HPV vaccine, and only a quarter (25%) of those said the conversations included sex topics. Provider discussions about HPV vaccine that included messages about sex were associated with mothers talking with their daughters about sex topics both in the context of HPV vaccine discussions (OR= 3.34 95% CI: 1.59-7.00) and overall (OR= 6.21, 95% CI: 1.76-21.94) .

**Discussion.** HPV vaccine discussions provide an acceptable opportunity for mothers to talk with their daughters about sex at an age when such communication is most influential. Health care provider discussions with mothers about HPV vaccine could help promote parent-child communication about sexual health.

## **ACKNOWLEDGEMENTS**

I thank my dissertation committee for their contribution and good-natured counsel. Noel Brewer, my Dissertation Advisor, has been incredibly generous with his time and support. Carolyn Halpern, my Committee Chair, has always had my best interests, both academic and personal, at heart. They both showed me just how fun research can be and I am grateful that they gave me so many opportunities to learn while doing work I found both interesting and important. I also thank Sami Gottlieb for championing my ideas and finding a way to make this study happen; Carol Ford for modeling tireless advocacy for adolescent health; and Jon Hussey for his support.

It was my good fortune that Paul Reiter and I began working in the Health Cognition and Behavior Lab at the same time. He has been a de facto member of my committee; a gracious sounding board; and a skilled and fun collaborator.

I don't know what I would have done the past several years without the friendship of Abigail Haydon and Aubrey Spriggs Madkour ("the A-Team"). They have supported me in many ways (both personally and professionally) including: talking through analyses, sharing Stata code, taking walks in the woods, and making book recommendations. Gayle Thomas, Don Anthony, and the Cacalacky Kula also all helped me maintain balance during graduate school.

I appreciate my family's support, particularly that of my sister, Lanier. Her friendship has been a true benefit of living to North Carolina; I look forward to enjoying many more trails together.

Lastly, I will never be able to adequately thank my husband, Buzz Doyle, for being game to take on seemingly any adventure. He rocks.

This dissertation research was supported by the Centers for Disease Control and Prevention (02577-10), and the Jessie Ball DuPont Award for Adolescent Research from the UNC Graduate School.

## TABLE OF CONTENTS

LIST OF TABLES .....	ix
LIST OF FIGURES .....	x
CHAPTER I: INTRODUCTION.....	1
Public health challenge .....	1
Parent-child communication about sex .....	2
The potential opportunity of HPV vaccine .....	4
Preliminary study .....	5
Conceptual framework for parent-child communication about sex.....	7
Purpose.....	16
Significance.....	17
CHAPTER II: HPV VACCINE DISCUSSIONS--AN OPPORTUNITY FOR MOTHER-DAUGHTER COMMUNICATION ABOUT SEXUAL HEALTH (Paper1).....	18
Abstract .....	18
Introduction.....	20
Methods.....	21
Measures .....	22
Data analyses .....	24
Results.....	25
Sample characteristics .....	25
Cues to mother-daughter communication about sex .....	25
Correlates of mother-daughter communication about sex.....	26
Mothers' perceptions of HPV vaccine discussions .....	27
Discussion .....	28

Conclusion .....	30
CHAPTER III: HEALTH CARE PROVIDER COMMUNICATION ABOUT HPV VACCINE: AN OPPORTUNITY TO PROMOTE SEXUAL HEALTH? (Paper 2).....	39
Abstract .....	39
Introduction .....	41
Methods.....	42
Measures .....	42
Data analyses .....	45
Results.....	45
Communication with HCPs about HPV vaccine .....	46
Communication with HCPs about sex topics .....	47
Mother-daughter communication about sex topics.....	48
Discussion .....	48
Conclusion .....	51
CHAPTER IV: CONCLUSION .....	61
APPENDIX A: COMPARISON OF STUDY PARTICIPANTS AND NON- PARTICIPANTS .....	69
APPENDIX B: SURVEY INSTRUMENT .....	71
REFERENCES .....	98



## LIST OF TABLES

### Table

2.1. Characteristics of the study sample .....	31
2.2. Proportion of mother-daughter communication about sex attributable to potential cues .....	33
2.3. Correlates of mother-daughter communication about sex topics .....	34
3.1. Characteristics of mothers and their daughters.....	52
3.2. Mothers' communication with HCPs about HPV vaccine .....	54
3.3. Inclusion of sex topics in mothers' discussions with HCPs about HPV vaccine .....	57
3.4. Multivariate associations between mothers' communication with HCPs and mother-daughter communication about sex topics.....	60

## LIST OF FIGURES

### Figure

1.1. Conceptual model of mother-daughter communication about sex .....	9
2.1. Study flow diagram.....	38

## **CHAPTER I: INTRODUCTION**

### **Public health challenge**

Sexuality is a normal part of healthy child and adolescent development.<sup>1, 2</sup> During adolescence, young people develop their own identities, clarify their values, and gain the knowledge, attitudes, and skills they need to be sexually healthy. It is also a time when many young people become sexually active. Almost half of all high school students in the United States (46%) have ever had sexual intercourse. This proportion varies with age, from 32% of 9<sup>th</sup> graders to 62% of students in 12<sup>th</sup> grade.<sup>3</sup> By the time they turn 20, over 3 out of 4 adolescents have had sexual intercourse.<sup>4</sup>

Although sexual debut during adolescence is statistically normative, it nonetheless carries risk. As a group, young people experience a disproportionate share of unintended pregnancies and sexually transmitted infections (STIs) when they engage in sexual intercourse.<sup>5-7</sup> The U.S. has the highest rates of teen pregnancy among industrialized nations with an estimated 3 in 10 girls experiencing at least one pregnancy before age 20, the vast majority of which are unintended.<sup>8-12</sup> Although 15- to 24-year-olds represent only 25% of the sexually active population, nearly half of all reported STIs occur in this age group.<sup>7</sup> Human papillomavirus (HPV) is a particularly prevalent STI; recent estimates are that 1 in 4 female adolescents aged 14-19 years in the U.S. are infected (25%) and the prevalence is even greater among young women aged 20-24 (45%).<sup>13</sup> Many aspects of adolescent sexual behavior contribute to their elevated risk of STIs and unintended pregnancy. For example, adolescents tend to engage in sexual activity sporadically, which can lessen the chance that

they use contraception or others forms of protection.<sup>14</sup> According to the 2009 Youth Risk Behavior Survey, only 61% of students who were sexually active in the previous 3 months reported using a condom the last time they had sex.<sup>3</sup>

The U.S. Public Health Service's *Healthy People 2010* goals include reducing adolescent pregnancies, cases of STIs, and prevalence of HIV infection.<sup>15</sup> To reach these goals, the *21 Critical Health Objectives for Adolescents and Young Adults* identify specific strategies for promoting responsible adolescent sexual behavior. These include promoting abstinence, delaying the initiation of sexual intercourse, and promoting condom use among adolescents who have sex.<sup>16</sup>

### **Parent-child communication about sex**

Parents are one of the primary socialization agents for their children and, as such, play a critical role in shaping the sexual attitudes and behaviors of adolescents.<sup>17, 18</sup> From the time children are young, parents directly and indirectly teach their children about many aspects of sexuality including social norms, gender roles, relationships, and values.<sup>19</sup> Social Cognitive Theory<sup>20</sup> postulates that modeling and observational learning are key processes by which children learn behaviors to support their growing independence as they enter adolescence; however some types of behavior (such as sexual behavior and how to protect against STIs) are unlikely to be learned through these channels, or at least not through parents. Therefore, direct communication between parents and their children is a key mechanism for socialization and learning about sexuality. Beyond imparting knowledge and values, parent-child communication about sexuality can serve as a model for communication that is important for healthy relationship and sexual behavior into adulthood.

Extensive research offers empirical support for the theoretical mechanisms described above. Parent-child communication, particularly mother-daughter communication, about sexual and reproductive health issues is associated with positive outcomes, making parent-child communication about sexuality and other sex topics, an important outcome to achieve *Healthy People* goals and promote healthy sexual behavior.<sup>21</sup> Adolescents who talk with their parents about sex are less likely to have sex<sup>22-24</sup> and are older at sexual debut.<sup>25</sup> Among teens who are sexually active, those who have talked with their parents about sex have fewer sexual partners<sup>22</sup> and are more likely both to talk with their sexual partners about condoms and HIV/AIDS,<sup>26, 27</sup> and to use condoms or other birth control when they have sex.<sup>24, 28-33</sup>

Simply talking about sex may not be enough. Several factors influence the effect of parent-child discussion about sex on adolescent sexual behavior, including the frequency and quality of communication.<sup>18, 27, 34-36</sup> The timing of communication about sex may be particularly important. To be most effective, parents need to have these conversations before children become sexually active, and ideally, as part of an ongoing component of their conversations.<sup>27, 28, 31</sup> One study found that mother-daughter communication about condoms that occurred prior to first intercourse was associated with subsequent condom use whereas conversations that occurred after sexual debut were not.<sup>28</sup> However, parents' timing of communication is often "off," as they may underestimate their child's risk and may not be aware of when their children become romantically involved.<sup>37-41</sup> For example, in one study of parent-adolescent dyads, 40% of youth had intercourse before talking to their parents about safer sex, birth control and STIs.<sup>41</sup> Findings such as these underscore the importance of identifying factors that may prompt parents to initiate discussions about sex with their children *before* they become sexually and romantically involved.

Beyond the empirical support for its effectiveness, parent-child communication about sexuality has other important advantages.<sup>21, 42, 43</sup> Unlike other information sources, parent-child discussions can be ongoing and progressive, allowing the parent to tailor information to the child's developmental status and experiences. The discussions also provide a way for parents to share their own values and beliefs about sexual behavior. Talking about sex with younger adolescents is also highly acceptable to parents and their children. In one study, more than 90% of mothers reported that children should be younger than 14 when parents first start talking with them about sex, with a mean, median, and mode of 10 years.<sup>44</sup> Further, during these younger years, children *want* to hear from parents about sex and other sensitive issues.<sup>45-48</sup> Despite these advantages, many parents fail to engage in such conversations with their preadolescent and young adolescent children about sex for a variety of reasons, including feeling uncomfortable or embarrassed, having difficulty beginning conversations, and finding the right time and place to talk.<sup>30, 49, 50</sup> To date, the majority of research has focused on communication with older adolescents with few studies examining parents' discussions of sex with their preadolescent and young adolescent children.<sup>48, 51-53</sup> Clearly, better understanding of how to promote communication with this younger age group is a priority.

### **The potential opportunity of HPV vaccine**

HPV vaccine could be a novel and particularly effective way to promote parent-child communication about sex because of its high acceptability among parents, the recommended timing of HPV vaccination, and the number of doses required. HPV vaccines are now available<sup>54, 55</sup> that have the potential to prevent many of the negative health outcomes

associated with HPV infection, including genital warts and up to 70% of cervical cancers.<sup>56</sup> HPV vaccine is likely to be most effective if received before sexual debut, when exposure to STIs typically begins.<sup>57</sup> Because the majority of youth become sexually active during adolescence,<sup>58</sup> routine vaccination against HPV is recommended for girls aged 11-12, with catch-up vaccination for girls and women aged 13-25 or 26 who have not yet received it (depending on the vaccine product).<sup>56</sup> Recent guidelines now permissively recommend HPV vaccine for use in boys and young men in the same age range.<sup>59, 60</sup>

Recent research suggests that most parents have talked with their daughters about HPV vaccine<sup>61, 62</sup> and that many adolescents participate in decisions about whether or not to get HPV vaccine.<sup>63, 64</sup> Since HPV is sexually transmitted, discussions about HPV vaccine may provide an opportunity for parents to talk with their pre-adolescent and adolescent children about STIs and other sexual health issues. Multiple studies, both pre- and post-licensure, have found that most parents intend to vaccinate their adolescent daughters against HPV<sup>65-69</sup>. Additionally, both HPV vaccination<sup>57, 58</sup> and parent-child communication about sex<sup>28</sup> are most effective if they occur prior to sexual debut, and, since HPV vaccine is administered in 3 shots over the course of 6 months, it may provide multiple opportunities, or “teachable moments” for parents and their children to talk about sex, which further reinforces messages and may increase effectiveness.<sup>31, 35</sup>

### **Preliminary study**

As a first step to assess the potential of HPV vaccine to serve as a cue to communication about sexuality, we collected data from mothers of adolescent girls aged 11-20 in North Carolina ( $n=609$ ) as a part of the Carolina HPV Immunization Measurement and

Evaluation (CHIME) Study during Fall 2008.<sup>62, 64</sup> We found that many mothers discuss HPV vaccine with their daughters (81%, 496/609) and that these discussions include messages about sex about half of the time (47%, 231/496). This was more common among mothers who believed their daughters may be sexually active (OR: 1.88, 95%CI: 1.25-2.83), had greater knowledge of HPV vaccine (OR: 2.46, 95%CI: 1.07-5.64), lived in urban areas (OR: 1.75, 95%CI: 1.21-2.54), or reported being born-again Christians (OR: 1.74, 95%CI: 1.17-2.58), in adjusted analyses. These findings highlight the potential for HPV vaccine discussions to facilitate sexual health promotion and STI prevention efforts. Further, doctor recommendation of HPV vaccine was associated with mother-daughter communication about it. This finding points to the potential for health care providers to encourage parent-child discussions about HPV vaccine which could, in turn, lead to conversations about sex.

As the CHIME study was primarily designed to examine HPV vaccine uptake, and not communication about sex, we were unable to assess many of the correlates of parent-child communication found in the literature. This dissertation builds on this previous work by examining mother-daughter communication about HPV vaccine and sex topics in a national sample, with a focus on communication with younger adolescents. The dissertation includes a fuller compliment of factors related to parent-child communication about sex and relies on a new conceptual model informed by multiple levels of the social ecological framework. I also investigate the potential for health care providers to use HPV vaccine delivery to also provide guidance about sexual health and STIs to adolescent patients and their parents.



## **Conceptual framework for parent-child communication about sex**

Previous research has employed a range of theories to understand how parent-child communication about sex influences adolescent sexual behavior, but has not favored any one theory or framework to understand how communication begins and is sustained.<sup>70</sup> Empirical and theoretical work suggests that four main types of factors influence parent-child communication about sex: characteristics of the parent, the child, their relationship, and external cues. These can be situated within an ecological framework that acknowledges multiple levels of influence on health behavior. The framework suggests that influences arise at the individual, community, environmental and possibly other levels.<sup>71, 72</sup>

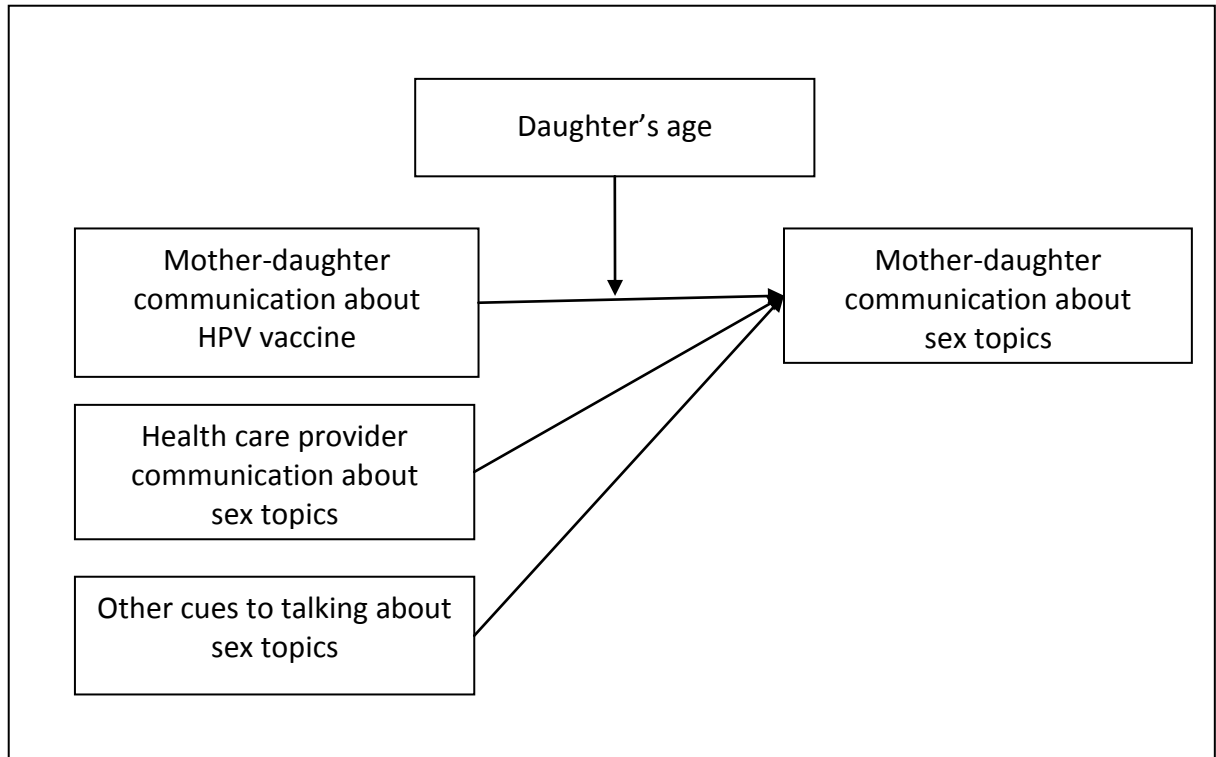
While the ecological framework of health behavior is useful in identifying multilevel influences on health and behavior, a significant limitation is that it does not specify the process of behavioral change. One way in which interpersonal and environmental factors may influence individual behavior is through serving as an external behavioral cue or prompt, making it easier or more natural to perform the behavior. Several theoretical approaches to health behavior explicitly acknowledge the potency of external cues, including the health belief model<sup>73</sup> and implementation intentions.<sup>74</sup> This dissertation seeks to determine whether these interpersonal and environmental factors influence parent-child communication about sex through serving as a cue to talking. Although most parents use spontaneous opportunities and prompts to talk about sex, some parents are exclusively “opportunistic” in child-communication; they rely on external occasions and events (such as television or sex education classes at their children’s school) to prompt talking about sexuality with their children.<sup>75</sup> Thus, understanding whether and how such cues are effective is an important question for public health intervention.

Cues to talk about sex may come from other external (to the parent) influences such as characteristics of the child. For example, changes in the daughter's pubertal status (such as menarche) may serve as a cue to talking about sex and conversations about sex topics may be a part of broader discussions about puberty.<sup>18, 23, 51, 52, 76</sup> Empirical findings indicate that mothers' discussions with their children about sex often occur in contexts where the focus is on non-sex related topics.<sup>77</sup> Indeed, parent-child communication about sex may be best understood within the context of parents' general communication patterns and relationships with their children.<sup>77</sup>

### **HPV vaccine and parent-child communication about sex**

The focus of this dissertation is HPV vaccine as a potential cue to parent-child communication about sex. Parent-child communication about HPV vaccine may provide parents with an opportunity to communicate with their children about sex (Figure 1.1).<sup>78</sup> HPV vaccination status, that is, whether or not the daughter has received any doses of HPV vaccine, is a child characteristic that could influence parent-child communication about sex. Parents may be more likely to discuss sex topics with vaccinated children for a variety of reasons. For example, because HPV is sexually transmitted, getting their children HPV vaccine may prompt parents to discuss STIs. HPV vaccination and discussions about the vaccine may also prompt conversations about abstinence and parental expectations about sexual behavior as some parents may feel that getting their child HPV vaccine implies tacit consent to have sex or they may have concerns that vaccination could encourage sexual disinhibition.<sup>66, 79</sup>

Daughter's age may moderate the association between HPV vaccine discussions and communication about sex. I hypothesize that HPV vaccine will be a more effective cue to talking for parents of younger adolescents. Past work indicates these parents may be not have talked with their children about sex as often or in as much depth, and may feel more uncomfortable and therefore have more difficulty beginning conversations about sex.<sup>52, 80</sup>



**Figure 1.1.** Conceptual model of mother-daughter communication about sex. Figure does not show individual (mother and daughter), relationship, and household characteristics that are also important and will be used as statistical controls.

### **Conversations with health care providers as cues**

Parent interactions with their child's health care provider (HCP) are another potential, yet largely unexamined, cue to talking about sex. Indeed, current guidelines for adolescent preventive services suggest that providers use adolescent visits to offer guidance to adolescents and their parents about sexual health;<sup>81-85</sup> however, research suggests missed

opportunities for them to do so.<sup>86-89</sup> Roughly one-third of HCPs report discussing sexual development (including physical growth) or sexual health (including behavior or sexually transmitted infections) topics with all of their adolescent patients,<sup>88, 89</sup> and substantially fewer (<15%) report educating the parents of their adolescent patients about these topics.<sup>88</sup>

Although HCPs may not bring up issues of sexual health because of barriers such as a lack of time or concern about the adolescent's or the parents' social discomfort,<sup>90, 91</sup> concerns about parent and patient discomfort are likely largely unfounded as both parents<sup>92, 93</sup> and adolescents<sup>47, 94</sup> report wanting providers to broach sensitive topics (like sexual health) during adolescent health care visits. In fact, doing so may increase adolescents' perception of health care quality.<sup>87</sup> It is important to acknowledge that, while many guidelines recommend providing anticipatory guidance,<sup>81-85</sup> scant evidence exists about effects of such guidance on either adolescent patients' or their parents' behavior. Among parents of younger children, anticipatory guidance from HCPs is associated with an increase in parents reporting that they discussed preventive health topics (such as injury prevention and literacy promotion) with their children.<sup>95</sup> Providers may also be able to facilitate parent-child communication about sexual health, including condom use.<sup>96</sup> However, the vast body of research on parent-adolescent communication tends to ignore the potential contribution of HCPs. Parents' relationship with and trust in their children's providers are associated with adherence to treatment protocols<sup>97, 98</sup> and other recommendations.<sup>95</sup> These factors could influence whether parents act on the providers' guidance if it does occur.

HCPs' discussions about HPV vaccine are a potential environmental cue that warrants particular attention as a possible avenue for future intervention to promote parent-child communication about sex. Discussions about HPV vaccine may present an opportunity

for providers to directly educate both parents and adolescents about sexual health and STI prevention, as well as an opportunity to encourage parent-child communication about sex topics.<sup>99</sup> To my knowledge, no research has examined communication between parents, adolescents, and health care providers about HPV vaccine as an opportunity to promote sexual health.

### **Other external cues to talking about sex**

Other external events may serve as cues to action for parents to talk with their children about sex. For example, parents cite asking children about material covered in sex education classes and using events from real life and television shows as conversation starters,<sup>18, 23, 43, 48, 75</sup> and students who receive HIV instruction in school are more likely to report talking with parents about sex and HIV/AIDS.<sup>22</sup>

### **Other correlates of parent-child communication about sex**

To address my research questions and assess communication about HPV vaccine as an opportunity to discuss sex topics, it is important to include other correlates of parent-child communication. In the following section, I review empirical findings about parent, child, and relationship influences on parents' communication with their children about sex topics.

#### ***Parent characteristics***

*Sociodemographic characteristics.* Findings show a clear pattern of association of parent gender and race/ethnicity with parent-child communication about sex, but are inconsistent or null for other demographic characteristics.<sup>35, 52, 100</sup> Overwhelmingly, mothers

are more likely to talk with their children about sex than fathers,<sup>34, 101-104</sup> and most research on parent-child communication has examined the role of mothers. Most studies find that African-American parents have the highest prevalence of having discussed sex with their children and provide a greater range of information to their children,<sup>33, 50, 102</sup> while such communication is less frequently reported among Hispanic families than in other racial/ethnic groups.<sup>33, 36, 48, 76, 105, 106</sup>

Associations between parent-child communication and other sociodemographic characteristics are less consistent. Higher socioeconomic status (as measured by parent educational attainment and/or household income) is positively associated with greater communication in some studies,<sup>102, 106</sup> other studies report null findings,<sup>50</sup> at least one study has found that mothers who had not finished high school were more likely to have discussed sex topics with their children.<sup>107</sup> A few studies include family structure but have found no relationship between communication and either marital status or being in a 2 parent family.<sup>80, 108</sup> The presence of an older sibling in the home appears to increase the likelihood of mother-adolescent discussions about sex<sup>109</sup>

Although rarely examined in previous research, area of residence may influence parent-child communication about sex. Participants in suburban and rural areas report less communication about sexuality than their urban counterparts;<sup>33, 48</sup> though the reason why is unclear, it may be that issues related to adolescent sexual activity and its consequences are more visible in urban environments<sup>43</sup> which, in turn, could increase parents' perception of their child's risk.

Fewer studies have examined the role of religion. Though some report no differences<sup>52</sup> or greater communication about sex among more religious parents when

general measures of communication about sex are used,<sup>80, 108</sup> associations tend to differ based on the content of communication. Parents with conservative religious beliefs report less discussion about contraception and safer sex<sup>80, 108, 110</sup> and more about morality and negative consequences of sexual activity.<sup>104</sup> Parents' political leaning may have a similar effect, with more conservative parents reporting less communication than moderate and liberal parents,<sup>104</sup> but, to my knowledge this has been examined only rarely and warrants greater attention.

*Attitudes and values about adolescent sexual activity.* Although findings are mixed, parental values and attitudes towards adolescent sexual behavior may influence whether they talk about sex with their children. Parental disapproval of their adolescent being sexually active increases the occurrence of communication<sup>108, 111</sup> and is also related to the content of their discussions.<sup>112</sup>

*Parental competence in talking about sex.* Parents' knowledge, skills, and comfort discussing sex with their children increase their communication about related topics with their children.<sup>34, 36, 48, 51, 113-115</sup> Parental barriers to communication include embarrassment and fear that their children might ask them something they do not know.<sup>44</sup> Although most parents believe that talking with their children about sex is important, some parents may be reluctant to have these conversations and not all parents are comfortable doing so.<sup>115</sup> Not surprisingly, parent-child communication about sex is more common among those who are comfortable talking about sex with their children.<sup>48, 51, 52, 111</sup>

*Personal experience.* Parents' personal experiences and their association with parent-child communication about sex are understudied. A few studies suggest that having experienced negative consequences (such as having an unintended pregnancy or getting an

STI)<sup>43, 116</sup> or having talked with their own parents about sex when they were young<sup>43</sup> may motivate some parents to communicate with their adolescent and pre-adolescent children.

### ***Child characteristics***

*Biological sex.* Children's biological sex is an important and consistent correlate of parent-child communication about sex. Parents are more likely to talk about sex with daughters than with sons.<sup>104, 112</sup> The content of these discussions also differs by biological sex, with parents talking more with daughters about protection, birth control, and the negative consequences of pregnancy and STIs than with sons.<sup>49, 104, 117</sup> Additionally, parents conduct these conversations more frequently with children of the same sex as themselves.<sup>18, 21, 42, 104</sup>

*Age and development.* Most research finds that, as children get older, the amount of discussion and breadth of topics discussed increase.<sup>52, 118</sup> Conversations about sex are often initiated in response to children's developmental or pubertal status (e.g., such as menarche).<sup>18, 23, 51, 52, 76</sup> Further, age is a correlate of sexual behavior that may have an effect on parent-child discussions about sexuality by influencing parents' perceptions of their child's risk.<sup>119</sup>

*Risk behaviors.* Parents who believe their children are romantically involved or sexually active are more likely to talk with them about sex-related topics,<sup>18, 40, 43, 75, 76, 120</sup> however, parents often underestimate their child's sexual experience,<sup>37, 38, 41, 111, 121</sup> making this cue to talking one that potentially misses the opportunity to discuss sexual topics before their children sexually active. Children's involvement in other risk behaviors (such as experimenting with alcohol or drugs) may also prompt parents to talk with their children



about sex, but this area has received little research attention.<sup>52, 113</sup> In addition, previous research has found that if parents believe that their child's friends are sexually active, they have more discussions about STIs, birth control, and whether or not sex is appropriate.<sup>120</sup>

### ***Relationship characteristics***

*Closeness and quality of parent-child relationship.* Parent-child relationship closeness and quality not only protect against early sexual debut and sexual risk taking,<sup>34, 122, 123</sup> but they are also associated with parent-child communication about sex.<sup>123</sup> Parents report that being close to their children is an important facilitator of communication about sex.<sup>43</sup> Those who describe their relationship with their children as very close report more communication about sex topics than parents who describe their relationship as having average closeness,<sup>33, 100, 119, 124</sup> and parents' relationship satisfaction is also associated with their communication about sex with their children.<sup>49</sup> Likewise, adolescents' satisfaction with their relationship and closeness with their mothers is associated with greater communication about sex and may also influence whether adolescents pay attention to and accept information their mothers give them about sexual topics.<sup>44, 123</sup>

*General communication.* General (non-sex related) communication may create a context for discussion about more sensitive topics between parents and adolescents. Greater parent-child communication about sex is found among parents who perceive that they have high quality general communication with their children.<sup>35, 44, 52, 75, 110, 120</sup> Similarly, adolescents who report meaningful discussions with their parents are more likely to report having also discussed sexual topics with their parents.<sup>120</sup> Discussions with their children

about other sensitive topics, such as puberty or substance use, may prompt parents to also talk about sex topics.<sup>75, 76</sup>

### **Purpose**

Despite the importance of parent-child communication about HPV vaccine and the importance of such conversations with health care providers, we know remarkably little about these topics. The purpose of this dissertation was to explore HPV vaccine as a potential opportunity for communication about sexual health and STI prevention. The research had the following specific aims: (1) characterize mothers' communication with their adolescent daughters about HPV vaccine and sex topics; (2) determine whether some HPV vaccine discussions provide an opportunity for mothers to talk with their adolescent daughters about sex; and (3) describe mothers' communication with health care providers about HPV vaccine and sexual health.

In this dissertation, I address these three aims through two papers. Data for both papers are from the UNC Mother-Daughter Communication Study, which was specifically designed to investigate my questions about mother-daughter communication about HPV vaccine and sex topics. This research focuses exclusively on communication between mothers and daughters because mothers are more likely than fathers to be the primary caregiver and to talk with their children about sex.<sup>34, 101-104</sup> Additionally, HPV vaccine presents a greater opportunity for communication with daughters than with sons because guidelines have recommended routine HPV vaccination of girls and young women since 2007,<sup>56</sup> and it is already a widely accepted clinical practice. In contrast, HPV vaccine became available for use in adolescent boys and young men as recently as October 2009<sup>60</sup> and

received only a provisional permissive recommendation from the Advisory Committee on Immunization Practices.<sup>59</sup> The permissive recommendation encourages HCPs to discuss the vaccine with age-appropriate male patients and to provide the vaccine if a patient requests it rather than offering it routinely.

### **Significance**

Understanding how external cues, and HPV vaccine discussions in particular, may prompt parent-child communication about sex is an important public health issue. Several aspects of this dissertation research contribute to its overall significance. Findings may have direct implications for public health and clinical practice. The promotion of mother-daughter communication about sex through HPV vaccine discussions would be a novel way to capitalize on already widely accepted clinical practice and promote healthier sexual behaviors among adolescents. Study findings could inform the development of guides or other tools for parents, educators and health care providers on how to use HPV vaccine discussions to facilitate communication about sexual health and STI prevention. It is possible that promoting parent-child communication about sex could potentially increase HPV vaccine uptake, as concerns about discussing sex are one potential barrier to HPV vaccination for parents and providers.<sup>125, 126</sup> Encouraging parents to talk with their children about sexuality and facilitating parent-child communication during health care visits may provide a way for health care providers to address this barrier.<sup>111, 127</sup>

## **CHAPTER II: HPV VACCINE DISCUSSIONS--AN OPPORTUNITY FOR MOTHER-DAUGHTER COMMUNICATION ABOUT SEXUAL HEALTH (Paper1)**

### **Abstract**

**Purpose.** Mother-daughter communication about sex is associated with healthier behavior during adolescence. We sought to characterize mothers' communication with their daughters about HPV vaccine and the potential for HPV vaccine discussions to provide an opportunity for talking about sex.

**Methods.** During December 2009, we conducted an online survey with a nationally representative sample of U.S. mothers of female adolescents ages 11-14 years (response rate=66%). The sample ( $n=900$ ) was 64% non-Hispanic white and 16% non-Hispanic black. We analyzed data with logistic regression. Estimates are weighted.

**Results.** Sixty-five percent of mothers reported talking with their daughters about HPV vaccine, of whom 41% said that talking about the vaccine led to a conversation about sex. Mothers who had talked with their daughters about HPV vaccine were more likely than those who had not to have talked with their daughters about sex topics (92% vs. 74%,  $p<.001$ ), even controlling for factors associated with mother-daughter communication about sex in multivariate analyses (OR=3.07, CI=1.44-6.54). Among mothers who talked about sex when they talked about HPV vaccine, many felt that HPV vaccine provided a good reason to do so (64%) or that it facilitated discussions by making it easier to start a conversation (33%).

**Conclusions.** HPV vaccine discussions provide an acceptable opportunity for mothers to talk with their daughters about sex at an age when such communication is most influential. It may be possible for parents to capitalize on HPV vaccine discussions already happening in many families to provide messages about sexual health to adolescents.

## Introduction

Parent-child communication about sex, particularly communication with daughters, is important because it is associated with decreased sexual risk taking during adolescence and an older age at sexual debut.<sup>21, 25, 28, 29, 48</sup> Parents need to have these conversations early and often for them to be most effective. Communication ideally begins *before* children start having sex;<sup>28</sup> however, many parents underestimate their children's level of sexual activity, and their timing of communication is often late, occurring after sexual debut, if at all.<sup>37, 38, 40,</sup>  
<sup>41</sup> For example, in a recent study of parent-adolescent dyads, 40% of youth had intercourse before their parents talked with them about safer sex.<sup>41</sup> Frequency of communication also matters. Discussing sex topics repeatedly, rather than as a single conversation or "big talk," provides parents with opportunities to reinforce messages, answer questions, and tailor content to their children's development, potentially increasing the protective benefits of communication.<sup>31, 35</sup> These findings underscore the need to promote communication about sex between parents and their children during early adolescence.

Many parents rely on situations that arise spontaneously to prompt conversations with their children about sex. These cues can include external events, such as something seen on television or a child's school providing a sex education class,<sup>75</sup> but they can also include developmental changes, such as a daughter's menarche or interest in sex.<sup>76</sup> Conversations about sex topics may also be part of broader discussions about puberty or topics not directly related to sex.<sup>18, 52, 53, 76, 77</sup> Understanding whether and how cues are effective in prompting such conversations is important for public health.

One potential cue to talking about sex that has gone largely unexamined is mother-daughter communication about human papillomavirus (HPV) vaccine. U.S. guidelines

recommend routine administration of HPV vaccine to 11 or 12 year old girls with catch-up until age 26.<sup>56</sup> Since HPV is a common sexually transmitted infection (STI),<sup>128</sup> discussions about HPV vaccine may provide an opportunity for parents to talk with their young adolescent children about STIs and other sexual health issues. Furthermore, as HPV vaccine is administered in 3 shots over 6 months,<sup>56</sup> discussions about the vaccine may provide multiple opportunities for parents and their children to talk about sex. Many studies, both pre- and post-vaccine licensure, have found that most parents intend to vaccinate their adolescent daughters against HPV,<sup>65, 67-69</sup> and just under half have done so now that the vaccine is available.<sup>129</sup>

While recent research suggests that many parents talk with their daughters about HPV vaccine,<sup>61, 62</sup> little is known about the role of HPV vaccine discussions as a cue to talking about sex. The purpose of the present study was to characterize mothers' communication with their daughters about HPV vaccine, and assess the potential for HPV vaccine to provide an opportunity for mothers to talk with their early adolescent daughters about sex.

## **Methods**

We surveyed a nationally representative sample of mothers of adolescent females aged 11-14 years during December 2009. All mothers were members of an existing national panel of U.S. households that a survey company created using a dual frame approach combining list-assisted, random-digit dialing and address-based random sampling of U.S. households.<sup>130</sup> In exchange for completing surveys, panel members accumulate points which can be redeemed for small cash payments. Households without pre-existing internet are provided a laptop computer and internet access.

The survey company invited 1,681 mothers to complete our cross-sectional online survey (Figure 2.1). Among those mothers, 1,170 (70%) responded to the invitation, and 1,009 were eligible to participate in the study as they had daughters ages 11-14 years. A total of 951 mothers of 11-14 year-old females consented to participate and completed the survey in December 2009 (response rate=66%<sup>131</sup>). Participants were more likely than non-participants to have a college degree, but they did not differ on other sociodemographic characteristics. In the present analysis, we report data from 900 mothers, having excluded those with missing values for items assessing mother-daughter communication about sex or HPV vaccine, and other potential cues to talking about sex ( $n=51$ , 5% of total sample). Mothers in the analytic sample and those whose data we excluded had similar sociodemographic characteristics in bivariate analyses. The Institutional Review Board at the University of North Carolina approved the study.

## Measures

The UNC Mother-Daughter Communication Study survey is available online at [www.unc.edu/~ntbrewer/hpv](http://www.unc.edu/~ntbrewer/hpv). We developed survey items based on established measures in the literature<sup>36, 51, 132</sup> as well as our own HPV vaccine research involving parents of adolescent girls.<sup>62, 69, 133</sup> We cognitively tested the survey with 8 mothers of pre-adolescent and adolescent children prior to the study to ensure that survey instructions and items were clear and to confirm that participants interpreted items as intended.<sup>134</sup>

***Mother-daughter communication about sex.*** The survey assessed mother-daughter communication about sex through the question: “Have you ever talked with [daughter’s name] about sex topics? These might include what sexual intercourse is, when you start



having sex, how to keep from getting pregnant, diseases you can get when you have sex, HIV/AIDS, and condoms.” (yes/no). Mothers who responded “yes” received a question about how old their daughters were when they first talked about sex topics.

***Mother-daughter communication about HPV vaccine.*** The survey assessed mother-daughter communication about HPV vaccine with the question: “How much have you talked with [daughter’s name] about HPV vaccine?” (“a little” or “a lot” = 1, and “not at all” = 0). For mothers who reported having talked with their daughters about HPV vaccine, the survey presented follow-up questions about who first brought up the topic of HPV vaccine and whether talking about HPV vaccine led to a discussion with their daughters about sex topics (yes/no). Among mothers who said “yes,” the survey assessed their perceptions of HPV vaccine as an opportunity to talk with their daughters about sex through 4 agree-disagree statements. For mothers who had not yet talked with their daughters about HPV vaccine, the survey assessed agreement with 5 statements that described reasons for not discussing it (“strongly agree” or “agree” = 1, and “neither agree nor disagree,” “disagree,” or “strongly disagree” = 0).

***Other potential cues to talking about sex.*** The survey assessed other potential cues to talking with their daughters about sex topics including whether: mothers had talked with their daughters about puberty or drugs/alcohol; their daughters had gotten their period; their daughters had shown an interest in boys/dating; their daughters received sex education at school; their daughters had initiated the HPV vaccine series; and their daughters may be sexually active. Mothers who reported having a potential cue received a follow-up question about whether that cue led them to talk with their daughters about sex topics (yes/no). The survey also assessed whether mothers had talked with their daughters about sex topics

because: their daughters asked about it, their daughters' friends were having sex or talking about sex, something in the news, on television or on the internet, or something else.

The survey collected information about sociodemographic characteristics, knowledge about HPV and HPV vaccine, and other factors associated with mother-daughter communication about sex in previous studies, including mothers' attitudes towards their daughter having sex as a teenager,<sup>111</sup> personal history of talking about sex with their own mothers,<sup>43</sup> satisfaction with their relationship with their daughters,<sup>49</sup> and perceived ability to communicate with their daughters,<sup>35, 52, 75</sup> as well as whether the daughters have an older sister.<sup>109</sup>

## **Data analyses**

We used 3 separate but complimentary approaches to assess HPV vaccine as an opportunity for mother-daughter communication about sex. First, we calculated the proportion of all mothers who said each cue led to a conversation about sex topics; we call this the "attributable proportion." We compared the attributable proportion for HPV vaccine discussions to other potential cues using McNemar's chi-square test. Second, we assessed whether mothers' communication with daughters about HPV vaccine was independently associated with communication about sex. We ran a series of bivariate logistic regression models assessing associations between sociodemographics and potential cues to talking about sex with the main outcome. We then entered all variables bivariately associated ( $p < .10$ ) with communication about sex into a multivariate model. We also examined whether daughters' age and HPV vaccination status moderated the effect of HPV vaccine discussions on mother-daughter communication about sex. Finally, we assessed mothers' perceptions of HPV

vaccine as an opportunity to discuss sex topics with their daughters. We conducted all analyses in Stata SE version 10.0 (Statacorp, College Station, TX) and incorporated sample weights to yield nationally-representative estimates. All statistical tests were two-tailed using a critical alpha of .05.

## **Results**

### **Sample characteristics**

Most mothers were less than 50 years old (90%), non-Hispanic white (64%), married or living with a partner (81%), and from an urban area (82%; Table 2.1). About one-third of mothers had a college degree (30%), and half reported a household income of at least \$60,000 (52%). Most mothers (86%) felt their communication with their daughter was very good or excellent, and most (75%) believed their daughter should wait until married to have sex. Daughters ranged in age from 11-14, with roughly equal proportions in each age group.

### **Cues to mother-daughter communication about sex**

Sixty-five percent of mothers reported talking with their daughters about HPV vaccine, of whom 41% said that doing so led to a conversation about sex (Table 2.2). Thus, among all mothers, 27% talked about sex as a result of HPV vaccine conversations (attributable proportion). This is similar to the proportion of mothers in the sample who talked with their daughters about sex as a result of talking about alcohol or drugs (29%), or because their daughters had gotten their periods (21%), even though mother-daughter discussions about alcohol or drugs were more commonly reported.

More mothers talked with their daughters about sex in the context of HPV vaccine discussions than did so because they believed that their daughters may be sexually active

(6%) or because their daughters were vaccinated against HPV (11%), in part because these other cues were less commonly reported in the sample. Compared to the proportion of mothers who talked with their daughters about sex as a result of HPV vaccine discussions, a greater proportion talked with their daughters about sex because they talked with them about puberty (68%), thought their daughters were interested in boys (36%), or because their daughters had sex education at school (46%). Mothers also more commonly reported talking about sex because their daughters asked (63%), they thought their daughters' friends were having sex or talking about sex (35%), or because of something in the media (60%).

### **Correlates of mother-daughter communication about sex**

The majority of mothers (86%) reported ever having talked with their daughter about sex (Table 2.3). The mean age of daughters at which the mothers first talked about sex was 10 years old (SD=2.2 years). In multivariate analyses, mothers who talked with their daughters about HPV vaccine had greater odds of talking with their daughters about sex topics than mothers who did not (OR=3.07, 95% CI: 1.44-6.54). Mothers were also more likely to report talking with their daughter about sex topics if their daughters had gotten their period (OR=2.43, 95% CI: 1.12-5.28), showed an interest in boys (OR=2.53, 95% CI: 1.24-5.18), or had sex education at school (OR= 2.18, 95% CI 1.12-4.26). In addition, communication with daughters about sex was significantly more likely among mothers who: had a college degree (OR=1.91, 95% CI: 1.08-3.38); felt their communication with their own daughters was very good or excellent (OR=3.20, 95% CI: 1.31-7.81); reported having talked with their own mothers about sex when they, themselves, were teenagers (OR=5.19, 95% CI: 2.26-11.96); or lived in the western (vs. the northeastern) region of the U.S. (OR=2.76, 95%

CI: 1.11-6.88). The association between HPV vaccine discussions and mother-daughter communication about sex did not differ by daughters' age ( $p=.67$ ) or HPV vaccination status ( $p=.84$ ); as a result, we did not include these interaction terms in the final model.

### **Mothers' perceptions of HPV vaccine discussions**

Most mothers who talked with their daughters about sex when they discussed HPV vaccine reported that HPV vaccine discussions provided a good reason to do so (64%). Additionally, one-third of mothers found that talking about HPV vaccine made it easier to start a conversation with their daughters about sex (33%), and a quarter reported that it gave them an opportunity to do so that they might not have had otherwise (27%). However, the vast majority reported that they would still talk with their daughters about sex even without talking about HPV vaccine (98%).

Mothers reported the reasons they did or did not discuss HPV vaccine with their daughters. Of mothers who had talked with their daughters about the vaccine ( $n=594$ ), most reported that these discussions began because mothers brought up the topic themselves (52%) or that a doctor or other health care provider did (35%). Among mothers who brought up the topic, most did so because a health care provider prompted them (35%) or because of an advertisement for the vaccine (26%). Other reported prompts to talking about HPV vaccine included something in the news or media (11%) and information from their daughter's school (3%).

Among mothers who had not yet talked with their daughters about HPV vaccine ( $n=306$ ), the main reasons reported for not doing so were: not knowing enough about the vaccine (42%); believing their daughters were too young (38%); not wanting to get their daughters vaccinated (37%); and not receiving a doctor recommendation to get the vaccine

(22%). One-fifth of mothers said they just had not gotten around to it yet (20%). Only 5% reported not talking about HPV vaccine because they did not want to talk with their daughters about sex.

## **Discussion**

Despite the advantages of parent-child communication about sex as a strategy to promote adolescent health, many parents fail to engage in such conversations with their children for a variety of reasons, including having difficulty beginning conversations and finding the right time to talk.<sup>30, 49, 50</sup> Our findings indicate that HPV vaccine could provide a new and effective cue to prompt parents to talk with their young adolescent children about sex. In this nationally-representative sample, most mothers reported having talked with their 11-14 year old daughters about HPV vaccine, and many of these mothers included messages about sex in their HPV vaccine discussions, consistent with previous research.<sup>62, 135</sup> Further, mothers' discussions with their daughters about HPV vaccine were associated with their communication about sex, even controlling for other factors.

To our knowledge, this study is among the first to compare multiple potential cues to talking about sex. We found that HPV vaccine discussions provide a cue to talking about sex that is as important as some more widely recognized cues (such as menarche),<sup>27, 28, 33</sup> even though HPV vaccine discussions have not yet been promoted as a possible cue to parent-child communication. Many mothers who included sex topics in their HPV vaccine discussions reported that talking about the vaccine facilitated discussing sex by providing a good reason or by making it easier to start the conversation.

Taken together, these findings suggest that it may be possible to capitalize on HPV vaccine discussions to facilitate parent-child communication about sex. For mothers who

have not yet talked with their daughters about HPV vaccine, simply initiating vaccine discussions may provide an avenue for talking with their daughters about sex topics. As a substantial proportion of mothers in our sample had low knowledge of HPV and HPV vaccine, education about the vaccine might promote communication among more parents and their daughters,<sup>62</sup> as well as potentially increase vaccine acceptability and uptake. For mothers who are already talking with their daughters about HPV vaccine, more could be encouraged to take advantage of this opportunity to provide messages about sexual health to their children.

Health care providers may be able to use HPV vaccination visits to provide information and guidance to parents about discussing sex topics with their children. Research shows that parents want providers to broach sensitive topics like sex,<sup>92, 93</sup> and such an approach is aligned with current guidelines for adolescent preventive services suggesting that providers offer guidance to adolescents and their parents about sexual health.<sup>81, 136</sup> Because HPV vaccine protects against an STI, it may provide a natural segue to talking about sex. As it is recommended for all 11-12 year-old girls and administered over 3 visits,<sup>56</sup> it could be a cue for early and frequent communication about sexual health. However, while parents are largely supportive of HPV vaccine, they are more supportive when it is framed as preventing cancer, as opposed to an STI.<sup>137</sup> Providers may also be less likely to recommend HPV vaccine when considering it necessary to discuss sexuality beforehand.<sup>138</sup> Thus, using HPV vaccine to promote sexuality discussions could affect vaccination rates and should be explored further.

Our study's strengths include a large nationally-representative sample and extensive controls for variables associated with parent-child communication about sex. The main

limitation is reliance on mothers' reports, which may not fully reflect actual conversations, as parent and adolescent reports of communication about sex can be discrepant.<sup>37,42</sup> However, data on parent (as opposed to child) perceptions may be more appropriate for the present study, as it can inform interventions targeting parents. Our study used a single, dichotomous measure of mother-daughter communication; future research should assess the content, timing, and frequency of mothers' conversations with their daughters about HPV vaccine and sex. The study's cross-sectional design precludes causal inferences about associations between HPV vaccine-related variables and parent-child communication about sex topics. The generalizability of study findings to other populations is unknown.

## **Conclusion**

Our findings highlight the potential of HPV vaccine discussions to promote sexual health. Clearly HPV vaccine discussions are not the only opportunity for parents to talk with their children about sex, but they provide an acceptable opportunity at an age when such communication can be most influential. Given the importance of parent-child communication about sex that is early and frequent, conversations about HPV vaccine could facilitate parents' conversations with their preadolescent and young adolescent daughters. Future research should examine health care provider communication about HPV vaccine and explore ways to use HPV vaccine and other cues to maximize important discussions about sexual health at different stages of an adolescent's development.



**Table 2.1.** Characteristics of the study sample ( $n=900$ )<sup>a</sup>

	<i>n</i>	(%)
<b>Mother characteristics</b>		
Age		
<40 years	294	(43)
40-49 years	482	(47)
≥50 years	124	(10)
Race/ethnicity		
Non-Hispanic white	686	(64)
Non-Hispanic black	82	(16)
Hispanic	78	(14)
Other race/ethnicity	54	(6)
Education		
Some college or less	464	(70)
College degree or higher	436	(30)
Marital status		
Other	144	(19)
Married/living with a partner	756	(81)
Born-again Christian		
No	556	(60)
Yes	344	(40)
Political leaning		
Conservative	395	(44)
Moderate	327	(42)
Liberal	178	(14)
<b>Mother's beliefs and knowledge</b>		
Satisfied with relationship with daughter		
Not strongly agree	277	(33)
Strongly agree	623	(67)
Perceived communication with daughter		
Poor/fair/good	122	(14)
Very good/excellent	778	(86)
Talked with own mother about sex		
No	653	(72)
Yes	247	(28)
Thought daughter should wait until she's married to have sex		
Not agree <sup>c</sup>	225	(25)
Agree/strongly agree	675	(75)
Thought daughter having sex while she's a teenager could be okay		
Not agree <sup>c</sup>	860	(97)
Agree/strongly agree	40	(3)

Knew that HPV is a STI		
No	203	(29)
Yes	562	(53)
Don't know	135	(18)
HPV vaccine knowledge, mean (SD) <sup>b</sup>	0.44	(0.33)

#### **Daughter characteristics**

Age		
11-12 years	420	(48)
13-14 years	480	(52)
Had an older sister		
No	609	(67)
Yes	291	(33)

#### **Household characteristics**

Annual household income		
<\$60,000 (Ref)	325	(48)
≥\$60,000	575	(52)
Urbanicity		
Rural	126	(18)
Urban	774	(82)
Region of residence		
Northeast	148	(15)
South	257	(37)
Midwest	277	(25)
West	218	(22)

<sup>a</sup> Table shows raw frequencies and weighted percentages. Percentages may not total 100% due to rounding.

<sup>b</sup> Proportion of correct responses on 4 HPV vaccine knowledge items (range: 0-1). Component items included knowledge that HPV vaccine: prevents most genital warts, prevents most cervical cancer, is recommended for 11-12 year old girls, and works best if girls get it before they start having sex. Mothers received these items before they received informative statements about HPV vaccine.

<sup>c</sup> Includes responses of “strongly disagree,” “disagree,” and “neither agree nor disagree.”

**Table 2.2.** Proportion of mother-daughter communication about sex attributable to potential cues<sup>a</sup>

	Reported the cue		Cue led to conversation about sex topics			
	<i>n</i>	%	<i>n</i>	Among mothers reporting cue %	Among all mothers %	<i>p</i>
<b>All mothers, <i>n</i>=900</b>						
Mother talked with daughter about...						
HPV vaccine	594	65	261	41	27	[ref]
puberty/physical development	886	96	629	70	68	**
alcohol/drugs	887	97	274	30	29	
Daughter has gotten her period	542	61	206	35	21	
Daughter is interested in boys/dating	502	60	306	60	36	*
Daughter's school has sex education class	613	64	461	71	46	**
Daughter has initiated HPV vaccine <sup>b</sup>	271	31	95	35	11	**
Daughter may be sexually active	56	7	46	87	6	**
<b>Mothers who had talked about sex, <i>n</i>=792</b>						
Mother talked with daughter about sex because...						
daughter asked about it	565	74	n/a	-	63	**
daughter's friends are having sex/talking about it	308	41	n/a	-	35	*
something in the media	587	70	n/a	-	60	**
something else	321	35	n/a	-	30	**

Abbreviations: HPV= human papillomavirus; n/a= not applicable as asked only of mothers who had discussed sex with their daughters; ref= comparison cue.

<sup>a</sup> Table shows observed frequencies and weighted percentages. Asterisks denote differences between proportion attributable to HPV vaccine discussions and other potential cues based on McNemar's chi-square statistic.

<sup>b</sup> Defined as having received at least 1 shot of HPV vaccine.

\**p*<.05, \*\**p*<.001.

**Table 2.3.** Correlates of mother-daughter communication about sex topics (*n*=900)<sup>a</sup>

	Ever talked with daughter about sex topics <i>n</i> (%)	Bivariate OR (95% CI)	Multivariate OR (95% CI)
<b>Overall</b>	792 (86)	-	-
<b>Potential cues to talking about sex</b>			
Talked with daughter about...			
HPV vaccine			
No	240 (74)	1 [reference]	1 [reference]
Yes	552 (92)	4.10 (2.05-8.23)**	3.07 (1.44-6.54)*
Puberty <sup>b</sup>			
No	6 (31)	1 [reference]	-
Yes	786 (88)	16.14 (2.95-88.39)**	-
Alcohol/drugs <sup>b</sup>			
No	10 (83)	1 [reference]	-
Yes	782 (86)	1.23 (0.24-6.34)	-
Daughter has gotten her period			
No	289 (76)	1 [reference]	1 [reference]
Yes	503 (92)	3.70 (1.83-7.48)**	2.43 (1.12-5.28)*
Daughter is interested in boys			
No	322 (78)	1 [reference]	1 [reference]
Yes	470 (91)	2.86 (1.36-6.01)*	2.53 (1.24-5.18)*
Daughter had sex education in school			
No	197 (77)	1 [reference]	1 [reference]
Yes	569 (92)	3.36 (1.62-6.97)**	2.18 (1.12-4.26)*
Don't know	26 (61)	0.48 (0.14-1.60)	0.67 (0.19-2.33)
Daughter has initiated HPV vaccine <sup>c</sup>			

No	546 (83)	1 [reference]	1 [reference]
Yes	246 (92)	2.52 (1.33-4.77)*	0.82 (0.35-1.92)
Perception of daughter's sexual activity			
Not sexually active	738/844 (85)	1 [reference]	1 [reference]
May be sexually active	54/56 (98)	9.12 (1.71-48.54)*	3.69 (0.75-20.36)

### Mother characteristics

#### Age

<40 years	257 (84)	1 [reference]	-
40-49 years	421 (87)	1.29 (0.64-2.62)	-
≥50 years	114 (88)	1.48 (0.44-5.05)	-

#### Race/ethnicity

Non-Hispanic white	600 (86)	1 [reference]	-
Non-Hispanic black	73 (86)	1.05 (0.37-2.93)	-
Hispanic	70 (82)	0.76 (0.23-2.50)	-
Other race/ethnicity	49 (93)	2.30 (0.72-7.32)	-

#### Education

Some college or less	400 (83)	1 [reference]	1 [reference]
College degree or higher	392 (92)	2.28 (1.33-3.92)*	1.91 (1.08-3.38)*

#### Marital status

Other	133 (91)	1 [reference]	-
Married/living with a partner	659 (84)	0.56 (0.19-1.64)	-

#### Born-again Christian

No	482 (84)	1 [reference]	-
Yes	310 (88)	1.31 (0.65-2.65)	-

#### Political leaning

Conservative	349 (86)	1 [reference]	-
Moderate	281 (84)	0.88 (0.42-1.87)	-
Liberal	162 (90)	1.43 (0.63-3.22)	-

### Mother's beliefs and knowledge

Satisfied with relationship with daughter

Not strongly agree	244 (83)	1 [reference]	-
Strongly agree	548 (87)	1.40 (0.68-2.88)	-
Perceived communication with daughter			
Poor/fair/good	106 (73)	1 [reference]	1 [reference]
Very good/excellent	686 (88)	2.58 (1.06-6.29)*	3.20 (1.31-7.81)*
Talked with own mother about sex			
No	559 (82)	1 [reference]	1 [reference]
Yes	233 (95)	4.62 (2.22-9.64)**	5.19 (2.26-11.96)**
Thought daughter should wait until she's married to have sex			
Not agree <sup>e</sup>	149 (61)	1 [reference]	-
Agree/strongly agree	445 (66)	1.65 (0.80-3.41)	-
Thought daughter having sex while she's a teenager could be okay			
Not agree <sup>e</sup>	569 (65)	1 [reference]	-
Agree/strongly agree	25 (53)	0.73 (0.13-4.12)	-
Knew that HPV is a STI			
No	172 (84)	1 [reference]	-
Yes	509 (89)	1.58 (0.70-3.54)	-
Don't know	111 (77)	0.63 (0.24-1.63)	-
HPV vaccine knowledge, mean (SD) <sup>d</sup>	0.46 (0.33)	2.70 (1.02-7.10)*	0.91 (0.29-2.88)

### Daughter characteristics

Age			
11-12 years	344 (79)	1 [reference]	1 [reference]
13-14 years	448 (92)	3.04 (1.47-6.29)**	1.08 (0.49-2.38)
Has an older sister			
No	531 (86)	1 [reference]	-
Yes	261 (86)	0.99 (0.46-2.12)	-

### Household characteristics

#### Annual household income

<\$60,000	287 (85)	1 [reference]	-
≥\$60,000	505 (86)	1.02 (0.51-2.04)	-

#### Urbanicity

Rural	110 (80)	1 [reference]	-
Urban	682 (87)	1.63 (0.65-4.09)	-

#### Region of residence

Northeast	122 (84)	1 [reference]	1 [reference]
South	224 (83)	0.93 (0.42-2.02)	0.90 (0.38-2.12)
Midwest	247 (84)	1.00 (0.42-2.38)	1.26 (0.54-2.96)
West	199 (92)	2.22 (1.07-4.60)*	2.76 (1.11-6.88)*

Abbreviations: HPV= human papillomavirus; CI= confidence interval; OR= odds ratio; SD= standard deviation.

<sup>a</sup> Table shows observed frequencies and weighted percentages. Multivariate model contains all correlates  $p < .10$  in bivariate models.

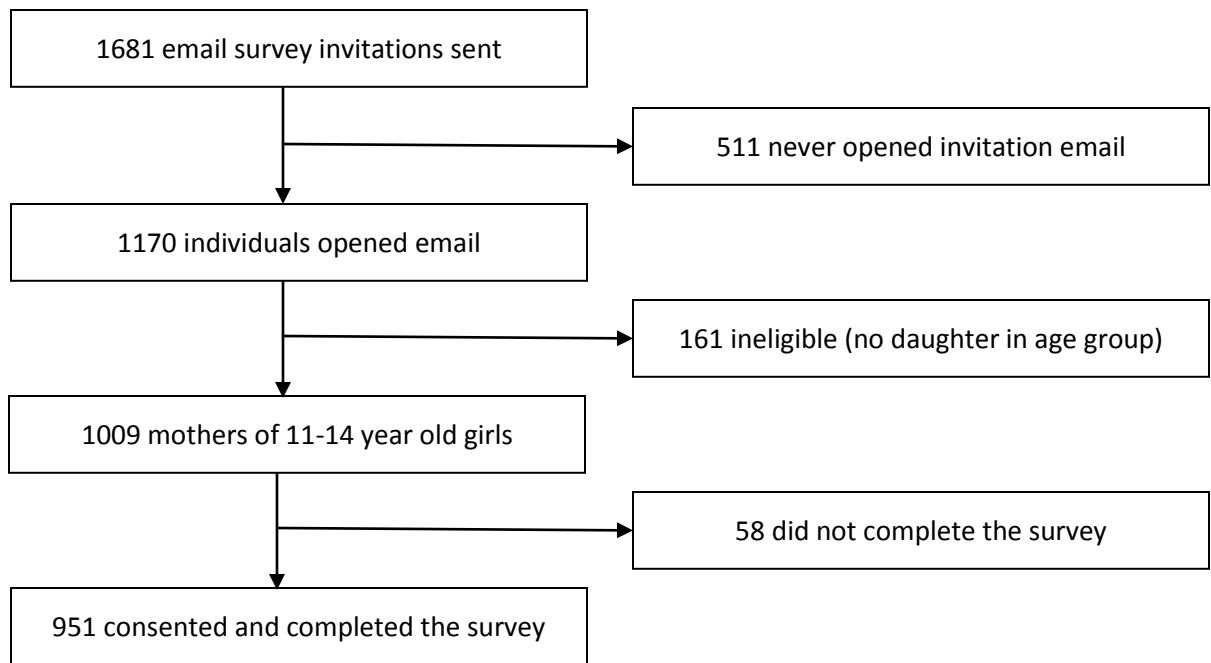
<sup>b</sup> Shown for descriptive purposes; not included in multivariate model due to small expected cell size ( $< 5$ ).

<sup>c</sup> Defined as having received at least 1 shot of HPV vaccine.

<sup>d</sup> Proportion of correct responses on 4 HPV vaccine knowledge items (range: 0-1). Component items included knowledge that HPV vaccine: prevents most genital warts, prevents most cervical cancer, is recommended for 11-12 year old girls, and works best if girls get it before they start having sex. These items were asked prior to mothers receiving informative statements about HPV vaccine.

<sup>e</sup> Includes responses of “strongly disagree,” “disagree,” and “neither agree nor disagree.”

\* $p < .05$ , \*\*  $p < .001$ .



**Figure 2.1.** Study flow diagram



### **CHAPTER III: HEALTH CARE PROVIDER COMMUNICATION ABOUT HPV VACCINE: AN OPPORTUNITY TO PROMOTE SEXUAL HEALTH? (Paper 2)**

#### **Abstract**

**Objective(s):** To characterize health care providers' (HCPs) communication about HPV vaccine, and to assess HPV vaccine discussions as an opportunity for HCPs to provide guidance to mothers and their young adolescents about sexual health.

**Design:** Cross-sectional study design.

**Setting:** Internet survey conducted in December 2009.

**Participants:** Mothers ( $n=902$ ) of adolescent females ages 11-14 years who were members of an existing national panel of U.S. households.

**Main Exposure:** Mothers' reports of talking with their daughters' HCPs about sex topics during discussions about HPV vaccine.

**Outcome Measures:** Mothers' reports of talking with their daughters about sex topics, ever and during their discussions about HPV vaccine.

**Results:** About half (55%) of all mothers reported ever talking with their daughters' HCPs about HPV vaccine and a quarter (25%) of mothers who did so said the HCPs included sex topics in those conversations. In multivariate analyses, mothers who reported that HCPs included sex topics when discussing HPV vaccine were more likely to talk about sex with their daughters both during HPV vaccine conversations (62% vs. 35%, odds ratio [OR]= 3.34, 95% confidence interval [CI]: 1.59-7.00) and overall (96% vs. 76%, OR= 6.21, 95% CI: 1.76-21.94).

**Conclusion:** An effective way for HCPs to promote mother-child communication about sexual health could be to provide information during HPV vaccination visits. However, our findings suggest that many HCPs are not discussing HPV vaccine with parents of their adolescent patients, and most who do are not using it as an opportunity to provide anticipatory guidance about sexual health.

## Introduction

Mother-daughter communication about sex, particularly communication that happens early and frequently, is associated with healthy sexual behavior during adolescence, including older age at sexual debut and decreased sexual risk taking.<sup>21, 25, 28, 29, 48</sup> Health care providers (HCPs) who see young adolescents can play an important role in providing information and resources to promote parent-child communication and to reduce sexual risks.<sup>90</sup> Indeed, numerous national guidelines for adolescent preventive services recommend that providers use adolescent visits to offer guidance to adolescents and their parents about sexual health.<sup>81-85</sup> Both parents<sup>92, 93</sup> and adolescents<sup>47, 94</sup> report wanting providers to broach sensitive topics (like sexual health) during adolescent health care visits. However, only one-third of HCPs report discussing sexual development or related health topics with most of their adolescent patients,<sup>88, 89</sup> and substantially fewer report educating the parents of their adolescent patients about these topics.<sup>88</sup>

Discussions about human papillomavirus (HPV) vaccine, a vaccine against a common sexually transmitted infection (STI) that can cause cancer, may provide a natural opportunity for HCPs to talk about STIs and other sexual health issues with young adolescent patients and their parents. U.S. guidelines recommend routine administration of HPV vaccine to 11 or 12 year old girls with catch up vaccination until age 26.<sup>56</sup> Research finds that HPV vaccine is highly acceptable to parents.<sup>79, 139, 140</sup> Further, because it is administered over 3 visits,<sup>56</sup> discussions about the vaccine may provide HCPs with multiple opportunities to promote parent-child communication.

Little research has examined communication about HPV vaccine between parents, adolescents, and HCPs as an opportunity to promote sexual health. To address this gap, we

sought to characterize mothers' communication with their adolescent daughters' HCPs about HPV vaccine. We also examined associations between these discussions and mother-daughter communication about sex.

## **Methods**

We surveyed a nationally representative sample of mothers of adolescent females ages 11 to 14 years..<sup>141</sup> The mothers were members of an existing survey panel composed using list-assisted, random-digit dialing and address-based sampling for homes with no landline, which provided a probability sample of U.S. households.<sup>130</sup> The survey company provided a laptop and free internet access to non-Internet households so panel members could complete multiple online surveys each month. Panel members in households with existing computer and internet access accumulated points for completing surveys that they could later redeem for small cash payments.

A total of 951 mothers of 11-14 year-old females completed the survey in December 2009 (response rate = 66%).<sup>131</sup> While the analytic sample for the present analysis excludes 49 respondents with missing data for key outcome variables (7% of sample), resulting in an analytic sample size of 902, mothers in the analytic sample did not differ on assessed sociodemographic characteristics from those excluded. The Institutional Review Board at the University of North Carolina approved the study procedures.

## **Measures**

The UNC Mother-Daughter Communication Study survey is available online at [www.unc.edu/~ntbrewer/hpv](http://www.unc.edu/~ntbrewer/hpv). We developed survey items based on established measures in the literature<sup>36, 51, 132, 142-144</sup> as well as our own HPV vaccine research with parents of

adolescent girls.<sup>62, 69, 133</sup> We cognitively tested the survey with 8 mothers of preadolescent and adolescent children prior to the study to ensure that survey instruction and items were clear and to confirm that participants interpreted items as intended.<sup>134</sup>

*Mothers' communication with health care providers.* Each mother provided information on whether their daughter's HCPs had ever discussed sex topics while she and her daughter were in the room together or encouraged her to talk to her daughter about sex topics.

Mothers reported whether they had talked with health care providers about getting HPV vaccine for their daughters. Those who responded "yes" received 4 questions about whether the health care providers: recommended that mothers should get their daughters HPV vaccine; recommended that mothers should not get their daughters HPV vaccine; told mothers that HPV is a sexually transmitted disease; and included information about sex topics when they discussed HPV vaccine. We also created a composite variable for HCP communication about HPV vaccine that incorporates whether providers included information about sex topics when they discussed HPV vaccine (1=did not talk about HPV vaccine, 2=talked about HPV vaccine but did not include sex topics in HPV vaccine discussions, and 3=included sex topics in HPV vaccine discussions).

*Mothers' preferences.* The survey included 5 agree-disagree statements assessing mothers' preferences for holding discussions with their daughters' health care providers about sex and using HPV vaccine as an opportunity to have these discussions. We dichotomized responses so that 1="strongly agree" or "agree", and 0="neither agree nor disagree," "disagree," or "strongly disagree."

*Health care variables.* The survey assessed daughters' health insurance status (1= has insurance, and 0= no insurance or do not know), whether daughters had a regular health care provider, had received a preventive care visit in the past year, what type of HCPs daughters saw most often (1="pediatrician" and 0="family/general practitioner" or "other" type of provider) and how often they spent time talking to HCPs in private during health care visits. A 4-item scale assessed mothers' satisfaction with their daughters' health care (possible range 1-5, with higher values indicating greater satisfaction;  $\alpha=0.85$ ). Items included overall satisfaction with the quality of care her daughter receives, and agreement that: the mother gets needed information about daughter's health or health care from the child's health care provider, the doctor spends enough time with the daughter, and the doctor is a trusted source of advice.

*Mother-daughter communication about sex.* The survey assessed mother-daughter communication about sex with the question: "Have you ever talked with [daughter's name] about sex topics? These might include what sexual intercourse is, when you start having sex, how to keep from getting pregnant, diseases you can get when you have sex, HIV/AIDS, and condoms."

*Mother-daughter communication about HPV vaccine.* The survey assessed mother-daughter communication about HPV vaccine with the question: "How much have you talked with [daughter's name] about HPV vaccine?" (1="a little" or "a lot" and 0="not at all"). Mothers who reported having talked with their daughters about HPV vaccine received a question about whether talking about HPV vaccine led to a discussion with their daughter about sex topics.

The survey assessed sociodemographic characteristics, mothers' HPV and HPV vaccine knowledge, and whether daughters had received any doses of HPV vaccine (i.e., vaccine initiation). Additionally, the survey assessed other factors associated with mother-daughter communication about sex including mothers' attitudes towards their daughter having sex as a teenager,<sup>111</sup> personal history of talking about sex with their own mothers,<sup>43</sup> their perceived ability to communicate with their daughter,<sup>35, 52, 75</sup> and other potential cues to talking with their daughters about sex.

### **Data analyses**

First, we used logistic regression to examine correlates of (a) mothers' communication with HCPs about HPV vaccine and (b) the inclusion of sex topics were in these discussions. For each outcome, we examined bivariate associations with each independent variable, and then simultaneously entered all variables bivariately associated ( $p < .10$ ) into a multivariate model. We then described mothers' communication with HCPs about sex topics and assessed mothers' preferences for receiving information and guidance from HCPs about sex. Finally, we examined whether the inclusion of sex topics in mothers' communication with HCPs about HPV vaccine was independently associated with mother-daughter communication about sex. We conducted analyses in Stata version 10 (Statacorp, College Station, TX) and applied sample weights to yield nationally-representative estimates. Statistical tests were two-tailed using a critical alpha of .05.

### **Results**

Most mothers were under 50 years of age (90%), non-Hispanic white (64%) or non-Hispanic black (16%; Table 1). Daughters ranged in age from 11-14, with roughly equal

proportions in each age group. Most daughters had health insurance (94%) and had a preventive health visit in the past year (75%). Over half of daughters (59%) primarily saw a pediatrician for health care and mothers had high satisfaction with their daughters' HCPs (mean=4.6, SD=0.69, possible range=1-5). Only 22% of mothers reported that their daughters had ever spent time talking with their HCPs in private and just 3% said this happens at every visit. About one-third of daughters (30%) had initiated HPV vaccine.

### **Communication with HCPs about HPV vaccine**

About half of all mothers (55%) reported ever talking with their daughters' HCPs about HPV vaccine. Mothers were more likely to have discussed HPV vaccine with HCPs if they had greater satisfaction with their daughters' health care, had greater knowledge of HPV vaccine, or lived in an urban area (Table 2). Mothers were also more likely to report HPV vaccine discussion with HCPs if their daughters had a preventive health care visit in the past year or had initiated the HPV vaccine series.

Among mothers who reported talking with HCPs about HPV vaccine ( $n=544$ ), most (70%) reported that the providers recommend the vaccine, though some mothers (9%) reported that HCPs recommended that they not get their daughter vaccinated against HPV. Fewer than half (44%) reported that providers told them HPV was an STI, and only a quarter (25%) said HCPs included sex topics in this conversation. HCPs were more likely to include sex topics in their conversations about HPV vaccine if mothers were "other race/ethnicity" (compared to non-Hispanic white mothers), were more satisfied with their daughter's health care, or thought their daughter may be sexually active (Table 3). Mothers were less likely to report discussing sex topics with HCPs during HPV vaccine discussions if their daughters



primarily saw a pediatrician rather than another type of provider or if mothers lived in the southern region of the U.S., as compared to the northeast. Inclusion of sex topics in mothers' discussions with HCPs about HPV vaccine was not associated with whether or not daughters received any doses of the vaccine.

### **Communication with HCPs about sex topics**

Overall, 27% of mothers reported ever talking with their daughters' HCPs about sex topics. This percentage was greater among mothers who reported talking with a provider about HPV vaccine than among those who did not (39% and 12%, odds ratio [OR]=2.13, 95% confidence interval [CI]: 1.22-3.73). Mothers were also more likely to report ever talking with a HCP about sex topics if they reported discussing HPV vaccine with a HCP, had greater satisfaction with their daughters' health care (OR=1.58, 95% CI: 1.11-2.27) or if their daughters' were 13 or 14 years old compared to 11 or 12 years old (OR=2.02, 95% CI: 1.17-3.51).

Few mothers (19%) said that a HCP had ever encouraged them to talk with their daughters about sex, although almost one-third (31%) agreed that it would be helpful if HCPs gave them information on doing so. Of mothers who wanted information from a HCP on talking with their daughters about sex ( $n=297$ ), 81% agreed that yearly check-ups would be a good time to receive it, and 75% felt that visits for HPV vaccine shots would. Many mothers (30%) also reported that it would be helpful if a doctor talked directly with their daughters about sex topics; of these mothers, 73% agreed that visits for HPV vaccine shots would be a good time for them to do so.

### **Mother-daughter communication about sex topics**

Most mothers (86%) reported ever talking with their daughters about sex topics. Among mothers who talked with their daughters about HPV vaccine ( $n=594$ ), many said that talking about the vaccine led to a conversation about sex topics (41%). Compared to mothers who had not talked about HPV vaccine with their daughters' providers, mothers who reported that they talked with HCPs about sex topics during HPV vaccine discussions were more likely to talk with their daughters about sex topics both during HPV vaccine conversations (62% vs. 35%, odds ratio [OR]= 3.34 95% confidence interval [CI]: 1.59-7.00) and overall (96% vs. 76%, OR= 6.21, 95% CI: 1.76-21.94) in multivariate analyses (Table 4).

### **Discussion**

Doctors and other HCPs are an important but underused resource for promoting parent-child communication about sex. Despite guidelines for adolescent preventive services suggesting that providers offer guidance to adolescents and their parents about sexual health<sup>81, 136</sup> and previous research showing that both parents and HCPs feel that providing such guidance is important,<sup>15, 53</sup> only about a quarter of mothers in this study reported talking with their child's HCP about sex. Providing information during HPV vaccination visits could be an effective and acceptable way for HCPs to provide guidance and promote parent-child communication about sexual health when it can have the greatest impact-- *before* young people become sexually active. In this nationally-representative sample, we found that HCP discussions about HPV vaccine were a cue to talking about sex topics for HCPs and mothers. Further, mothers' who reported that HCPs included sex topics in their discussions about HPV vaccine were more likely to report having talked with their daughters about sex.

That so few mothers of 11-14 year old girls report discussing HPV vaccine with their daughters' HCP is concerning and suggests providers may not be following national recommendations.<sup>56</sup> Caution is needed when interpreting this finding, as it is possible that HCPs might have discussed HPV vaccine but mothers did not remember it, and some daughters in this study may not have been in the target age range (11-12 years old) at their last preventive care visit. Still, almost one-third of mothers of all 13-14 year olds did not report talking with a HCP about the vaccine even though HCPs discussion of HPV vaccine and vaccine recommendation are important for HPV vaccine uptake.<sup>65, 69, 146, 147</sup>

Study findings suggest that most HCPs are not discussing sex topics in their HPV vaccine conversations with mothers of preadolescent and young adolescent patients. While some providers perceive the opportunity to educate adolescents about STIs and reinforce prevention messages as a benefit of HPV vaccination,<sup>125</sup> others may be less likely to strongly recommend HPV vaccine for their 11 and 12 year old patients if they felt they needed to talk about sex beforehand.<sup>138</sup> HCPs may be uncomfortable broaching sexuality in a clinical setting, anticipate negative reactions from parents, or have concerns that discussing sex could negatively influence HPV vaccine uptake. While we were not able to fully address these concerns with our cross-sectional data, we found that HCPs talking about HPV vaccine and including sex topics in these conversations was associated with higher levels of mothers' satisfaction with their daughters' health care. More importantly, we found no association between HPV vaccine uptake and the inclusion of sex topics in mothers' discussions with HCPs about HPV vaccine.

In order to capitalize on HPV vaccine discussions to promote parent-child communication, it will be important to address potential barriers such as concerns about

parent discomfort and the time it takes both to inform parents about HPV vaccine<sup>138</sup> and to offer anticipatory guidance.<sup>148</sup> Tailored materials providing information and strategies for parents to use HPV vaccine discussions as a cue to talking with their preadolescent and young adolescent daughters about developmentally appropriate sex topics may be useful. In previous research, HCPs identified educational materials, such as brochures, resource lists, and videos as important tools for communication about sexual health with parents.<sup>90</sup> It may also be possible to delegate some counseling and other preventive services to support staff<sup>149</sup> and to take advantage of time in the waiting room to provide outreach promoting communication. For example, a recent evaluation of a communication intervention delivered to parents while their adolescent was being seen by a provider showed reductions in adolescent sexual risk at 9-month follow-up.<sup>150</sup> HPV vaccine visits could be a logical time to promote parent involvement in such a program. Other strategies such as training for HCPs<sup>90, 151</sup> and office systems approaches (such as standardized forms)<sup>149, 151</sup> may also improve provision of recommended preventive services including anticipatory guidance.

### **Strengths and Limitations**

Study strengths include a large, nationally-representative sample of mothers with young adolescent daughters in the recommended age range for HPV vaccination, extensive controls for variables associated with communication about sex, and a timely exploration of an important issue. In addition to the cross-sectional nature of the study design, study limitations include dichotomous measures of communication that do not distinguish the quality and complexity of discussions, and reliance on mothers' reports, which may not reflect actual conversations with HCPs or daughters. However, data on parents' perceptions

are needed to inform interventions targeting parents. Our study did not address HCPs' conversations with daughters that may happen without their mothers present and may be an important opportunity for confidential screening and guidance about sexual health.<sup>152</sup> Yet, relatively few mothers in this study reported their daughters spent time talking with HCPs in private, further highlighting the importance of parents' role in health care visits for young adolescents. Finally, as the sample was drawn from English-speaking residents of the U.S., generalizability of study findings to other populations is not yet known.

## **Conclusion**

Our findings suggest that HPV vaccine discussions could be an effective way for HCPs to provide anticipatory guidance about sexual health and promote communication among parents and their young adolescent children. Future research should examine HCP attitudes and barriers to providing information and explore how provision of guidance about sexual health during HPV vaccine discussions influences HPV vaccine uptake, parent-child communication about sex, and adolescent sexual behavior.

**Table 3.1.** Characteristics of mothers and their daughters (*n*=902)

	<i>n</i>	(%)
<b>Mother characteristics</b>		
Age		
<40 years	290	(43)
40-49 years	486	(47)
≥50 years	126	(10)
Race/ethnicity		
Non-Hispanic white	689	(64)
Non-Hispanic black	81	(16)
Hispanic	78	(14)
Other race/ethnicity	54	(6)
Education		
Some college or less	466	(70)
College degree or higher	436	(30)
Marital status		
Other	140	(19)
Married/living with a partner	762	(81)
<b>Daughter characteristics</b>		
Age		
11-12 years	420	(48)
13-14 years	282	(52)
Had health insurance		
No	35	(6)
Yes	867	(94)
Had a regular HCP		
No	43	(5)
Yes	859	(95)
Primarily saw a pediatrician		
No	325	(41)
Yes	577	(59)
Had a preventive care visit in past year		
No	245	(25)
Yes	657	(75)
Had initiated HPV vaccine		
No <sup>a</sup>	633	(70)
Yes	269	(30)
<b>Household characteristics</b>		
Annual household income		
<\$60,000	324	(48)
≥\$60,000	578	(52)
Urbanicity		
Rural	127	(18)

Urban	775	(82)
Region of residence		
Northeast	146	(15)
South	256	(37)
Midwest	282	(26)
West	218	(22)

---

*Note.* Table shows observed frequencies and weighted estimates. Percentages may not total 100% due to rounding.

HCP= health care provider; HPV= human papillomavirus

<sup>a</sup> Includes 24 “don’t know”

**Table 3.2.** Mothers' communication with HCPs about HPV vaccine (*n*=902)

	Talked with HCP about HPV vaccine		Bivariate		Multivariate	
	<i>n</i>	(%)	OR	(95% CI)	OR	(95% CI)
<b>Overall</b>	544	(55)	-		-	
<b>Mother characteristics</b>						
Age						
<40 years	158	(53)	1	[ref]	-	
40-49 years	304	(55)	1.09	(0.70-1.70)	-	
≥50 years	82	(62)	1.43	(0.74-2.78)	-	
Race/ethnicity						
Non-Hispanic white	423	(57)	1	[ref]	-	
Non-Hispanic black	41	(45)	0.63	(0.32-1.23)	-	
Hispanic	45	(58)	1.05	(0.49-2.24)	-	
Other race/ethnicity	35	(61)	1.21	(0.53-2.75)	-	
Education						
Some college or less	267	(52)	1	[ref]	1	[ref]
College degree or higher	277	(62)	1.52	(1.06-2.20)*	1.17	(0.76-1.78)
Marital status						
Other	92	(66)	1	[ref]	-	
Married/living with a partner	452	(53)	0.58	(0.32-1.07)	-	
Satisfaction with daughter's health care, mean (SD)	4.36	(0.69)	2.05	(1.55-2.73)*	1.66	(1.16-2.38)*
HPV vaccine knowledge, mean (SD)	0.55	(0.30)	10.40	(5.25-20.59)**	3.48	(1.61-7.55)*
Knows HPV is an STI						
No	127	(62)	1	[ref]	1	[ref]
Yes	358	(58)	0.86	(0.52-1.44)	1.00	(0.50-1.98)



Did not know	59 (34)	0.31 (0.17-0.63)*	0.59 (0.26-1.33)
<b>Daughter characteristics</b>			
Age			
11-12 years	207 (44)	1 [ref]	1 [ref]
13-14 years	337 (65)	2.36 (1.55-3.60)**	1.35 (0.78-2.34)
Had health insurance			
No	14 (26)	1 [ref]	1 [ref]
Yes	530 (57)	3.71 (1.44-9.59)*	3.11 (0.73-1.33)
Had a regular HCP			
No	13 (23)	1 [ref]	1 [ref]
Yes	531 (57)	4.35 (1.92-9.74)**	1.57 (0.63-3.95)
Primarily saw a pediatrician			
No	161 (44)	1 [ref]	1 [ref]
Yes	383 (63)	2.10 (1.36-3.25)**	1.29 (0.79-2.13)
Had a preventive care visit in past year			
No	86 (36)	1 [ref]	1 [ref]
Yes	458 (62)	2.87 (1.78-4.63)**	2.03 (1.12-3.68)*
Has initiated HPV vaccine			
No <sup>a</sup>	303 (41)	1 [ref]	1 [ref]
Yes	241 (88)	10.08 (5.55-18.32)**	6.32 (3.52-11.35)**
<b>Household characteristics</b>			
Annual household income			
<\$60,000	176 (53)	1 [ref]	-
≥\$60,000	368 (57)	1.19 (0.78-1.81)	-
Urbanicity			
Rural	56 (37)	1 [ref]	1 [ref]
Urban	488 (59)	2.51 (1.39-4.56)*	2.06 (1.08-3.94)*
Region of residence			
Northeast	105 (70)	1 [ref]	1 [ref]
South	444 (51)	0.45 (0.24-0.86)*	0.61 (0.33-1.12)

Midwest	158 (49)	0.41 (0.22-0.76)*	0.64 (0.34-1.19)
West	137 (59)	0.62 (0.33-1.16)	0.81 (0.41-1.60)
<b>Cues to talking with daughter about sex</b>			
Daughter had gotten her period			
No	184 (45)	1 [ref]	1 [ref]
Yes	360 (62)	1.93 (1.26-2.94)**	1.17 (0.64-2.13)
Daughter was interested in boys			
No	217 (49)	1 [ref]	1 [ref]
Yes	327 (60)	1.54 (1.02-2.32)*	1.06 (0.65-2.13)
Daughter had sex education in school			
No	125 (44)	1 [ref]	1 [ref]
Yes	402 (62)	2.10 (1.33-3.32)*	1.00 (0.59-1.68)
Don't know	17 (38)	0.79 (0.27-2.31)	0.78 (0.18-3.44)
Mother's perception of daughter's sexual activity			
Not sexually active	500 (53)	1 [ref]	1 [ref]
May be sexually active	44 (81)	3.78 (1.68-8.52)*	1.82 (0.52-6.43)

*Note.* Table shows observed frequencies and weighted estimates.

HCP= health care provider; HPV= human papillomavirus; CI= confidence interval; OR= odds ratio; ref= referent category; SD= standard deviation.

† $p < .10$ , \* $p < .05$ , \*\* $p < .001$

**Table 3.3.** Inclusion of sex topics in mothers' discussions with HCPs about HPV vaccine (*n*=544)

	HCP talked about sex when talked about HPV vaccine	Bivariate		Multivariate	
	<i>n</i> (%)	OR	(95% CI)	OR	(95% CI)
<b>Overall</b>	139 (25)	-		-	
<b>Mother characteristics</b>					
Age					
<40 years	42 (22)	1	[ref]	-	
40-49 years	75 (26)	1.19	(0.65-2.21)	-	
≥50 years	22 (30)	1.49	(0.63-3.50)	-	
Race/ethnicity					
Non-Hispanic white	103 (25)	1	[ref]	1	[ref]
Non-Hispanic black	9 (19)	0.69	(0.26-1.84)	0.93	(0.27-3.17)
Hispanic	12 (52)	0.67	(0.29-1.55)	0.93	(0.41-2.08)
Other race/ethnicity	15 (18)	3.17	(1.06-9.51)*	2.63	(1.07-6.45)*
Education					
Some college or less	69 (22)	1	[ref]	-	
College degree or higher	70 (30)	1.49	(0.88-2.55)	-	
Marital status					
Other	19 (17)	1	[ref]	-	
Married/living with a partner	120 (27)	1.79	(0.83-3.87)	-	
Satisfaction with daughter's health care, mean(SD)	4.54 (0.59)	1.88	(1.09-3.25)*	2.63	(1.46-4.72)*
HPV vaccine knowledge, mean (SD)	0.60 (0.31)	2.60	(0.90-7.54)†	2.09	(0.79-5.52)
Knows HPV is a STI					
No	24 (22)	1	[ref]	-	

Yes	104 (28)	1.40 (0.67-2.90)	-
Don't know	11 (19)	0.85 (0.28-2.57)	-
<b>Daughter characteristics</b>			
Age			
11-12 years	51 (20)	1 [ref]	-
13-14 years	8 (28)	1.56 (0.89-2.72)	-
Had health insurance <sup>a</sup>			
No	5 (61)	-	-
Yes	134 (24)	-	-
Had a regular HCP <sup>a</sup>			
No	2 (27)	-	-
Yes	137 (25)	-	-
Primarily saw a pediatrician			
No	48 (31)	1 [ref]	1 [ref]
Yes	91 (22)	0.60 (0.33-1.09) <sup>†</sup>	0.48 (0.24-0.92)*
Had a preventive care visit in past year			
No	20 (29)	1 [ref]	-
Yes	119 (24)	0.80 (0.34-1.86)	-
Had initiated HPV vaccine			
No <sup>a</sup>	78 (24)	1 [ref]	-
Yes	61 (26)	1.09 (0.62-1.91)	-
<b>Household characteristics</b>			
Annual household income			
<\$60,000	48 (22)	1 [ref]	-
≥\$60,000	91 (27)	1.32 (0.73-2.67)	-
Urbanicity			
Rural	9 (13)	1 [ref]	1 [ref]
Urban	130 (26)	2.38 (0.87-6.48) <sup>†</sup>	2.34 (0.89-6.11) <sup>†</sup>
Region of residence			
Northeast	32 (28)	1 [ref]	1 [ref]

South	32 (16)	0.48 (0.23-1.03	0.42 (0.18-0.97)*
Midwest	38 (34)	1.28 (0.58-2.85)	0.82 (0.35-1.91)
West	37 (21)	0.94 (0.46-1.94)	0.90 (0.34-1.43)
<b>Cues to talking with daughter about sex</b>			
Daughter had gotten her period			
No	45 (21)	1 [ref]	-
Yes	94 (27)	1.41 (0.80-2.49)	-
Daughter was interested in boys			
No	54 (24)	1 [ref]	-
Yes	85 (26)	1.08 (0.62-1.86)	-
Daughter had sex education in school <sup>a</sup>			
No	29 (22)	-	-
Yes	106 (27)	-	-
Don't know	4 (13)	-	-
Mother's perception of daughter's sexual activity			
Not sexually active	118 (23)	1 [ref]	1 [ref]
May be sexually active	21 (46)	2.93 (1.10-7.84)*	3.65 (1.50-8.88)*

*Note.* Table shows observed frequencies and weighted estimates.

HCP= health care provider; HPV= human papillomavirus; CI= confidence interval; OR= odds ratio; ref= referent category; SD= standard deviation.

<sup>a</sup>Included for descriptive purposes only, not included in regression models due to small expected cell size (<5)

† $p < .10$ , \* $p < .05$ , \*\* $p < .001$

**Table 3.4.** Multivariate associations between mothers' communication with HCPs and mother-daughter communication about sex topics

	Mother discussed sex topics with daughter during HPV vaccine discussions <sup>a</sup> ( <i>n</i> =594)		Mother ever discussed sex topics with daughter <sup>b</sup> ( <i>n</i> =902)	
	OR	(95% CI)	OR	(95% CI)
Mothers' communication with HCPs				
Did not talk about HPV vaccine	1	[ref]	1	[ref]
Talked about HPV vaccine	1.24	(0.69-2.24)	1.87	(0.78-4.52)
Talked about sex when talked about HPV vaccine	3.34	(1.59-7.00)*	6.21	(1.76-21.94)*

*Note.* Table shows results of multivariate logistic regression analyses controlling for other factors associated with mother daughter communication about sex ( $p < .10$ ) in bivariate analyses. All estimates are weighted.

HCP= health care provider; HPV= human papillomavirus; CI= confidence interval; OR= odds ratio; ref= referent category

<sup>a</sup>Model adjusted for mothers' age, race/ethnicity, education, knowledge that HPV is a STI, daughters' age and HPV vaccination status, and household income.

<sup>b</sup>Model adjusted for mothers' education, daughters' age and HPV vaccination status, whether daughter primarily sees a pediatrician, region of residence, general mother-daughter communication, whether mother talked with own mother about sex, daughter has gotten her period, daughter is interested in boys, daughter had sex education in school, and mothers' perception of their daughters' sexual activity.

\* $p < .05$

## **CHAPTER IV: CONCLUSION**

Parents play a critical role as one of the primary socialization agents in shaping the sexual attitudes and behaviors of their adolescent children.<sup>17, 18</sup> Direct communication is a key mechanism for socialization and learning about sexuality, and is associated with positive health behaviors during adolescence.<sup>21, 25, 28, 29</sup> Despite the rich body of literature on parent-adolescent communication about sexual health, important questions about the communication process itself require deeper exploration, including questions about what prompts parents to talk with their children about sex.<sup>153</sup>

The overarching aim of this dissertation was to explore HPV vaccine discussions as a potential cue to talking about sex for mothers and their young adolescent daughters as well as an opportunity for HCPs to promote parent-child communication about sex. Findings not only offer insights into mother-daughter communication about sex during early adolescence, but may have application to other areas of parent-child risk communication. This section summarizes the conclusions of both studies, provides suggestions for translating this research into action, and identifies avenues for additional study.

### **Summary of Findings**

Much research has examined sociodemographic correlates of mother-daughter communication about sex, and recent work has moved toward understanding the process of communication<sup>18, 21</sup> but, to my knowledge, this dissertation is among the first research to

examine the role of cues to talking and their independent associations with communication about sex. Taken together, these findings offer preliminary evidence of the role of cues in prompting mothers' discussion with their daughters about sex and suggest that it may be possible to capitalize on HPV vaccine discussions already happening in many families to provide messages about sexual health to adolescents.

In paper 1, I found that mothers reported a wide range of cues to talking about sex; several of these cues (i.e., mother-daughter HPV vaccine discussions, daughters' menarche, daughters' interest in boys or dating, and receipt of sex education in school) were among the strongest correlates of mother-daughter communication about sex topics in multivariate models. Findings from paper 2 extend those from the first paper by suggesting that HPV vaccine may also be a cue for health care providers to provide guidance about sexual development and health to mothers of their adolescent patients. Further, HCP-mother discussions about HPV vaccine, particularly those that included sex topics, were associated with mothers' talking with their daughters about sex.

### **Cues to talking**

Influences on parent-child communication, including cues, can be situated more broadly within an ecological framework that acknowledges multiple levels of influence on health behavior.<sup>71, 72</sup> Such a framework presumes that mother-daughter conversations about sex occur in a larger context. Specifically, communication about sex is situated within the mother-daughter relationship and established communication patterns.<sup>77</sup> I found that mothers' perception of the quality of their general communication with their daughters was strongly associated with their communication about sex. Mothers with better communication



skills may have more practice talking with their children and more opportunities to cover a range of topics than parents with poorer general communication skills. In addition to providing a potential opening for initiating conversations, other research finds that general communication is more strongly related to adolescent risk taking than sex-specific communication and observes differential effects of mother-daughter communication based on the communication quality.<sup>27</sup> These findings suggest that strengthening mothers' general communication skills, particularly promoting communication that is open and responsive, is important for mother-daughter communication about sex topics and may make such communication more effective.

Dissertation findings also support the importance of modeling (i.e., learning how to do the behavior by watching someone else do it) for parent-child communication about sex. Social Cognitive Theory posits that behavior is learned vicariously through observational learning, reinforcing the importance of the environment on behavior.<sup>20</sup> Indeed, one of the strongest predictors of mother-daughter communication about sex, both within HPV vaccine discussions and generally, was mothers' report of talking with own mother about sex topics when they themselves were teens. Findings related to HCP discussions may also support modeling's central role in promoting parent-child communication about sex. During their conversations with mothers about HPV vaccine, HCPs may not only be providing valuable information about the vaccine, but, by including messages about sex during their HPV vaccine discussions with mothers, HCPs may also be modeling ways of talking about sex and promoting the norm of talking about sex in this context.

Communication about sex as a part of HPV vaccine discussions can occur spontaneously, as evidenced by the large proportion of mothers in this study who reported

that talking about HPV vaccine led to a conversation with their daughters about sex topics, even though HPV vaccine discussions have not been promoted as a possible cue to such communication. HPV vaccine discussions may simply provide a topical transition into a discussion about sex.

An area for future research is to examine interpretive processes that the Teachable Moment model<sup>154</sup> suggests are important to behavior change. This model proposes three key constructs (risk perception, emotional response, and self-concept) which influence how receptive an individual is to a potential cue and, thus, how well the event serves as an opportunity to promote behavior.<sup>154</sup> Discussions about HPV vaccine may: increase mothers' perceptions of their child's risk of engaging in sexual activity and vulnerability to potential consequences of sexual behavior (because the vaccine is for a sexually transmitted infection); heighten their emotional response (e.g., fear); and capitalize on parents' perception of their social role (e.g., to protect their children from harm), thus making HPV vaccine a salient cue to talking about sex. Using this heuristic model to examine HPV vaccine discussions could be useful in understanding what makes HPV vaccine a salient cue to talking about sex and in identifying ways of promoting HPV vaccine as a cue.

## **Implications**

A growing body of research shows that parent-child communication about sex is modifiable; interventions for improving parent-child communication about sex can have positive effects on multiple dimensions of communication including frequency, quality, intentions, comfort, and self-efficacy.<sup>155</sup> Further, communication interventions targeting parents also have the potential to affect adolescent sexual behavior.<sup>150</sup> One disadvantage to

parent-based interventions is that parents are a hard-to-reach population for community-based outreach, in part because of they must make a special effort to attend and have high dropout rates.<sup>121</sup> This has led to the development of novel approaches to reach parents, including those in the workplace and clinicians' offices. For example, the workplace-based program, *Talking Parents, Healthy Teens*, is successful in increasing parents' reported ability and openness in sexual communication with their children and in increasing the number of sexual topics discussed at follow-up.<sup>121</sup> While the study does not disentangle which aspects of the program are most important for its effectiveness, the program implicitly recognizes the importance of cues. An entire session is devoted to "Talking about sex: getting past roadblocks," that introduces parents to strategies to initiate conversations with their adolescents about sex including using everyday situations (or teachable moments) that provide opportunities to start discussions. Similarly, a recent evaluation of the communication intervention, *Families Talking Together*, showed reductions in risk of sexual debut and in frequency of sexual intercourse among those who were already sexually experienced at 9-month follow-up.<sup>150</sup> This program is delivered to parents while their adolescent is being seen by an HCP, making it convenient as parents are often already at the health facility with their young adolescent. HPV vaccine visits could be a logical time to promote parent involvement in such a program.

Encouraging parent-adolescent communication is a key strategy described in a recent empirically derived framework for increasing partnerships between parents and HCPs to improve adolescent health care and health outcomes.<sup>145</sup> As discussed in paper 2, findings from this dissertation suggest that HCPs' discussions with mothers of their young adolescent patients about HPV vaccine could be a meaningful and effective way to educate parents

about adolescent sexual development and health, and to promote parent-child communication about sex.

### **Broader application of study findings**

While this dissertation focuses on one particular cue to talking about sex – HPV vaccine – study findings may be useful for examining other opportunities to promote parent-child communication both about sex and other behaviors. Using multiple cues may be one way for parents to have an ongoing conversation with their children about sex, rather than a single “big talk.”<sup>35</sup> For example, paper 1 shows that many mothers whose daughters received sex education at school did not report that they talked with their daughter about sex as a result (i.e., it wasn’t a cue). Schools may be able to take advantage of this opportunity by providing parents with education or resources, and by incorporating take-home activities that promote parent-child communication into the curricula, an approach which has been successfully used for adolescent risk behaviors including sexual activity<sup>156</sup> and tobacco use.<sup>157</sup> Similar to HPV vaccine discussions with HCPs, such an approach capitalizes on an already existing opportunity.

Findings from this dissertation may also be applicable to other areas of adolescent health promotion. Problem Behavior Theory posits that many adolescent “problem behaviors” (e.g., alcohol and drug use, sexual intercourse, delinquency) cluster together and share underlying causes;<sup>158, 159</sup> as such, common prevention strategies may be effective. Parent-adolescent communication appears to be important to promoting healthy behavior during adolescence, across a range of behaviors.<sup>21, 160-164</sup> For example, as with communication about sex, recent research shows that frequency, timing, and quality of

parents' communication with their children about substance use also matters.<sup>160, 161</sup>

Promoting wider use of already existing cues to talking may provide parents with opportunities to promote healthy behaviors early and often, and warrants greater attention.

Many aspects of parents' relationships with their children have far-reaching implications for adolescent health and behavior. Parental monitoring, connectedness, and parenting style have all been linked with a wide range of positive outcomes for youth from healthier sexual behavior to lower substance use and delinquency to academic achievement, and even health care use.<sup>163, 165-167</sup> Parent-child communication is an important aspect of these relationships. For example, parental monitoring is in many ways assessing not only parents' active attempts to know what their adolescents are doing, but also adolescents' willingness to disclose information to their parents;<sup>168, 169</sup> authoritative parenting, which is widely recognized as beneficial for adolescents,<sup>166, 170</sup> is characterized not only by high expectations but also by greater warmth and more open communication.<sup>171, 172</sup> While speculative, it is possible that improving communication in both specific and general domains can also serve to strengthen other aspects of parent-adolescent relationships and promote healthier behavior. Discussions about HPV vaccine are a concrete strategy for parents to do so.

Parent-child communication about sexual health that occurs across different stages of adolescent development is an important strategy to promote adolescent health and well-being. The findings of this dissertation suggest that HPV vaccine discussions provide an acceptable opportunity for mothers to talk with their young adolescent daughters about sex at an age when such communication is most influential. Provider discussions about HPV vaccine also present an opportunity for providers to talk with mothers and adolescent patients

about sexual health and development, and to support mothers' efforts in educating their daughters by encouraging parent-child communication about sex.

## **APPENDIX A: COMPARISON OF STUDY PARTICIPANTS AND NON-PARTICIPANTS**

The response rate for UNC Mother-Daughter Communication Study was 66% (calculated using APPOR response rate 4).<sup>131</sup> Most non-participation was due to panel members not opening the email invitation (74%), with fewer panelists not participating because they were ineligible (17%) or because they decided not to take the survey even though they were eligible (9%). The survey company provided sample weights that incorporate post-stratification adjustments using demographic distributions from the most recent data from the Current Population Survey.<sup>130</sup> Analyses conducted as part of this dissertation use these sample weights to reduce the effects of any non-response and non-coverage bias, and yield nationally-representative estimates.

I assessed sociodemographic differences between study participants ( $n=951$ ) and non-participants ( $n=730$ ) using information on panel members available in the survey company's demographic profile of panel members. Out of 7 examined characteristics, respondents differed from non-respondents only with respect to education (Table A.1). Among those sent an email invitation to participate in the study, 33% of participants had at least a college degree, compared to 21% of non-participants.

Table A.1. Sociodemographic comparison of study participants and non-participants

	Full invited sample ( <i>n</i> =1681) %	Non- participants ( <i>n</i> =730) %	Participants ( <i>n</i> =951) %	<i>p</i>
<b>Mother characteristics</b>				
Age				0.67
<40 years	49	51	48	
40-49 years	41	39	43	
50+ years	9	10	9	
Race/ethnicity				0.26
Non-Hispanic white	60	54	64	
Non-Hispanic black	13	15	11	
Hispanic	22	24	19	
Other race/ethnicity	7	7	6	
Education				0.002
Some college or less	72	79	67	
College degree or higher	28	21	33	
Marital status				0.39
Other	20	22	19	
Married/living with a partner	80	78	81	
<b>Household characteristics</b>				
Annual household income				0.12
<\$60,000	53	57	49	
≥\$60,000	47	43	51	
Urbanicity				0.96
Rural	18	18	18	
Urban	82	82	82	
Region of residence				0.22
Northeast	14	15	14	
South	40	38	41	
Midwest	21	19	24	
West	25	29	21	

*Note.* Percents may not total 100% due to rounding. *p*-values are based on results of chi-square analyses comparing study non-participants and participants.



## **APPENDIX B: SURVEY INSTRUMENT**

### UNC Mother-Daughter Communication Study (2009)

This survey was designed by Noel Brewer and colleagues at the UNC Gillings School of Global Public Health and the Centers for Disease Control and Prevention (<http://www.unc.edu/~ntbrewer/hpv.htm>). Data collection was via an online survey with a national sample of mothers of girls aged 11-14 years (n= 951, response rate 66%) during December 2009.

#### Preferred citation:

McRee, A.L., Gottlieb, S.L., Reiter, P.L., Dittus, P.D. & Brewer, N.T. (2009). UNC mother-daughter communication survey. Unpublished manuscript.

[...] Brackets indicate text that participants did not see, including source of item, instructions to the programmer or response scale options not seen by participants

Item #	Construct	Item	Response Scale
	Introduction	Thank you for taking our survey.  There are no right or wrong answers. If you have a hard time remembering anything, please just give us your best answer.	
A95	Introduction	We invited you to participate because you have an 11-14 year old daughter. Many of the survey questions will be about her. If you have more than one 11-14 year old daughter, please think about the <u>one who had the most recent birthday</u> when you answer the questions.	
A110	Daughter's name	What is your 11-14 year old daughter's first name?  If you prefer to give initials, that is fine. We just need a way to refer to her.	Name: [oe]

<b>A120</b>	Daughter's age	How old is [name]?	1= 11 years old 2= 12 years old 3= 13 years old 4= 14 years old [-1 = item not answered]
<b>A130</b>	Daughter's grade	[Asked of all]  What grade is [name] in?	1= 4 <sup>th</sup> grade 2= 5 <sup>th</sup> grade 3= 6 <sup>th</sup> grade 4= 7 <sup>th</sup> grade 5= 8 <sup>th</sup> grade 6= 9 <sup>th</sup> grade 7= other, please specify: [oe] grade [-1 = item not answered]
<b>A140</b>		Does [name] have any older sisters?	1= yes 0= no [-1 = item not answered]
<b>HEALTH BEHAVIORS</b>			
<b>B90</b>		The next questions are about your daughter's health and health care.	
<b>B100</b>	Communication (safety)	How much have you talked with [name] about always using a seat belt?	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>B110</b>	Communication (substance use)	How much have you talked with [name] about not using cigarettes or tobacco?	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>B115</b>	Seasonal Flu Vaccination	Each fall a seasonal influenza or flu vaccine becomes available. It can be given as a shot injected into the arm or as a mist that is sprayed in the nose (also called FluMist).  This is <u>not</u> the H1N1 or Swine Flu vaccine.  Has [name] received a seasonal flu vaccine this flu season (since this summer)?  <i>Modified from</i> (Centers for Disease Control and Prevention, 2009)	1= yes 0= no 9= I don't know [-1 = item not answered]

<b>B117</b>	H1N1 Vaccination	<p>This year, you may have heard about a type of the flu called H1N1, also known as Swine Flu.</p> <p>This is <u>not</u> the seasonal flu.</p> <p>Has [name] received H1N1 flu vaccine?</p> <p><i>Modified from</i> (Centers for Disease Control and Prevention, 2009)</p>	<p>1= yes 0= no [skip to B118] 9= I don't know [-1 = item not answered]</p>
<b>B117a</b>	Objective Barriers-H1N1 Vaccination	Did you want to get [name] H1N1 flu vaccine but were unable to?	<p>1= yes 0= no [-1 = item not answered]</p>
<b>B118</b>	Hepatitis B Vaccination	<p>Hepatitis B shots are usually given during infancy. Children can receive hepatitis B vaccine at older ages if they did not get it as an infant. The hepatitis B vaccine is a series of three shots.</p> <p>How many hepatitis B shots, if any, has [name] had?</p>	<p>0= none 1= 1 2= 2 3= 3 4= at least 1, but I don't know how many 9= I don't know [-1= item not answered]</p>
<b>B120</b>	Meningitis Vaccination	Has [name] received a meningitis shot, sometimes called Menactra or Menomune?	<p>1= yes 0= no 9= I don't know [-1 = item not answered]</p>
<b>B130</b>	Communication (meningitis vaccine)	How much have you talked with [name] about the meningitis shot?	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>B140</b>	Tetanus Vaccination	<p>Has [name] received a tetanus booster, also called Td or Tdap shot?</p> <p>Tetanus boosters are given every 10 years. The first booster is usually given around 11 or 12 years of age.</p>	<p>1= yes 0= no 9= I don't know [-1 = item not answered]</p>
<b>B150</b>	Communication (tetanus vaccine)	How much have you talked with [name] about the tetanus booster or Tdap shot?	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>

<b>C100</b>	HPV Vaccination	<p>HPV is human papillomavirus. The next questions are about the HPV vaccine. It's sometimes called the cervical cancer vaccine, Gardasil, or Cervarix.</p> <p>Has [name] had any shots of the HPV vaccine?</p>	<p>1= yes 0= no <b>[skip to C150]</b> [-1 = item not answered]</p>
<b>C110</b>	Vaccinated- Age	<p><b>[If C100=1; i.e., dtr has gotten HPV vaccine]</b></p> <p>How old was [name] when she got her first HPV vaccine shot?</p>	<p>1= 9 years 2= 10 years 3= 11 years 4= 12 years 5= 13 years 6= 14 years [-1 = item not answered]</p>
<b>C120</b>	Vaccinated- # of Shots	<p>How many shots of HPV vaccine has [name] gotten?</p>	<p>1= 1 2= 2 <b>[skip to C140]</b> 3= 3 <b>[skip to C150]</b> [-1 = item not answered]</p>
<b>C130</b>	Vaccinated- Last 4 Months	<p><b>[If C120=1; i.e., dtr had 1 shot]</b></p> <p>Did she get the HPV shot in the last 4 months (since [month4 day], 2009)?</p>	<p>1= yes 0= no 9= I don't know [-1 = item not answered]</p> <p><b>[all skip to C150]</b></p>
<b>C140</b>	Vaccinated-Shot #2, Last 6 Months	<p><b>[If C120=2; i.e., dtr had 2 shots]</b></p> <p>Did she get her second HPV shot in the last 6 months (since [month6 day], 2009)?</p>	<p>1= yes 0= no 9= I don't know [-1 = item not answered]</p>
<b>C150</b>	HPV knowledge	<p>The next questions are about your thoughts on HPV and HPV vaccine.</p> <p>Do you think HPV is a sexually transmitted disease?</p> <p>(Reiter, Brewer, Gottlieb, McRee, &amp; Smith, 2009)</p>	<p>1= yes 0= no 9= I don't know [-1 = item not answered]</p>

<b>C160</b>	HPV vaccine knowledge	Do you think health officials recommend that all 11-12 year old girls should get the HPV vaccine?  (Brewer et al., 2009)	1= yes 0= no 9= I don't know [-1 = item not answered]
<b>C170</b>	HPV vaccine knowledge	Do you think there is an HPV vaccine that can prevent most genital warts?  (Brewer et al., 2009)	1= yes 0= no 9= I don't know [-1 = item not answered]
<b>C180</b>	HPV vaccine knowledge	Do you think HPV vaccine prevents most cervical cancer?  (Brewer et al., 2009)	1= yes 0= no 9= I don't know [-1 = item not answered]
<b>C190</b>	HPV vaccine knowledge	Do you think HPV vaccine works best if girls get it before they start having sex?  (Brewer et al., 2009)	1= yes 0= no 9= I don't know [-1 = item not answered]
<b>C195</b>	Transition	<b>[C195 should be given to all participants]</b>  HPV vaccine is recommended for all girls aged 11-12. It can also be given up to age 26. HPV vaccine protects against most cervical cancer. One HPV vaccine (Gardasil) also protects against most genital warts.	<b>[If C100==1, skip to C210]</b>
<b>C200</b>	Intention (HPV vaccination)	<b>[If C100=0; i.e., dtr unvaccinated]</b>  How likely are you to get [name] the HPV vaccine in the next year? Would you say you...  (Reiter et al., 2009)	4= definitely will 3= probably will 2= probably won't 1= definitely won't [-1 = item not answered]
<b>C210</b>	School provision	<b>[Asked of all participants]</b>  If [name]'s school offered HPV vaccine, how willing would you be to let her get it there?  (Brewer et al., 2009)	4= definitely willing 3= probably willing 2= probably not willing 1= definitely not willing [-1= item not answered]
<b>C220</b>	School provision	What concerns would you have about [name] getting HPV vaccine at her school?	Check all that apply.  1= insurance might not cover it 2= staff might not be well trained 3= schools should

			<p>not provide immunizations</p> <p>4= I want her doctor to keep track of her shots and other health history.</p> <p>5= I would want to be there when she got it</p> <p>6= other students might find out that she got the HPV vaccine</p> <p>7= no concerns</p> <p>8= other, please specify: [oe]</p> <p>[-1 = item not answered]</p>
<b>D90</b>	Transition	The next questions are about your relationship with your daughter.	
<b>D100</b>	Parental monitoring	<p>How much do you know about how [name] spends her free time?</p> <p><i>Modified from</i> (Miller, Forehand, &amp; Kotchick, 1999)</p>	<p>4= a lot</p> <p>3= a moderate amount</p> <p>2= a little</p> <p>1= nothing at all</p> <p>[-1 = item not answered]</p>
<b>D110</b>	Parental monitoring	<p>How much do you know about where [name] is most afternoons after school?</p> <p><i>Modified from</i> (Miller et al., 1999)</p>	<p>4= a lot</p> <p>3= a moderate amount</p> <p>2= a little</p> <p>1= nothing at all</p> <p>[-1 = item not answered]</p>
<b>D120</b>	Parental monitoring	<p>How much do you know about who [name]'s friends really are?</p> <p><i>Modified from</i> (Miller et al., 1999)</p>	<p>4= a lot</p> <p>3= a moderate amount</p> <p>2= a little</p> <p>1= nothing at all</p> <p>[-1 = item not answered]</p>
<b>D130</b>	Relationship satisfaction	<p>Please tell us how much you agree or disagree with the following statement.</p> <p>Overall, I am satisfied with my relationship with [name].</p> <p>(National Longitudinal Study of Adolescent Health (Add Health), 1999)</p>	<p>5 = strongly agree</p> <p>4 = somewhat agree</p> <p>3 = neither agree nor disagree</p> <p>2 = somewhat disagree</p> <p>1 = strongly disagree</p> <p>[-1 = item not answered]</p>

<b>D140</b>	General communication	How would you rate your ability to communicate with [name]?  <i>Modified from</i> (Martino, Elliott, Corona, Kanouse, & Schuster, 2008)	5= excellent 4= very good 3= good 2= fair 1= poor [-1 = item not answered]
<b>COMMUNICATION</b>			
<b>E90</b>	Transition	The next questions are about talking with your daughter about sex topics.	
<b>E100</b>	Communication (sex topics)	Have you ever talked with [name] about sex topics?  These might include what sexual intercourse is, when to start having sex, how to keep from getting pregnant, diseases you can get when you have sex, HIV/AIDS, and condoms.	1= yes 0= no [ <b>skip to E130</b> ] [-1 = item not answered]
<b>E110</b>	Communication-Age (sex topics)	<b>[If E100=1; i.e., talked about sex]</b>  How old was [name] when you first talked with her about sex topics?	[oe] years [-1 = item not answered]
<b>E120</b>	Communication-Past Year (sex topics)	Have you talked with [name] about sex topics <u>in the past year</u> ?	1= yes 0= no [-1 = item not answered]
<b>E130</b>	Attitudes	<b>[Asked of all participants]</b>  Please tell us how much you agree or disagree with the following statements.  I think [name] should wait until she's married to have sex.  <i>Modified from</i> (Miller et al., 1999)	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>E140</b>	Attitudes	I think that [name] having sex while she is a teenager could be okay under certain circumstances.  <i>Modified from</i> (Miller et al., 1999)	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]



<b>E150</b>	Communication-Self Comfort (sex topics)	I feel comfortable talking to [name] about sex topics.  (Miller et al., 2009)	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>E160</b>	Communication-Dtr Comfort (sex topics)	I think [name] would feel comfortable talking with me about sex topics.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>E170</b>	Attitudes (communication about sex)	[Name] will get information about sex somewhere else, so I don't really need to talk to her about it.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>E180</b>	Communication-Mom as Teen (sex topics)	When I was a teenager, my mother talked with me about sex topics.  <i>Modified from (Hutchinson, 2002)</i>	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>E190</b>	Intention (talk sex)	How likely are you to talk with [name] about sex topics in the next year?	1= Definitely won't 2= Probably won't 3= Probably will 4= Definitely will [-1 = item not answered]  <b>[If E100==0, skip to E280 after this question]</b>

<b>E200</b>	Sex communication Content	<p><b>[E200-E270 only if E100=1; i.e., has talked about sex]</b></p> <p>We'd like to understand what you discussed with your daughter when you talked about sex topics.</p> <p>How much have you told [name] that she should wait until she is married to have sex?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>E210</b>	Sex Communication Content	<p>How much have you told [name] that sex between teenagers could be okay under certain circumstances?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot</p>
<b>E220</b>	Sex Communication Content	<p>How much have you talked with [name] about ...how to decide when to start having sex?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>E230</b>	Sex Communication Content	<p>...infections or diseases a person can get from having sex?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>E240</b>	Sex Communication Content	<p>...the importance of using condoms during sex?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>E250</b>	Sex Communication Content	<p>...birth control or how to prevent pregnancy?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>E260</b>	Communication Quality (self)	<p>Would you say your conversation/s with [name] about sex went...</p>	<p>1= well 2= poorly 3= neither well nor poorly [-1 = item not answered]</p>
<b>E270</b>	Communication Quality (dtr)	<p>In your opinion, do you think [name] would say your conversation/s about sex went...</p>	<p>1= well 2= poorly 3= neither well nor poorly [-1 = item not answered]</p>

			answered]
<b>E280</b>	Information Source (doctor)	<p><b>[Ask of all participants]</b></p> <p>How comfortable would you be if [name] got information about sex topics from</p> <p>...her doctor or health care provider?</p>	<p>3= very comfortable 2= somewhat comfortable 1= not at all comfortable [-1 = item not answered]</p>
<b>E282</b>	Information Source (other parent/guardian)	...her other parent (or guardian)?	<p>3= very comfortable 2= somewhat comfortable 1= not at all comfortable 8= does not apply to our family [-1 = item not answered]</p>
<b>E284</b>	Information Source (friends)	...her friends?	<p>3= very comfortable 2= somewhat comfortable 1= not at all comfortable [-1 = item not answered]</p>
<b>E286</b>	Information Source (school)	...her school?	<p>3= very comfortable 2= somewhat comfortable 1= not at all comfortable [-1 = item not answered]</p>
<b>E288</b>	Information Source (website)	...a website that gives information about health?	<p>3= very comfortable 2= somewhat comfortable 1= not at all comfortable [-1 = item not answered]</p>

<b>E290</b>	Preferred information source	Where would you most prefer [name] get information about sex topics?	1= me 2= her other parent (or guardian) 3= her doctor or other health care provider 4= her friends 5= her school 6= a website that gives information about health [-1 = item not answered]
<b>F100</b>	Menstruation Onset	We'd like to understand more about what prompts mothers to talk to their daughters about health and sex topics.  To your knowledge, has [name] ever gotten her period (menstruated)?	1= yes 0= no <b>[skip to F120]</b> [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F120]</b>
<b>F110</b>	Cue to action (talk sex)	<b>[If F100=1, i.e., dtr got period &amp; E100=1]</b>  Did [name] getting her period lead you to talk with her about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F120</b>	Communication (puberty)	How much have you talked with [name] about puberty or physical development?	1= not at all <b>[skip to F140]</b> 2= a little 3= a lot [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F140]</b>
<b>F130</b>	Cue to action (talk sex)	<b>[If F120=2 or 3, i.e., had talked about puberty &amp; E100=1]</b>  Did talking about puberty or physical development ever lead you to talk with [name] about sex topics?	1= yes 0= no [-1 = item not answered]

<b>F140</b>	Dtr Interest in Boys	In your opinion, has [name] shown an interest in boys or dating?	1= yes 0= no [ <b>skip to F160</b> ] [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F160]</b>
<b>F150</b>	Cue to action (talk sex)	<b>[If F140=1; i.e., dtr interested in boys &amp; E100=1]</b>  Did noticing her interest in boys or dating ever lead you to talk with [name] about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F160</b>	Perceived Risk (sexual activity, current)	Do you think [name] has had sex?  <i>Modified from (A L McRee, Reiter, &amp; Brewer, 2010)</i>	1= I'm sure that she has not [ <b>skip to F165</b> ] 2= She might have 3= I'm sure that she has [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F165]</b>
<b>F163</b>	Cue to action (talk sex)	<b>[If F160=2 or 3; i.e., dtr might have or has had sex &amp; E100=1]</b>  Did thinking [name] has had sex ever lead you to talk with her about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F165</b>	Perceived Risk (sexual activity, future)	What are the chances that [name] will have sex in the next year?  (A L McRee et al., 2010)	1= I'm sure that she will not [ <b>skip to F180</b> ] 2= She might 3= I'm sure that she will [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F180]</b>

<b>F170</b>	Cue to action (talk sex)	<b>[If F165=2 or 3; i.e., dtr might or will have sex in next year &amp; E100=1]</b>  Has the possibility of [name] having sex in the next year ever led you to talk with her about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F180</b>	Sex Education	To your knowledge, has [name] had sex education in school?	1= yes 0= no 9= I don't know [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F230]</b>
<b>F190</b>	Cue to action (talk sex)	Did a sex education class or discussion at her school ever lead you to talk with [name] about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F200</b>	Cue to action (talk sex)	Have you ever talked with [name] about sex topics because she asked about it?	1= yes 0= no [-1 = item not answered]
<b>F210</b>	Cue to action (talk sex)	Have you ever talked with [name] about sex topics because her friends were having sex or talking about sex?	1= yes 0= no [-1 = item not answered]
<b>F220</b>	Cue to action (talk sex)	Has something in the news, on television, or on the internet ever led you to talk with [name] about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F230</b>	Perceived Risk (drugs/alcohol)	To your knowledge, has [name] ever experimented with drugs or alcohol?	1= yes 0= no [-1 = item not answered]
<b>F240</b>	Communication (drugs/alcohol)	How much have you talked to [name] about drugs or alcohol?	1= not at all <b>[skip to F300]</b> 2= a little 3= a lot [-1 = item not answered]  <b>[E100=0, i.e., if said they had not ever talked about sex, skip to F310]</b>

<b>F250</b>	Cue to action (talk sex)	<b>[If F240=2 or 3; i.e., talked about drugs &amp; E100=1]</b>  Did talking about drugs or alcohol with [name] ever lead you to talk with her about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F300</b>	Cue to action (talk sex)	<b>[If C100=1 &amp; E100=1; i.e., dtr has received HPV vaccine &amp; they have talked about sex]</b>  Earlier, you said that your daughter had received the HPV vaccine.  Did her getting the HPV vaccine lead you to talk with [name] about sex topics?	1= yes 0= no [-1 = item not answered]
<b>F310</b>	Communication (HPV vaccine)	<b>[Ask of all participants]</b>  How much have you talked to [name] about the HPV vaccine?	1= not at all <b>[skip to F500]</b> 2= a little 3= a lot [-1 = item not answered]
<b>F320</b>	Communication Initiator (HPV vaccine)	<b>[If F310=2 or 3; i.e., talked to dtr about HPV vacc]</b>  When you talked to [name] about the HPV vaccine, who first brought up the topic?	Choose one.  1= I did 2= my daughter, [name] 3= her other parent or guardian 4= doctor or other health care provider 5= someone else [-1 = item not answered]
<b>F330</b>	Cue to action (talk HPV vaccine)	<b>[If F320=1; i.e., "I did"]</b>  What prompted you to talk with [name] about the HPV vaccine?	Check all that apply.  1= doctor or health care provider visit 2= information from my daughter's school 3= an ad for the vaccine 4= news or internet coverage of the vaccine 5= nothing specific 6= other

			[-1 = item not answered]
<b>F340</b>	Cue to action (talk sex)	<p><b>[F310=2 or 3; i.e., talked to dtr about HPV vacc &amp; E100=1]</b></p> <p>Did talking about the HPV vaccine with [name] ever lead to a discussion about sex topics?</p> <p>(A.L. McRee, Brewer, Reiter, Gottlieb, &amp; Smith, 2009)</p>	<p>1= yes 0= no <b>[skip to F360]</b> [-1 = item not answered]</p>
<b>F350</b>	First Communication (sex)	<p><b>[Ask if F340=1; i.e., talking about HPV vaccine led to talk about sex]</b></p> <p>Was this the <u>first time</u> you spoke with [name] about sex topics?</p>	<p>1= yes 0= no [-1 = item not answered]</p>
<b>F360</b>	Cue to action (talk sex)	<p><b>[If E100=1; i.e., talked about sex with dtr]</b></p> <p>We've asked about some things that could prompt parents to talk with their daughters about sex topics. Did anything else prompt you to talk with [name] about sex?</p>	<p>1= yes, please specify: [oe] 0= no [-1 = item not answered]</p>
<b>F370</b>	HPV Vacc Communication (abstinence)	<p><b>[F370-F480 asked only if F340=1; i.e., talking about HPV vaccine led to talk about sex; if F310=0, skip to F500]</b></p> <p>When you talked with [name] about HPV vaccine, how much did you tell her that she should wait until she is married to have sex?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>
<b>F380</b>	HPV Vacc Communication Content	<p>When you talked with [name] about HPV vaccine, how much did you tell her that sex between teenagers could be okay under certain circumstances?</p> <p><i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i></p>	<p>1= not at all 2= a little 3= a lot [-1 = item not answered]</p>



<b>F390</b>	HPV Vacc Communication Content	When you talked with [name] about HPV vaccine, how much did you talk about  ...how to decide when to start having sex?  <i>All content items (E200-E250 and F370-F400, F420-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i>	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F400</b>	HPV Vacc Communication Content	...how she doesn't need HPV vaccine because she's not having sex yet?	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F410</b>	HPV Vacc Communication Content	...how getting HPV vaccine doesn't mean you think it is okay for her to have sex?	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F420</b>	HPV Vacc Communication Content	...infections or diseases a person can get from having sex? <i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i>	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F430</b>	HPV Vacc Communication Content	...the importance of using condoms during sex?  <i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i>	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F440</b>	HPV Vacc Communication Content	...birth control or how to prevent pregnancy?  <i>All content items (E200-E250 and F370-F440) generated based on items in (Miller et al., 2009; Wyckoff et al., 2008)</i>	1= not at all 2= a little 3= a lot [-1 = item not answered]
<b>F450</b>	Attitudes	Many things could give parents a chance to talk with their daughters about sex topics. Please tell us how much you agree or disagree with the following statements.  Talking about HPV vaccine with [name] gave me a chance to talk with her about sex, <u>that I might not have had otherwise.</u>	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]

<b>F460</b>	Attitudes	Talking about HPV vaccine made it easier to start a conversation about sex with [name].	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F470</b>	Attitude	Because HPV vaccine is recommended for young girls, it is a good reason to talk about sex with [name] at her age.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F480</b>	Attitude	Even without talking about HPV vaccine, I would have talked about sex topics with [name] at her age.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F500</b>	Reasons not talk HPV vacc	<p><b>[F500-F580 asked only if F310=0; i.e., has not talked about HPV vaccine; if F310=1, i.e., talked about HPV vaccine, skip to G90]</b></p> <p>Please tell us how much you agree or disagree with the following statements.</p> <p>I haven't talked with [name] about HPV vaccine because</p> <p>...her doctor hasn't recommended it.</p>	<p>5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]</p>

<b>F510</b>	Reasons not talk HPV vacc	...I don't know enough about HPV vaccine.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F520</b>	Reasons not talk HPV vacc	...she's too young.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F530</b>	Reasons not talk HPV vacc	...I don't want to talk to her about sex.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F560</b>	Reasons not talk HPV vacc	...she's not having sex yet.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>F570</b>	Reasons not talk HPV vacc	...I don't want her to get the HPV vaccine.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]

<b>F580</b>	Reasons not talk HPV vacc	...I just haven't gotten around to it.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>HEALTH CARE</b>			
<b>G90</b>	Transition	The next questions are about your daughter's health care.	
<b>G100</b>	Health care provider	Does [name] have a regular doctor or other health care provider?  A regular doctor or health care provider knows your daughter and her health history. This can be a general doctor, a pediatrician, a specialist doctor, a nurse practitioner, or a physician assistant.  <i>Modified from</i> (North Carolina State Center for Health Statistics, 2009)	1= yes 0= no [-1 = item not answered]
<b>G110</b>	Health care provider	What type of doctor or other health care provider does [name] see most often?	1= a pediatrician 2= a family or general practitioner 3= not sure or another type of health care provider. [-1 = item not answered]
<b>G120</b>	Health care	When was the last time [name] had a preventive care visit, such as a physical, check up, or shots?  This does not include times you took her to the doctor because she was sick.  <i>Modified from</i> (North Carolina State Center for Health Statistics, 2008)	1= less than 1 year ago 2= 1 to 3 years ago 3= more than 3 years ago [-1 = item not answered]
<b>G130</b>	Health care satisfaction	Overall, how satisfied are you with the quality of health care [name] receives?  <i>Modified from</i> (Saha, Arbelaez, & Cooper, 2003)	5= very satisfied 4= somewhat satisfied 3= neither satisfied nor dissatisfied 2= somewhat dissatisfied 1= very dissatisfied [-1 = item not answered]

<b>G140</b>	HCP relationship (information)	<p>The next questions are about [name]'s regular doctor or other health care provider. If she does not have a regular health care provider, these are about the doctor or clinic your daughter goes to most often.</p> <p>Please tell us how much you agree or disagree with the following statements.</p> <p>I get the information I need about [name]'s health or health care from her health care provider.</p> <p><i>Modified from (Saha et al., 2003)</i></p>	<p>5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]</p>
<b>G150</b>	HCP relationship (time)	<p>[Name]'s health care provider spends enough time with her.</p> <p><i>Modified from (Saha et al., 2003)</i></p>	<p>5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]</p>
<b>G160</b>	HCP relationship (trust)	<p>I trust [name]'s health care provider so much that I always try to follow her or his advice.</p> <p>(Moseley, Clark, Gebremariam, Sternthal, &amp; Kemper, 2006)</p>	<p>5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]</p>
<b>G200</b>	HCP Communication Content	<p>Has any health care provider ever discussed sex topics while you and [name] were in the room together?</p>	<p>1= yes 0= no <b>[skip to G230]</b> [-1 = item not answered]</p>
<b>G210</b>	HCP Communication Content	<p><b>[If G200=1; i.e., HCP has discussed sex topics]</b></p> <p>Has a health care provider ever discussed prevention of sexually transmitted diseases?</p>	<p>1= yes 0= no [-1 = item not answered]</p>
<b>G220</b>	HCP Communication Content	<p>Has a health care provider ever discussed birth control (prevention of pregnancy)?</p>	<p>1= yes 0= no [-1 = item not answered]</p>

<b>G230</b>	HCP Communication Content	<b>[Ask of all participants]</b>  Has a health care provider ever encouraged you to talk to [name] about sex topics?	1= yes 0= no [-1 = item not answered]
<b>G240</b>	HCP Communication Content	Have you ever talked to a health care provider about the HPV vaccine for [name]?	1= yes 0= no <b>[skip to G280]</b> [-1 = item not answered]
<b>G245</b>	HCP Communication Content	When the health care provider talked about HPV vaccine for [name], did she or he also talk about sex topics?	1= yes 0= no [-1 = item not answered]
<b>G250</b>	Doctor recommendation	Has a health care provider ever told you ...[name] should get the HPV vaccine?	1= yes 0= no [-1 = item not answered]
<b>G260</b>	Doctor recommendation (not)	...[name] should <u>not</u> get the HPV vaccine?	1= yes 0= no [-1 = item not answered]
<b>G270</b>	HCP Communication Content	...that HPV is a sexually transmitted disease?	1= yes 0= no [-1 = item not answered]
<b>G280</b>	Dtr alone with HCP	<b>[Asked of all]</b> How often has [name] spent time talking with a doctor or other health care provider in private (without you in the room)? <i>Modified from (North Carolina State Center for Health Statistics, 2009)</i>	2= every visit 1= some visits 0= never [-1 = item not answered]
<b>G290</b>	Information Preferences	Please tell us how much you agree or disagree with the following statements.  It would be helpful if a health care provider gave <u>me</u> information on how to talk to [name] about sex.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>G300</b>	Information Preferences	It would be helpful if a health care provider <u>talked to [name]</u> about sex topics.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree

			[-1 = item not answered]
<b>G310</b>	Information Preferences	[Name]'s next yearly check up would be a good time for me to get information on talking with her about sex.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>G320</b>	Information Preferences	Doctor visits for HPV vaccine shots would be a good time for me to receive information on talking with [name] about sex.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>G330</b>	Information Preferences	Doctor visits for HPV vaccine shots would be a good time to for a health care provider to talk with [name] about sex.	5 = strongly agree 4 = somewhat agree 3 = neither agree nor disagree 2 = somewhat disagree 1 = strongly disagree [-1 = item not answered]
<b>G335</b>	Health insurance	What type of insurance does [name] have?  <i>Modified from (Reiter et al., 2009)</i>	1= no insurance 2= private health insurance 3= prepaid plan such as HMO 4= government plan including Medicaid or the Children's Health Insurance Program (CHIP) 9= I don't know [-1= item not answered]
<b>G340</b>	Transition	The survey is almost done.	[display to all]
<b>HPV VACCINE &amp; BOYS</b>			

	Son	Do you have a son between the ages of 9 and 18?	1= yes 0= no [skip to section I] [-1= item not answered]
<b>H90</b>	Transition	We are asking the next questions because you have a 9-18 year old son. The next questions will be about him. If you have more than one 9-18 year old son, please think about <u>the one who had the most recent birthday</u> when you answer the questions.	
<b>H95</b>	Son's age	How old is your son?	1= 9 years old 2= 10 years old 3= 11 years old 4= 12 years old 5= 13 years old 6= 14 years old 7= 15 years old 8= 16 years old 9= 17 years old 10= 18 years old [-1 = item not answered]
<b>H100</b>	Awareness	<p>An HPV vaccine is now available for use in boys and young men 9-26 years old. It protects against most genital warts and may provide some protection against different types of cancer, including oral and anal cancers. It requires 3 doses (or shots) over 6 months.</p> <p>Before today, had you heard that the HPV vaccine can be given to boys?</p> <p><i>Modified from (Reiter et al., 2009)</i></p>	<p>1= yes 0= no [-1 = item not answered]</p> <p>\</p>
<b>H110</b>	HPV vaccination	<p>Has your son had any shots of the HPV vaccine?</p> <p>(Reiter et al., 2009)</p>	<p>1= yes <b>[skip to H150]</b> 0= no [-1 = item not answered]</p>
<b>H120</b>	Benefits	<p><b>[Ask H150 of all who have sons 11-18]</b></p> <p>Vaccinating boys against HPV may also provide protection against genital warts and cervical cancer for their future spouses or girlfriends.</p> <p>How important is it to you that HPV vaccine could protect your son's future spouse or girlfriend?</p> <p><i>Modified from (Gerend &amp; Barley, 2009)</i></p>	<p>4= very important 3= fairly important 2= slightly important 1= not important at all [-1 = item not</p>



			answered]
<b>H130</b>	Willingness	<p><b>[If H120=0, son has not had HPV vaccine shots]</b></p> <p>How willing would you be to get the HPV vaccine for your son if it was free?</p> <p>Remember, this is about your son, aged 9-18.</p> <p><i>Modified from (Reiter et al., 2009)</i></p>	<p>5= definitely willing 4= probably willing 3= not sure 2= probably not willing 1= definitely not willing [-1 = item not answered]</p>
<b>H140</b>	Willingness	<p>How willing would you be to get the HPV vaccine for your son if it cost \$400 out of pocket?</p> <p>This would be from your own money, not paid for by insurance.</p> <p><i>Modified from (Reiter et al., 2009)</i></p>	<p>5= definitely willing 4= probably willing 3= not sure 2= probably not willing 1= definitely not willing [-1 = item not answered]</p>
<b>H150</b>	Communication (HPV vaccine)	<p>How much have you talked with your son about the HPV vaccine?</p> <p><i>Modified from (A.L. McRee et al., 2009)</i></p>	<p>1= not at all <b>[skip to section I]</b> 2= a little 3= a lot [-1 = item not answered]</p>
<b>H160</b>	Cue to action (talk sex)	<p><b>[If H160=2 or 3]</b></p> <p>Did talking about the HPV vaccine with your son ever lead to a discussion about sex topics?</p> <p><i>Modified from (A.L. McRee et al., 2009)</i></p>	<p>1= yes 0= no [-1 = item not answered]</p>
<b>BACKGROUND</b>			
<b>I90</b>	Transition	<p><b>[I90-end asked of all]</b></p> <p>The next questions are about your religious and political beliefs. Your answers will help us better understand the backgrounds of the mothers who took our survey.</p>	
<b>I100</b>	Religion	<p>How important is religion to you?</p> <p>(Pew Research Center for the People and the Press, 2009)</p>	<p>4= very important 3= fairly important 2= slightly important 1= not important at all [-1 = item not answered]</p>

<b>I110</b>	Religion	Do you consider yourself a Born-again Christian?  <i>Modified from</i> (Pew Research Center for the People and the Press, 2009)	1=yes 0=no [-1 = item not answered]
<b>I120</b>	Political leaning	In general, would you say your views in most political matters are...  (Pew Research Center for the People and the Press, 2009)	1 = very conservative 2 = somewhat conservative 3 = moderate 4 = somewhat liberal 5 = very liberal [-1 = item not answered]
<b>I130</b>	Mother HPV vaccination	The last questions are about your medical history.  Have <u>you</u> ever received any doses of the HPV vaccine?	1= yes 0= no [-1 = item not answered]
<b>I140</b>	Abnormal pap	Have you ever had an abnormal pap smear?	1= yes 0= no [-1 = item not answered]
<b>I150</b>	Closing statement	Thank you for taking the UNC Mother-Daughter Communication Survey:  You can find information on talking with your daughter about sex here: [hyperlink to: <a href="http://www.advocatesforyouth.org/index.php?option=com_content&amp;task=view&amp;id=108&amp;Itemid=206">http://www.advocatesforyouth.org/index.php?option=com_content&amp;task=view&amp;id=108&amp;Itemid=206</a> ]  You can find information about HPV vaccine here: [hyperlink to: <a href="http://www.cdc.gov/vaccines/spec-grps/preteens-adol/hpvfacts-qa.htm">http://www.cdc.gov/vaccines/spec-grps/preteens-adol/hpvfacts-qa.htm</a> ]	

### References for UNC Mother-Daughter Communication Survey

- Brewer, N. T., Gottlieb, S., Reiter, P. L., McRee, A. L., Liddon, N., Markowitz, L., et al. (2009). *Longitudinal Predictors of HPV Vaccine Uptake*. Paper presented at the American Public Health Association 137th Annual Meeting and Exposition, Philadelphia, PA.
- Centers for Disease Control and Prevention. (2009). National 2009 H1N1 Flu Survey. from [http://www.cdc.gov/nis/about\\_nis.htm#h1n1](http://www.cdc.gov/nis/about_nis.htm#h1n1)
- Gerend, M. A., & Barley, J. (2009). Human papillomavirus vaccine acceptability among young adult men. *Sex Transm Infect*, 36(1), 58-62.

- Hutchinson, M. K. (2002). The influence of sexual risk communication between parents and daughters on sexual risk behaviors. *Family Relations*, 238-247.
- Martino, S. C., Elliott, M. N., Corona, R., Kanouse, D. E., & Schuster, M. A. (2008). Beyond the "Big Talk": The Roles of Breadth and Repetition in Parent-Adolescent Communication About Sexual Topics. *Pediatrics*, 121(3), e612.
- McRee, A. L., Brewer, N. T., Reiter, P. L., Gottlieb, S., & Smith, J. S. (2009). *Mother-daughter communication about HPV vaccination*. Paper presented at the American Public Health Association 137th Annual Meeting and Exposition, Philadelphia, PA.
- McRee, A. L., Reiter, P. L., & Brewer, N. T. (2010). Vaccinating adolescent girls against human papillomavirus— who decides? *Preventive Medicine*, 50(4), 213-214.
- Miller, K. S., Fasula, A. M., Dittus, P., Wiegand, R. E., Wyckoff, S. C., & McNair, L. (2009). Barriers and facilitators to maternal communication with preadolescents about age-relevant sexual topics. *AIDS Behav*, 13(2), 365-374.
- Miller, K. S., Forehand, R., & Kotchick, B. A. (1999). Adolescent sexual behavior in two ethnic minority samples: The role of family variables. *J Marriage and the Family*, 85-98.
- Moseley, K. L., Clark, S. J., Gebremariam, A., Sternthal, M. J., & Kemper, A. R. (2006). Parents' Trust in Their Child's Physician: Using an Adapted Trust in Physician Scale. *Ambulatory Pediatrics*, 6(1), 58-61.
- National Longitudinal Study of Adolescent Health (Add Health). (1999). Parental Questionnaire Codebook (Wave I). Retrieved 18 July, 2007, from <http://www.cpc.unc.edu/projects/addhealth/codebooks/wave1>
- North Carolina State Center for Health Statistics. (2008). North Carolina Child Health Assessment and Monitoring Program Survey (CHAMP). Retrieved 10 October, 2009, from <http://www.schs.state.nc.us/SCHS/champ/questions.html>
- North Carolina State Center for Health Statistics. (2009). North Carolina Child Health Assessment and Monitoring Program Survey (CHAMP). Retrieved 10 October, 2009, from <http://www.schs.state.nc.us/SCHS/champ/questions.html>
- Pew Research Center for the People and the Press. (2009). Demographic questions. Retrieved 20 September, 2009, from <http://people-press.org/methodology/faq/>
- Reiter, P. L., Brewer, N. T., Gottlieb, S. L., McRee, A. L., & Smith, J. S. (2009). Parents' health beliefs and HPV vaccination of their adolescent daughters. *Soc Sci Med*, 69(3), 475-480.
- Saha, S., Arbelaez, J. J., & Cooper, L. A. (2003). Patient-Physician Relationships and Racial Disparities in the Quality of Health Care. *Am J Pub Health*, 93(10), 1713-1719.
- Wyckoff, S. C., Miller, K. S., Forehand, R., Bau, J. J., Fasula, A., Long, N., et al. (2008). Patterns of Sexuality Communication Between Preadolescents and Their Mothers and Fathers *Journal of Child and Family Studies*, 17(5).

## REFERENCES

1. Schalet A, Santelli J. A New Vision for Adolescent Sexual and Reproductive Health. Ithaca, NY: ACT for Youth Center of Excellence. 2009.
2. Welsh DP, Rostosky SS, Kawaguchi MC. A normative perspective of adolescent girls' developing sexuality. In: Travis CB, White JW, editors. *Sexuality, Society, and Feminism*. Washington, DC: American Psychological Association; 2000. p. 111-40.
3. Centers for Disease Control and Prevention. Youth Risk Behavior Surveillance-- United States, 2009. *Morbidity and Mortality Weekly Report*. 2010;59:SS-5.
4. Finer LB. Trends in Premarital Sex in the United States, 1954–2003. *Public Health Rep*. 2007;122(1):73-8.
5. Cates W. Estimates of the incidence and prevalence of sexually transmitted diseases in the United States. *Sex Transm Dis*. 1999;26(4):S2-7.
6. Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, et al. Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. *Pediatrics*. 2009;124(6):1505.
7. Weinstock H, Berman S, Cates W. Sexually transmitted diseases among American youth: Incidence and prevalence estimates, 2000. *Perspect Sex Repro Health*. 2004;36(1):6-10.
8. Finer LB, Henshaw SK. Disparities in Rates of Unintended Pregnancy in the United States, 1994 and 2001. *Perspec Repro Sex Health*. 2006;38(2):90-6.
9. Henshaw SK. Unintended pregnancy in the United States. *Fam Plann Perspec*. 1998;30(1):24-46.
10. Henshaw SK, Feivelson DJ. Teenage abortion and pregnancy statistics, by state 1996. *Fam Plann Perspec*. 2000;32(6):272-80.
11. Singh S, Darroch JE. Adolescent pregnancy and childbearing: Levels and trends in developed countries. *Fam Plann Perspec*. 2000;32(1):14-23.
12. National Campaign to Prevent Teen and Unintended Pregnancy. How is the 3 in 10 statistic calculated? 2008 [cited 2010 10 Feb]; Available from: [www.thenationalcampaign.org/resources/pdf/FactSheet\\_3in10\\_Apr2008.pdf](http://www.thenationalcampaign.org/resources/pdf/FactSheet_3in10_Apr2008.pdf).
13. Dunne EF, Unger ER, Sternberg M, McQuillan G, Swan DC, Patel SS, et al. Prevalence of HPV infection among females in the United States. *JAMA*. 2007;297:813-9.
14. Gleit DA. Measuring contraceptive use patterns among teenage and adult women. *Fam Plann Perspec*. 1999;31(2):73-80

15. U.S. Department of Health and Human Services. Healthy People 2010. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office; 2000.
16. Park MJ, Brindis CD, Chang F, Irwin CE. A midcourse review of the Healthy People 2010: 21 critical health objectives for adolescents and young adults. *J Adolesc Health*. 2008;42(4):329-34.
17. Oetting ER, Donnermeyer JF. Primary Socialization Theory: The etiology of drug use and deviance. 1. *Subst Use Misuse*. 1998;33(4):995-1026.
18. DiIorio C, Kelley M, Hockenberry-Eaton M. Parent-child communication about sexuality: A review of the literature from 1980-2002. *Journal of HIV/AIDS Prevention & Education for Adolescents and Children*. 2003;5:7-32.
19. Shtarkshall RA, Santelli JS, Hirsch JS. Sex education and sexual socialization: Roles for educators and parents. *Perspec Repro Sex Health*. 2007;39(2):116-9.
20. Bandura A. *Social Foundations of Thought and Action*. Englewood Cliffs, NJ: Prentice Hall; 1986.
21. Jaccard J, Dodge T, Dittus P. Parent-adolescent communication about sex and birth control: A conceptual framework. *New Dir Child Adolesc Dev*. 2002(97).
22. Holtzman D, Robinson R. Parent and peer communication effects on AIDS-related behavior among US high school students. *Fam Plann Perspec*. 1995;27(6):235-68.
23. Lehr ST, DiIorio C, Dudley WN, Lipana JA. The relationship between parent-adolescent communication and safer sex behaviors in college students. *J Fam Nurs*. 2000;6(2):180.
24. Newcomer SF, Udry JR. Parent-child communication and adolescent sexual behavior. *Fam Plann Perspec*. 1985:169-74.
25. Hutchinson MK, Jemmott JB, Sweet Jemmott L, Braverman P, Fong GT. The role of mother-daughter sexual risk communication in reducing sexual risk behaviors among urban adolescent females: a prospective study. *J Adolesc Health*. 2003;33(2):98-107.
26. Shoop DM, Davidson PM. AIDS and adolescents: the relation of parent and partner communication to adolescent condom use. *J Adolesc*. 1994;17(2):137-48.
27. Whitaker DJ, Miller KS, May DC, Levin ML. Teenage partners' communication about sexual risk and condom use: The importance of parent-teenager discussions. *Fam Plann Perspec*. 1999:117-21.
28. Miller KS, Levin ML, Whitaker DJ, Xu X. Patterns of condom use among adolescents: the impact of mother-adolescent communication. *Am J Pub Health*. 1998;88(10):1542.

29. DiClemente RJ, Wingood GM, Crosby R, Cobb BK, Harrington K, Davies SL. Parent-adolescent communication and sexual risk behaviors among African American adolescent females. *J Pediatr*. 2001;139(3):407-12.
30. Hadley W, Brown LK, Lescano CM, Kell H, Spalding K, DiClemente R, et al. Parent-adolescent sexual communication: Associations of condom use with condom discussions. *AIDS Behav*. 2009;13(5):997-1003.
31. Clawson CL, Reese-Weber M. The amount and timing of parent-adolescent sexual communication as predictors of late adolescent sexual risk-taking behaviors. *Journal of Sex Research*. 2003;40(3):256-66.
32. Crosby RA, Hanson A, Ranger K. The protective value of parental sex education: A clinic-based exploratory study of adolescent females. *J Pediatr Adolesc Gynecol*. 2009;22:189-92.
33. Hutchinson MK. The influence of sexual risk communication between parents and daughters on sexual risk behaviors. *Fam Rel*. 2002:238-47.
34. Dutra R, Miller KS, Forehand R. The process and content of sexual communication with adolescents in two-parent families: Associations with sexual risk-taking behavior. *AIDS Behav*. 1999;3(1):59-66.
35. Martino SC, Elliott MN, Corona R, Kanouse DE, Schuster MA. Beyond the "big talk": The roles of rreadth and repetition in parent-adolescent aommunication about sexual topics. *Pediatrics*. 2008;121(3):e612.
36. Miller KS, Forehand R, Kotchick BA. Adolescent sexual behavior in two ethnic minority samples: The role of family variables. *J Marriage Fam*. 1999:85-98.
37. Jaccard J, Dittus PJ, Gordon VV. Parent-adolescent congruency in reports of adolescent sexual behavior and in communications about sexual behavior. *Child Dev*. 1998:247-61.
38. Young TL, Zimmerman R. Clueless: parental knowledge of risk behaviors of middle school students. *Arch Pediatr Adolesc Med*. 1998;152(11):1137.
39. Briuckner H, Bearman P. Dating behavior and sexual activity of young adolescents: Analyses of the National Longitudinal Study of Adoelscent Health. In: Albert B, Brown S, Flanigan C, editors. *Fourteen and Younger: The Sexual Behavior of Young Adolescents*. Washington, DC: National Campaign to Prevent Teen Pregnancy; 2003. p. 31-56.
40. Eisenberg ME, Bearinger LH, Resnick MD. Parents' communication with adoelscents about sexual behavior: A missed opportunity for prevention? *J Youth Adolesc*. 2006;35:893-902.

41. Beckett MK, Elliot MN, Martino S, Kanouse DE, Corona R, Klein DJ, et al. Timing of parent child communication about sexuality relative to children's sexual behaviors. *Pediatrics*. 2010;125:34-42.
42. Miller KS, Kotchick BA, Dorsey S, Forehand R, Ham AY. Family communication about sex: what are parents saying and are their adolescents listening? *Fam Plann Perspec*. 1998;30(5):218-35.
43. Wilson EK, Dalberth BT, Koo HP, Gard JC. Parents' perspectives on talking with preteenage children about sex. *Perspec Sex Repro Health*. 2010;42(1):56-63.
44. Jaccard J, Dittus PJ, Gordon VV. Parent-adolescent communication about premarital sex: factors associated with the extent of communication. *J Adolesc Res*. 2000;15:187-208.
45. Kaiser Family Foundation. Kids ready to talk about today's tough issues before their parents are: Sex AIDS, violence, and drugs/alcohol. 1999 [cited 2009 December 18]; Available from: <http://www.kff.org/youthhivstds/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=14687>.
46. Hacker KA, Amare Y, Strunk N, Horst L. Listening to youth: Teen perspectives on pregnancy prevention. *J Adolesc Health*. 2000;26(4):279-88.
47. Ackard DM, Neumark-Sztainer D. Health care information sources for adolescents: age and gender differences on use, concerns, and needs. *J Adolesc Health*. 2001;29(3):170-6.
48. Guilamo-Ramos V, Dittus P, Jaccard J, Goldberg V, Casillas E, Bouris A. The content and process of mother-adolescent communication about sex in Latino families. *Soc Work Res*. 2006;30(3):169-81.
49. McNeely C, Shew ML, Beuhring T, Sieving R, Miller BC, Blum RW. Mothers' influence on the timing of first sex among 14-and 15-year-olds. *J Adolesc Health*. 2002;31(3):256-65.
50. Fox GL, Inazu JK. Patterns and outcomes of mother-daughter communication about sexuality. *Journal of Social Issues*. 1980;36(1):7-29.
51. Miller KS, Fasula AM, Dittus P, Wiegand RE, Wyckoff SC, McNair L. Barriers and facilitators to maternal communication with preadolescents about age-relevant sexual topics. *AIDS Behav*. 2009;13(2):365-74.
52. Pluhar EI, DiIorio CK, McCarty F. Correlates of sexuality communication among mothers of 6-12 year old children. *Child: Care, Helath, and Development*. 2008;34(3):283-90.

53. Rose A, Koo HP, Bhaskar B, Anderson K, White G, Jenkins RR. The influence of primary caregivers on the sexual behavior of early adolescents. *J Adolesc Health*. 2005;37(2):135-44.
54. US Food and Drug Administration. FDA licenses new vaccine for prevention of cervical cancer and other diseases in females caused by human papillomavirus [press release]. 2006 [updated June 8; cited 2009 Aug 20]; Available from: <http://www.fda.gov/libproxy.lib.unc.edu/NewsEvents/Newsroom/PressAnnouncements/2006/ucm108666.htm>.
55. US Food and Drug Administration. FDA approves new vaccine for prevention of cervical cancer [press release]. 2009 [cited 2010 Jan 4]; Available from: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm187048.htm>.
56. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent human papillomavirus vaccine: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep*. 2007;56:1-24.
57. Hildesheim A, Herrero R. Human papillomavirus vaccine should be given before sexual debut for maximum benefit. *J Infect Dis*. 2007;196:1431-2.
58. Mosher WD, Chandra A, Jones J. Sexual behavior and selected health measures: men and women 15–44 years of age, United States, 2002. *Adv Data*. 2005;362(362):1-55.
59. Department of Health and Human Services, Centers for Disease Control and Prevention, editors. Advisory Committee on Immunization Practices (ACIP): Summary Report 2009 October 21-22, 2009; Atlanta, GA.
60. U.S. Food and Drug Administration. FDA approves new indication for Gardasil to prevent genital warts in men and boys. [Internet] 2009 [cited 2009 Nov 6]; Available from: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm187003.htm>.
61. Brabin L, Roberts SA, Stretch R, Baxter D, Elton P, Kitchener HC, et al. A survey of adolescent experiences of human papillomavirus vaccination in the Manchester study. *Br J Cancer*. 2009;101:1502-4.
62. McRee AL, Reiter PL, Gottlieb SL, Brewer NT. Mother-daughter communication about HPV vaccine. *J Adolesc Health*. 2011;48(3):314-7.
63. Mathur MB, Mathur VS, Reichling DB. Participation in the decision to become vaccinated against human papilloma virus by California high school girls and the predictors of vaccine status. *J Pediatr Health Care*. 2009;24(1):14-24.
64. McRee AL, Reiter PL, Brewer NT. Vaccinating adolescent girls against human papillomavirus– who decides? *Prev Med*. 2010;50(4):213-4.



65. Brewer NT, Fazekas KI. Predictors of HPV vaccine acceptability: A theory-informed, systematic review. *Prev Med.* 2007;45(2-3):107-14.
66. Constantine NA, Jerman P. Acceptance of human papillomavirus vaccination among Californian parents of daughters: A representative statewide analysis. *J Adolesc Health.* 2007;62(6):377.
67. Kahn JA, Ding L, Huang B, Zimet GD, Rosenthal SL, Frazier AL. Mothers intention for their daughters and themselves to receive human papillomavirus vaccine: A national study of nurses. *Pediatrics.* 2009;123:1439-45.
68. Olshen E, Woods ER, Austin SB, Luskin M, Bauchner H. Parental acceptance of the human papillomavirus vaccine. *J Adolesc Health.* 2005;37(3):248-51.
69. Reiter PL, Brewer NT, Gottlieb SL, McRee AL, Smith JS. Parents' health beliefs and HPV vaccination of their adolescent daughters. *Soc Sci Med.* 2009;69(3):475-80.
70. Feldman SS, Rosenthal DA. Talking sexuality: Parent-adolescent communication (editors' notes). *New Dir Child Adolesc Dev.* 2002;98:1-8.
71. Bronfenbrenner U. Toward an experimental ecology of human development. *American Psychologist.* 1977;32:513-31.
72. McLeroy KR, Bibeau D, Steckler A, Glanz K. An ecological perspective on health promotion programs. *Health Educ Quart.* 1988;15:351-77.
73. Becker MH. The health belief model and personal health behavior. *Health Educ Monogr.* 1974;2:324-508.
74. Gollwitzer PM. Goal achievement: The role of intentions. *Eur Rev Soc Psychol.* 1993;4:141-85.
75. Rosenthal DA, Feldman SS, Edwards D. Mum's the word: Mothers' perspectives on communication about sexuality with adolescents. *J Adolesc.* 1998;21(6):727-43.
76. O'Sullivan LF, Meyer-Bahlburg HFL, Watkins BX. Mother-daughter communication about sex among urban African American and Latino families. *J Adolesc Res.* 2001;16(3):269.
77. Lefkowitz ES. Beyond the yes-no question: Measuring parent-adolescent communication about sex. *New Dir Child Adolesc Dev.* 2002;97:43-56.
78. McRee AL, Reiter PL, Gottlieb SL, Brewer NT. Mother-daughter communication about HPV vaccine. *J Adolesc Health.* [Working paper]. In press.
79. Zimet GD, Perkins SM, Sturm LA, Bair RM, Juliar BE, Mays RM. Predictors of STI vaccine acceptability among parents and their adolescent children. *J Adolesc Health.* 2005;37(3):179-86.

80. DiIorio C, Resnicow K, Dudley WN, Thomas S, Wang DT, Marter DfV, et al. Social cognitive factors associated with mother-adolescent communication about sex. *J Health Commun.* 2000;5(1):41-51.
81. American Medical Association. Guidelines for Adolescent Preventive Services (GAPS): Recommendation Monograph. Chicago, IL: AMA1997.
82. Hagan JF, Shaw JS, Paula Duncan P, editors. Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents. 3rd ed. Elk Grove, IL: American Academy of Pediatrics; 2008.
83. American Academy of Pediatrics, Committee on Pediatric AIDS and Committee on Adolescence. Adolescents and human immunodeficiency virus infection: the role of the pediatrician in prevention and intervention. *Pediatrics.* 2001;107(188-190).
84. American Academy of Pediatrics, Committee on Practice and Ambulatory Medicine. Recommendations for preventive pediatric health care. *Pediatrics.* 2000;105:645 –6.
85. American Academy of Pediatrics, Committee on Psychosocial Aspects of Child and Family Health and Committee on Adolescence. Sexuality education for children and adolescents. *Pediatrics.* 2001;108(2):498-502.
86. Burstein GR, Lowry R, Klein JD, Santelli JS. Missed opportunities for sexually transmitted diseases, human immunodeficiency virus, and pregnancy prevention services during adolescent health supervision visits. *Pediatrics.* 2003;111(5):996.
87. Brown JD, Wissiw LS. Discussion of sensitive health topics with youth during primary care visits: Relationship to youth perceptions of care. *J Adolesc Health.* 2009(44):48-54.
88. Halpern-Felsher B, Ozer EM, G MS, Wibbelsman CJ, Fuster CD, Elster AB, et al. Preventive services in a health maintenance organization: How well do pediatricians screen and educate adolescent patients? *Arch Pediatr Adolesc Med.* 2000;154:173-19.
89. Millstein SG, Igra V, Gans J. Delivery of STD/HIV preventive services to adolescents by primary care physicians. *J Adolesc Health.* 1996;19(4):249-57.
90. Miller KS, Wyckoff SC, Lin CY, Whitaker DJ, Sukalac T, Fowler MG. Pediatricians' role and practices regarding provision of guidance about sexual risk reduction to parents. *J Primary Prevent.* 2008;29:279-91.
91. Kahn JA, Zimet GD, Bernstein DI, M RJ, Lan D, Huang B, et al. Pediatricians' intention to administer human papillomavirus vaccine: The role of practice characteristics, knowledge, and attitudes. *J Adolesc Health.* 2005;37:502-10.
92. Dempsey AF, Singer DD, Clark SJ, Davis MM. Adolescent preventive health care: What do parents want? *J Pediatr.* 2009;155(5):689-94.

93. Ford CA, Davenport AF, Meier A, McRee AL. Parents and health care professionals working together to improve adolescent health: The perspectives of parents. *J Adolesc Health*. 2009;44(2):191-4.
94. Ford CA, Millstein SG, Eyre SL, Irwin CEJ. Anticipatory guidance regarding sex: views of virginal female adolescents. *J Adolesc Health*. 1996;19(3):179-83.
95. Nelson CS, Wissow LS, Cheng TL. Effectiveness of anticipatory guidance: recent developments. *Curr Opin Pediatr*. 2003;15:630-5.
96. Sonenstein FL, Ku L, Lindberg LD, Turner CF, Pleck JH. Changes in sexual behavior and condom use among teenaged males: 1988 to 1995. *Am J Pub Health*. 1998;88(6):956-9.
97. Brown KF, Kroll JS, Hudson MJ, Ramsay M, Green J, Long SJ, et al. Factors underlying parental decisions about combination childhood vaccinations including MMR: a systematic review. *Vaccine*. 2010;28:4235-48. .
98. Thom DH, Ribisl KM, Stewart AL, Luke DA. Further validation and reliability testing of the Trust in Physician Scale. *Med Care*. 1999;37(5):510-7.
99. Broder KR, Cohn AC, Schwartz B, Klein JD, Fisher MM, Fishbein DB, et al. Adolescent immunizations and other clinical preventive services: A needle and a hook? *Pediatrics*. 2008;121:S25-S34.
100. Fisher TD. Family communication and the sexual behavior and attitudes of college students. *J Youth Adolesc*. 1987;16(5):481-95.
101. DiIorio C, Kelley M, Hockenberry-Eaton M. Communication about sexual issues: Mothers, fathers, and friends. *J Adolesc Health*. 1999;24(3):181-9.
102. Hutchinson MK, Cooney TM. Patterns of parent-teen sexual risk communication: Implications for intervention. *Fam Rel*. 1998:185-94.
103. Raffaelli M, Green S. Parent-adolescent communication about sex: Retrospective reports by Latino college students. *Journal of Marriage and the Family*. 2003;65(2):474-81.
104. Swain CR, Ackerman LK, Ackerman MA. The influence of individual characteristics and contraceptive beliefs on parent-teen sexual communications: A structural model. *J Adolesc Health*. 2006;38:753.e9-e.18.
105. Meneses LM, Orrell-Valente JK, Guendelman SR, Oman D, Irwin CE. Racial/ethnic differences in mother-daughter communication about sex. *J Adolesc Health*. 2006;39(1):128-31.

106. Hovell M, Sipan C, Blumberg E, Atkins C, Hofstetter CR, Kreitener S. Family influences on Latino and Anglo adolescents' sexual behavior. *Journal of Marriage and the Family*. 1994;56:973-86.
107. Leland NL, Barth RP. Characteristics of adolescents who have attempted to avoid HIV and who have communicated with parents about sex. *J Adolesc Res*. 1993;8(1):58.
108. Regnerus MD. Talking about sex: Religion and patterns of parent-child communication about sex and contraception. *Sociol Quart*. 2005;46(1):79-105.
109. Hofstetter CR, Hovell M, Myers CA, Blumberg E, Sipan C, Yuasa T, et al. Patterns of communication about AIDS among Hispanic and Anglo adolescents. *Am J Prev Med*. 1995;11:231-7.
110. Lefkowitz ES, Boone TL, Au TK, Sigman M. No sex or safe sex? Mothers' and adolescents' discussions about sexuality and AIDS/HIV. *Health Educ Res*. 2003;18(3):341.
111. Miller KS, Whitaker DJ. Predictors of mother-adolescent discussions about condoms: implications for providers who serve youth. *Pediatrics*. 2001;108(2).
112. Rothenberg PB. Communication about sex and birth control between mothers and their adolescent children. *Popul Envir*. 1980;3(1):35-50.
113. Kotchick BA, Shaffer A, Miller KS, Forehand R. Adolescent sexual risk behavior: A multi-system perspective. *Clin Psych Rev*. 2001;21(4):493-519.
114. Whitaker DJ, Miller KS. Parent-adolescent discussions about sex and condoms: Impact on peer influences of sexual risk behavior. *J Adolesc Res*. 2000;15(2):251.
115. Guilamo-Ramos V, Jaccard J, Dittus P, Collins S. Parent-adolescent communication about sexual intercourse: an analysis of maternal reluctance to communicate. *Health Psychol*. 2008;27(6):760-9.
116. Nwoga IA. African American mothers use stories for family sexuality education. *Am J MCN*. 2000;25(1):31.
117. Nolin MJ, Peterson KK. Gender differences in parent-child communication about sexuality: An exploratory study. *J Adolesc*. 1992;7:59-79.
118. DiIorio C, Dudley WN, Lehr S, Soet JE. Correlates of safer sex communication among college students. *J Adv Nurs*. 2000;32(3):658-65.
119. Somers CL, Paulson SE. Students' perceptions of parent-adolescent closeness and communication about sexuality: relations with sexual knowledge, attitudes, and behaviors. *J Adolesc*. 2000;23(5):629-44.

120. Raffaelli M, Bogenschneider K, Flood MF. Parent-teen communication about sexual topics. *J Fam Issues*. 1998;19(3):315-33.
121. Schuster MA, Corona R, Elliott MN, Kanouse DE, Eastman KL, Zhou AJ, et al. Evaluation of Talking Parents, Healthy Teens, a new worksite based parenting programme to promote parent-adolescent communication about sexual health: randomised controlled trial. *BMJ*. 2008;337(jul10 2):a308.
122. Dittus PJ, Jaccard J. Adolescents' perceptions of maternal disapproval of sex: relationship to sexual outcomes<sup>1</sup>. *J Adolesc Health*. 2000;26(4):268-78.
123. Jaccard J, Dittus PJ, Gordon VV. Maternal correlates of adolescent sexual and contraceptive behavior. *Fam Plann Perspec*. 1996;28(4):159-85
124. Fox GL, Inazu JK. Mother-daughter communication about sex. *Fam Rel*. 1980;29(3):347-52.
125. Kahn JA, Rosenthal SL, Tissot AM, Bernstein DI, Wetzel C, Zimet GD. Factors influencing pediatricians' intention to recommend human papillomavirus vaccines. *J Women's Health (Larchmt)*. 2007;7(5):367-73.
126. Sussman AL, Helitzer D, Sanders M, Urquieta B, Salvador M, Ndiaye K. HPV and cervical cancer prevention counseling with younger adolescents: Implications for primary care. *Ann Fam Med*. 2007;5:298-304.
127. Roberts ME, Gerrard M, Reimer R, Gibbons FX. Mother-daughter communication and human papillomavirus vaccine uptake by college students. *Pediatrics*. 2010;125(5):982-9.
128. Forhan SE, Gottlieb SL, Sternberg MR, Xu F, Datta SD, McQuillan GM, et al. Prevalence of sexually transmitted infections among female adolescents aged 14 to 19 in the United States. *Pediatrics*. 2009(6):1505-12.
129. Centers for Disease Control and Prevention (CDC). National, state, and local area vaccination coverage among adolescent 13-17 years--United States, 2009. *MMWR Morb Mortal Wkly Rep*. 2010;59(32):1018-23.
130. Dennis JM. Description of within-panel survey sampling methodology: the Knowledge Networks approach. 2009 [cited 2009 July 7]; Available from: <http://knowledgeNetworks.com/ganp/docs/KN%20Within-Panel%20Survey%20Sampling%20Methodology.pdf>.
131. American Association for Public Opinion Research. Response Rate 4. Standard Definitions: Final Dispositions of Case Codes and Outcome Rates for Surveys. 6th ed: AAPOR; 2009
132. National Longitudinal Study of Adolescent Health (Add Health). Parental Questionnaire Codebook (Wave I). Chapel Hill, NC: Carolina Population Center; 1999

[cited 2007 18 July]; Available from:  
<http://www.cpc.unc.edu/projects/addhealth/codebooks/wave1>.

133. Fazekas KI, Brewer NT, Smith JS. HPV Vaccine Acceptability in a Rural Southern Area. *J Rural Health*. 2008;17(4):539-48.
134. Willis GB. *Cognitive Interviewing: A Tool for Improving Questionnaire Design*. Thousand Oaks, CA: Sage Publications; 2005.
135. Askelson NM, Campo S, Smith S, Lowe JB, Dennis LK, Andsager J. The birds, the bees and the HPVs: What drives mothers' intentions to use the HPV vaccination as a chance to talk about sex? *J Ped Health Care*. in press.
136. Hagan J, Shaw J, Duncan P, editors. *Bright Futures: Guidelines for Health Supervision of Infants, Children, and Adolescents*. 3rd ed. Elk Grove Village, IL: American Academy of Pediatrics; 2008.
137. Sperber NR, Brewer NT, Smith JS. Influence of parent characteristics and disease outcome framing on HPV vaccine acceptability among rural, Southern women. *Cancer Causes Control* 2008;19:115-8.
138. Daley MF, Crane LA, Markowitz LE, Black SR, Beaty BL, Barrow J, et al. Human papillomavirus vaccination practices: a survey of US physicians 18 months after licensure. *Pediatrics*. 2010;126(3):425-33.
139. Brabin L, Roberts SA, Farzaneh F, Kitchener HC. Future acceptance of adolescent human papillomavirus vaccination: A survey of parental attitudes. *Vaccine*. 2006;26(16):3087-94.
140. Fazekas KI, Brewer NT, Smith JS. HPV vaccine acceptability in a rural southern area. *J Women's Health (Larchmt)*. 2008;17(4):539-48.
141. McRee AL, Gottlieb SL, Reiter PL, Dittus P, Halpern CT, Brewer NT. HPV vaccine discussions: an opportunity for mothers to talk with their daughters about sexual health. In preparation.
142. Saha S, Arbelaez JJ, Cooper LA. Patient–physician relationships and racial disparities in the quality of health care. *Am J Pub Health*. 2003;93(10):1713-9.
143. Moseley KL, Clark SJ, Gebremariam A, Sternthal MJ, Kemper AR. Parents' trust in their child's physician: Using an adapted Trust in Physician Scale. . *Ambulatory Pediatrics*. 2006;6(1):58-61.
144. Statistics NCSCfH. North Carolina Child Health Assessment and Monitoring Program Survey (CHAMP). 2009 [cited 2009 10 October]; Available from:  
<http://www.schs.state.nc.us/SCHS/champ/questions.html>.

145. Ford CA, Davenport AF, Meier A, L MA. Partnerships between parents and health care professionals to improve adolescent health. *J Adolesc Health*. In press.
146. Dempsey AF, Abraham LM, Dalton V, Ruffin M. Understanding the reasons why mothers do or do not have their adolescent daughter vaccinated against human papillomavirus. *Ann Epidemiol*. 2009.
147. Rosenthal SL, Weiss TW, Zimet GD, Ma L, Good MB, Vichnin MD. Predictors of HPV vaccine uptake among women aged 19-26: importance of a physician's recommendation. *Vaccine*. 2011;29(5):890-5.
148. Cheng TL, DeWitt TG, Savageau JA, O'Connor KG. Determinants of counseling in primary care pediatric practice: Physician attitudes about time, money, and health Issues. *Arch Pediatr Adolesc Med*. 1999;153:629-35.
149. Leif I. Solberg LI, Nordin J D, Bryantb TL, Kristensen AH, Maloney SK. Clinical preventive services for adolescents. *Am J Prev Med*. 2009;37(5):445-54.
150. Guilamo-Ramos V, Bouris A, Jaccard J, Gonzalez B, McCoy W, Aranda D. A parent-based intervention to reduce sexual risk behavior in early adolescence: building alliances between physicians, social workers, and parents. *J Adolesc Health*. 2011;48(2):159-63.
151. Rosenthal MS, Lannon CM, Stuart JM, Brown L, Miller WC, Margolis PA. A randomized trial of practice-based education to improve delivery systems for anticipatory guidance. *Arch Pediatr Adolesc Med*. 2005;159:456-3.
152. Ford CA, Millstein SG, Eyre SL, Irwin CE. Anticipatory guidance regarding sex: Views of virginal female adolescents. *J Adolesc Health*. 1996;19(3):179-83.
153. Jerman P, Constantine NA. Demographic and psychological predictors of parent-adolescent communication about sex: a representative statewide analysis. *J Youth Adolesc* 2010;39(10):1164-74.
154. McBride CM, Emmons KM, Lipkus IM. Understanding the potential of teachable moments: the case of smoking cessation. *Health Educ Res*. 2003;18(2):156-70.
155. Akers AY, Holland CL, Bost J. Interventions to Improve Parental Communication About Sex: A Systematic Review. *Pediatrics*. 2011.
156. O'Donnell L, Stueve A, Agronick G, Duran R, JeanBaptiste V. Saving sex for later: An evaluation of a parent-education intervention. *Perspec Sex Repro Health*. 2005;37:166-73.
157. Guilamo-Ramos V, Jaccard J, Dittus P, Gonzalez B, Bouris A, Banspach S. The Linking Lives Health Education Program: A randomized clinical trial of a parent-Based tobacco use prevention program for African American and Latino youths. *Am J Pub Health*. 2010;100(9):1641-7.

158. Donovan JE, Jessor R, Costa FM. Adolescent health behavior and conventionality-unconventionality: An extension of problem-behavior theory. *Health Psychol.* 1991;10(1):52-61.
159. Jessor R. Problem-Behavior Theory, Psychosocial Development, and Adolescent Problem Drinking. *British Journal of Addiction.* 1987;82(4):331-42.
160. Ennett ST, Bauman KE, Foshee VA, Pemberton M, Hicks KA. Parent-child communication about adolescent tobacco and alcohol use: what do parents say and does it affect youth behavior? *J Marriage Fam.* 2001;63(1):48-62.
161. Miller-Day M, Kam JA. More than just openness: developing and validating a measure of targeted parent-child communication about alcohol. *Health Commun.* 2010;24(4):293-302.
162. Miller-Day M, Dodd AH. Toward a descriptive model of parent-offspring communication about alcohol and other drugs. *J Social and Personal Relationships.* 2004;21(1):69-91.
163. Resnick M, Bearman P, Blum R, Bauman K, Harris K, Jones J, et al. Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *JAMA.* 1997;278(10):823-32.
164. Guilamo-Ramos V, Jaccard JT, R, Johansson M. Parental and school correlates of binge drinking among middle school students. *Am J Pub Health.* 2005;95(5):894-9.
165. McRee AL, Halpern CT. Parenting style and foregone health care as adolescents transition to adulthood. Under review.
166. DeVore ER, Ginsburg KR. The protective effects of good parenting on adolescents. *Curr Opin Pediatr.* 2005;17:460-5.
167. DiClemente R, Wingood G, Crosby R, Sionean C, Cobb B, Harrington K, et al. Parental monitoring: association with adolescents' risk behaviors. *Pediatrics.* 2001;107(6):1363-8.
168. Stattin H, Kerr M. Parental monitoring: A reinterpretation. *Child Dev.* 2000;71(4):1072-85.
169. Kerr M, Stattin H, Trost H. To know you is to trust you: parents' trust is rooted in child disclosure of information. *J Adolesc.* 1999;22(6):737-52.
170. Steinberg L, Lamborn SD, Dornbusch SM, Darlin N. Impact of parenting practices on adolescent achievement, authoritative parenting, school involvement, and encouragement to succeed. *Child Development.* 1992;63:1226-81.
171. Baumrind D. The influence of parenting style on adolescent competence and substance use. *J Early Adol.* 1991;1:56-95.



172. Maccoby EE, Martin J. Socialization in the context of family: parent -child interaction. In: Hetherington EM, editor. Handbook of Child Psychology. New York: John Wiley; 1983. p. 1-101.