

HISTORY OF HPV VACCINATION

Introduction

HPV vaccination is more than 90% effective at preventing six HPV cancers (including cervical, vaginal, vulvar, anal, penile, and oral/throat cancer) and yet, not enough children or adolescents – or their parents and caregivers – are aware of this cancer-preventing tool. HPV vaccination has been available since 2006 in the US, has been administered more than 270 million times globally, and has been proven to be safe and effective in countless studies.

Learn more about the history and development of the HPV vaccine and its power to prevent HPV cancers.



1951

Henrietta Lacks' (HeLa) cells collected

This beloved wife and mother developed cervical cancer at age 30. After seeking treatment at Johns Hopkins University Hospital, Dr. George Gey took a sample of her HeLa cells without her permission or knowledge to experiment on. While the origins of this immortal cell line were not known till the 1970s, Lacks' legacy has had a profound impact on major scientific discoveries, including the creation of the polio vaccine and discovery of the link between HPV and cervical cancer.



1983



Scientists discovered that HPV causes cancer

After centuries of misconceptions surrounding the causes of cervical cancer, Dr. Richard Shope hypothesized that viruses could be transmitted and cause different symptoms in animals.

Thanks to this initial foundation and advances in DNA technology, German virologist Harald zur Hausen was able to show that HPV was a papillomavirus. This was the start to decades of innovations in combatting HPV and preventing cancer since doctors could finally start to work on effective treatments and vaccines with the cause of cervical cancer finally established.

1991



Scientists developed the first HPV vaccine

In the early years, Dr. Jian Zhou and Dr. Ian Frazer created “virus-like particles” that mimicked HPV. The vaccine is composed of these particles, which do not contain any of the DNA, and can’t cause an HPV infection or a cancer. The body produces the antibodies needed to fight the particles to generate immunity within the body. This then prepares the body to remove infection if it is ever exposed in the future.

Using this technology, Dr. Dough Lowy and Dr. John Schiller eventually developed the HPV vaccine after finding that multiple HPV proteins could regroup and form these non-infectious virus-like particles that help humans develop antibodies and fight future HPV infections.

2001-2002



Laura Koutsky shows proof of principle and then efficacy for the monovalent (HPV16) vax

This trial proved evidence of protection, and paved the way for the development of HPV vaccines – cancer-preventing and life-saving tools.

2006



Gardasil (HPV4) licensed and approved for girls by US Food and Drug Administration

Gardasil 4 (made by Merck) offered protection against four types of HPV – 6, 11, 16, and 18 – and targeted over 70% of cervical cancer cases. Following extensive clinical trials through seven years of design and testing, which found that the vaccine offered nearly 100% protection against HPV 16 and 18, it was approved for use in girls ages 9-26 in the US.

2008



Dr. Harald zur Hausen wins the Nobel Prize in Physiology or Medicine

Dr. zur Hausen eventually won the Nobel Prize for his groundbreaking discovery that certain strains of HPV (namely HPV 16 and 18) could eventually cause cervical cancer, which led to the development of the HPV vaccine.

2009



Gardasil (HPV4) approved for boys by US Food and Drug Administration

The vaccine was licensed for use and was expanded to boys ages 9-26 for the prevention of genital warts.

Cervarix (HPV16 and HPV18) approved for girls by US Food and Drug Administration

The GSK vaccine was approved for the prevention of cervical pre-cancers and cervical cancer associated with HPV types 16 and 18 in girls and young women. The vaccine was later pulled from the US market in 2016 following the success of Gardasil 9, but continues to be used abroad for HPV cancer prevention.

2014



Gardasil 9 (HPV 9) approved by US Food and Drug Administration

The second iteration of Gardasil offered protection from several low-risk, wart-causing HPV strains in addition to the high-risk cancer-causing HPV strains that were protected with HPV4.

Gardasil 9, the only HPV vaccine currently used in the United States, prevents infection from 9 HPV types:

- ★ HPV 16 and 18, two high-risk types of HPV that cause ~70% of cervical cancers and other HPV cancers;
- ★ HPV 31, 33, 45, 52, and 58, high-risk types of HPV that account for another 10% to 20% of cervical cancers; and
- ★ HPV 6 and 11, which cause 90% of genital warts.

The trials that led to its approval found it to be nearly 100% effective in preventing the 6 HPV cancers caused by all 7 cancer-causing HPV types.

2016



US CDC shifts dosage guidelines for younger recipients

The CDC altered guidance to recommend that individuals ages 11 and 12 receive 2 doses of vaccine at least 6 months apart rather than the previously recommended 3 doses. For individuals older than 15, the recommendation remained the same (3 doses of the vaccine).

2018



US Food and Drug Administration approved expanded use of Gardasil 9

The FDA expanded the vaccine's approval to include females and males 27-45 years old.

2019



HPV vaccination rates soar

By October 2019, 100 countries worldwide incorporated HPV vaccination into their regular vaccine schedule.

2020



US Food and Drug Administration approves expanded use of Gardasil 9

The FDA originally only approved the vaccine for cervical cancer prevention, but based on additional research in 2020, they expanded it to include cervical, vaginal, vulvar, anal, oropharyngeal, and other head and neck cancers.

2030



WHO hopes to meet milestones on path to eliminating cervical cancer

After meeting the 90-70-90 targets through a global focus on vaccination, screening, and treatment, the World Health Organization (WHO) hopes to eradicate vaccine-preventable cervical cancer within the next century.

- ★ 90% of girls fully vaccinated with the HPV vaccine by age 15;
- ★ 70% of women initially screened with high-performance testing by age 35 and a secondary test at age 45; and
- ★ 90% of pre-cancers treated and 90% of invasive cancers managed.

Want to Learn More?

Have a conversation with your or your child's healthcare provider, or another trusted, reliable source of medical information, and visit [StJude.org/Bright-Future](https://www.stjude.org/Bright-Future).

HPV vaccination is cancer prevention and offers protection today for a lifetime against HPV cancers.

References

- American Cancer Society www.cancer.org
- Centers for Disease Control and Prevention www.cdc.gov
- The Embryo Project Encyclopedia <https://embryo.asu.edu/>
- Food and Drug Administration www.fda.gov
- Johns Hopkins Medicine www.hopkinsmedicine.org
- Kaiser Family Foundation www.kff.org
- Merck & Co www.merck.com
- National Cancer Institute at the National Institutes of Health <https://ccr.cancer.gov/>
- The Noble Prize Organization www.nobelprize.org
- NOMAN Race to End HPV www.nomancampaign.org
- R Street www.rstreet.org