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University of Novi Sad, Faculty of Medicine Novi Sad¹
Clinical Center of Vojvodina, Novi Sad
Clinic of Gynecology and Obstetrics²
Oncology Institute of Vojvodina, Sremska Kamenica³

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KNOWLEDGE AND ATTITUDES TOWARDS HUMAN PAPILLOMAVIRUS INFECTION AMONG THE FIRST YEAR STUDENTS OF THE FACULTY OF MEDICINE, UNIVERSITY OF NOVI SAD, SERBIA

*ZNANJA I STAVOVI STUDENATA PRVE GODINE MEDICINSKOG FAKULTETA, UNIVERZITETA U
NOVOM SADU, O INFEKCIJI HUMANIM PAPILOMA VIRUSOM*

Ljiljana MLADENović SEGEDI^{1,2}, Aljoša MANDIĆ^{1,3}, Miloš PANTELIC^{1,2},
Artur BJELICA^{1,2} and Aleksandra VEJNOVIĆ^{1,2}

Summary

Introduction. Persistent infection with highly oncogenic human papillomavirus is associated with premalignant cervical lesions and cervical cancer, as well as cancers of the vulva and vagina. The aim of the study was to determine the level of knowledge and attitudes towards human papillomavirus infection, its risk factors, clinical manifestations and the use of contraception. **Material and Methods.** A total of 355 first-year students of the Faculty of Medicine, University of Novi Sad, filled in a non-standardized, self-administered questionnaire designed for the purpose of this study. The collected data included: sexual history of the respondents, the use and knowledge of contraception, human papillomavirus infection, and human papillomavirus vaccine. **Results.** About 89% of students have heard of human papillomavirus infection, while 75.5% of them knew that human papillomavirus infection is a sexually transmitted disease. Accurate knowledge about human papillomavirus infection was low, while female students showed higher levels of knowledge compared to the male (4.03 ± 3.07 versus 5.56 ± 3.37 ; $p < 0.01$). Only 27.6% of students knew that young women are at a higher risk of human papillomavirus infection, 45.9% of the respondents knew that the risk of human papillomavirus infection depends on the number of sexual partners, 34.09% of them knew that a condom does not provide complete protection against human papillomavirus infection, 53.5% knew that human papillomavirus can cause cervical cancer, and only 19.7% of students knew that human papillomavirus infection can cause penile cancer. **Conclusion.** The first-year medical students showed a lack of knowledge about human papillomavirus infection and human papillomavirus-related diseases. General education and health education of young people is necessary primarily in secondary schools, in order to preserve the reproductive health and prevent human papillomavirus-related cancers.

Key words: Papillomavirus Infections; Uterine Cervical Neoplasms; Health Knowledge, Attitudes, Practice; Students, Medical; Risk Factors; Contraception; Sexual Behavior

Sažetak

Uvod. Perzistentna infekcija visoko-onkogenim humanim papiloma virusom povezana je s pojavom premalignih cervikalnih lezija i raka grlića materice, kao i raka vulve i vagine. Cilj nam je bio da utvrdimo nivo znanja i stavove studenata medicine o infekciji humanim papiloma virusom, o njenim faktorima rizika, kliničkim manifestacijama kao i upotrebi kontracepcije. **Materijal i metode.** 355 studenata prve godine Medicinskog fakulteta Univerziteta u Novom Sadu popunilo je nestandardizovani, za studiju konstruisan upitnik. Prikupljeni podaci uključivali su: anamnezu seksualnih odnosa ispitanika, znanje o kontracepciji i njena upotreba, znanje o infekciji humanim papiloma virusom i vakcini. **Rezultati.** Oko 89% studenata je čulo za infekciju humanim papiloma virusom, dok 75,5% njih zna da se infekcija humanim papiloma virusom prenosi seksualno. Tačno poznavanje infekcije humanim papiloma virusom bilo je nisko, a devojke su pokazale viši nivo znanja u odnosu na muškarce ($4,03 \pm 3,07$ vs $5,56 \pm 3,37$; $p < 0,01$). Samo 27,6% studenata zna da mlade žene imaju veći rizik od infekcije humanim papiloma virusom, 45,9% ispitanika zna da rizik od infekcije zavisi od broja seksualnih partnera, 34,09% zna da kondom ne predstavlja potpunu zaštitu od infekcije humanim papiloma virusom, 53,5% zna da humani papiloma virus može uzrokovati rak grlića materice, a samo 19,7% studenata zna da infekcija humanim papiloma virusom može uzrokovati rak penisa. **Zaključak.** Studenti prve godine medicine nemaju dovoljno znanja o infekciji i bolestima povezanim sa humanim papiloma virusom. Obrazovanje i zdravstveno prosvetčivanje mladih ljudi, već u srednjim školama, potrebno je kako bi se očuvalo reproduktivno zdravlje i sprečio nastanak karcinoma uzrokovanih humanim papiloma virusom.

Glavne reči: infekcije papiloma virusom; karcinom grlića materice; znanje o zdravlju, stavovi, praksa; studenti medicine; faktori rizika; kontracepcija; seksualno ponašanje

Abbreviations

HPV – human papillomavirus
STD – sexually transmitted disease

Introduction

Today, human papillomavirus (HPV) infection is one of the most prevalent sexually transmitted diseases and the most common viral infection of the genital region [1, 2]. It is believed that about 70 - 80% of sexually active women will be infected with HPV during their lifetime [3, 4]. The highest prevalence rate is reported in female student population, that is, between 18 and 25 years of age, while men are at constant risk of a new HPV infection during their entire life [4]. In about 80 - 90% of infected persons, the infection is transient and a spontaneous elimination of the virus from the organism occurs in the period of 2 years [4].

A persistent HPV infection with low risk oncogenic HPV types (HPV 6 and 11, in more than 90% of cases) can clinically manifest with the appearance of genital warts [5].

A persistent infection with high risk oncogenic HPV types (HPV 16 and 18, in 70 - 80% of cases) is associated with cervical premalignant lesions and cervical cancer, as well as development of cancer of the vulva, vagina, anus, penis, oropharynx, mouth, and larynx [1, 6-8].

Cervical cancer is the third most common cancer in women worldwide, with about 569,847 new cases and 311,365 deaths in 2018 according to Global Cancer Incidence [9, 10]. However, in the population of women aged 15 - 44, cervical cancer is the second most common cancer [9]. In Serbia, the annual standardized incidence of cervical cancer is around 20.3 [9].

A prophylactic HPV vaccine has been introduced into the regular primary prevention of HPV infection and HPV-related carcinomas in more than 100 countries of the world, particularly in the developed countries. HPV vaccine is recommended for girls and boys aged 9 - 13, or younger persons aged 13 - 26 years who had not been in contact with HPV [4, 11]. In several large clinical trials, vaccines were confirmed (bivalent vaccine against HPV types 16 and 18, and quadrivalent HPV types 6, 11, 16 and 18) as highly immunogenic, safe, well-tolerated and highly effective in the prevention of HPV infection [7, 12, 13]. Nevertheless, they are poorly accepted in most countries of the world [4, 11-14].

Vaccines are available in Serbia as well, but they have not been introduced into the National Immunization Program yet.

It has been determined that accurate and correct knowledge of HPV infection, its etiology and transmission, possible consequences as well as the possibilities of prevention are very important when making a decision whether to receive the vaccine or not [5, 6, 11, 13]. Moreover, correct knowledge and attitude towards HPV vaccination is in direct positive correlation with the recommendation for the vaccine to future adolescents [2, 4, 13].

Our goal was to determine the level of knowledge and attitudes of the first year students at the Faculty of Medicine towards HPV infection, its risk factors, means of protection, its clinical manifestations, as well as to raise their awareness and knowledge about HPV infection to a higher level through organizing educational workshops.

We believe that they, as future doctors and healthcare workers, will play a significant role in further dissemination of information about HPV infection and its consequences as well as prevention possibilities in our society and community.

Material and Methods

The a cross-sectional study included 355 first year students of the Faculty of Medicine, University of Novi Sad, and it was conducted in November of 2016. The research was approved by the Ethics Committee of the Faculty of Medicine as part of the City Administration of Novi Sad Health Care Project entitled "My Gynecological Reminder". Students were given information on the objectives of this research, after which they were asked to fill in a non-standardized, self-administered questionnaire, designed for the purpose of this study.

The questionnaire consisted of 32 questions, which were divided into 5 parts. The first group (three questions) was related to gender, previous education and the Department they enrolled at the Faculty of Medicine. The second group (4 questions) was related to the attitudes towards visiting a counseling service for the young and seeing a gynecologist. The third group (9 questions) was related to their past sexual life and the use of contraception, as well as their attitudes towards contraception. The fourth group of 13 questions was related to the knowledge of HPV infection. The purpose of the fifth group of three questions was to gather information on whether they wanted to learn more about HPV infection and cervical cancer, and whether they were willing to receive the HPV vaccine.

The students' unwillingness to participate in the study was the only exclusion criterion from the research.

Students were asked to circle one of the provided answers showing their attitudes and knowledge about reproductive health and contraception (the second and the third group of questions). Their knowledge of HPV infection was estimated based on the number of correct answers to 13 questions from the fourth group. Each correct answer was worth 1 point, while incorrect answers were worth 0 points. The students answered 12 questions by circling one of the three possible answers: "Yes", "No" and "I do not know". Four answers were provided for the question: "How is HPV infection transmitted?" a) via blood, b) through sexual contact, c) by dirty hands, d) I do not know.

The correct answer was worth 1 point. The total score of the test was 13 points. The number of correct answers equal to or over 10 = excellent knowledge, 6 - 10 = moderate, less than 6 = poor knowledge.

Table 1. General characteristics of the respondents
Tabela 1. Opšte karakteristike ispitanika

Characteristic/Karakteristika	Number (% , percentage)/Broj (% , procenat)
Gender/Pol	
Male/Muški	108 (30.4)
Female/Ženski	247 (69.6)
Department at the FM/Smer na fakultetu	
General Medicine/Opšta medicina	258 (72.75)
Nursing/Zdravstvena nega	74 (20.8)
Others/Ostali	23 (6.45)
Previous school/Završena škola	
High school/Gimnazija	274 (77.2)
Secondary medical school/Srednja medicinska škola	69 (19.4)
Others/Ostalo	12 (3.4)

The statistical package for the social sciences 21 was used for data processing. Frequency analysis, descriptive statistics and χ^2 test were used for the analysis of the sample structure as well as the analysis of the correct answers on the HPV infection. Differences in knowledge with respect to demographic variables were examined by Student's t-test and analysis of variance.

Results

The study included 355 students, 108 (30.4%) male and 247 (69.6%) female. The examined sample included 72.75% of medical students and 20.8% of nursing students. The vast majority of students were high school graduates (77.2%), while a significantly smaller number, 19.4% of students were secondary medical school graduates (**Table 1**).

Attitudes towards visiting a counseling service for young people and having a gynecological examination

Ninety one point five percent of students thought that preventive gynecological examinations were necessary. However, 88.2% of students have never visited a youth counseling service; they obtained information on reproductive health from media and the Internet (39.4%), followed by parents/family members (20.6%), health workers (20.3%), and friends (18.6%) (**Graph 1**).

About 73% of students did not want to talk to a gynecologist or an expert about their sex life, because 49.9% did not like talking about their sex life, while 22.8% of students had no dilemmas about their sex life. Only about 27% of students thought they needed a conversation with a gynecologist or an expert about their sex life.

Sex life of students and their attitudes towards contraception

Two hundred and two students (56.9%) have had sexual intercourse and they had their first sexual experience at the age of 17 (min. 15, max. 19 years). By the moment of examination, they have changed 2 partners on average (min. 1, max. 6 partners). At the moment of examination, 42.8% of students had a sexual partner.

About 34.2% of sexually active students had only vaginal sex, while 65.8% of sexually active students had vaginal, oral and anal sex. Sexually transmitted diseases (STDs) were not reported by 87.9% of students (**Table 2**).

The majority of students (51%) used condoms against unplanned pregnancy, 15.7% had interrupted sexual intercourse, and only 11.3% used oral contraceptives, while 14.7% used a combination of two methods (**Graph 2**).

Forty seven percent of students thought that condoms were the most effective means to prevent unwanted pregnancy. Only 14.1% of students believed that intrauterine devices provided complete preven-

Table 2. Characteristics of the prior sexual life of students
Tabela 2. Karakteristike seksualnog života ispitanika

Had sexual relations (number (%))/Imao/la seksualne odnose (broj (%))	202 (56.9)
Currently has a partner (number (%))/Trenutno ima partnera (broj (%))	152 (42.8)
Age of the first sexual relation intercourse ($\bar{X} \pm SD$)/Starost kod prvog polnog donosa ($\bar{X} \pm SD$)	17.2 $\pm$ 1.27
Number of previous sex partners ($\bar{X} \pm SD$)/Broj dosadašnjih seksualnih partnera ($\bar{X} \pm SD$)	2.11 $\pm$ 1.16
Type of sexual relation (%)/Tip polnih odnosa (%)	
Vaginal/vaginalni	34.2
vaginal + anal + oral/vaginalni + analni + oralni	65.8
Had a sexually transmitted infection (number (%))/Imao/la seksualno prenosivu infekciju (broj (%))	43 (12.1)

Legend/Legenda: $\bar{X}$ = mean value/srednja vrednost; SD = standard deviation/standardna devijacija

Table 3. Correct answers to the questions about HPV infection
Tabela 3. Tačni odgovori o infekciji humanim papiloma virusom

Question <i>Pitanje</i>	Correct answer (%) <i>Tačan odgovor (%)</i>
Young women are at higher risk of HPV infection (yes) <i>Mlade žene imaju veći rizik za HPV infekciju (da)</i>	27.6
HPV infection is transmitted by sexual intercourse (yes) <i>HPV infekcija se prenosi seksualnim kontaktom (da)</i>	75.5
The risk of HPV depends on the number of sexual partners (yes) <i>Rizik od HPV-a zavisi od broja seksualnih partnera (da)</i>	45.9
Early sexual intercourse is a risk of HPV infection (yes) <i>Rano stupanje u seksualne odnose je rizik za HPV infekciju (da)</i>	32.1
HPV infections can affect men (yes)/ <i>Od HPV infekcije mogu da obole muškarci (da)</i>	37.7
HPV is the cause of genital warts (condyloma) (yes) <i>HPV su uzrok nastanka polnih bradavica (kondiloma) (da)</i>	41.1
HPV infection can be cured (yes)/ <i>HPV infekcija se može izlečiti (da)</i>	31.55
HPV infection always has pronounced symptoms (no) <i>HPV infekcija uvek daje izražene simptome (ne)</i>	36.6
Condom provides a complete protection against HPV (no)/ <i>Kondom je potpuna zaštita od HPV-a (ne)</i>	34.09
There is a vaccine against HPV (yes)/ <i>Postoji vakcina protiv HPV-a (da)</i>	28.7
HPV can cause cervical cancer (yes)/ <i>HPV može da izazove rak grlića materice (da)</i>	53.5
HPV can cause penile cancer (yes)/ <i>HPV može da izazove rak penisa (da)</i>	19.7

HPV – humani papiloma virus

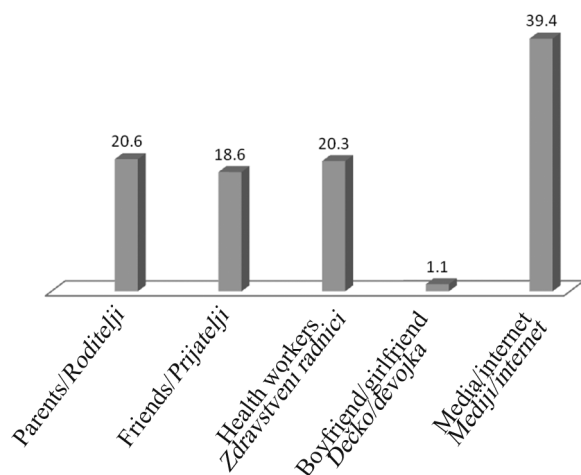
tion of pregnancy, 11.2% of them believed in contraceptive pills, or a combination of two methods (11.2%). About 17% of students did not know the answer to this question (**Graph 3**).

Forty eight point seven percent of students thought that pregnancy termination was dangerous and that it should be avoided using contraception, while 27.6% of students believed that it was very dangerous for health.

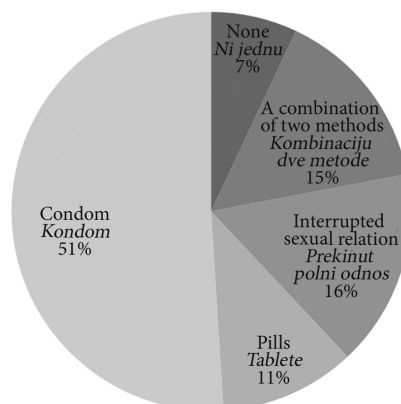
Students' knowledge of HPV infection

Eighty nine percent of students have heard about HPV infection, while 75.5% of them knew that HPV

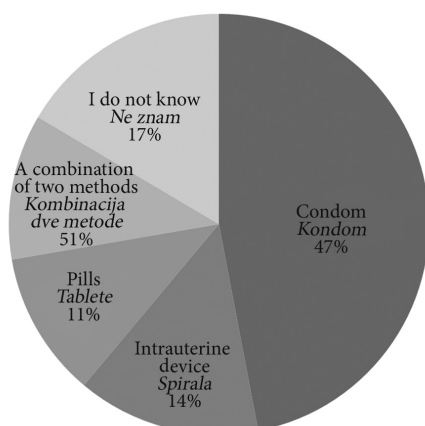
infection is transmitted through sexual intercourse. Only 27.6% of students knew that young women are at a higher risk of HPV infection, that the risk of HPV infection depends on the number of sexual partners (45.9%), that early sexual intercourse is a risk of getting HPV infection (32.1%), that HPV infection may also affect men (37.7%), that HPV infection causes genital warts (41.1%), that HPV infection can be cured (31.55%), that HPV infection does not always have symptoms (36.6%), that condoms do not provide complete protection against HPV infection (34.09%), 28.7% have heard of HPV vaccine, while 53.5% knew that HPV can cause cervical cancer, and only 19.7% of students knew that HPV infection may cause penile cancer (**Table 3**).



Graph 1. Sources of information on reproductive health
Grafikon 1. Izvori informacija o reproduktivnom zdravlju



Graph 2. Contraceptive methods used by students
Grafikon 2. Tipovi kontracepcije koju studenti koriste



Graph 3. The most effective means to prevent pregnancy according to students

Grafikon 3. Najefikasnije sredstvo za zaštitu od trudnoće prema mišljenju studenata

The total score of the knowledge test was 5.09 ± 3.35 , which means that students of the first year showed poor knowledge about HPV infection.

The female students showed better results than male students ($t_{(353)} = -4.192$; $p < 0.01$). There was also a statistically significant difference in the knowledge of students related to the secondary school they attended. The best results were achieved by students who attended medical high schools ($F_{(2, 352)} = 10.177$; $p < 0.01$). In addition, students of nursing showed better knowledge of HPV infection than students from other departments ($F_{(2, 352)} = 10.177$; $p < 0.01$), than students who have not had sexual intercourse yet ($t_{(353)} = -5.699$; $p < 0.01$), and students who have not had sexually transmitted infections so far ($t_{(353)} = -3.946$; $p < 0.01$).

Students' opinions on HPV vaccine

About 75% of the total number of respondents thought that they were not sufficiently informed of HPV infection and cervical cancer and wanted to learn more through lectures and workshops. More than half (53.2%) of students did not want to receive HPV vaccine, while only 18.6% of them would receive a vaccine if they were advised by a doctor.

Discussion

Previous studies have shown that medical students have a higher level of knowledge compared to students of other sciences, as well as compared to general population [11, 13]. A research which was conducted in our country on HPV infection, as a sexually transmitted disease, showed that students of the Faculty of Medicine have statistically significantly higher knowledge, compared to the respondents from secondary medical schools and other high schools (84% versus 65.8% versus 60.3%), but with low awareness of the existence and role of HPV vaccine (55% versus 23.1% vs. 14.7%) [15]. The aim of our research was to determine the actual level of students' knowledge of HPV infection.

In our research, the majority of students (89%) have heard of HPV infection and knew that the infection is transmitted through sexual intercourse (75.5%); however, accurate knowledge of HPV infection was low, with female students showing a higher level of knowledge (4.03 ± 3.07 versus 5.56 ± 3.37 ; $p < 0.01$). Overall, female students showed a higher level of knowledge compared to male students than students who had previously graduated from a secondary medical school, students of general medicine, students who have not had sexual intercourse yet, and those who have not had a sexually transmitted infection [3, 14].

On average, students answered 5 out of 13 questions about HPV infection correctly. Our results do not differ from the results of other authors, who have also found that, in general, there is a low level of knowledge about HPV infection among students of the Faculty of Medicine and that female students have a higher level of knowledge than male students [3, 6, 8, 14]. The results of other authors are diverse. According to a research of McCusker SM et al., among students of medicine in Scotland, 96% of girls and 100% of boys knew that HPV was a sexually transmitted infection, while another study conducted in Germany showed that less than 50% of students knew that HPV was a sexually transmitted infection [4, 6].

The results of our study show that there is an insufficient level of knowledge about the correlation between HPV infection and cancer of the genital region. Just over half of the students (53.5%) knew that HPV infection is associated with cervical cancer and genital warts (41.1%).

However, only about 19.7% of students knew that HPV infection can cause penile cancer. Our results are slightly worse than the results of other authors. In a study by Choudhary et al., conducted in India, 78% of medical students who participated in the study knew that HPV is sexually transmitted, 54% knew that HPV causes cervical cancer, 53% knew that it causes genital warts, while 25% knew about the correlation between HPV infection and penile cancer [8]. In the study conducted by Khan et al. in Pakistan, 57% of students have heard of HPV infection, but 55% knew that HPV can cause cervical cancer, while 47% knew that HPV causes penile and anal cancer [1]. In China, 76.5% of students have heard of HPV infection, 46.8% knew that it is sexually transmitted, 49.4% knew that HPV causes genital warts, while 67.4% knew that HPV causes cervical cancer [3].

In addition, students' knowledge about the risk factors of HPV infection, as well as the possible ways of prevention, is incomplete and imprecise [16]. In our study, one third of students knew that HPV infection does not always have symptoms (37%), that it can be cured spontaneously (31.55%) and that condoms do not provide complete protection against HPV infection (34%), which is consistent with the results of other authors [1].

However, almost two-thirds of students do not know that having early sexual relations poses a risk for getting HPV infection (67.9%), that HPV infection depends on

the number of sex partners (54.1%), that young women are at a higher risk (72.4%), and that men can also get infected (62.3%). In the study conducted by Yoruk et al., students knew that risk factors for HPV infection are having early sexual relations (61.8%) and having multiple sex partners (83.3%) [16].

The lack of knowledge about HPV infection and its possible consequences, as well as the ways of preventing it, can be explained by the lack of education of young people in secondary schools about STDs. Statistically speaking, a better level of knowledge in our research was demonstrated by students who had previously graduated from secondary medical schools, which suggests that in secondary schools young people get insufficient education on reproductive health and STDs, which is in line with the results of other authors [3, 14].

In our research, 88.2% of students have never visited a youth counseling service, while information on reproductive health are obtained from media and the Internet (39.4%), followed by parents or family members (20.6%), health workers (20.3%) and friends (18.6%). Furthermore, data that about 73% of students do not want to talk to a gynecologist or an expert about their sex life (they do not like talking about their sex life (50%), they have no dilemmas regarding their sex life (22.8%), are also a sign of insufficient health awareness. Other authors have come to similar conclusions [6].

Good knowledge of HPV infection and its association with cervical and other genital carcinomas is a

significant factor in deciding whether to receive the vaccine or not [6]. In our study, only 28.7% of students knew that there is an HPV vaccine, but more than half (53.2%) of them do not want to receive it. Only 18.6% of students would receive the vaccine if the doctor recommended it. The results of other authors are diverse.

In Khan's study, 47% of students knew that there is an HPV vaccine, and a vast majority would receive it if it was recommended by a doctor [1]. In the study of Tripathy S et al., 36.1% of medical students would receive an HPV vaccine, while in the study of Mehta S et al., as many as 88% of students would receive an HPV vaccine [17, 18]. This attitude of students is expected, given the low level of knowledge about HPV infection and the severity of its possible consequences.

Conclusion

There is a lack of knowledge among medical students, future health workers, about human papillomavirus infection, ways of its spreading, diseases it causes, and about its prevention. Education and health awareness of young people is necessary in secondary schools, in order to preserve reproductive health and prevent human papillomavirus-related cancers. Better awareness and higher level of knowledge about human papillomavirus vaccine will contribute to increase acceptance of vaccination, which will reduce the morbidity and mortality from cervical and other human papillomavirus-induced carcinomas.

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