

# Human Papillomavirus Vaccine Knowledge and Intention Among Adult Inmates in Kansas, 2016–2017

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**Objectives.** To assess human papillomavirus (HPV) knowledge and vaccine awareness, intention, and uptake among adult inmates in Kansas jails.

**Methods.** We administered a survey with questions adapted from the US National Cancer Institute's Health Information National Trends Survey to 571 adult inmates in 3 Kansas jails from October 10 to 12, 2016, and January 25 to 27, 2017, to assess HPV knowledge and vaccine awareness, intention, and uptake.

**Results.** Although most adults across demographic groups recognized HPV as causing cervical cancer, knowledge was lower about other HPV-related cancers. Vaccine awareness was higher for women (70%) than men (41%). Only 8% of age-eligible men reported ever receiving the vaccine. Most adults across demographic groups reported "definitely" wanting to get the vaccine if offered in jail at no cost.

**Conclusions.** Low uptake of HPV vaccine and high interest in receiving the vaccine in jails may indicate that vaccination availability for jail populations needs to be reexamined.

**Public Health Implications.** Expanding HPV vaccine programs or partnerships to facilitate vaccine provision in jails could increase inmates' knowledge of and intention to receive vital health services. (*Am J Public Health.* 2018;108:1000–1002. doi:10.2105/AJPH.2018.304499)

The human papillomavirus (HPV) vaccine has been routinely recommended since 2006 for females and since 2011 for males aged 11 to 12 years, with provisions for catch-up vaccines.<sup>1</sup> However, among older adolescents (aged 13–17 years) and young adults (aged 18–26 years), uptake of the vaccine remains low in the United States.<sup>1</sup> HPV is the most common sexually transmitted infection in the United States and typically clears the body on its own, but some high-risk types of HPV persist and cause genital and oropharyngeal cancers.<sup>2,3</sup> The vaccine protects against several of the HPV subtypes that are the causative agent of cervical and other cancers.<sup>1,3</sup>

Women with criminal justice histories are 4 to 5 times as likely to be diagnosed with cervical cancer as women without criminal justice histories, but we know little about the HPV burden on men with justice involvement.<sup>4,5</sup> We do know that high rates of tobacco use, sexually transmitted infections,

engagement in the sex trade, and lack of continuity of care can contribute to justice-involved women's and men's high risk for HPV-related cancers.<sup>6–8</sup> The dearth of literature about this groups' HPV knowledge and experience with the vaccine may result in a widening HPV-related cancer disparity. As part of an implementation strategy for a jail-based HPV vaccination clinic run by local health departments, we conducted surveys with adult inmates in Kansas to assess factors associated with HPV knowledge and vaccine awareness, intention, and uptake.

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## METHODS

On October 10 to 12, 2016, and January 25 to 27, 2017, we administered a survey adapted from the National Cancer Institute's Health Information National Trends Survey to 571 adult inmates in 3 Kansas City, Kansas, jails. The jails were located in Wyandotte, Kansas (urban), Olathe, Kansas (suburban), and Gardner, Kansas (suburban). None of the facilities currently offer the HPV vaccine. Inclusion criteria were aged 18 years or older, English speaking, and residing in the jails' general population. Three interviewers were escorted by jail staff to multiple pods in each facility. One was the research team's health educator and project director, who trained the other 2 interviewers on administering health surveys and education to inmates.

For recruitment, correctional officers gathered inmates in the pod common area, and interviewers made an announcement about the survey. Although all general population inmates were invited to participate, those in segregation units, in court, or outside the housing pod at the time of the announcement did not have this opportunity. Interested inmates sat in small groups at tables in the housing pods, and interviewers separately met with each group to obtain verbal consent from participants.

After consent, interviewers passed out a 2-page paper survey and pencils and read each question and answer choice aloud, and participants filled out their own answers. After

survey completion, interviewers gave participants individualized education about HPV and the vaccine, using the participants' survey responses to correct misinformation. Participants later received \$5 on their commissary account for completing a survey.

The main subscales in the 22-item survey were HPV knowledge and vaccine awareness, intention, and uptake (Table 1). Vaccine awareness refers to whether participants had ever heard of the vaccine and had ever discussed it with a health care professional. We

adapted knowledge, awareness, and uptake questions from the Health Information National Trends Survey, and the research team developed the question used to assess intentions toward receiving the vaccine in jail. Yes/no and Likert-scale questions assessed

**TABLE 1—Differences in HPV Knowledge and Vaccine Awareness, Intention, and Uptake Among Adults at Jails in Wyandotte and Johnson Counties, KS: October 2016 and January 2017**

Survey Question and Answers	Age, Years, No. (%)		Gender, No. (%)		Ethnicity, No. (%)		Race, No. (%)		Insured, No. (%)	
	≤26	≥27	Male	Female	Hispanic	Non-Hispanic	White	Black	Yes	No
<b>HPV knowledge</b>										
Have you ever heard of HPV?										
Yes	103 (58.5)	227 (60.2)	249 (56.3)	80 (75.4)	32 (45.7)	298 (63.1)	196 (69.5)	64 (48.1)	156 (61.4)	170 (60.2)
No	73 (41.4)	150 (39.7)	193 (43.6)	26 (24.5)	38 (54.2)	174 (36.8)	86 (30.5)	69 (51.8)	98 (38.5)	112 (39.7)
HPV can cause										
Cervical cancer	141 (83.4)	301 (85.5)	347 (83.4)	92 (91.0)	54 (84.3)	380 (85.0)	240 (87.5)	95 (78.5)	202 (84.8)	232 (85.2)
Penile cancer	93 (61.5)	178 (57.7)	225 (60.1)	46 (56.1)	35 (62.5)	232 (58.5)	141 (57.5)	59 (57.2)	131 (61.7)	138 (57.9)
Anal cancer	79 (53.0)	152 (51.5)	192 (53.7)	38 (45.7)	37 (67.2)	192 (50.2)	113 (47.4)	51 (52.0)	110 (53.9)	117 (50.8)
Oral cancer	82 (53.9)	156 (53.2)	190 (52.9)	46 (56.1)	30 (55.5)	204 (53.1)	121 (50.6)	54 (54.5)	118 (57.8)	116 (50.2)
Does HPV require medical treatment or will it go away on its own?										
Medical treatment	166 (94.3)	347 (93.5)	412 (94.2)	98 (92.4)	63 (92.6)	442 (94.4)	266 (93.9)	122 (93.1)	228 (91.2)	273 (96.4)
Will go away on its own	10 (5.6)	24 (6.4)	25 (5.7)	8 (7.5)	5 (7.3)	26 (5.5)	17 (6.0)	9 (6.8)	22 (8.8)	10 (3.5)
<b>Vaccine awareness</b>										
Have you ever heard of the HPV vaccine?										
Yes	78 (43.5)	182 (48.2)	183 (41.1)	75 (70.0)	30 (42.2)	229 (48.4)	152 (53.5)	53 (39.5)	123 (48.8)	133 (46.5)
No	101 (56.4)	195 (51.7)	262 (58.8)	32 (29.9)	41 (57.7)	244 (51.5)	132 (46.4)	81 (60.4)	129 (51.1)	153 (53.5)
Has a doctor ever talked with you about the HPV vaccine?										
Yes	36 (19.8)	61 (16.0)	48 (10.6)	49 (46.2)	9 (12.6)	88 (18.3)	45 (15.6)	31 (22.7)	48 (18.7)	48 (16.6)
No	129 (71.2)	293 (76.9)	367 (81.3)	48 (45.2)	57 (80.2)	352 (73.3)	222 (77.3)	91 (66.9)	192 (75.0)	219 (75.7)
Don't know	16 (8.8)	27 (7.0)	36 (7.9)	9 (8.4)	5 (7.0)	40 (8.3)	20 (6.9)	14 (10.2)	16 (6.2)	22 (7.6)
Has a doctor ever recommended that you get the HPV vaccine? <sup>a</sup>										
Yes	19 (24.6)	18 (13.7)	12 (5.5)	24 (32.0)	5 (11.9)	33 (13.3)	17 (11.8)	13 (17.3)	24 (16.2)	15 (10.7)
No	53 (68.8)	103 (78.6)	184 (85.1)	42 (56.0)	34 (80.9)	192 (77.7)	111 (77.0)	59 (78.6)	114 (77.0)	112 (80.5)
Don't know	5 (6.4)	9 (6.8)	20 (9.2)	9 (12.0)	3 (7.1)	22 (8.9)	16 (11.1)	3 (4.0)	10 (6.7)	12 (8.6)
<b>Vaccine intention</b>										
If offered in jail today at no cost, would you want to get the HPV vaccine?										
Yes, definitely	102 (57.9)	... <sup>b</sup>	79 (56.0)	21 (67.7)	14 (53.8)	83 (58.0)	45 (58.4)	24 (51.0)	54 (58.0)	44 (59.4)
Maybe	37 (21.0)	... <sup>b</sup>	31 (21.9)	6 (19.3)	7 (26.9)	30 (20.9)	17 (22.0)	11 (23.4)	20 (21.5)	16 (21.6)
Not sure	28 (15.9)	... <sup>b</sup>	24 (17.0)	2 (6.4)	4 (15.3)	22 (15.3)	13 (16.8)	7 (14.8)	13 (13.9)	12 (16.2)
Definitely not	9 (5.1)	... <sup>b</sup>	7 (4.9)	2 (6.4)	1 (3.8)	8 (5.5)	2 (2.6)	5 (10.6)	6 (6.4)	2 (2.7)
<b>Vaccine uptake<sup>c</sup></b>										
Have you ever gotten the HPV vaccine?										
Yes	16 (20.7)	10 (13.1)	8 (8.0)	18 (34.6)	2 (12.5)	23 (17.2)	13 (14.2)	6 (19.3)	19 (25.6)	6 (8.0)
No	53 (68.8)	59 (77.6)	82 (82.0)	30 (57.6)	13 (81.2)	97 (72.9)	68 (74.7)	23 (74.1)	51 (68.9)	59 (78.6)
Don't know	8 (10.3)	6 (7.8)	10 (10.0)	4 (7.6)	1 (6.2)	13 (9.7)	10 (10.9)	2 (6.4)	4 (5.4)	10 (13.3)

Note. HPV = human papillomavirus. n = 571.

<sup>a</sup>Only participants who were eligible for the vaccine (for females, aged ≤26 years from 2006 to the present; for males, aged ≤26 years from 2011 to the present) were analyzed for the question "Has a doctor ever recommended that you get the HPV vaccine?" (n = 309). For participants aged ≥27 years at the time of the study, we included only those who were eligible for vaccine in 2006 or 2011.

<sup>b</sup>Only participants eligible for the vaccine (aged ≤26 y) at the time of the study were included in analysis (n = 178).

<sup>c</sup>Only participants who were eligible for the vaccine (for females, aged 11–26 years from 2006 to the present; for males, aged 11–26 years from 2011 to the present) and answered "yes" to ever having heard of the vaccine were included in the analysis (n = 153). Participants aged ≥27 years at the time of study but who were eligible for vaccine in 2006 (females) or 2011 (males) were included in the analysis.

outcome variables. We used the data-capturing software Captricity version 2012–2016 (Captricity, Oakland, CA) to transfer paper survey data into an Excel spreadsheet (Microsoft Corp., Redmond, WA) for analysis.

We performed statistical analysis using SAS Studio version 3.6 (SAS Institute, Cary, NC). We used the TABULATE and FREQ procedures to obtain descriptive statistics on the sample. We used bivariate tests to present answers to individual survey questions on the basis of age, gender, ethnicity, race, and insurance coverage before incarceration.

## RESULTS

We administered 571 surveys to adult inmates at the Wyandotte, Olathe, and Gardner jails. Response rates were 61.1% ( $n = 165\ 270$  general population) in Wyandotte, 75.1% ( $n = 106\ 141$  general population) in Olathe, and 61.8% ( $n = 300\ 485$  general population) in Gardner. Participants ranged in age from 18 to 75 years (mean = 33; SD = 11.7) and had been incarcerated an average of 53 months over their lifetimes. The majority were male ( $n = 451$ ; 78.9%). Fifty percent ( $n = 287$ ) of participants identified as non-Hispanic White; 23% ( $n = 136$ ) identified as non-Hispanic Black; and 12% ( $n = 71$ ) identified as Hispanic. Only 31.7% ( $n = 181$ ) of participants were within the recommended HPV vaccination age range (18–26 years).

Table 1 shows that approximately 60% of participants had heard of HPV regardless of age group or insurance status before incarceration. A higher majority of women (75%) had heard of HPV than men (56%;  $P < .01$ ), and almost 70% of White participants had heard of it compared with 48% of Black participants ( $P < .001$ ). Across demographic groups, the majority of participants recognized that HPV can cause cervical cancer, but far fewer participants knew of the other HPV-related cancers.

Seventy percent of women reported having heard of the vaccine compared with 41% of men ( $P < .001$ ). More women also discussed the vaccine with a doctor (46% said a doctor had talked with them about the vaccine vs 11% of men;  $P < .001$ ). Among participants aged 27 years or older who were eligible for the vaccine in 2006 (females) or 2011 (males), only 13% said that a doctor had recommended that they get the vaccine.

When considering only participants who were eligible for the vaccine at the time of the study, the majority across demographic groups said that they would “definitely” want to get the vaccine if offered at no cost. Finally, vaccine uptake was low across all demographic groups. Among those who had heard of the vaccine and were eligible at the time of the study or in 2006 or 2011, respectively, 8% of men said they had received the vaccine compared with 35% of women ( $P < .001$ ).

## DISCUSSION

Incarcerated adults had limited knowledge of HPV and the vaccine, but more than half of participants across demographic groups expressed interest in being vaccinated in jail if offered at no cost. Additionally, physician interaction about the vaccine was low across all demographic groups. Engaging inmates about HPV and the vaccine while incarcerated could lead to more informed decision-making about the vaccine. Although inmates’ length of stay in jails may be a barrier for receiving the complete HPV vaccine series (most stays are less than 1 year),<sup>9</sup> single or delayed HPV vaccine doses may still provide lasting protection.<sup>10</sup> Although this study was on the basis of a relatively small and local sample, findings shed light on an opportunity to rethink vaccination protocols and availability for high-risk groups moving through jails.

## PUBLIC HEALTH IMPLICATIONS

We found that adult inmates’ HPV knowledge, awareness, and vaccine uptake is low. However, considering participants’ interest in receiving the vaccine while incarcerated, jail stays may provide an opportunity for providing education and making vaccines available. Eliciting the help of jail medical staff for education could be an easy approach for increasing inmates’ knowledge and awareness. Implementing HPV vaccine programs that bridge jails and local public health departments may also connect inmates to subsequent vaccine doses once they are released. **AJPH**

## CONTRIBUTORS

M. Allison drafted the article and analyzed the data. M. Allison and B. Musser collected the data. M. Allison, B. Musser, C. Satterwhite, P. Kelly, and M. Ramaswamy edited the article. B. Musser helped with the literature review. C. Satterwhite oversaw data analysis and guided statistical testing. C. Satterwhite, K. Ault, and P. Kelly are coinvestigators. K. Ault approved the final version of the article. M. Ramaswamy is the primary investigator.

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## HUMAN PARTICIPANT PROTECTION

The University of Kansas Medical Center institutional review board approved this study. Before beginning a survey, we obtained verbal consent from all participants.

## REFERENCES

- Walker TY, Elam-Evans LD, Singleton JA; Centers for Disease Control and Prevention, et al. National, regional, state, and selected local area vaccination coverage among adolescents aged 13–17 years—United States, 2016. Available at: [https://www.cdc.gov/mmwr/volumes/66/wr/mm6633a2.htm?s\\_cid=mm6633a2\\_e](https://www.cdc.gov/mmwr/volumes/66/wr/mm6633a2.htm?s_cid=mm6633a2_e). Accessed November 20, 2017.
- Satterwhite CL, Torrone E, Meites E, et al. Sexually transmitted infections among US women and men: prevalence and incidence estimates, 2008. *Sex Transm Dis*. 2013;40(3):187–193.
- Holman DM, Benard V, Roland KB, Watson M, Liddon N, Stokley S. Barriers to human papillomavirus vaccination among US adolescents: a systematic review of the literature. *JAMA Pediatr*. 2014;168(1):76–82.
- Binswanger IA, Mueller S, Clark CB, Cropsey KL. Risk factors for cervical cancer in criminal justice settings. *J Womens Health (Larchmt)*. 2011;20(12):1839–1845.
- Binswanger IA, Krueger PM, Steiner JF. Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *J Epidemiol Community Health*. 2009;63(11):912–919.
- Hogben M, St. Lawrence JS, Eldridge GD. Sexual risk behavior, drug use, and STD rates among incarcerated women. *Women Health*. 2001;34(1):63–78.
- Lee J, Vlahov D, Freudenberg N. Primary care and health insurance among women released from New York City jails. *J Health Care Poor Underserved*. 2006;17(1):200–217.
- Cropsey K, Eldridge GD, Ladner T. Smoking among female prisoners: an ignored public health epidemic. *Addict Behav*. 2004;29(2):425–431.
- HG Legal Resources. What is the difference between jail and prison? Available at: <https://www.hg.org/article.asp?id=31513>. Accessed February 5, 2018.
- Centers for Disease Control and Prevention. HPV vaccine information for clinicians. Available at: <https://www.cdc.gov/hpv/hcp/need-to-know.pdf>. Accessed February 5, 2018.