

Life Course Indicator: Cervical Cancer Screening

The Life Course Metrics Project

As MCH programs begin to develop new programming guided by a life course framework, measures are needed to determine the success of their approaches. In response to the need for standardized metrics for the life course approach, AMCHP launched a project designed to identify and promote a set of indicators that can be used to measure progress using the life course approach to improve maternal and child health. This project was funded with support from the [W.K. Kellogg Foundation](#).

Using an RFA process, AMCHP selected seven state teams, Florida, Iowa, Louisiana, Massachusetts, Michigan, Nebraska and North Carolina, to propose, screen, select and develop potential life course indicators across four domains: Capacity, Outcomes, Services, and Risk. The first round of indicators, proposed both by the teams and members of the public included 413 indicators for consideration. The teams distilled the 413 proposed indicators down to 104 indicators that were written up according to three data and five life course criteria for final selection.

In June of 2013, state teams selected 59 indicators for the final set. The indicators were put out for public comment in July 2013, and the final set was released in the Fall of 2013.

Basic Indicator Information

Name of indicator: Cervical Cancer Screening (LC-34)

Brief description: The proportion of women who receive the appropriate evidence-based clinical preventive services (pap smear) for cervical cancer screening

Indicator category: Health care access and quality

Indicator domain: Service/Capacity

Numerator: Women ages 21 to 65 who received a pap smear within the last three years

Denominator: Total women ages 21 to 65

Potential modifiers: Age, race/ethnicity, sex, health insurance status

Data source: Behavioral Risk Factor Surveillance System (BRFSS)

Notes on calculation: Percent of females responding "Within past year", "Within past two years" or "Within past three years" to question: How long has it been since you had your last Pap test? Analysts who use the raw datasets should apply the appropriate survey weights to generate the final estimates.

Similar measures in other indicator sets: HP 2020 Focus area C-15; NQF measure 0032; Chronic Disease Indicator

Life Course Criteria

Introduction

Cervical cancer is a slow growing cancer that is often asymptomatic. It is almost always caused by the Human Papillomavirus (HPV), which is the most common sexually transmitted infection in the United States; more than 70 percent of cervical cancer cases are caused by two strains of HPV, types 16 and 18, which constitute high risk HPV infection. Worldwide, High-risk HPV infection accounts for approximately 5 percent of all cancers (National Cancer Institute 2012). Men and women can protect themselves from HPV through vaccination when given in the recommended age groups.

Cervical cancer also can be detected through regular screening tests known as Papanicolaou tests or pap smears. Pap smears are recommended for all women between the ages of 21 and 65. This evidence-based, clinical preventive service is included in the well-woman exam, and is covered by private insurance, Medicare, Medicaid, and the *Patient Protection and Affordable Care Act* (ACA). Additionally, persons that do not have health insurance may be able to get a free or low-cost pap smear test through the National Breast and Cervical Cancer Early Detection Program.

While the cancer usually occurs later in life, the combination of the HPV vaccine and regular screening through pap smears, is an effective way to prevent, or increase early detection of cervical cancer, which can lead to successful treatment. Many women around the world, and in the United States, are affected by cervical cancer. In 2012 there were an estimated 12,170 new invasive cervical cancer cases and over 4,200 cancer-related deaths in the United States, making cervical cancer the third most common form of female-related malignancy (del Carmen & Avila-Wallace, 2013). With regular screening tests beginning in early adulthood and follow up, cervical cancer is a gynecological cancer that is easily preventable.

Implications for equity

The United States has seen significant improvements in the incidence and mortality rates due to cervical cancer, yet large disparities still exist between populations groups of women. These disparities exist not only in terms of incidence and mortality rates, but also in terms of screening utilization and prevention (del Carmen, & Avila-Wallace, 2013). African-American women have higher rates of cervical cancer morbidity and mortality compared to their White counterparts (Jemal, Thun, Ries et al, 2008); and Latina women also experience higher incidence compared to non-Hispanic White women (Watson, Saraiya, Benard, et al, 2008). In addition to race and ethnicity, socioeconomic status also has been linked with cervical cancer mortality and late stage diagnosis. It has been suggested that almost three-quarters of the cervical cancer-related deaths that occurred in 2007 might have been avoided through the elimination of socioeconomic disparities. (Simard, Fedewa, Ma, Siegel, & Jemal, 2012).

While poverty and minority racial/ethnic status have been linked to lower rates of pap smear utilization (American Cancer Society, 2011), other factors such as perception of pain and personal experiences of discomfort have also been identified as barriers to screening utilization (Hoyo, Yarnall, Skinner, et al , 2005; Jennings-Dozier, 1999). A literature review found that women who were uninsured, obese, homeless, older, experiencing language barriers, had low education, and who have sex with women, were least likely to utilize pap smear screening (Brankovic, Verdonik, and Klinge 2013).

Adolescents are a prime audience to engage about awareness and early intervention for cervical cancer screening. Despite recommendations for routine HPV vaccinations among adolescents starting at age 11 or 12, only 50 percent of women, and less than 2 percent of men in the United States are fully vaccinated (Etter, Zimet, & Rickert, 2012). Monitoring and evaluating HPV uptake and completion rates, which are tracked in the life course indicator LC-36 A/B "HPV Immunization," will provide another opportunity to discern possible disparities affecting women and men of different racial/ethnic groups, and income levels. A study by Niccolai, Mehta, & Hadler (2011) suggested that non-Hispanic African-American and Hispanic teens between the ages of 13 and 17, who received at least one dose of HPV vaccine, were significantly less likely to complete their HPV vaccine series, than non-Hispanic White teens. Additionally, lower income adolescents and young women were at higher risk of not initiating or completing their vaccination series (Niccolai, Mehta, and Hadler, 2011; Wei, Moore, & Green, 2013). Furthermore, despite HPV vaccination being covered by Medicaid, provider-based studies have shown lower rates of HPV vaccine uptake among young female patients covered by Medicaid (Vadaparampil, Staras, Malo, Eddleton, Christie, Rodriguez, Giuliano, & Shenkman, 2013). Another significant factor associated with low initiation rates is not having a regular provider and not having received childhood immunizations

(Wei et al, 2013; Kessels, Marshall, Watson, et al., 2012). Despite the widespread availability of the HPV vaccine, patient knowledge of the vaccine and clinician recommendations for the HPV vaccine is lower among lower income and minority women (Polonijo, Carpiano, 2013; Mehta, Julian, Meek, Sosa, Bilinski, Hariri, Markowitz, Hadler, & Niccolai, 2012). Similar knowledge disparities have been documented regarding the use of pap smears (Daley, Perrin, Vamos, et al., 2013).

Reducing socioeconomic disparities would significantly impact disparities in pap smear utilization rates (Simard, Fedewa, Ma, Siegel, & Jemal, 2012). Additionally, it has been suggested that culturally competent and integrated outreach efforts to increase knowledge and improve attitudes toward the HPV vaccine and pap smear screening should be implemented in order to bridge the knowledge divide affecting those with differential access to more traditional means of communication such as the Internet or a regular health care provider (Kontos, Emmons, Puleo, & Viswanath, 2012; Daley, 2011). Providers can play an important role in reducing inequalities in HPV vaccine initiation, series completion, and pap smear utilization (Vadaparampil, Staras, Malo, et al., 2013; Daley, Vamos, Buhi, et al, 2010).

Public health impact

Cervical cancer still affects a large proportion of women worldwide and in the United States. In 2012 alone in the United States, there were an estimated 12,170 new invasive cervical cancer cases and over 4,200 cancer-related deaths, making cervical cancer the third most common form of female-related malignancy (del Carmen & Avila-Wallace, 2013). Additionally, it is estimated that as many as 80 percent of females and 50 percent of males in the United States will contract HPV throughout their lives (Alexander, Daley, Dempsey, 2012). Several studies have documented the efficacy and safety of both pap smears and HPV vaccine to prevent and increase early detection of cervical cancer (Etter, Zimet, & Rickert, 2012). While the HPV vaccine is an effective way to prevent cervical cancer, pap smears are still needed in addition to the vaccine as the vaccine alone does not cover all strains of HPV. Additionally, regular screening through pap smears, are an effective means to increase early detection of cervical cancer, which can be important for persons whom are not vaccinated or are incompletely vaccinated for HPV.

The incidence of HPV infections in the United States is highest among teens and young adults (Alexander, Daley & Dempsey, 2012), with development of cervical cancer usually occurring later, and most commonly in the premenopausal stage (median age at diagnosis, 47 years) (CDC, 2011). By monitoring the effectiveness of prevention and screening prior to and during young adulthood, intervention will be more effective well in advance of cancer development.

Leverage or realign resources

This indicator presents opportunities for leveraging and realigning resources in numerous sectors including health care providers such as pediatricians, primary care physicians, and OB/gyns; public health practitioners working on education and awareness campaigns related to preconception health; education professionals working to educate students and their parents about available immunizations with a focus on complete health for boys and girls; and navigators and insurance providers who can educate families about coverage options related to women's health with private insurers, Medicaid, Medicare, and the ACA.

Extensive studies have shown that universal utilization of HPV vaccine among indicated at-risk populations, as well as the use of pap smears to detect early stage cervical lesions and abnormalities, does not only result in health gains, but also in health care cost savings associated with cervical cancer treatment (Tully, Anonychuk, Sanchez, Galvani, & Bauch, 2012; Westra, Rozenbaum, Rogoza, et al, 2011). Additionally, a link between HPV infection and other types of cancer such as oral and anal malignancies has been suggested (Hu & Goldie, 2008; Meyers, 2008).

Given this, education and awareness campaigns that encourage age-appropriate HPV vaccines for men and women, and promote cervical cancer screening through pap smears, can serve to promote and protect the health of all men and women. This is very much a focus among health care professionals (including pediatricians, primary care providers and gynecologists), insurers, communities, government groups, employers, hospitals and others.

Furthermore, pap smears are covered by private insurance, Medicare, Medicaid and also the ACA. Through the ACA, women's preventive health care services, such as mammograms, screenings for cervical cancer, and other services, are already covered with no cost sharing under some health plans (HRSA 2013). Therefore, health insurance providers who

cover women at highest risk of cervical cancer, as well as other cancer researchers, are likely to be interested in the preventive interventions available.

Predict an individual's health and wellness and/or that of their offspring

HPV has been identified as a necessary causal factor in the development of cervical cancer (Daley, 1998; Crosbie, Kitchener, 2012; MMWR, 2012). While most HPV infections clear the body within the first two years, some will progress and develop into cancer several years later (MMWR, 2012). The median age of cervical cancer diagnosis is 48 years; however, women in their child-bearing years are still susceptible to cervical cancer (CDC, 2011). The widespread use of safe and effective HPV vaccines and pap smears for early detection is a significant determinant of lifelong health for women who may be at risk of developing cervical cancer. Additionally, early detection and treatment also can be critical in preserving fertility for women who wish to become pregnant and have children.

Data Criteria

Data availability

The National Health Interview Survey (NHIS) is a cross-sectional household interview survey that has been in use in the United States since 1957. Sampling and interviewing are continuous throughout each year. Data are collected in-person by U.S. Census Bureau interviewers (CDC, 2012). The National Cancer Institute (NCI) chose the NHIS to periodically identify trends in cancer-related health behaviors in the U.S. population, by adding the Cancer Control Supplement (CCS), which has been administered every five years since 2000 (National Cancer Institute, 2011). As part of this survey, pap smear data among women 18 years and older are collected and reported with stratification by selected demographic characteristics such as race/ethnicity, age, and insurance status. Specifically as it relates to pap smear utilization, the survey asks if the woman has ever had a pap smear, and if so, the age of her first pap smear, the number of pap smears in the last six years, and when the most recent pap smear occurred. Given that HPV is the most sensitive indicator of cervical cancer, data related to the HPV vaccination among 18 to 26 year olds is also collected. The NHIS includes an HPV vaccine section for children that can estimate HPV vaccination for the nine to 17 year old U.S. population. The variables included in the adult and child modules measure whether a child in the household has ever received an HPV vaccination, the number of HPV shots received, and the age at which the first shot was received.

Data quality

The sampling plan follows a multistage area probability design that allows for representative sampling of households and non-institutionalized group quarters. The NHIS sample is drawn from each State and the District of Columbia. The current NHIS sample design features oversampling of African Americans, Hispanics and Asian/Pacific Islanders. Survey participation is voluntary and confidential. The annual response rate of NHIS is approximately 90 percent of the eligible households in the sample. The NHIS sample may be too small to provide State level data with acceptable precision for each state. Therefore, states should combine years to obtain selected estimates. This may be a drawback as the Cancer Control Supplement is implemented every five years. If this time frame is too long, BRFSS could be used as a data source for both measures.

The BRFSS is the world's largest, on-going telephone health survey system, tracking health conditions and risk behaviors in the United States yearly since 1984. Currently, data are collected monthly in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam for adults 18 years and older. CDC provides state and national level prevalence data on their website.

The CDC develops approximately 80 questions each year. Some of these are core questions asked each year, and some are rotating core questions asked every other year. There are also CDC supported modules that address specific topics that states can use. States may also develop additional questions to supplement the core questions. Modules used by states are noted on the CDC website: cdc.gov/brfss/publications/mvr.htm.

Both the BRFSS and the NHIS surveys are administered post-vaccination and post-pap smear so that responses may be subject to recall bias. The issue of recall bias is not just pertaining to participants' responses about their own experiences with HPV vaccines and pap smears, but in the case of minors, participants are reporting on their children's experiences, which may differentially impact reporting accuracy.

Simplicity of indicator

Though this indicator is relatively simple, the indicator could include a layer of complexity if researchers choose to include incomplete HPV vaccine series in addition to completion of HPV vaccine series to measure uptake. Additionally, this indicator is a composite measure of both screening (pap smears) and HPV vaccination. The purpose of this indicator is to measure preventive services among women of reproductive age, and combining pap smears and HPV vaccination captures this group of women and provides a good sentinel indicator for preventive services.

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