

University of Pennsylvania

Annual Progress Report: 2006 Nonformula Grant

Reporting Period

June 1, 2010 – May 31, 2011

Nonformula Grant Overview

The University of Pennsylvania received \$4,206,097 in nonformula funds for the grant award period June 1, 2007 through May 31, 2011. Accomplishments for the reporting period are described below.

Research Project: Project Title and Purpose

HPV Vaccination of Underserved Adolescent and Young Women in Pennsylvania - The research proposed will address critical questions related to the successful delivery of human papilloma virus (HPV) vaccine in underserved adolescents and young women in urban and rural Pennsylvania. We will evaluate knowledge of and attitudes towards HPV and HPV vaccination among adolescents, parents, and health care providers. With the knowledge gained we will compare interventional strategies to increase HPV vaccination rates on individual and community levels.

Duration of Project

6/1/2007 - 5/31/2011

Project Overview

The primary objective of this project is to evaluate whether HPV vaccination rates among adolescent girls/young women ages 9-18 in Philadelphia and NE Pennsylvania can be increased by interventions targeting barriers to immunization.

Initially, we will assess knowledge of and attitudes/intentions towards HPV vaccination among consumers and health care providers through elicitation research. The project will continue with an interventional phase. Research communities will be mapped using census data; five communities of similar size, demographics, and income will be constructed in Philadelphia and three in NE Pennsylvania. Two tiers of interventions will be introduced sequentially into these communities using a stepped wedge study design. The first intervention will consist of community education targeting adolescents and their parents designed to improve knowledge and overcome barriers to vaccination. A small group behavioral intervention will be delivered to adolescents and/or their parents/guardians. Pre- and post-intervention questionnaires will measure the impact of the intervention on HPV knowledge and intent to receive vaccination. Responses to follow-up questionnaires will be solicited to determine the durability of the intervention's effect. In Philadelphia, the rate of HPV vaccination will be tracked using the

Philadelphia KIDS Vaccine Registry to determine whether the intervention had an effect on vaccination rates and how receipt of vaccination is related to intent to receive vaccination. Vaccination rates will be compared to those in control communities in which adolescents and parents complete questionnaires to assess HPV vaccination knowledge and intent to receive vaccination, but do not receive the intervention. In NE Pennsylvania, vaccination rates will be verified using the Geisinger Health System electronic medical record among residents who receive care within that network. Following the completion of the small group intervention a community-wide educational initiative will be conducted using street outreach. The effect of this community-wide initiative will be measured by determining vaccination rates at the community level. A second tier intervention will be developed following an assessment of the effect of the small group and street outreach interventions to determine if vaccination rates can be further improved.

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Expected Research Outcomes and Benefits

Human papillomavirus (HPV) is the cause of almost all cases of cervical cancer. A vaccine has recently been approved by the US Food and Drug Administration that is safe and effective in preventing infection with two HPV types that cause 70% of cases of cervical cancer, and two other types that cause genital warts. The vaccine is approved for use in adolescent and young women ages 9-26.

We propose a project that will study ways to increase the numbers of adolescent women in Philadelphia and NE Pennsylvania who are vaccinated. The methods that we will follow will

reach large communities that include low income families. In this way we anticipate that our research will mean that many more adolescents in the two regions where the research will be performed will receive HPV vaccine. The strategy that we will follow will also improve relationships between adolescents and their families with health care providers, and this should lead to better health care in general. Also, by increasing knowledge of HPV and how it is contacted, we think our research will lead to less risky sexual behavior and this will decrease the numbers of adolescents acquiring other sexually transmitted diseases.

This project will also increase awareness of how effective educational messages can be delivered to urban and rural communities and how health care providers' practices can work more efficiently to increase the delivery of other types of vaccines, not just the HPV vaccine we are studying.

Summary of Research Completed

Overview of Progress

The work performed during this period has been focused in three areas: i) completion of recruitment and follow-up of participants in the small group behavioral intervention in Philadelphia; ii) development and implementation of a short-duration behavioral intervention targeting adolescents to evaluate a strategy to overcome recruitment obstacles observed in the small group behavior intervention; and iii) recruitment and follow-up of participants in the behavioral intervention in NE Pennsylvania. Progress made in each of these areas is described below.

Small Group Behavioral Intervention in Philadelphia

Enrollment. During the current reporting period (July 1, 2010 to May 31, 2011), an additional 222 participants were enrolled, including 83 parents and 139 adolescents. Total enrollment for the study included 575 adolescents and 459 parents/guardians. Eight adolescents and 6 parents/guardians did not complete the intervention session. Following participation in the intervention or completion of the surveys in the control group, it was discovered that 51 adolescents and 43 participants did not meet eligibility criteria. These 59 adolescents and 49 parents/guardians were removed from the study sample, leaving an analytical sample of 516 adolescents (294 in the intervention group and 222 in the control group) and 410 parents/guardians (253 in the intervention group and 157 in the control group). The results reported below include these 926 participants.

Demographic, Behavioral Characteristics, and Health Care Access of Participants. Tables 1 and 2 below outline the demographic and behavioral characteristics of adolescent and adult participants. The mean age of the adolescents was 15.2 years. Most of the adults were parents of adolescents. The population was predominantly Black/African American. Most adolescents only lived with their biologic mother - 83.6% lived with their mother full or part-time, while only 25.4% lived with their father full or part-time. With respect to sexual behavior, 45.9% of adolescents had had their sexual debut at a mean age of 14.6 years, although 75.3% reported that their friends were sexually active. Among those with sexual experience 33.2% were on birth control, 21.2% had had 4 or more sexual partners, and 34.2% reported using condoms only

sometimes, rarely, or never. 88.8% of adolescents reported having a doctor; 64.2% felt it was easy and only 2.3% felt it was hard to access health care. There were no differences in these characteristics between adolescents in the intervention and control groups. Annual household income of adults was less than \$10,000 in 37.1% and greater than \$30,000 in 18.0%. Adults reported that their adolescent had a doctor in 87.6% of cases, with easy healthcare access in 76.3%. Again, there were no differences in these characteristics between adults in the intervention and control groups.

Impact of Small Group Intervention on Knowledge, Beliefs, Attitudes, Self-Efficacy and Intentions. The primary goals of the intervention were to increase the intention of adolescents and adults to seek the HPV vaccine for themselves or their daughters. The impact of the intervention on adolescents' and adults' knowledge of facts concerning HPV, cervical cancer, and the HPV vaccine; beliefs and attitudes concerning HPV and the HPV vaccine; intention to receive (have their daughter receive) the HPV vaccine; and self-efficacy with respect to being able to obtain the HPV vaccine are summarized in Tables 3 and 4. For questions related to beliefs/attitudes, intention, and self-efficacy, a series of questions were asked with one or two questions selected a priori as the primary outcome question(s) for that group.

At the time of enrollment and prior to the completion of the baseline survey, 56% of adolescents had heard of HPV, 59% had heard of the HPV vaccine, 38% had been informed of the HPV vaccine by a health care provider, and 34% knew someone who had gotten the HPV vaccine. The adolescents' mean number of correct responses to knowledge questions increased from 6.3 out of 18 possible at baseline to 14.4 post-intervention. With respect to beliefs/attitudes towards HPV, the percentage of adolescents who agreed with the primary outcome question, "HPV infection can be prevented" increased from 57.1% to 76.5% post-intervention. Importantly, the percentage of adolescents who felt that "There is a chance I could get HPV infection" increased from 22.8% to 48.3%, approximately the number of adolescents with previous sexual experience. With respect to HPV vaccination beliefs, our goals were to increase the beliefs that the vaccination was protective and that the vaccine was not a vehicle for HPV transmission. The percentage of adolescents who agreed with the question "Getting the HPV shot would protect me from cervical cancer and genital warts" increased from 44.2% to 75.2% post-intervention, and the proportions who disagreed with the question "I'll get HPV, genital warts, or cervical cancer if I get the HPV shot" increased from 58.8% to 72.1%. With respect to self-efficacy, the percentage of adolescents who agreed with the primary outcome question "I am able to get the HPV shot in the next 3 months" increased from 55.8% to 69.0%. Although not a primary self-efficacy question, the proportion of adolescents who agreed with the question "I know enough about the HPV shot to decide if I want to get it in the next 3 months" increased from 20.4% to 77.9%. With respect to intentions, the percentage of adolescents who agreed with the question "I plan to get the HPV shot in the next 3 months" increased from 45.9% to 70.1%. Perhaps as important, the intervention helped adolescents overcome fears of potential adverse events related to the immunization, as the percentage who agreed with the question "I would get the HPV shot in the next 3 months even if I knew I might get side effects" increased from 26.2% to 60.2%.

At baseline, awareness of HPV and the HPV vaccine among adults was similar to that of adolescents. At the time of enrollment and prior to the completion of the baseline survey, 68% had heard of HPV, 60% had heard of the HPV vaccine, 31% had been informed of the HPV

vaccine by a health care provider, and 23% knew someone who had gotten the HPV vaccine. Changes in adults' knowledge about HPV and the HPV vaccine, their beliefs, intentions and self-efficacy changed in a similar fashion as the adolescent cohort.

Durability of Effects of Intervention. During the past year of funding 407 follow-up visits were performed: 113 adolescents and 55 adults participated in 3-month follow-up visits, and 152 adolescents and 87 adults participated in 6-month follow-up visits. For the entire funding period, 157 of the 294 (53.4%) adolescents in the intervention group and 124/222 (55.9%) in the control group completed their 3-month follow-up visit and 173 (58.8%) in the intervention group and 96 (43.2%) in the control group completed their 6-month follow-up visit; 70.7% in the intervention group and 63.5% in the control group completed either their 3- or 6-month follow-up. Among adults, 149/253 (58.9%) and 92/157 (58.6%) participants in the intervention and control groups completed their 3-month visit, respectively; and 146 (57.7%) and 77 (49.0%) completed their 6-month visit. The numbers (percentages) of adults who completed either follow-up visit were 174 (68.8%) and 106 (67.5%) in the intervention and control groups, respectively.

Because of the space limitations of the annual report, we will focus on the durability of the effects of the intervention at the 3-month follow-up time point, comparing baseline, post-intervention, and 3-month follow-up responses of the intervention group and baseline and 3-month follow-up responses of the control group, including only those adolescent and adult participants who completed a 3-month follow-up visit (Tables 5 and 6).

There were no differences in responses between the intervention and control groups at the baseline time point, confirming the similarities of these groups. In addition, there were no differences in responses between the baseline and 3-month time point in the control group, suggesting that either these adolescents had little or no exposure to any external information related to HPV or the HPV vaccination, or whatever information they received had a negligible impact. In the intervention group HPV knowledge waned over time, with the number of correct responses declining from 14.4 immediately post-intervention to 11.8 at the 3-month follow-up. Intention to receive the HPV vaccine also waned by the 3-month follow-up. At baseline 46.4% in the intervention group agreed with the statement "I plan to get the first/next HPV shot in the next 3 months." This number increased to 71.3% immediately post-intervention, but decline to 46.5% at the 3-month follow-up. However, feelings of self-efficacy relative toward receipt of the HPV vaccine persisted at the 3-month time point; 57.1% of adolescents felt that they "know enough about the HPV shot to decide if I want to get it in the next 3 months," at the 3-month follow-up, down from 73.4% immediately post-intervention, but higher than 20.6% at baseline. In addition, 75.8% could "explain to my parent or doctor why I want to get the HPV shot in the next 3 months" at the 3-month follow-up, similar to the 83% post-intervention.

As was the case with the adolescents, responses at the baseline time points were similar in the adult intervention and control groups, and there were no differences in responses in the control group between the baseline and 3-month follow-up time point. Adults' knowledge score declined slightly from 16.0 correct responses post-intervention to 13.8 at the 3-month follow-up. However, adult interventions and self-efficacy were maintained. Post-intervention 75.0% of adults planned "to get the first/next HPV shot for my daughter in the next 3 months" and 69.8% had that intention at the 3-month time-point. The percentages of adults who "know enough

about the HPV shot to decide if I want my daughter to get it in the next 3 months were 82.6% and 75.8% at the post-intervention and 3-month follow-up time points, respectively; and the percentages who “know where my daughter could go to get the HPV shot in the next 3 months” and “could explain to my daughter why I want her to get the HPV shot in the next 3 months were unchanged from post-intervention to the 3-month time point.

Impact of the Intervention on Self-Reported HPV vaccination rates.

In a preliminary analysis we report the rate of first HPV immunization among adolescent by self-report, using an intention-to-treat approach, which includes the 294 adolescents in the intervention group and 222 in the control group and the 253 adults in the intervention and 157 in the control group in the analytical sample, and assumes that adolescents who did not participate in the 3-month follow-up failed to receive a vaccination and that daughters of adults who did not participate in a follow-up session failed to be vaccinated. A total of 79 adolescents (26.9%) in the intervention group began the HPV vaccinations series by self-report, with 29 reporting receiving the vaccination at the 3-month follow-up and an additional 50 at the 6-month follow-up. In contrast, 34 adolescents (15.3%) in the control group reported starting the HPV vaccination series, 19 at the 3-month follow-up and an additional 15 at the 6-month follow-up. Among parents, 76 (30.0%) intervention participants reported that their daughter had begun the vaccination series (46 and 30 at the 3- and 6-month follow-ups) and 21 (13.3%) control participants reported that their daughter had begun the vaccination series (12 and 9 at the 3-month and 6-month follow-ups). We are still awaiting reports from the City of Philadelphia KIDS Database to confirm these results.

Development, Recruitment, and Implementation of a Short Intervention

Rationale. We identified two primary obstacles to recruitment into our Phase I, small group intervention, the exclusion of adolescents who had started the HPV vaccination series or were unsure of their HPV vaccination status, and the time commitment required to participate – approximately 3 hours to complete the intervention and the pre- and post-intervention surveys. Therefore, we elected to test the effects of a shorter intervention that would be delivered in a real world setting where vaccine naïve and experienced adolescents would both be present.

Methods: We developed an abbreviated, interactive intervention formatted on our Phase I intervention, that could be conducted within 30 - 40 minutes, and shortened our surveys so that each could be completed in 10 minutes, thereby reducing the duration of the entire study encounter to one hour. The Phase II short intervention was delivered in neighborhoods according to the randomization assignment in the Phase I intervention. Participants in intervention neighborhoods completed pre- and post-intervention surveys, received the intervention, and then returned to complete a survey at a 3-month follow-up visit. Participants in the control neighborhoods completed baseline and 3-month surveys. We recruited adolescents at community centers and included all adolescents ages 13 - 18, with the exception of those who had received the entire HPV vaccination series.

Objectives: The primary objective of the phase II short intervention was to evaluate whether a short intervention could have the same effect on intention to start or complete the HPV vaccination series compared to adolescents who completed the Phase I intervention.

Enrollment. We enrolled 606 adolescents during this reporting period, including 459 intervention group participants, 224 of whom were not previously vaccinated or who were unsure of their vaccination status and 235 of whom were previously vaccinated, plus 147 control group participants, 79 of whom were not previously vaccinated or who were unsure of their vaccination status and 68 of whom had been previously vaccinated. Three-month follow-up visits were obtained for 348 (75.8%) of the intervention participants and 88 (59.9%) of the control group participants.

Results. Data are currently being analyzed.

Implementation of the Intervention in NE Pennsylvania

Enrollment. A total of 656 parent-daughter dyads were enrolled into the intervention study in NE Pennsylvania during the past year of funding, including 140 in the group assigned to the short intervention to be viewed at home, 109 in the group assigned to the short intervention to be reviewed at the clinic with a health educator, 142 in the group assigned to the long intervention to be viewed at home, 116 in the group assigned to the long intervention to be reviewed at the clinic with a health educator, and 149 in the control group. Each group completed pre- and post-intervention surveys (the control group completed baseline surveys), and 3- and 6-month follow-up surveys. Follow-up surveys were obtained in 601 (91.6%) of the dyads at 3-months and 506 (77.1%) at 6-months. The funding period of the project ended before some participants reached the 6-month time point.

Vaccination Rates. The primary outcome was receipt of the initial HPV vaccination. Vaccination rates were 61.5% in the group assigned to the short intervention reviewed at home, 70.0% in the group assigned to the short intervention reviewed in the clinic with a health educator, 72.9% in the group that reviewed the long intervention at home, 72.7% in group that received the long intervention delivered in the clinic by a health educator and 71.1% in the control group. Therefore, no effect of the intervention on the rate of HPV vaccination was seen. We are currently evaluating the possible reasons for this outcome. One possibility is the fact that the Geisinger Health System has cross-system standards of practice, and providers may influence vaccination outcomes irrespective of the intent of parents or adolescents. Another possibility is that adolescents/parents in the control group sought additional information about HPV and the HPV vaccine after completing the baseline survey and decided to obtain the vaccination. Under such a scenario, there may have been an effect produced by the control condition. The impact of the intervention on HPV knowledge, beliefs, intentions, and self-efficacy and the relationships between these covariates on receipt of the HPV vaccine will be included in our final reported.

Table 1: Adolescent Demographics and Health Habits of the Philadelphia cohort

Characteristic		Total Intervention n=294	Total Control n=222	All Study Areas n=516
Age	Mean, (SE) y	15.1 (1.53)	15.28 (1.51)	15.18 (1.52)
	Median, y	15	15	15
	Range, y	5	5	5
Race	Black/ African-American, No. (%)	276 (93.9)	204 (91.9)	480 (93.0)
	White, No. (%)	2 (0.7)	2 (0.9)	4 (0.8)
	Asian, No. (%)	1 (0.3)	2 (0.9)	3 (0.6)
	Native American, No. (%)	4 (1.4)	4 (1.8)	8 (1.6)
	Other, No. (%)	8 (2.7)	10 (4.5)	18 (3.5)
Ethnicity	Hispanic, No. (%)	15 (5.1)	11 (5.0)	26 (5.0)
Education	Middle School (6, 7, 8), No. (%)	74 (25.2)	50 (22.5)	124 (24.0)
	Early High School (9, 10), No. (%)	129 (43.9)	87 (39.2)	216 (41.9)
	Late High School (11, 12), No. (%)	82 (27.9)	71 (32.0)	153 (29.7)
Living Situation	Lives with mother (full/part-time), No.(%) ¹	244 (83.0)	188 (84.7)	432 (83.7)
	Lives with father (full/part-time), No.(%) ²	66 (22.4)	64 (28.8)	130 (25.2)
	Lives with neither parent, No(%) ³	49 (16.7)	40 (18.0)	89 (17.2)
Alcohol Use, No. (%)		17 (5.8)	17 (7.7)	34 (6.6)
Sexually Active, No. (%)		142 (48.3)	96 (43.2)	238 (46.1)
Age of 1 st sexual encounter, mean (SE) y		14.54 (1.38)	14.55 (1.63)	14.54 (1.48)
# of sexual partners	1-3, No. (%)	132 (44.9)	92 (41.4)	224 (43.4)
	4 or more, No. (%)	4 (1.4)	3 (1.4)	7 (1.4)
# of sexual partners in last 3 months	0, No. (%)	27 (9.2)	16 (7.2)	43 (8.3)
	1, No. (%)	92 (31.3)	57 (25.7)	149 (28.9)

	2 or more, No. (%)	18 (6.1)	15 (6.8)	33 (6.4)
Condom Use	Every time, No. (%)	91 (31.0)	61 (27.5)	152 (29.5)
	Sometimes, No. (%)	29 (9.9)	26 (11.7)	55 (10.7)
	Rarely/ Never, No. (%)	17 (5.8)	7 (3.2)	24 (4.7)
Use of condom during last sexual encounter, No. (%)		109 (37.1)	69 (31.1)	178 (34.5)
Birth Control Use, No. (%)		43 (14.6)	35 (15.8)	78 (15.1)
Has had STD, No (%)		7 (2.4)	10 (4.5)	17 (3.3)

Table 2. Adult Demographics and Adolescent Sexual Behavioral of the Philadelphia cohort.

Characteristic		Intervention n=253	Control n=157	All Study Areas n=410
Age	Mean, (SE) y	40.87 (9.28)	41.76 (9.21)	41.21 (9.22)
	Median, y	41	41	41
Race	Black/ African-American, No. (%)	248 (98.0)	147 (93.6)	395 (96.3)
	White, No. (%)	2 (0.8)	1 (0.6)	3 (0.7)
	Asian, No. (%)	0 (0)	1 (0.6)	1 (0.2)
	Native American, No. (%)	0 (0)	0 (0)	0 (0)
	Other, No. (%)	2 (0.8)	6 (3.8)	8 (2.0)
Ethnicity	Hispanic, No. (%)	8 (3.2)	4 (2.5)	12 (2.9)
Parental Role	Parent No. (%)	226 (89.3)	144 (91.7)	370 (90.2)
	Grandparent, No. (%)	16 (6.3)	5 (3.2)	21 (5.1)
	Other Guardian, No. (%)	8 (3.2)	6 (3.8)	14 (3.4)
Gender	Female, No. (%)	208 (82.2)	141 (89.8)	349 (85.1)
	Male, No. (%)	45 (17.8)	15 (9.6)	60 (14.6)
# of Children	1 or 2, No. (%)	67 (26.5)	52 (33.1)	119 (29.0)
	3 or 4, No. (%)	99 (39.1)	58 (36.9)	157 (38.3)
	5 or more, No. (%)	83 (32.8)	46 (29.3)	129 (31.5)
# of Female Children	1, No. (%)	78 (30.8)	47 (29.9)	125 (30.5)
	2 or 3, No. (%)	122 (48.2)	77 (49.0)	199 (48.5)
	4 or more, No. (%)	47 (18.6)	29 (18.5)	76 (18.5)
Household Income Level	Less than \$10,000, No. (%)	98 (38.7)	54 (34.4)	152 (37.1)
	\$10,000 to \$20,000, No. (%)	66 (26.1)	23 (14.6)	89 (21.7)
	\$20,000 to \$30,000, No. (%)	26 (10.3)	29 (18.5)	55 (13.4)
	\$30,000 to \$50,000, No. (%)	32 (12.6)	25 (15.9)	57 (13.9)
	Greater than \$50,000, No. (%)	9 (3.6)	8 (5.1)	17 (4.1)
Daughter's Age	Mean, (SE) y	13.80 (2.91)	13.51 (2.93)	13.69 (2.91)
	Median, y	14	14	14
Daughter is sexually active, No. (%)		65 (25.7)	29 (18.5)	94 (22.9)
Would help daughter get birth control, No. (%)		216 (85.4)	134 (85.4)	350 (85.4)

Table 3. Adolescent Baseline and Post-Intervention Survey Responses of the Philadelphia Cohort (Partial list of questions) n=516

	Baseline	Post-intervention
HPV Knowledge Questions Summary Score		
Mean number correct answers (Std dev) out of 18	6.3 (3.8)	14.4 (2.8)
	% Agree/Disagree Baseline	% Agree/Disagree Post
HPV Beliefs		
There is a chance I could get HPV infection.	22.8	48.3
HPV infection can be prevented. ++	57.1	76.5
Getting HPV infection is not a big deal.	75.9*	74.5*
Only “dirty girls” get HPV.	55.8*	77.9*
HPV Vaccine Beliefs and Attitudes		
It will be okay to have sex more often if I get the HPV shot.	63.6*	53.4*
Getting the HPV shot would protect me from cervical cancer and genital warts. ++	44.2	75.2
It is important to get all three HPV shots.	70.7	92.9
The HPV shot doesn’t work.	54.8*	83.0*
I don’t know how the HPV shot will affect my body.	8.2*	31.6*
If I decide to abstain from sex I do not need to get the HPV shot.	49.3*	66.7*
I am scared to get the HPV shot because I am afraid of needles.	59.2*	69.0*
Even if I don’t like needles, it is important for me to get the HPV shot.	66.3	86.4
I’ll get HPV, genital warts, or cervical cancer if I get the HPV shot. ++	58.8*	72.1*
The HPV shot is a cure for HPV and other diseases.	28.6*	47.6*
If I get the HPV shot, I can have sex without worrying about getting STDs.	70.1*	76.2*
Intention		
I plan to get the HPV shot in the next 3 months. ++	45.9	70.1
I plan to talk to my parent or guardian about HPV and the HPV shot in the next 3 months	62.2	75.2
I plan to talk to my doctor or nurse about HPV and the HPV shot in the next 3 months	60.9	75.5
I would get the HPV shot in the next 3 months even if I knew I might get side effects.	26.2	60.2
Self-efficacy		
It is important to have my parent or guardian’s OK	77.2	72.8

before I get the HPV shot.		
I am comfortable talking to my parent or guardian about the HPV shot in the next 3 months.	63.9	64.3
If I talk to my parent or guardian about the HPV shot, they'll think I'm having sex.	37.4*	31.0*
If I really want to, I can get the HPV shot in the next 3 months.	66.0	73.1
I am able to get the HPV shot in the next 3 months. ++	55.8	69.0
I know enough about the HPV shot to decide if I want to get it in the next 3 months.	20.4	77.9
I know where I could go to get the HPV shot in the next 3 months.	55.1	78.2
I could explain to my parent or doctor why I want to get the HPV shot in the next 3 months.	50.0	83.0
It is important to have my parent or guardian's OK before I get the HPV shot.	77.2	72.8

*refers to % Disagree, ++Primary Outcome

Table 4. Adult Baseline and Post-Intervention Survey Responses of the Philadelphia cohort (Partial list of questions), n=410

	Baseline	Post-intervention
HPV Knowledge Questions Summary Score		
Mean number correct answers (Std dev) out of 18	7.3 (4.7)	15.8 (2.3)
	% Agree/Disagree Baseline	% Agree/Disagree Post
HPV Beliefs		
There is a chance my daughter could get HPV infection.	37.5	63.2
HPV infection can be prevented. ++	62.5	90.5
Getting HPV infection is not a big deal.	74.7*	85.0*
Only "dirty girls" get HPV.	73.1*	87.7*
HPV Vaccine Beliefs and Attitudes		
My daughter will think it is okay to have sex more often if she gets the HPV shot.	73.5*	77.5*
Getting the HPV shot would protect my daughter from cervical cancer and genital warts. ++	44.3	82.6
It is important to get all three HPV shots.	75.1	97.2
The HPV shot doesn't work.	51.0*	82.6*
I don't know how the HPV shot will affect my daughter's body.	4.3*	34.0*

If my daughter decides to abstain from sex, she does not need to get the HPV shot.	54.2*	76.3*
Even if my daughter doesn't like needles, it is important for her to get the HPV shot.	59.7	84.6
My daughter will get HPV, genital warts, or cervical cancer if she gets the HPV shot. ++	64.8*	81.0*
The HPV shot is a cure for HPV and other diseases.	41.9*	51.0*
If my daughter gets the HPV shot, she can have sex without worrying about getting STDs.	78.7*	84.2*
Intentions		
I plan to get the HPV shot for my daughter in the next 3 months. ++	49.8	77.5
I plan to talk to my daughter about HPV and the HPV shot in the next 3 months	75.5	91.3
I plan to talk to my doctor or nurse about HPV and the HPV shot in the next 3 months	80.2	91.3
I would encourage my daughter to get the HPV shot in the next 3 months even if I knew she might get side effects.	37.2	73.5
Self Efficacy		
I plan to get the HPV shot for my daughter in the next 3 months. ++	49.8	77.5
I plan to talk to my daughter about HPV and the HPV shot in the next 3 months	75.5	91.3
I plan to talk to my doctor or nurse about HPV and the HPV shot in the next 3 months	80.2	91.3
I would encourage my daughter to get the HPV shot in the next 3 months even if I knew she might get side effects.	37.2	73.5
I plan to get the HPV shot for my daughter in the next 3 months. ++	49.8	77.5
I plan to talk to my daughter about HPV and the HPV shot in the next 3 months	75.5	91.3
I plan to talk to my doctor or nurse about HPV and the HPV shot in the next 3 months	80.2	91.3
I would encourage my daughter to get the HPV shot in the next 3 months even if I knew she might get side effects.	37.2	73.5

*refers to % Disagree, ++Primary Outcome

Table 5. Adolescent Baseline, Post-intervention and 3-Month Follow-up Survey Responses of the Philadelphia cohort (Partial List)

	Intervention N=157			Control N=124	
	Base	Post	3-M	Base	3-M
Mean number correct answers (Std dev) out of 18	6.3 (3.8)	14.4 (2.8)	11.8 (3.9)	6.5 (4.0)	6.9 (4.4)
	% A/D Base	% A/D Post	% A/D 3-M	Base	3-M
HPV Beliefs					
There is a chance I could get HPV infection.	22.9	48.3	39.4	21.9	25.8
HPV infection can be prevented. ++	57.3	77.1	69.2	50.0	52.4
Getting HPV infection is not a big deal.	76.1*	74.5*	79.0*	73.3*	70.2*
Only “dirty girls” get HPV.	56.4*	77.9*	77.1*	54.4*	58.1*
HPV vaccine beliefs					
It will be okay to have sex more often if I get the HPV shot.	63.8*	53.8*	68.6*	67.3*	72.6*
Getting the HPV shot would protect me from cervical cancer and genital warts. ++	45.1	75.2	52.6	40.5	44.4
It is important to get all three HPV shots.	71.0	93.5	88.5	67.6	68.5
The HPV shot doesn’t work.	55.7*	83.3*	67.5*	52.5*	48.4*
I am scared to get the HPV shot because I am afraid of needles.	59.4*	69.5*	58.6*	56.4*	57.3*
Even if I don’t like needles, it is important for me to get the HPV shot.	66.6	87.0	76.9	65.1	56.9
I’ll get HPV, genital warts, or cervical cancer if I get the HPV shot. ++	59.2*	72.9*	76.4*	64.5*	69.4*
The HPV shot is a cure for HPV and other diseases.	28.8*	47.9*	45.2*	26.0*	25.4*
If I get the HPV shot, I can have sex without worrying about getting STDs.	70.8*	77.0*	83.3*	74.0*	79.8*
I don’t know how the HPV shot will affect my body.	8.2*	31.6*	19.1*	9.1*	8.9*
Intentions					
I plan to get the first/next HPV shot in the next 3 months. ++	46.4	71.3	46.5	43.7	37.9
I would get the first/next HPV shot in the next 3 months even if I knew I might get side effects.	26.5	60.8	37.6	26.4	22.6
Self Efficacy					
It is important to have my parent or guardian’s OK before I get the HPV shot.	77.5	72.8	68.6	73.6	73.4
I am comfortable talking to my parent or	63.9	64.3	63.1	64.8	63.7

guardian about the HPV shot in the next 3 months.					
If I talk to my parent or guardian about the HPV shot, they'll think I'm having sex.	37.4*	31.0*	40.1*	37.4*	48.8*
If I really want to, I can get the HPV shot in the next 3 months.	66.0	73.4	72.6	60.8	59.3
I am able to get the HPV shot in the next 3 months. ++	56.4	69.0	61.8	50.2	52.4
I know enough about the HPV shot to decide if I want to get it in the next 3 months.	20.6	78.2	57.1	21.7	20.3
I know where I could go to get the HPV shot in the next 3 months.	55.1	78.5	76.4	49.5	61.3
I could explain to my parent or doctor why I want to get the HPV shot in the next 3 mo.	50.2	83.0	75.8	46.6	54.8

*refers to % Disagree, ++Primary Outcome. Base = Baseline time point. Post = Post-intervention time point. 3-M = 3 month follow-up time point. A/D = Agree/Disagree

Table 6. Adult Baseline, Post-intervention and 3-Month Follow-up Survey Responses of the Philadelphia cohort (Partial List)

	Intervention N=157			Control N=124	
	Base	Post	3-M	Base	3-M
Mean number correct answers (Std dev) out of 18	7.1 (4.8)	16.0 (2.2)	13.8 (3.1)	7.1 (4.4)	8.4 (4.3)
	% A/D Base	% A/D Post	% A/D 3-M	Base	3-M
HPV Beliefs					
There is a chance my daughter could get HPV infection.	36.5	66.4	52.0	44.6	36.3
HPV infection can be prevented. ++	60.5	89.8	58.4	72.8	67.4
Getting HPV infection is not a big deal.	76.4*	83.8*	82.4*	75.0*	80.2*
Only “dirty girls” get HPV.	76.3*	85.9*	88.5*	76.8*	78.0*
HPV vaccine beliefs					
My daughter will think it is okay to have sex more often if she gets the HPV shot.	73.0*	77.4*	77.2*	72.8*	73.6*
Getting the HPV shot would protect my daughter from cervical cancer and genital warts. ++	39.5	81.8	67.6	52.2	51.1
It is important to get all three HPV shots.	73.0	96.6	94.6	70.7	75.0
The HPV shot doesn’t work.	49.3*	81.1*	74.5*	50.0*	57.6*
I don’t know how the HPV shot will affect my daughter’s body.	6.5*	31.8*	23.8*	7.3*	12.0*
Even if my daughter doesn’t like needles, it is important for her to get the HPV shot.	56.8	82.9	74.3	56.1	52.2
My daughter will get HPV, genital warts, or cervical cancer if she gets the HPV shot. ++	68.1*	83.8*	81.9*	64.6*	69.6*
The HPV shot is a cure for HPV and other diseases.	42.1*	50.0*	58.9*	44.4*	47.8*
If my daughter gets the HPV shot, she can have sex without worrying about getting STDs.	83.5*	83.0*	87.9*	86.6*	84.4*
My daughter will think it is okay to have sex more often if she gets the HPV shot.	73.0*	77.4*	77.2*	72.8*	73.6*
Intentions					
I plan to get the first/next HPV shot for my daughter in the next 3 months. ++	47.9	75.0	69.8	44.0	41.3
I would encourage my daughter to get the first/next HPV shot in the next 3 months even if I knew she might get side effects.	35.6	72.6	59.7	30.8	34.8
Self Efficacy					
It is important for my daughter to have my	81.8	67.8	68.2	85.4	80.2

OK before she gets the HPV shot.					
I am comfortable talking to my daughter about the HPV shot in the next 3 months.	87.7	91.8	89.9	79.3	83.7
If I really want to, I can get the HPV shot for my daughter in the next 3 months.	71.7	81.0	75.8	69.5	71.7
I am able to get the HPV shot for my daughter in the next 3 months. ++	70.9	81.5	75.0	67.8	72.8
I know enough about the HPV shot to decide if I want my daughter to get it in the next 3 months.	28.4	82.6	75.8	40.7	48.9
I know where my daughter could go to get the HPV shot in the next 3 months.	65.5	85.6	83.2	71.7	63.7
I could explain to my daughter why I want her to get the HPV shot in the next 3 months.	67.8	91.8	89.3	61.5	66.3

*refers to % Disagree, ++Primary Outcome. Base = Baseline time point. Post = Post-intervention time point. 3-M = 3 month follow-up time point. A/D = Agree/Disagree