

Risk Factors for Cervical Cancer in Criminal Justice Settings

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Abstract

Background: Women in criminal justice settings have an increased prevalence of cervical cancer compared with the general population. However, little is known about abnormal cervical cancer screening results among women in jail and community-based criminal justice settings. Thus, the aims of this study were to compare the prevalence of self-reported abnormal Papanicolaou (Pap) test results in women in jail and under community criminal justice supervision and to examine factors associated with abnormal Pap tests in these criminal justice settings.

Methods: We analyzed data from two cross-sectional surveys of women in jails and community corrections in two Southern cities ($n=380$) about their history of abnormal Pap tests and risk factors for cervical cancer. Univariate analyses (analysis of variance [ANOVA] and chi-square) and a binary logistic regression analysis were conducted to test associations between a history of abnormal Pap testing and factors known to be associated with cervical cancer.

Results: Nearly half of the women surveyed ($n=163$, 43%) reported ever having an abnormal Pap test. There was a high prevalence of risk factors for cervical cancer among women with and without an abnormal Pap test. After controlling for age and race, there were significant associations between an abnormal Pap test and inconsistent use of barrier protection (odds ratio [OR] 2.01, 95% confidence interval [CI] 1.18-3.43), having a history of gynecologic infections (OR 1.68, 95% CI 1.05-2.67), and having a history of sexually transmitted diseases (OR 1.92, 95% CI 1.17-3.15).

Conclusions: Women in jail and under community justice supervision reported a high prevalence of risk factors for cervical cancer. Because of their high prevalence of abnormal Pap testing, women in criminal justice settings may be appropriate targets for improved cervical cancer screening, prevention with human papillomavirus (HPV) vaccination, risk reduction education, and treatment.

Introduction

WOMEN IN JAILS AND PRISONS are at high risk for cervical cancer,¹⁻³ and cervical cancer is the most common type of cancer among female prisoners.⁴ Based on nationally representative surveys, women in U.S. jails and prisons have significantly greater odds than the general population of having cervical cancer.¹ Women in Ohio prisons had a higher rate of high-grade cervical lesions than women in the general population but a lower rate of a biopsy follow-up.⁵ In Canada, girls in juvenile detention had higher rates of abnormal Papanicolaou (Pap) tests than the general adolescent female population.⁶ Given these higher risks to incarcerated girls

and women, a California study demonstrated that women frequently have had Pap testing in jails and prison and are willing to have Pap testing in correctional settings,⁷ so opportunities exist to intervene in criminal justice settings.

Little is known about the prevalence of abnormal Pap testing and associated factors in the full range of criminal justice settings that supervise women in the United States. The criminal justice population in the United States is large, with over 7 million individuals under criminal justice supervision at year end 2008. Of those, women represented 12% of the parole population but 24% of the probation population.⁸ Community supervision, which includes both parole and probation, involves being under criminal justice supervision

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while still living in the community. In the United States, individuals are detained in jails while awaiting trial or while serving short-term (less than 1 year) sentences.⁹

Addressing the risk for cervical cancer among women in the criminal justice system may offer the opportunity to address health disparities and encourage the provision of preventive health services to an otherwise underinsured and underserved population. African American and Latina women are disproportionately represented in U.S. jails and prisons.¹⁰ African American and Latina women also have a higher incidence and mortality rate from cervical cancer than white women.¹¹ Underinsurance and limited access to care can be a problem for African American and Latina women.¹² Little is known about women in community criminal justice settings, but incarcerated women have historically lacked access to preventive healthcare and are underserved when it comes to their reproductive health.^{13,14} Offering preventive health services to women involved in the criminal justice system may help ameliorate health disparities and poor health outcomes.

Pap testing (cervical cytology) is a way to detect precancerous and cancerous cervical lesions by identifying women who need further diagnosis and treatment. Few studies of cervical cancer or screening have included women in jails^{7,15} and prisons,^{1,16–18} and none, to our knowledge, have included women living in the community but involved with the criminal justice system, such as those on parole or probation (community supervision). Furthermore, studies have not examined risk factors for cervical cancer among inmates or other criminal justice populations.

Common risk factors for abnormal Pap tests and cervical cancer for women include early sexual activity, having unprotected sex, and a lack of health education. Multiple sexual partners among young adults can increase the risk of acquiring human papillomavirus (HPV),^{19,20} which is implicated in 99% of cervical cancer cases.¹⁴ Other risk factors for cervical cancer include tobacco use,^{21,22} pregnancy at a young age,^{23,24} parity,²⁵ and not receiving Pap testing. Women involved in the criminal justice system are likely to be at higher risk for cervical cancer because of a history of multiple sex partners,²⁶ early parity, trading sex for money or drugs,^{27,28} and tobacco use.

We designed this study to compare the prevalence of reported abnormal Pap tests in women involved with the criminal justice system in jail and in the community in two Southern cities. We also sought to examine tobacco use, parity, and history of a sexually transmitted infection (STI) as factors associated with abnormal Pap tests in women involved in the criminal justice system. We tested the following hypotheses. Hypothesis 1: A high proportion of women in the criminal justice system would report a history of abnormal Pap testing. Hypothesis 2: Factors associated with women reporting abnormal Pap testing, compared with women without abnormal tests, would correspond to the risk factors for cervical cancer in the general population.

Materials and Methods

Study design

This study is an analysis of data from two cross-sectional surveys of women in jails and community corrections aimed at examining the prevalence of abnormal Pap testing and

factors associated with abnormal Pap tests in these settings. The surveys were originally designed to examine the sexual and reproductive health of criminal justice involved women.

Participants

Participants were women at least 18 years old who were involved with the criminal justice system. Women who were underage (i.e., <18 in Virginia and <19 in Alabama) were excluded. The total sample included 390 participants, of whom 188 participants were in jail and 202 participants were in community supervision programs. Ten women did not answer the question on abnormal Pap testing (perhaps because they had not been tested) and were excluded from further analysis (3 from the jail sample and 7 from the community supervision sample).

Procedures

Participants for the jail sample were recruited from five local jails around a medium-sized metropolitan area in the southeast. Announcements explaining the survey were made in the common areas of the jails. Potential participants were free to ask questions after the announcement or in private with the research staff. All women who were present to hear the announcement received a stamped envelope to use to mail a letter to family or friends, regardless of their completion of the survey. These letters were provided as compensation for their time in completing survey materials but were not contingent on study participation. Women in the community supervision sample were recruited from a community corrections office in a different southern correctional system.²⁹ Women in a community corrections office were recruited at the time they checked in for urine drug screening through convenience sampling. Women who agreed to participate took a survey and completed it on their own in private. Participants were told to not write their name or any other identifying information on the survey. Surveys were returned directly to a locked box located onsite at the jail or the community corrections office that was able to be accessed only by the research team. Members of the research team collected the surveys from the locked boxes.

Instrument

The surveys were modeled after similar areas of inquiry noted in the prior literature on incarcerated women.¹³ The surveys were developed by an obstetrician/gynecologist, a psychologist (K.L.C.) with experience doing research in correctional populations, and a medical student and reviewed by several additional individuals before field implementation. The two surveys were identical, with the exception that the survey administered to the community custody sample had additional questions not used in the current analysis. The self-administered surveys included demographic information (e.g., self-reported race), most frequent birth control used, history of STIs and other gynecologic infections, number of sexual partners in the past 3 months, number of pregnancies, number of live births, tobacco use, and if they currently have a healthcare provider. Participants were asked about the consistency of their use of a barrier during intercourse (i.e., always, sometimes, or never). Inconsistent use was operationalized as never or sometimes using a barrier as opposed

to always using a barrier. Cervical cancer risk was assessed by asking one question about history of an abnormal Pap test: Have you ever had an abnormal Pap smear? The surveys took about 10–15 minutes to complete. Institutional Review Board approval was obtained from Virginia Commonwealth University and the University of Alabama at Birmingham.

Statistical analyses

Univariate analyses were used to compare the characteristics of women with abnormal Pap test results vs. normal Pap test results on sexual health characteristics. Frequency distributions were used to describe the demographic characteristics of the sample. We compared having a usual source of medical care as well the prevalence of abnormal Pap test results history between the two criminal justice settings (jail vs. community corrections) from the two cities using chi-square analyses. We evaluated tobacco, history of STI, number of sexual partners, and inconsistent use of a barrier method as risk factors for abnormal Pap tests using binary logistic regression, adjusted for age and race. We selected these factors to examine because they are known risk factors for cervical cancer in the general population. We generated odds ratios (OR) and 95% confidence intervals (CI). Missing data points were excluded on a case by case basis for the univariate analyses. Participants' data were excluded from the multivariate analysis if one of the variables of interest was missing from the data. Analysis was carried out using SPSS version 18.0.

Results

Table 1 describes the demographic characteristics of the sample and by self-report of an abnormal or normal Pap testing history. Nearly half of the women surveyed ($n=163$, 43%) reported ever having an abnormal Pap test. There was no significant difference in the proportion of women with abnormal Pap testing by setting (jail, 40.5% vs. community corrections, 45.1%, $p=0.366$). The mean age of the jail sample was 36.8 (standard deviation [SD] 8.8) years, and the mean age of the community corrections sample was 30.8 (SD 8.9) years.

Table 2 provides health-related characteristics by Pap testing, as well as bivariate associations between potential risk factors and protective factors and abnormal Pap tests. Overall, there was a high prevalence of risk factors for abnormal Pap tests among women in the sample. For instance, 64% of the women were current smokers, and 63% reported more than one sexual partner over the past 3 months. Inconsistent use of a barrier during sexual intercourse ($p<0.05$) and a lower frequency of barrier use when having sexual intercourse ($p<0.05$) were associated with increased reports of abnormal Pap tests. A history of any STI ($p<0.01$), including chlamydia ($p<0.05$) and genital warts ($p<0.05$), was significantly associated with a history of an abnormal Pap test. Additionally, a history of any gynecologic infection ($p<0.01$) including candidiasis ($p<0.05$) and bacterial vaginosis ($p<0.05$), was significantly associated with a reported history of an abnormal Pap test. Having a healthcare provider was not significantly associated with ever having an abnormal Pap test. Eighty percent ($n=306$) of women reported a history of pregnancy, and 73.9% ($n=291$) reported a history of giving birth. Number of live births was not associated with reporting an abnormal Pap test.

Table 3 presents the association between potential risk and protective factors for cervical cancer and abnormal Pap testing in multivariable analysis. After controlling for age and race, there were significant associations between an abnormal Pap test result and inconsistent use of barrier protection (OR 2.01, 95% CI 1.18-3.43), having a history of gynecologic infections (OR 1.68, 95% CI 1.05-2.67), and having a history of STIs (OR 1.92, 95% CI 1.17-3.15) (Table 3). In multivariable analysis, there was no association of abnormal Pap testing with African American race or number of sexual partners over the past 3 months.

Discussion

Our study demonstrates a high prevalence of self-reported abnormal Pap test results in a jail and community supervision population and a high prevalence of risk factors for cervical cancer, consistent with our first hypothesis. These results are consistent with other studies that demonstrate a higher

TABLE 1. DEMOGRAPHIC CHARACTERISTICS BY SELF-REPORT OF HISTORY OF ABNORMAL OR NORMAL PAP TEST

Variable	Overall sample (n=380)	Abnormal Pap test (n=163)	Normal Pap test (n=217)	Chi-square or F
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	
Race				
Caucasian	187 (49.2)	82 (50.3)	105 (48.4)	0.14
African American	193 (50.8)	81 (49.7)	112 (51.6)	
Age	33.7 (9.31)	33.3 (8.6)	34.2 (9.8)	0.73
Marital status				
Single	313 (83.7)	136 (84.0)	117 (83.5)	0.01
Married/partnered	61 (16.3)	26 (16.0)	35 (16.5)	
Education				
<High school	93 (24.5)	42 (25.8)	51 (23.5)	1.63
High school/GED	205 (53.9)	82 (50.3)	123 (56.7)	
≥High school	82 (21.6)	39 (23.9)	43 (19.8)	
Full-time employment	215 (57.8)	86 (53.1)	129 (61.4)	2.61
Criminal justice setting				
Jail	185 (48.7)	75 (46.0)	110 (50.7)	0.82
Community	195 (51.3)	88 (54.0)	107 (49.3)	

GED, general equivalency diploma; SD, standard deviation.

TABLE 2. HEALTH-RELATED CHARACTERISTICS BY PAP TESTING HISTORY

Variable	Overall sample (n=380)	Abnormal Pap test (n=163)	Normal Pap test (n=217)	Chi-square or F
	Mean (SD) or n (%)	Mean (SD) or n (%)	Mean (SD) or n (%)	
Current smoker	240 (64.0)	108 (66.7)	132 (62.0)	0.88
Sex partners over 3 months				1.42
None	25 (6.7)	8 (5.0)	17 (8.1)	
1	147 (39.6)	65 (40.4)	82 (39.0)	
>1	199 (53.6)	88 (54.7)	111 (52.9)	
Most frequent birth control				6.20*
Condoms	156 (43.0)	55 (35.5)	101 (48.6)	
No barrier	207 (57.0)	100 (64.5)	107 (51.4)	
Inconsistent use of barrier method	93 (24.5)	30 (18.4)	63 (29.0)	5.69*
History of STIs				
Any	151 (40.4)	78 (48.4)	73 (34.3)	7.65**
Gonorrhea	55 (14.6)	28 (17.4)	27 (12.6)	1.72
Chlamydia	71 (18.9)	38 (23.6)	33 (15.3)	4.09*
Genital warts	18 (4.8)	12 (7.5)	6 (2.8)	4.39*
HSV	21 (5.6)	11 (6.8)	10 (4.7)	0.83
Syphilis	10 (2.7)	6 (3.7)	4 (1.9)	1.24
Chancroid	2 (0.5)	1 (0.6)	1 (0.5)	0.04
Trichomoniasis	76 (20.2)	38 (23.6)	38 (17.7)	2.01
Hepatitis B	11 (2.9)	7 (4.3)	4 (1.9)	2.74
Hepatitis C	37 (9.8)	20 (12.4)	17 (7.9)	2.12
HIV	5 (1.3)	2 (1.2)	3 (1.4)	0.02
History of gynecologic infections				
Any	168 (45.0)	87 (54.0)	81 (38.2)	9.26**
Candidiasis	146 (38.8)	75 (46.6)	71 (33.0)	7.13**
Bacterial vaginosis	58 (15.4)	33 (20.5)	25 (11.6)	5.55*
Toxic shock syndrome	5 (1.3)	3 (1.9)	2 (0.9)	0.61
Vaginitis	18 (4.8)	8 (5.0)	10 (4.7)	0.02
Medical problems				
Any	53 (14.1)	22 (13.7)	31 (14.4)	0.04
Breast cancer	5 (1.3)	0 (0.0)	5 (2.3)	3.78
Uterine cancer	6 (1.6)	4 (2.5)	2 (0.9)	1.43
Diabetes	16 (4.2)	9 (5.6)	7 (3.2)	1.25
Heart problems	30 (8.0)	11 (6.8)	19 (8.8)	0.49
Blood clots	4 (1.1)	2 (1.2)	2 (0.9)	0.09
Healthcare provider ^a				
Any	226 (60.4)	101 (62.7)	125 (58.7)	0.63
General practitioner	145 (38.8)	61 (37.9)	84 (39.4)	0.09
Obstetrician/gynecologist	95 (25.4)	46 (28.6)	49 (23.0)	1.50
Other provider	61 (16.3)	30 (18.6)	31 (14.6)	1.11
Number of pregnancies	2.5 (2.0)	2.7 (2.1)	2.5 (2.0)	0.81
Number of live births	1.8 (1.5)	1.9 (1.5)	1.7 (1.5)	0.81

* $p < 0.05$; ** $p < 0.01$.^aParticipants could indicate more than one type of healthcare provider.

HIV, human immunodeficiency virus; HSV, herpes simplex virus; STI, sexually transmitted infection.

prevalence of cervical cancer among women in prison and jail than in the general population,¹ but prior studies have not examined the prevalence of abnormal Pap test results in the community corrections population or potential demographic, behavioral, and medical factors associated with abnormal Pap tests.

In our study, jail and community corrections populations were similar in terms of their prevalence of abnormal Pap test reporting. Our analysis suggests that differences between women who did and did not report abnormal Pap tests were related to differences in sexual behavior and medical factors. Consistent with our second hypothesis, we observed three factors that were significantly associated with abnormal Pap

test results in these criminal justice populations: history of inconsistent condom use, history of STIs, and history of other gynecologic infections. In contrast, other classic risk factors for cervical cancer (tobacco use) may not be associated with abnormal Pap tests in this population with a high prevalence of both abnormal Pap tests and tobacco use.

Our results that many women reported a history of an abnormal Pap test suggest that it is appropriate for women with criminal justice involvement to have access to cervical cancer screening that at least meets guidelines set forth for the general population. The United States Preventive Services Task Force (USPSTF) review of cervical cancer screening suggests that use of Pap testing reduces the incidence of and

TABLE 3. ASSOCIATION BETWEEN POTENTIAL RISK/PROTECTIVE FACTORS FOR CERVICAL CANCER AND REPORTED HISTORY OF ABNORMAL PAP TEST RESULTS IN MULTIVARIABLE ANALYSIS

Variable	Beta	p value	OR	95% CI
Age	-0.02	0.13	0.98	0.96-1.01
African American	-0.16	0.50	0.86	0.54-1.35
Inconsistent use of barrier method	0.70	0.01	2.01	1.18-3.43
Number of sexual partners in past 3 months				
None (referent)				
1	0.92	0.08	2.51	0.89-7.05
>1	0.70	0.18	2.02	0.72-5.61
History of gynecologic infections	0.52	0.03	1.68	1.05-2.67
History of STI	0.65	0.01	1.92	1.17-3.15

mortality from cervical cancer. Their latest recommendations, published in 2003, suggest screening within 3 years of the onset of sexual activity or age 21 (whichever comes first) and a screening interval of every 3 years.³⁰ Correctional-specific guidelines for providing Pap tests should at least meet guidelines set forth for the general public, although some individuals, correctional systems, and organizations suggest policies that exceed USPSTF guidelines. For instance, Lee et al. suggested that "cervical cancer screening via Pap testing or HPV genetic testing should be offered to all females with an intact cervix at facility admission and then annually."³⁰ The Federal Bureau of Prisons has also recommended that all females aged ≤ 30 have a Pap test at the intake physical and annually until the age of 31. For women aged 31–65 with previously negative Pap tests, they recommend a Pap test at the intake physical and every 3 years.³¹ It is likely to be logistically more complex to provide Pap testing in jails for women who are incarcerated for <1 week, but for those awaiting trial or serving sentences in jails, it is feasible in many jails with on-site medical facilities. Although our study was not designed to assess access to Pap testing, screening in community supervision settings (e.g., at parole or probation) is, to our knowledge, virtually nonexistent in the United States.

Our results also suggest that women involved in the criminal justice system are important targets for interventions designed to address cervical cancer because of their high risk of cancer and their high prevalence of risk factors.^{13,14} Incarceration offers an opportunity to provide reproductive health services to some high-risk women who might not otherwise seek or receive health services.¹⁴ In our study, approximately 40% of women did not have a current healthcare provider. This is higher than that in a 2002 survey of U.S. women, which suggested that 28.1% were uninsured, but lower than in a 2006 survey of incarcerated women in Rhode Island, which estimated that 54% entered the facility without health insurance. This finding emphasizes the significant barriers to care among criminal justice populations.¹³ Future work could assess the feasibility of providing cervical cancer screening in community supervision environments and the cost-effectiveness of enhanced screening in jails. The high prevalence of abnormal Pap test results suggests that women

in criminal justice settings also have medical treatment and follow-up needs, particularly given their poor access to care.

Although many of the women in our study would not have been eligible for HPV vaccination because of their age, targeting HPV vaccination to girls and younger women involved in the criminal justice system may be one way to address the high prevalence of abnormal Pap testing reported by women in our study. The HPV vaccination is currently recommended for women up to age 26.³² The natural history of HPV infection and cervical cancer and the characteristics of girls in the juvenile justice system suggest implications for the prevention of cervical cancer that also extend to girls younger than those enrolled in this study. Youth involved in the criminal justice system are often disenfranchised from traditional healthcare services, and correctional healthcare may be the major provider of care to adolescents in the criminal justice system.³³ Providing cancer prevention services to girls in juvenile detention affords an opportunity to address racial and ethnic disparities, given the disparities in cervical cancer incidence and mortality in this country.³² The criminal justice system involves populations of girls and young women appropriate for enhanced HPV vaccine access. Vaccination efforts should be considered as early as possible for this population, as the vaccine is more effective when administered before exposure to risks for cervical cancer.³⁴

Correctional settings tend to emphasize acute healthcare needs, whereas vaccinations and other preventive healthcare services may be overlooked or underprioritized in criminal justice settings,³⁴ especially community criminal justice settings (e.g., probation and parole). Many of the women in this study did not have a current healthcare provider; therefore, mechanisms to provide guideline-consistent screening tests, update immunization status, address developmental and psychosocial issues, and work to establish a medical home before release from correctional settings are needed.³³ A national study reported that most women in prisons are likely to receive a gynecologic examination (90%), but only 22% of women being admitted into jails receive a gynecologic examination.³⁵ For women who have short stays in correctional facilities, for example, youth who are detained at but not committed into juvenile correctional facilities, the first HPV vaccine dose can be administered in the facility and follow-up doses can be administered by a community-based provider.³⁴ Providing health education and risk reduction education combined with preventive care at parole and probation offices would offer a novel, adjunctive means to target high-risk women. These preventive interventions, however, may require specialized funding, given competing demands in criminal justice budgets.

Our study was limited by the collection of self-reported data about Pap testing results, which may not always correspond to the cytologic findings on cervical samples.³⁶ However, our use of survey data allowed us to obtain results from a large number of women involved in the criminal justice system, who gave us detailed behavioral data. Our participants may not have been as forthcoming if we had requested permission to examine identifiable medical or pathology reports. The presence of an abnormal Pap result was frequent, and, therefore, the use of an odds ratio may not accurately estimate a relative risk. Given that the surveys were designed to be brief self-administered surveys, they did not include questions about all potential risk factors for cervical cancer, including number of lifetime partners; did not specify

condom use relative to partner risk; and did not assess HPV vaccination history or access to Pap testing. Nonetheless, this study provides preliminary prevalence estimates to help guide further research in this area. Finally, our study may not be generalizable to other jails and community supervision settings in other parts of the country. Despite this limitation, our integration of data from two different populations in different locales increased diversity and our ability to make comparisons between the two groups of women in the criminal justice system. In addition, this is the first study, to our knowledge, to examine this topic in a community supervision sample of women.

Based on our results, it is premature to target screening and prevention to subsamples of women in jails and community supervision settings. Many women involved with the criminal justice system reported a history of abnormal cervical cancer screening results and are at high risk for cervical cancer. Providing preventive healthcare, including screening, education, and immunization, to this population presents an opportunity to address a disease that is overrepresented in women in the criminal justice system.

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Disclosure Statement

No competing financial interests exist.

References

- 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;63:912–919.
- Audet-Lapointe P. Detection of cervical cancer in a women's prison. *Can Med Assoc J* 1971;104:509–511.
- Moghissi KS, Mack HC. Epidemiology of cervical cancer: Study of a prison population. *Am J Obstet Gynecol* 1968;100:607–614.
- Mathew P, Elting L, Cooksley C, Owen S, Lin J. Cancer in an incarcerated population. *Cancer* 2005;104:2197–2204.
- Proca DM, Rofagha S, Keyhani-Rofagha S. High grade squamous intraepithelial lesion in inmates from Ohio: Cervical screening and biopsy follow-up. *Cytojournal* 2006;3:15.
- Gander S, Scholten V, Osswald I, Sutton M, van Wylick R. Cervical dysplasia and associated risk factors in a juvenile detainee population. *J Pediatr Adolesc Gynecol* 2009;22:351–355.
- Binswanger IA, White MC, Perez-Stable EJ, Goldenson J, Tulskey JP. Cancer screening among jail inmates: Frequency, knowledge, and willingness. *Am J Public Health* 2005;95:1781–1787.
- U.S. Department of Justice: Bureau of Justice Statistics, total correctional population, 2010. Available at bjs.ojp.usdoj.gov/index.cfm?ty=tp&tid=11 Accessed December 6, 2010.
- Bureau of Justice Statistics. FAQ detail: What is the difference between jails and prisons? 2010. Available at bjs.ojp.usdoj.gov/index.cfm?ty=qa&iid=322 Accessed February 4, 2010.
- Sabol WJ, West HC, Cooper M. Bureau of Justice Statistics Bulletin: Prisoners in 2008. Washington, DC: US Department of Justice, 2009.
- Centers for Disease Control and Prevention. Cervical cancer rates by race and ethnicity, 2010. Available at www.cdc.gov/cancer/cervical/statistics/race.htm Accessed July 21, 2010.
- Unequal treatment: Confronting racial and ethnic disparities in health care. *Choice: Current reviews for academic libraries* 2003;40:1780.
- Clarke JG, Hebert MR, Rosengard C, Rose JS, DaSilva KM, Stein MD. Reproductive health care and family planning needs among incarcerated women. *Am J Public Health* 2006;96:834–839.
- Nijhawan AE, Salloway R, Nunn AS, Poshkus M, Clarke JG. Preventive healthcare for underserved women: Results of a prison survey. *J Womens Health* 2010;19:17–22.
- Binswanger IA, Merrill JO, Krueger PM, White MC, Booth RE, Elmore JG. Gender differences in chronic medical, psychiatric, and substance-dependence disorders among jail inmates. *Am J Public Health* 2010;100:476–482.
- Elwood Martin R, Hislop TG, Grams GD, Calam B, Jones E, Moravan V. Evaluation of a cervical cancer screening intervention for prison inmates. *Can J Public Health* 2004;95:285–289.
- Magee CG, Hult JR, Turalba R, McMillan S. Preventive care for women in prison: A qualitative community health assessment of the Papanicolaou test and follow-up treatment at a California state women's prison. *Am J Public Health* 2005;95:1712–1717.
- Martin RE. A review of a prison cervical cancer screening program in British Columbia. *Can J Public Health* 1998;89:382–386.
- Au WW, Sierra-Torres CH, Tying SK. Acquired and genetic susceptibility to cervical cancer. *Mutat Res* 2003;544:361–364.
- Giuliano AR, Papenfuss M, Schneider A, Nour M, Hatch K. Risk factors for high-risk type human papillomavirus infection among Mexican-American women. *Cancer Epidemiol Biomarkers Prev* 1999;8:615–620.
- McCann MF, Irwin DE, Walton LA, Hulka BS, Morton JL, Axelrad CM. Nicotine and cotinine in the cervical mucus of smokers, passive smokers, and nonsmokers. *Cancer Epidemiol Biomarkers Prev* 1992;1:125–129.
- Wilkinson CE, Peters TJ, Harvey IM, Stott NC. Risk targeting in cervical screening: A new look at an old problem. *Br J Gen Pract* 1992;42:435–438.
- Clarke JG, Rosengard C, Rose J, Hebert MR, Phipps MG, Stein MD. Pregnancy attitudes and contraceptive plans among women entering jail. *Women Health* 2006;43:111–130.
- Bosch FX, Munoz N, de Sanjose S, et al. Risk factors for cervical cancer in Colombia and Spain. *Int J Cancer* 1992;52:750–758.
- Munoz N, Franceschi S, Bosetti C, et al. Role of parity and human papillomavirus in cervical cancer: The IARC multicentric case-control study. *Lancet* 2002;359:1093–1101.
- Fogel CI, Belyea M. The lives of incarcerated women: Violence, substance abuse, and at risk for HIV. *J Assoc Nurs AIDS Care* 1999;10:66–74.
- Bond L, Semaan S. At risk for HIV infection: Incarcerated women in a county jail in Philadelphia. *Women Health* 1996;24:27–45.

28. Magura S, Kang SY, Shapiro J, O'Day J. HIV risk among women injecting drug users who are in jail. *Addiction* 1993;88:1351–1360.
29. Hale GJ, Oswald KL, Cropsey KL, Villalobos GC, Ivey SE, Matthews CA. The contraceptive needs of incarcerated women. *J Womens Health* 2009;18:1221–1226.
30. Lee JD, Fordyce MW, Rich JD. Screening for public purpose: Promoting an evidence-based approach to screening of inmates to improve public health. In: Greifinger RB, ed. *Public health behind bars: From prisons to communities*. New York: Springer Science + Business Media, 2007.
31. Federal Bureau of Prisons. Preventive health care, clinical practice guidelines. 2010.
32. Saslow D, Castle PE, Cox JT, et al. American Cancer Society Guideline for human papillomavirus (HPV) vaccine use to prevent cervical cancer and its precursors. *CA Cancer J Clin* 2007;57:7–28.
33. American Academy of Pediatrics. Health care for children and adolescents in the juvenile correctional care system. *Pediatrics* 2001;107:799–803.
34. Henderson CE, Rich JD, Lally MA. HPV vaccination practices among juvenile justice facilities in the United States. *J Adolesc Health* 2010;46:495–498.
35. Freudenberg N. Jails, prisons, and the health of urban populations: A review of the impact of the correctional system on community health. *J Urban Health* 2001;78:214–235.
36. Howard M, Agarwal G, Lytwyn A. Accuracy of self-reports of Pap and mammography screening compared to medical record: A meta-analysis. *Cancer Causes Control* 2009;20:1–13.

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