

Human Papillomavirus (HPV) Vaccine Post-Licensure Monitoring and Surveillance Activities Centers for Disease Control and Prevention

1. Monitoring Disease Impact	Data anticipated	Lead CDC Center
Cancer		
<p>Cancer Registries Cancer registration is the fundamental method in the United States by which information is systematically collected about the incidence and types of cancer. Surveillance for cervical cancer and other cancer incidence is currently done through CDC's National Program of Cancer Registries (NPCR) and National Cancer Institute's (NCI) Surveillance, Epidemiology and End Results (SEER) program. The combined NPCR and SEER data cover the entire United States. (http://seer.cancer.gov/) (http://www.cdc.gov/cancer/npcr/)</p>	<p>Trends in HPV-related cancers</p> <p>Combined NPCR and SEER data are provided in the <i>United States Cancer Statistics</i> series (http://apps.nccd.cdc.gov/uscs/)</p>	NCCDPHP
<p>HPV typing in Cervical and Non-cervical cancers Using data from registries supported by CDC's National Program of Cancer Registries, a pilot study has been initiated to identify cancer cases and to obtain paraffin block tissues for HPV genotyping to establish a pre-vaccine distribution of HPV types in cervical cancer and non-cervical cancer cases randomly selected from four cancer registries from 2004 to 2005 (Louisiana, Kentucky, Florida, and Michigan) and in 3 sites using discarded tissue repositories (Hawaii, Iowa, Los Angeles) from 1994-2005. Future periodic typing is planned.</p>	<p>HPV type distribution in cervical cancer</p> <p>HPV type distribution in vaginal, vulvar, anal, penile, and subset of oropharyngeal cancers</p>	NCCDPHP and NCEZID
Precancer		
<p>Cervical Intraepithelial Neoplasia (CIN) 2/3 and adenocarcinoma in situ (AIS) (CIN 2+) monitoring in the Emerging Infections Program (EIP) Five EIP sites (California, Connecticut, New York, Oregon and Tennessee) have been funded since 2008 to develop and implement a population-based system for monitoring HPV vaccine impact on cervical intraepithelial neoplasia (CIN) 2 and 3 and AIS (CIN 2+) diagnoses and associated HPV types. CIN 2+ cases aged 18 and older are reported to 5 catchment areas ranging from 400,000 to 1.5 million in population with estimated 300-1800 CIN 2+ cases annually. In addition to collecting standard basic surveillance data on all reported cases, vaccination history and cervical screening history are obtained on cases aged 18-39. Archived histology specimens are also obtained on 18-39 year old cases for HPV DNA typing.</p>	<p>Population-based data on CIN 2+ including HPV type distribution and detailed information and vaccine status of cases</p>	NCHHSTP and NCEZID
<p>CIN3 and AIS monitoring in the National Program of Cancer Registries (NPCR) Four central (state-based) NPCR registries were funded to pilot an approach to registration and collation of data on cervical precancers (cervical intraepithelial neoplasia grade 3 (CIN3) and adenocarcinoma in situ (AIS)). Demographic data were collected along with case information</p>	<p>Broad state- and county-based data on CIN3 and AIS</p>	NCHHSTP and NCCDPHP

including age, race, county-level data. The data from one cancer registry was linked to a state based immunization registry containing HPV vaccination information. (http://www.cdc.gov/cancer/npcr/)		
Administrative datasets CDC will be working with several administrative medical claims data bases, such Thomson-Reuter's Medstat Marketscan dataset, ambulatory surgery data available from the Agency for Healthcare Research and Quality's Healthcare Utilization Project, and others to evaluate the usefulness of these data for surveillance of HPV-related health outcomes. Data on HPV vaccination rates, HPV associated cervical lesions, genital warts and health care utilization costs will be examined to monitor impact of HPV vaccination.	Administrative data on HPV-related diagnoses and procedures Cost data associated with HPV related outcomes	NCHHSTP
Genital warts		
Wart monitoring in the STD Surveillance Network (SSuN) The SSuN is a network of 42 STD clinics in 12 geographic areas in the U.S. collaborating to monitor trends in STDs and related behaviors. STD clinic data will be used to assess the prevalence and incidence of genital warts, treatment information, and HPV vaccine history.	Prevalence and incidence of genital wart diagnoses in the STD population	NCHHSTP
Administrative datasets (see above)	Prevalence of wart diagnoses and associated procedures	NCHHSTP
HPV type specific prevalence		
National Health and Nutrition Examination Survey (NHANES) NHANES is a national survey that collects data on the health and nutritional status of the US population. HPV DNA prevalence in self-collected vaginal swabs in females 14-59 years of age began in 2002. Continued monitoring through NHANES on a periodic basis could provide data on prevalence in a representative sample of the U.S. population. Sera are being tested for antibody to HPV types 6, 11, 16 and 18. Questions about HPV vaccine receipt have been added for both females and males. (http://www.cdc.gov/nchs/nhanes.htm)	Type specific HPV prevalence among a random sample of women in the US Prevaccine era seroprevalence of HPV types 6, 11,16 ,18	NCHHSTP, NCEZID and NCHS
Pilot study of HPV DNA testing in cervical cancer screening programs (see Behavior and Health Care)	Pap and HPV results for 8000 women in study Type specific HPV prevalence for underserved women	NCCDPHP and NCEZID
2. Monitoring Vaccine Coverage	Data anticipated	Lead CDC Center
National immunization Survey (NIS) NIS is a national survey that monitors childhood and adolescent immunization coverage for children and teens in the U.S. population and is a random-digit dial telephone survey. NIS is used to obtain provider-verified nationally representative estimates of HPV coverage among adolescent females 13 to 17 years of age. The adolescent module was added in the 4th quarter of 2006. State specific data were added in 2008. (http://www.cdc.gov/nis/). Questions on HPV vaccination coverage among males were added in 2010.	Vaccine coverage, knowledge of HPV and HPV vaccine, likelihood of receiving vaccine among those who have not received it	NCIRD
National Health Interview Survey (NHIS)	Vaccine coverage	NCIRD

<p>NHIS is a national survey used to monitor the health of the U.S. population. It provides national estimates on an annual basis. Estimates can also be made for the most populous states. The NHIS is a household survey. Since 2007 questions have been asked about HPV vaccine for women ages 18 to 49 years. Questions were added to the 2008 and 2010 NHIS cancer control supplement on HPV vaccine receipt for adults 18 to 64 years of age and for children 8 to 17 years of age. (http://www.cdc.gov/nchs/nhis.htm)</p>		
<p>Behavioral Risk Factor Surveillance System (BRFSS) BRFSS provides national and state based estimates on an annual basis. The BRFSS is a random-digit-dial telephone survey. Questions on HPV vaccine coverage will be a module on the 2008 survey, but it is unknown which states will administer the questions. Questions will be asked to female adults 18 to 49 years of age and to parents of female children 9 to 17 years of age. (http://www.cdc.gov/brfss/)</p>	Vaccine coverage	NCIRD
<p>Immunization Information System Sentinel Sites (IISSS) Immunization Information Systems (IIS), previously known as immunization registries, are confidential, population-based information systems capable of activities that include collecting vaccination data from multiple health-care providers and assessing vaccination coverage in a defined geographic area. IIS have historically focused on children <6 years. IIS Sentinel Sites (IISSS) receive additional grant funding to allow achievement of higher data quality, and routine analysis of data to inform program operations. The IISSS for 2008-2012 are comprised of eight sites. Since its launch in the 3rd quarter of 2006, an Adolescent Module has been used by sites to collect coverage estimates for vaccines recommended for persons aged 11-18 years. (http://www.cdc.gov/vaccines/programs/iis/activities/sentinel-sites.htm)</p>	Vaccine coverage	NCIRD
<p>National HIV Behavioral Surveillance Program (NHBS) The National HIV Behavioral Surveillance (NHBS) System collects risk behavior data from three populations at high risk for HIV infection: men who have sex with men (MSM), injection-drug users, and heterosexual adults in areas in which HIV is prevalent. Data collection began in 2003 among MSM in 17 U.S. metropolitan statistical areas (MSAs), and surveys have been conducted in 25 MSAs since 2005. Participants must be aged >18 years and reside in a participating MSA. HPV questions will be asked beginning in the third MSM cycle (2011).</p>	History of HPV diagnosis, awareness of HPV vaccine, and vaccine coverage (among participating MSM)	NCHHSTP
<p>National Health and Nutrition Examination Survey (NHANES) The National Survey of Family Growth (NSFG) Vaccine Safety Datalink (VSD) Information on vaccine coverage will also be available from these surveys and studies (see other sections).</p>	Vaccine coverage	NCIRD, NCHHSTP, ISO
<p>3. Behavior and Health Care</p>	Data anticipated	Lead CDC Center
<p>The National Survey of Family Growth (NSFG) NSFG is a large national survey of 15 to 44-year-old women that provides current information on fertility and family planning. This nationally-representative data set also includes detailed questions on sexual risk and STDs. Questions have been added to the current NSFG interviews</p>	Awareness of HPV, vaccine status, intention to get vaccinated, sexual behavior, and trends in cervical cancer	NCHHSTP

<p>that in conjunction with existing questions offer an opportunity to gauge changes in sexual risk (including timing of vaccination and first sex, condom use, number of partners) and sexual health care seeking (including HPV testing, pelvic exam, and Pap smear in the past 12 months). Some data are currently available from 2006-2008 on women age 15-25 and mothers of daughters age 9-18. Additional data on these groups will be available in Fall 2011. New rounds of continuous data collection and additional data collection begin in September 2011 and will include questions of mothers of sons age 9-18 years. http://www.cdc.gov/nchs/nsfg.htm</p>	screening	
<p>Healthy Passages Healthy Passages is a community-based longitudinal survey of adolescent health, which will include questions for parents on the HPV vaccine. Additional questions have been added to wave II asking parents questions about their 5th and 6th grade child's (girls) vaccine status and likelihood of getting vaccinated in the next year. http://www.cdc.gov/HealthyYouth/HealthyPassages/</p>	Cohort analysis of HPV vaccine status and sexual behaviors	NCCDPHP and NCHHSTP
<p>Behavioral Risk Factor Surveillance System Cancer Control Supplement (BRFSS) BRFSS provides national and state based estimates on an annual basis. The BRFSS is a random-digit-dial telephone survey. Questions for women regarding cervical cancer screening and Pap tests are included in this survey. http://www.cdc.gov/brfss/</p>	Trends in cervical cancer screening	NCCDPHP
<p>National Health Interview Survey Cancer Control Supplement (NHIS) NHIS is a national survey used to monitor the health of the U.S. population. NHIS provides national estimates on an annual basis. Estimates can also be made for the most populous states. The NHIS is a household survey. Questions for women regarding cervical cancer screening and Pap tests are included in this supplement to the core survey. Http://www.cdc.gov/pub/Health_Statistics/NCHS/Survey_Questionnaires/NHIS/2005/English/Q_CANCER.pdf</p>	Trends in cervical cancer screening	NCCDPHP
<p>Pilot Study of HPV DNA testing in cervical cancer screening programs During this pilot study, HPV DNA testing as part of cervical cancer screening will be introduced and reimbursed to all providers within selected clinics (urban and rural sites) in the Illinois Breast and Cervical Cancer Early Detection Program (BCCEDP) for providers to use for their patients 35 years of age and older. HPV (HC2 and genotyping) and Pap test results will be available for 8000 women in the study.</p>	Provider practices in cervical cancer screening	NCCDPHP and NCEZID
<p>4. Monitoring Vaccine Safety</p>	Data anticipated	Lead CDC Center
<p>Vaccine Adverse Event Reporting System (VAERS) VAERS is a passive reporting system that is used as an early warning system for vaccine safety. This project is one of the cornerstones of post-licensure safety surveillance and is a national spontaneous reporting system jointly operated by CDC and FDA. Although VAERS has well described limitations including underreporting and inability to determine causal relationship to vaccination for most reports, it can allow hypothesis generation. (http://vaers.hhs.gov/)</p>	Adverse events reported following receipt of HPV vaccine	NCEZID/ISO
<p>Vaccine Safety Datalink (VSD)</p>	Rates of adverse events	NCEZID/ISO

<p>VSD is a collaborative project between CDC and a group of managed care organizations (MCOs) that investigate possible vaccine-related events through systematic studies and evaluations of data collected in the MCOs. VSD includes the Rapid Cycle Project Analysis which specifically looks at outcomes of concern for early evaluation. The VSD project is conducting a self-controlled case series study in persons 9-26 years of age to estimate the risk of venous thromboembolism (VTE) following all vaccinations. This will control for some known VTE risk factors (e.g. Factor V Leiden) that do not change over time for a given individual, and will collect detailed information about known VTE risk factors that may be effect modifiers of the association between VTE and vaccination. (http://www.cdc.gov/od/science/iso/research_activities/vsdp.htm)</p>	<p>following HPV vaccination compared to appropriate comparison groups</p>	
<p>5. Vaccine Implementation</p>	<p>Data anticipated</p>	<p>Lead CDC Center</p>
<p>Feasibility of delivering new adolescent vaccines in complementary healthcare settings This project will evaluate the feasibility of delivering adolescent vaccines, including HPV, in complementary healthcare settings. Key informant interviews will be conducted in each setting to determine feasibility of providing vaccines. Surveys of parents and adolescents will be conducted to determine the acceptability and likelihood of receiving vaccines in these settings.</p>	<p>Feasibility/likelihood of providing vaccine in alternate settings</p>	<p>NCIRD</p>
<p>Adolescent reminder/recall Evaluation of the effectiveness of reminder/recall activities to increase vaccination coverage among adolescents. Reminders include notices (via mail or telephone) to parents of adolescents who are coming due for a vaccination; recall includes notices (via mail or telephone) to parents of adolescents who are overdue for a vaccination. Activities will be conducted in a variety of settings including public/private, urban/rural, pediatric/family medicine, and managed care settings.</p>	<p>Effectiveness of reminder/recall strategy to increase completion of adolescent vaccinations, including the HPV series</p>	<p>NCIRD</p>
<p>Evaluation of strategies to increase vaccine coverage among adolescents Researchers will conduct formative research with providers and parents/adolescents to identify strategies for improving vaccine delivery to adolescents. Selected strategies will be implemented in primary care offices and evaluated to determine their effectiveness at increasing vaccination coverage and well child visits.</p>	<p>Effectiveness of various strategies to increase completion of adolescent vaccinations, including the HPV series</p>	<p>NCIRD</p>
<p>School based vaccination project Schools have been looked to as a potential location for accessing and vaccinating large numbers of adolescents. This demonstration project, conducted in several middle schools in Denver, CO, will assist CDC evaluate the feasibility of conducting school based adolescent vaccination activities and the ability to bill health insurance plans for reimbursement of vaccination services for insured students.</p>	<p>Proportion of middle school students receiving recommended vaccinations (including HPV) and cost to implement</p>	<p>NCIRD</p>
<p>6. Communications and Education</p>	<p>Data anticipated</p>	<p>Lead CDC Center</p>
<p>Adolescent Immunization Communication Campaign A new, up to date and consumer-focused website is available to provide preteens and teens, their parents and doctors, as well as public health professionals, with information and multimedia products about vaccines for preteens and teens. Guided by recent formative research, new</p>		<p>NCIRD</p>

products such as print, social media, and audiovisual materials are being developed to include updated recommendations and reach parents of 7-18 year olds and immunization providers. Media placement includes: prints ads, bus ads, cinema ads, and a large social media presence to promote the vaccines recommended for preteens and teens, as well as drive traffic to the new website. http://www.cdc.gov/vaccines/teens		
7. Modeling	Data anticipated	Lead CDC Center
CDC modeling efforts include continued development and refinement of models to estimate the impact and cost-effectiveness of various HPV vaccination strategies.	Model-based estimates of impact and cost-effectiveness of vaccination	NCHHSTP

Lead CDC Center Key:

- NCIRD: National Center for Immunizations and Respiratory Diseases
- NCHHSTP: National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention
- NCCDPHP: National Center for Chronic Disease Prevention and Health Promotion
- NCEZID: National Center for Emerging and Zoonotic Infectious Diseases
- NCHS: National Center for Health Statistics
- ISO: Immunization Safety Office