

# HPV-Associated Cancers in New Hampshire, 1999–2013

## Data Brief / October 2016



### Background

**HPV is associated with certain types of cancer including cervical, vaginal, vulvar, penile, anal, and oropharyngeal.**

The human papillomavirus (HPV) is the name for a group of more than 150 related viruses, each type with an identifying number, named for the papillomas (warts) that are caused by certain types. The virus is contracted through sexual contact, primarily through vaginal or anal sex, but also through oral sex and other sexual activity. In rare cases, it can be passed on during childbirth. With over 40 types that can infect the genital areas and mouth and throat of both males and females, HPV is the most common sexually transmitted infection in the United States.

Most sexually active individuals will get at least one type of HPV in their lifetime; about 79 million Americans are currently infected and about 14 million become newly infected each year. In most cases, HPV is asymptomatic and will resolve without treatment within 2 years of infection; however, some HPV infections persist and can cause certain types of cancer, including cervical, vaginal, vulvar, penile, anal, and oropharyngeal. HPV-associated cancer can take years or even decades to develop after infection occurs.

#### Key findings in this data brief:

- When limiting analysis to the two types of cancer that affect both sexes, anal and oropharyngeal cancer, the total number of cases likely attributable to HPV among males from 1999 to 2013 exceeds the number of cases among females by a factor of 1.93.
- Despite the fact that males are increasingly affected by HPV-associated cancers, the rate of vaccination among males remains lower than that of females.

HPV-associated cancer is preventable. The HPV vaccine protects against the types of the virus that can cause cancer. It is recommended by the United States Centers for Disease Control and Prevention (CDC) that boys and girls receive the vaccine at age 11 or 12 before they are likely to be exposed to HPV; however, according to the recommendation, females can be vaccinated through age 26, and males through age 21.

Cervical cancer can be found early and even prevented with routine screening tests. The Pap test looks for changes in cervical cells caused by HPV infection. The HPV test looks for the infection itself. While there are no routine screening tests for HPV-associated cancers other than cervical, the CDC recommends that people visit their doctor regularly for checkups.

Using data from the New Hampshire State Cancer Registry and from the CDC, this report describes the prevalence of HPV-associated cancers in New Hampshire, with estimates of the proportion that are likely attributable to HPV.

### Number of Cancers in New Hampshire in Sites Where HPV Is Found

**Between 1999 and 2013, 2,251 new cases of cancer were found in parts of the body where HPV is often found. It is estimated that HPV caused 1,786 of these cases.**

Between the years of 1999 and 2013, there were a total of 2,251 cancer cases diagnosed in sites where HPV is often found. The number of cases among females outnumbered cases among males. According to CDC estimates, approximately 1,786 of these cases (79%) were probably caused by HPV. Cancer of the

oropharynx was the most commonly diagnosed HPV-associated cancer, accounting for 42% of all HPV-associated cancer diagnoses. The majority (78%) of oropharyngeal cancer diagnoses were made in male patients, and oropharyngeal cancer accounted for 81% of all HPV-associated cancers among males. The most commonly diagnosed HPV-associated cancer among females was cervical cancer, accounting for 47%.

**Table 1. Number of HPV-associated cancers by sex in New Hampshire, 1999–2013**

| Cancer site  | 1999–2013  |              |              | Percent of cases probably caused by HPV* | Number of cases probably caused by HPV during 1999–2013 time period |              |              |
|--------------|------------|--------------|--------------|--|---|--------------|--------------|
|              | Male       | Female       | Both Sexes   |  | Male  | Female       | Both Sexes   |
|              | n          | n            | n            |  | n   | n            | n            |
| Anus         | 107        | 202          | 309          | 91%                                      | 97  | 184          | 281          |
| Oropharynx   | 748        | 206          | 954          | 72%                                      | 539   | 148          | 687          |
| Cervix       |            | 624          | 624          | 91%                                      |   | 568          | 568          |
| Vagina       |            | 49           | 49           | 75%                                      |   | 37           | 37           |
| Vulva        |            | 248          | 248          | 69%                                      |   | 171          | 171          |
| Penis        | 67         |              | 67           | 63%                                      | 42  |              | 42           |
| <b>TOTAL</b> | <b>922</b> | <b>1,329</b> | <b>2,251</b> |  | <b>678</b>  | <b>1,108</b> | <b>1,786</b> |

Source: New Hampshire State Cancer Registry, 1999–2013

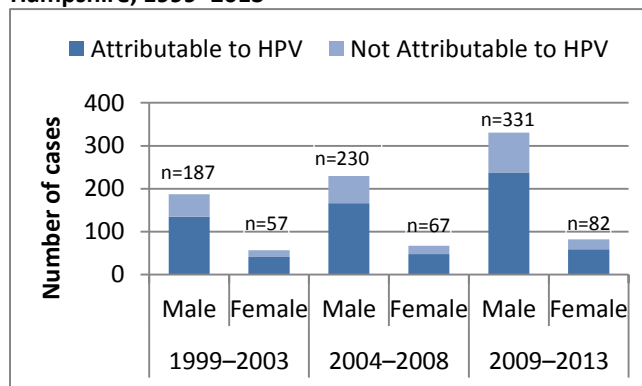
\*Based on CDC estimates

All cancers were confirmed microscopically. Cervical cancers were limited by histology to carcinomas only. All other cancer sites were limited by histology to squamous cell carcinomas only.

**The number of oropharyngeal cancer cases diagnosed among males in NH from 1999 to 2013 exceeded the number among females by more than three-and-a-half times.**

There are two types of HPV-associated cancers that affect both sexes, oropharyngeal and anal cancer. From 1999 through 2013, the number of oropharyngeal cancer cases likely attributable to HPV has consistently been higher among males than females, and has increased at a higher rate of 77% among males, as compared with an increase of 44% among females.

**Figure 1. Number of oropharyngeal cancers by Sex in New Hampshire, 1999–2013**

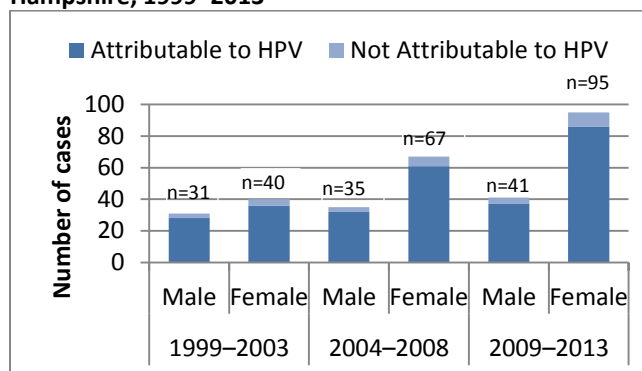


Source: New Hampshire State Cancer Registry, 1999–2013

**Between 1999 and 2013, diagnosed anal cancer cases among females in NH increased at a rate of 139%, compared with a rate of 32% among males.**

In contrast with the findings related to oropharyngeal cancer, the number of cases and rate of increase in cases of anal cancer are higher among females than males. Between 1999 and 2013, the number of diagnosed anal cancers among females increased from 36 to 86, representing a 139% increase. When looking at the two types of HPV-associated cancers that affect both sexes, the total number of cases likely attributable to HPV among males (n=428) from 1999 to 2013 exceeded the number of cases among females (n=222) by a factor of nearly 2 (1.93).

**Figure 2. Number of anal cancers by sex in New Hampshire, 1999–2013**



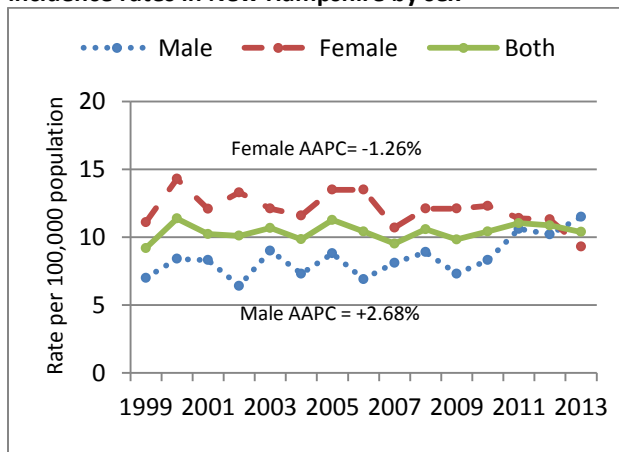
Source: New Hampshire State Cancer Registry, 1999–2013

## Incidence Rate for HPV-Associated Cancers in New Hampshire by Sex

In 2013, males had a higher incidence rate of HPV-associated cancers than females.

The overall age-adjusted incidence rate for HPV-associated cancers increased from 9.2 cases per 100,000 population [95% CI 7.5–10.9] in 1999 to 10.4 cases per 100,000 population [95% CI 8.8–12.0] in 2013. While the number of HPV-associated cancers is smaller among males, it is notable that the incidence rate for males is on the rise. Between 1999 and 2013, the incidence rate for females decreased from 11.1 to 9.2, representing an average annual percentage change of -1.26%, and increased for males from 7.0 to 11.5, representing an average annual percentage change of +2.68%. In 2013, the incidence rate among males surpassed that of females.

**Figure 3. Trends in HPV-associated age-adjusted cancer incidence rates in New Hampshire by sex**

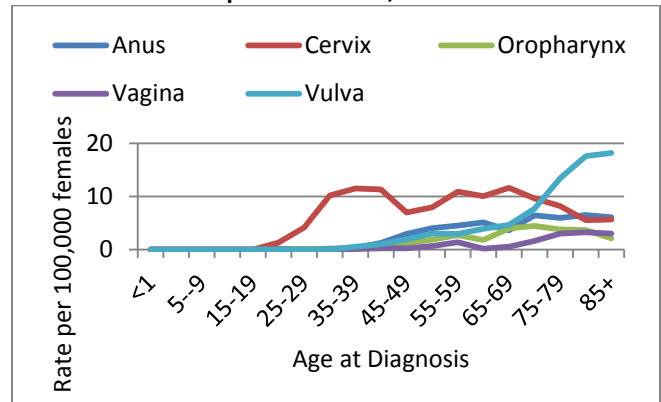


Source: New Hampshire State Cancer Registry, 1999–2013

For both sexes, the data show that most HPV-associated cancers are diagnosed several years after the age range within which the vaccine is recommended. The data show that cervical cancer onset is earlier compared with other HPV-associated cancers in females. The initial peak for cervical cancer diagnosis was seen at 35–39 years of age. The highest age-specific incidence rate for

any HPV-associated cancer affecting females is for cancer of the vulva, which peaks at 18.2 cases per 100,000 population among those aged 85 and older.

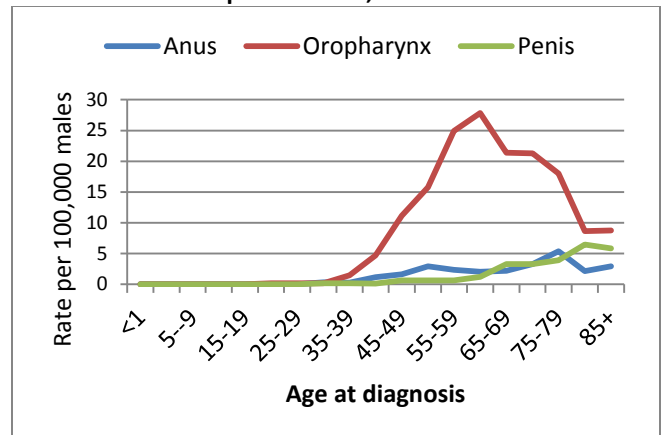
**Figure 4. Age-specific incidence rates of HPV-associated cancer in New Hampshire females, 1999–2013**



Source: New Hampshire State Cancer Registry, 1999–2013

For males, the highest age-specific incidence rate is for oropharyngeal cancer, which peaks at a rate of 27.82 cases per 100,000 population among males aged 60 to 64.

**Figure 5. Age specific incidence rates of HPV-associated cancer in New Hampshire males, 1999–2013**



Source: New Hampshire State Cancer Registry, 1999–2013

## HPV Vaccination Coverage in New Hampshire

HPV vaccination rates are lower among males than females.

The types of HPV that cause cancer are preventable by vaccine. Initial vaccine

recommendations were for only females to be vaccinated, but in recent years, the guidelines have been changed to include males. Despite the fact that the incidence rate of HPV-associated cancer among males has surpassed that of females, the vaccination rate among males remains lower. The first year that data was collected on HPV vaccination for both males and females was 2013. While the rate of vaccination coverage increased for both sexes between 2013 and 2014, a disparity between the sexes remained with only 56% of males receiving an initial dose, compared with 71% of females, and 50% of those females receiving an initial dose receiving the recommended additional doses, compared with only 33% completion rate among males who started the series.

**Table 2. Estimated HPV vaccination coverage among adolescents aged 13–17 years by sex in New Hampshire, 2013–2014**

|               | 2013                 |                           | 2014                 |                           |
|---------------|----------------------|---------------------------|----------------------|---------------------------|
|               | ≥ 1 HPV <sup>2</sup> | ≥3 doses HPV <sup>4</sup> | ≥ 1 HPV <sup>2</sup> | ≥3 doses HPV <sup>4</sup> |
| <b>Gender</b> | <b>% (95% CI)</b>    | <b>% (95% CI)</b>         | <b>% (95% CI)</b>    | <b>% (95% CI)</b>         |
| <b>Female</b> | 68.0<br>(59.7-76.3)  | 43.2<br>(34.6-51.8)       | 71.0<br>(63.8-78.2)  | 50.1<br>(41.7-58.5)       |
| <b>Male</b>   | 41.4<br>(33.0-49.8)  | 17.8<br>(11.1-24.5)       | 56.1<br>(48.3-63.9)  | 33.0<br>(25.4-40.6)       |

Data source: National Immunization Survey—Teen, 2008–2014  
Footnotes: <sup>1</sup>Percentages reported among females only and among males only. <sup>2</sup> ≥ 1 dose of HPV4 vaccine, not recommended for males in 2008; <sup>3</sup> either quadrivalent or bivalent. <sup>4</sup> ≥ 3 doses of HPV vaccine, either quadrivalent or bivalent. Some adolescents may have received more than the three recommended HPV doses.

## Conclusions

Between 1999 and 2013, there were 2,251 diagnoses of HPV-associated cancers in New Hampshire. It is estimated that 79% of these cases (n= 1,786) are attributable to HPV. As of 2013, for the first time, the age-adjusted incidence rate for HPV-associated cancers in males surpassed that in females. Despite this trend, the rate of vaccination still remains lower among males than females.

**Data Notes:** Data for this brief were obtained through the New Hampshire State Cancer Registry and through the National Immunization Survey. All cancers were confirmed microscopically. Cervical cancers were limited by histology to carcinomas only (ICD-O-3 histology codes 8010 to 8671 and 8940 to 8941). All other cancer sites were limited by histology to squamous cell carcinomas only (ICD-O-3 histology codes 8050 to 8084 and 8120 to 8131). Oropharyngeal cancers were defined as having the following ICD-O-3 site codes: 19, 24, 28, 90, 91, 98, 99, 102, 108, 109, 140, 142, and 148.

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### References:

1. CDC. Human Papillomavirus (HPV). <http://www.cdc.gov/hpv/index.html> [Accessed June 9, 2016].

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