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Science New HPV vaccine is effective against 9 strains of the virus And boys should be vaccinated as well as girls. Cathleen O'Grady Feb 21, 2015 9:30 am | 106 Percentage of 13- to 17-year-old girls completing HPV vaccine series, U.S., 2012 Credit: President's Cancer Panel Annual Report 2012-2013. Data taken from Centers for Disease Control and Prevention. Percentage of 13- to 17-year-old girls completing HPV vaccine series, U.S., 2012 Credit: President's Cancer Panel Annual Report 2012-2013. Data taken from Centers for Disease Control and Prevention. Text

settings Story text Size Small Standard Large Width \* Standard Wide Links Standard Orange \* Subscribers only Learn more Minimize to nav In a world obsessed with curing cancer, prevention is less headline-grabbing, but it's also generally less painful and cheaper. Vaccines for the human papillomavirus (HPV) are a formidable weapon in the arsenal against multiple kinds of cancer, yet the uptake of the vaccine in the US is low, especially when compared to other high-income countries. According to the Presidents Cancer Panel Annual Report 2012-2013 , only 33.4 percent of girls in the US complete the course of three HPV vaccines, compared to 60.4 percent in the UK and 71.2 percent in Australia. The vaccination rate for boys is even lower, at less than seven percentunsurprising given that many public health campaigns specifically target girls.

This is a problem given how common HPV is, and how dangerous it can be. At any given time, one in four Americans is infected with at least one strain of the virus. Almost all sexually active people will be infected with it at some point in their lives. Most infections will be cleared by the immune system, but the remaining cases may lead to cervical, anal, or oral cancer, with approximately 26,000 cases in the US every year. Two vaccines against HPV have been available for some time. Cervarix is "bivalent", protecting against the two most common cancer-causing strains, HPV-16 and 18. Quadrivalent Gardasil protects against four strains: 6, 11, 16 and 18. However, these aren't the only HPV strains associated with cancer. A recent paper in the New England Journal of Medicine reports that a new vaccine, Gardasil 9, offers protection against the original four strains, as well as against HPV-31, 33, 45, 52 and 58. The randomized, double-blind clinical trial, conducted in 14,215 women, showed that the new 9-valent Gardasil offered increased protection against genital cancers in women between the ages of 16 and 26. For diseases where medical treatment is already available and recommended, like the quadrivalent Gardasil vaccine, it's considered unethical to compare a new treatment to placebo. This is because the control group receiving the placebo would be missing out on recommended treatment, putting them at risk. So, in this trial, Gardasil-9 was compared to Gardasil. The results showed that Gardasil-9 provided the same protection against HPV-6, 11, 16 and 18 as Gardasil, and increased protection against the five additional strains. Overall, the researchers report, the 9-valent vaccine could prevent approximately 90 percent of cervical cancers, compared to Gardasil's 70 percent protection. There is some evidence that the bivalent and quadrivalent vaccines already provide some protection against additional strains of HPV. A recent paper in Clinical and Vaccine Immunology reporting on the clinical trial for Cervarix reported that the vaccine is more than 96 percent effective against disease associated with strains 16 and 18, and more than 50 percent effective against diseases associated with any HPV strain. The Cervarix trial found that the vaccine is most effective in the youngest age group of women tested, between 15 and 17 years old, says Dan Apter, Director of The Sexual Health Clinic, Family Federation of Finland, Helsinki. He explains that older women in the trial were more likely to already have been infected. The vaccine doesn't work for people who already have HPV, so there were

lower efficacy rates for older groups. This highlights the importance of vaccinating young teenagers before they become sexually active, he says. In the Gardasil-9 trial, the 9-valent vaccine was associated with more side effects, but the effects were not comparably dangerous to the kinds of cancers prevented by the vaccine. The slightly higher rate was to be expected, the researchers note, because the new vaccine has more viruslike antigens. The most common effects included swelling and pain at the injection site, and some patients experienced headaches, nausea, dizziness, and fatigue. HPV vaccines and public health campaigns shouldn't be limited to girls, says Apter, and Prof. Elmar Joura, lead author on the Gardasil-9 paper, agrees. The female-only campaigns leave men who have sex with men unprotected, says Joura. In societies where vaccination rates among girls are low, men who have sex with women are also at risk from HPV-related disease. Being vaccinated not only protects men individually, but also contributes to herd immunity, says Apter. There's still work to be done. More studies are needed to explore the effects of the vaccine in boys, says Apter. And it's necessary to continuously evaluate results in countries with good HPV vaccine coverage, like Australia and the UK. Performance in real life situations is key, says Joura. It's there that you see if the vaccines do what they are expected to do.

New England Journal of Medicine , 2015. DOI: 10.1056/NEJMoa1405044 ( About DOIs ). Listing image: President's Cancer Panel Annual Report 2012-2013. Data taken from Centers for Disease Control and Prevention. Cathleen O'Grady Contributing science reporter Cathleen O'Grady Contributing science reporter Cathleen is Ars Technica's contributing science reporter, covering behavioral sciences and life sciences. She has a Ph.D. in cognitive science. 106 Comments Comments Forum view Loading comments... Prev story Next story Most Read 1. Judge ends mans 11-year quest to dig up landfill and recover \$765M in bitcoin 2. A glowing ring of metal fell to Earth, and no one has any idea what it is 3. German router maker is latest company to inadvertently clarify the LGPL license 4. Man turns irreversibly gray from an unidentified silver exposure 5. A taller, heavier, smarter version of SpaceX's Starship is almost ready to fly Customize

The human papilloma virus can cause cervical cancer. Vaccination has only been available for 10

years. Photograph: BSIP/ UIG/ Getty Images View image in fullscreen The human papilloma virus can cause cervical cancer. Vaccination has only been available for 10 years. Photograph: BSIP/ UIG/ Getty Images Cervical cancer This article is more than 5 years old HPV vaccine 'offers chance' of wiping out cervical cancer in rich countries This article is more than 5 years old Study shows vaccine has greatly reduced infections among girls and young women Sarah Boseley Health editor Wed 26 Jun 2019 23.30 BST Last modified on Thu 27 Jun 2019 07.41 BST Share Elimination of cervical cancer in wealthy countries such as the UK may be possible within decades, say experts, following a major study showing the success of the HPV jab in protecting women. Human papilloma virus, which is sexually transmitted, can cause cervical cancer as well as anogenital warts. Data from high-income countries shows vaccination has led to an 83% reduction in HPV infections in 15- to 19-year-old girls over five to eight years. Among women aged 20 to 24, infections are down 66%. Major reductions also took place in anogenital warts and precancerous lesions, which can be the precursor to cervical cancer. HPV vaccination has only been available for 10 years, so the effect on cancers is not yet known, although it is predicted they will also drop significantly. The research, published in the Lancet medical journal, will bolster the determination of the World Health Organization, which is setting goals for reducing the number of cases of cervical cancer to no more than four per 100,000 population, below the threshold for a rare disease. Prof Marc Brisson from Laval University, one of the authors, said: We're working with the WHO, using mathematical modelling to determine when elimination would occur. We don't have a precise date. High vaccine coverage has to be maintained. It depends on the country and how much coverage and screening there is, and how many cohorts have been vaccinated. Australia, where take-up of the vaccine is almost as good as in the UK, is now working towards elimination. There could be elimination in decades, said Brisson. The study shows vaccinating multiple cohorts of girls at different ages, as took place at the beginning of the programme in the UK, helps bring down HPV infection rates. HPV vaccination was introduced for girls aged 12 in schools in the UK, but a catch-up programme allowed girls up to the age of 18 to be vaccinated as well. From September, the UK will begin offering HPV vaccination to boys, which will further reduce the pool of the virus. The study shows older women

and boys and men already get some protection from HPV-related diseases from the vaccination of girls. Dr David Mesher, a principal scientist at Public Health England, said it was too early to see data on a drop in cervical cancer cases because this takes years to develop. At the moment, the burden of cervical cancer is in women who were too old to be vaccinated the vaccine is not very effective in women who are sexually active and may have already been exposed to the virus. But he said: There is every indication we will see it in the near future. We will start relatively soon to see an impact in younger women. Brisson said there could be a noticeable drop in cervical cancers within 10 years. We know it's effective. So why is there opposition to the HPV vaccine ? Read more The paper looked only at studies carried out in high-income countries where there has not been opposition to the vaccine. In Denmark, Ireland and a few other European countries, a scare over claims that the jab had caused girls to become ill, fuelled by TV documentaries showing them in wheelchairs with ME-type symptoms, led to a drop in vaccination rates. In Japan, the vaccination programme was suspended. There is also no data from less wealthy countries, where there are the highest numbers of women with and dying from cervical cancer. In 2018, there were 569,000 cases of cervical cancer worldwide and 313,365 deaths, 80% of which were in these countries. What we see is that in many low- to middle-income countries, there is no vaccine at all, said Brisson. These are the countries with the highest burden of cervical cancer. The results show that the vaccines are working towards preventing cervical cancer, so I hope that we will be able in coming years to increase vaccination coverage in many of the countries that need it most. Low-income countries have been slow to introduce the vaccine and their monitoring systems are not good enough to produce useful data, said Mark Jit, a professor of vaccine epidemiology at the London School of Hygiene and Tropical Medicine. If we are to realise the dream of eliminating cervical cancer then we will need to ensure that our limited supplies of vaccines are prioritised to the countries that need them the most, he said. Robert Music, the chief executive of Jos Cervical Cancer Trust in the UK, said the drop in infections was truly exciting news. He added: Were lucky to have the HPV vaccination programme here in the UK, and this study supports the imminent rollout of the gender-neutral HPV vaccine. However, this study also shows the urgent need for all countries

without a vaccination programme to be supported in establishing one. This study furthers the growing evidence to counteract those who don't believe that this vaccine works, which is now extremely encouraging. We sincerely hope this will boost public faith in the HPV vaccine so that more lives can be saved and we get closer to a world where cervical cancer is a thing of the past.

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AHFS / Drugs.com Monograph MedlinePlus a615028 License data US DailyMed : Human papillomavirus vaccine Pregnancy category AU : B2 [ 1 ] Routes of administration Intramuscular injection ATC code J07BM01 ( WHO ) J07BM02 ( WHO ) J07BM03 ( WHO ) Legal status Legal status AU : S4 (Prescription only) [ 2 ] [ 3 ] [ 4 ] [ 5 ] [ 6 ] [ 7 ] [ 8 ] CA : -only / Schedule D [ 9 ] [ 10 ] UK : POM (Prescription only) [ 11 ] [ 12 ] US : -only [ 13 ] [ 14 ] [ 15 ] EU : Rx-only [ 16 ] [ 17 ] [ 18 ] [ 19 ] Identifiers CAS Number 910046-32-1 ChemSpider none KEGG D10192 D11863 N Y (what is this?) (verify) Human papillomavirus ( HPV ) vaccines are vaccines intended to provide acquired immunity against infection by certain types of human papillomavirus (HPV). [ 20 ] The first HPV vaccine became available in 2006. [ 20 ] [ 21 ] Currently there are six licensed HPV vaccines: three bivalent (protect against two types of HPV), two quadrivalent (against four), and one nonavalent vaccine (against nine) [ 22 ] [ 23 ] All have excellent safety profiles and are highly efficacious, or have met immunobridging standards. [ 20 ] :668 All of them protect against HPV types 16 and 18, which are together responsible for approximately 70% of cervical cancer cases globally. [ 22 ] The quadrivalent vaccines provide additional protection against HPV types 6 and 11. [ 22 ] The nonavalent provides additional protection against HPV types 31, 33, 45, 52 and 58. [ 22 ] It is estimated that HPV vaccines may prevent 70% of cervical cancer, 80% of anal cancer , 60% of vaginal cancer , 40% of vulvar cancer , and show more than 90% effectiveness in preventing HPV-positive oropharyngeal cancers . [ 24 ] [ 25 ] [ 26 ] [ 27 ] They also protect against penile cancer . [ 28 ] They additionally prevent genital warts (also known as anogenital warts), with the quadrivalent and nonavalent vaccines providing virtually complete protection. [ 22 ] [ 20 ] The WHO recommends a one or two-dose schedule for girls aged 9-14 years, the same for girls and women aged 15-20 years, and two doses with a 6-month interval for women older than 21 years. [ 29 ] [ 20 ] The vaccines provide protection for at least five to ten years. [ 20 ] The primary target group in most of the countries recommending HPV vaccination is young adolescent girls, aged 9-14. [ 22 ] The vaccination schedule depends on the age of the vaccine recipient. [ 22 ] As of 2023, 27% of girls aged 9-14 years worldwide received at least one dose (37 countries were implementing the single-dose schedule, 45% of girls aged 9-14 years old vaccinated in that year). [ 30 ] [ 31 ] As of



September 2024, 57 countries are implementing the single-dose schedule. [ 30 ] At least 144 countries (at least 74% of WHO member states) provided the HPV vaccine in their national immunization schedule for girls, as of November 2024. [ 32 ] [ 31 ] As of 2022, 47 countries (24% of WHO member states) also did it for boys. [ 20 ] :654 Vaccinating a large portion of the population may also benefit the unvaccinated by way of herd immunity . [ 33 ] The HPV vaccine is on the World Health Organization's List of Essential Medicines . [ 34 ] The World Health Organization (WHO) recommends HPV vaccines as part of routine vaccinations in all countries, along with other prevention measures. [ 20 ] The WHO's priority purpose of HPV immunization is the prevention of cervical cancer , which accounts for 82% of all HPV-related cancers and more than 95% of which are caused by HPV. [ 20 ] [ 30 ] 88% (2020 figure) of cervical cancers and 90% of deaths occur in low- and middle-income countries and 2% (2020 figure) in high-income countries. [ 20 ] :650 [ 30 ] The WHO-recommended primary target population for HPV vaccination is girls aged 9-14 years before they become sexually active. [ 20 ] :669 It aims the introduction of the HPV vaccine in all countries and has set a target of reaching a coverage of 90% of girls fully vaccinated with HPV vaccine by age 15 years. [ 31 ] [ 35 ] Females aged 15 years, boys, older males or men who have sex with men (MSM) are secondary target populations. [ 20 ] HPV vaccination is the most cost-effective public health measure against cervical cancer, particularly in resource-constrained settings. [ 36 ] [ 20 ] :666 Cervical cancer screening is still required following vaccination. [ 20 ] Preventive vaccines [ edit ] A growing number of vaccine products initially prequalified for use in a 2-dose schedule can now be used in a single-dose schedule. [ 30 ] Cecolin (WHO prequalified HPV vaccine product, confirmed for use in a single-dose schedule), in the second edition of WHO's technical document on considerations for HPV vaccine product choice [ 30 ] Cervarix (bivalent) [ 30 ] Gardasil (quadrivalent) and Gardasil 9 nonavalent vaccine) [ 30 ] Walrinvax (WHO prequalified with a two-dose schedule on 2 August 2024) [ 30 ] Medical uses [ edit ] Gardasil 9 A Gardasil Syringe HPV vaccines are used to prevent HPV infection and therefore in particular cervical cancer . [ 20 ] Vaccinating females between the ages of nine to thirteen is typically recommended, with many countries also vaccinating males in that age range. [ 20 ] In the United States, the Centers for

Disease Control and Prevention (CDC) recommends that all 11- to 12-year-olds receive two doses of HPV vaccine, administered 6 to 12 months apart. [ 37 ] The vaccines require three doses for those ages 15 and above. [ 20 ] Gardasil is a three-dose (injection) vaccine. HPV vaccines are recommended in the United States for women and men who are 926 years of age and are also approved for those who are 2745 years of age. [ 38 ] [ 39 ] HPV vaccination of a large percentage of people within a population has been shown to decrease rates of HPV infections, with part of the benefit from herd immunity . [ 20 ] [ 40 ] Since the vaccines only cover some high-risk types of HPV, cervical cancer screening is recommended even after vaccination. [ 20 ] [ 41 ] In the US, the recommendation is for women to receive routine Pap smears beginning at age 21. [ 42 ] In Australia, the national screening program has changed from the two yearly cytology (pap smears) to being based on tests for HPV DNA, [ 43 ] based on work by Karen Canfell and others. [ 44 ] As of 2021, the World Health Organization recommends HPV DNA testing as the preferred screening method. [ 45 ] [ 46 ] HPV adolescent girls vaccination rates (2023 estimated figures) and cervical cancer cases per 100,000 people across global regions (2021 figures). Efficacy [ edit ] The HPV vaccine has been shown to prevent cervical dysplasia from the high-risk HPV types 16 and 18 and provide some protection against a few closely related high-risk HPV types. [ 20 ] [ 47 ] However, other high-risk HPV types are not affected by the vaccine. [ 48 ] The protection against HPV 16 and 18 has lasted at least eight years after vaccination for Gardasil [ 49 ] and more than nine years for Cervarix. [ 49 ] It is thought that booster vaccines will not be necessary. [ 50 ] As of September 2024, 57 countries are implementing the single-dose schedule. [ 30 ] A growing number of vaccine products initially prequalified for use in a 2-dose schedule can now be used in a single-dose schedule. [ 30 ] Before, it was unsure whether two doses of the vaccine may work as well as three doses. [ 51 ] The US Centers for Disease Control and Prevention (CDC) recommends two doses in those less than 15 years and three doses in those over 15 years. [ 52 ] A single dose might be effective. [ 53 ] [ 54 ] [ 55 ] [ 56 ] A study with 9vHPV, a 9-valent HPV vaccine that protects against HPV types 6, 11, 16, 18, 31, 33, 45, 52, and 58, came to the result that the rate of high-grade cervical, vulvar, or vaginal disease was the same as when using a quadrivalent HPV vaccine. [ 57 ] A lack of a difference may

have been caused by the study design of including women 16 to 26 years of age, who may largely already have been infected with the five additional HPV types that are additionally covered by the 9-valent vaccine. [ 58 ] Neither Cervarix nor Gardasil prevent other sexually transmitted infections, and they do not treat existing HPV infections or cervical cancer. [ 59 ] [ 60 ] Gardasil [ edit ] When Gardasil was first introduced, it was recommended as a prevention for cervical cancer for women 25 years old or younger. [ 39 ] Evidence suggests that HPV vaccines are effective in preventing cervical cancer for women up to 45 years of age. [ 38 ] Gardasil and Gardasil 9 protect against HPV types 6 and 11 which can cause genital warts , with the quadrivalent and nonavalent vaccines providing virtually complete protection. [ 22 ] [ 13 ] [ 14 ] [ 20 ] Adenocarcinoma [ edit ] HPV types 16, 18, and 45 contribute to 94% of cervical adenocarcinoma (cancers originating in the glandular cells of the cervix). [ 61 ] While most cervical cancer arises in the squamous cells, adenocarcinomas make up a sizable minority of cancers. [ 61 ] Further, Pap smears are not as effective at detecting adenocarcinomas , so where Pap screening programs are in place, a larger proportion of the remaining cancers are adenocarcinomas. [ 61 ] Trials suggest that HPV vaccines may also reduce the incidence of adenocarcinoma. [ 61 ] Males [ edit ] As of 2022, 47 countries (24% of WHO member states) have introduced HPV vaccine in their national immunization programme for boys. [ 20 ] :654 For instance, it is the case in Switzerland, Portugal, Canada, Australia, Ireland, South Korea, Hong Kong, the United Kingdom, New Zealand, the Netherlands, and the United States. [ 62 ] [ 63 ] In males also, Gardasil and Gardasil 9 protect against HPV types 6 and 11 which can cause genital warts , with the quadrivalent and nonavalent vaccines providing virtually complete protection. [ 22 ] [ 13 ] [ 14 ] [ 20 ] They reduce their risk of precancerous lesions caused by HPV. This reduction in precancerous lesions is predicted to reduce the rates of penile and anal cancer in men. Gardasil has been shown to also be effective in preventing high-risk HPV types 16 and 18 in males. [ 64 ] [ 65 ] [ 66 ] [ 67 ] [ 68 ] [ 69 ] While Gardasil and the Gardasil 9 vaccines have been approved for males, a third HPV vaccine, Cervarix , has not. Unlike the Gardasil-based vaccines, Cervarix does not protect against genital warts. [ 70 ] Since penile and anal cancers are much less common than cervical cancer, HPV vaccination of young men is likely to be much less cost-effective than for

young women. [ 71 ] Gardasil is also used among men who have sex with men (MSM), who are at higher risk for genital warts, penile cancer, and anal cancer. [ 72 ] Recommendations by national bodies [ edit ] Australia [ edit ] Australia introduced HPV vaccination for boys in 2013. [ 73 ] Ireland [ edit ] Ireland introduced HPV vaccination for boys aged 13 as part of their National Immunization Plan in 2019. [ 74 ] UK [ edit ] UK introduced HPV vaccination for boys aged 12 as part of their National Immunization Plan in 2019. [ 75 ] Portugal [ edit ] Portugal introduced universal HPV vaccination for boys aged 10 years and above as part of its National Immunization Plan in 2020. [ 76 ] United States [ edit ] On 9 September 2009, an advisory panel recommended that the Food and Drug Administration (FDA) of the USA license Gardasil in the United States for boys and men ages 9 to 26 for the prevention of genital warts. [ 77 ] Soon after that, the vaccine was approved by the FDA for use in males aged 9 to 26 for prevention of genital warts [ 64 ] [ 65 ] and anal cancer . [ 78 ] [ 79 ] [ 80 ] In 2011, an advisory panel for the US Centers for Disease Control and Prevention (CDC) recommended the vaccine for boys ages 11 to 12. [ 39 ] This was intended to prevent genital warts and anal cancers in males, and possibly prevent head and neck cancer (though the vaccine's effectiveness against head and neck cancers has not yet been proven). [ 81 ] The committee also made the vaccination recommendation for males 13 to 21 years who have not been vaccinated previously or who have not completed the three-dose series. [ 64 ] [ 82 ] For those under the age of 27 who have not been fully vaccinated the CDC recommends vaccination. [ 39 ] Also in 2011, Harald zur Hausen 's support for vaccinating boys (so that they will be protected, and thereby so will women) was joined by professors Harald Moi and Ole-Erik Iversen. [ 83 ] In 2018, the US Food and Drug Administration (FDA) released a summary basis for regulatory action and approval for expansion of usage and indication for Gardasil 9, the 9-valent HPV vaccine, to include men and women 27 to 45 years of age. [ 84 ] Public health [ edit ] World Health Organization (WHO) [ edit ] The HPV vaccine is on the WHO Model List of Essential Medicines . [ 34 ] The WHO recommends HPV vaccines as part of routine vaccinations in all countries, along with other prevention measures. [ 20 ] The WHO's priority purpose of HPV immunization is the prevention of cervical cancer, which accounts for 82% of all HPV-related cancers and more than 95% of which are caused by HPV. [ 20 ]

[ 30 ] The WHO has a global strategy for cervical cancer elimination. [ 30 ] Its first pillar is having 90% of girls fully vaccinated with the HPV vaccine by 15 years of age. [ 30 ] The WHO-recommended primary target population for HPV vaccination is girls aged 9-14 years before they become sexually active. [ 20 ] :669 Females aged 15 years, boys, older males or MSM are secondary target populations. [ 20 ] Cervical cancer screening is still required following vaccination. [ 20 ] Global [ edit ] Cervical cancer [ edit ] The large majority of cervical cancer cases in 2020 (88%) occurred in LMICs, where they account for 17% of all cancers in women, compared with only 2% in high-income countries (HICs). In sub-Saharan Africa, the region with the highest rates of young WLWH, approximately 20% of cervical cancer cases occur in WLWH [women living with HIV]. HPV infection is more likely to persist and to progress to cancer in WLWH.<sup>33</sup> Mortality rates vary 50-fold between countries, ranging from <2 per 100 000 women in some HICs to >40 per 100 000 in some countries of sub-Saharan Africa. [ 20 ] :650 Of the 20 hardest hit countries by cervical cancer, 19 are in Africa. [ 30 ] The US National Cancer Institute states "Widespread vaccination has the potential to reduce cervical cancer deaths around the world by as much as two-thirds if all women were to take the vaccine and if protection turns out to be long-term. In addition, the vaccines can reduce the need for medical care, biopsies, and invasive procedures associated with the follow-up from abnormal Pap tests, thus helping to reduce health care costs and anxieties related to abnormal Pap tests and follow-up procedures." [ 41 ] In 2004, preventive vaccines already protected against the two HPV types (16 and 18) that cause about 70% of cervical cancers worldwide. [ 85 ] Because of the distribution of HPV types associated with cervical cancer, the vaccines were likely to be most effective in Asia, Europe, and North America. [ 85 ] Some other high-risk types cause a larger percentage of cancers in other parts of the world. [ 85 ] Vaccines that protect against more of the types common in cancers would prevent more cancers, and be less subject to regional variation. [ 85 ] For instance, a vaccine against the seven types most common in cervical cancers (16, 18, 45, 31, 33, 52, 58) would prevent an estimated 87% of cervical cancers worldwide. [ 85 ] In 2008, only 41% of women with cervical cancer in the developing world got medical treatment. [ 86 ] Therefore, prevention of HPV by vaccination may be a more effective way of lowering the disease burden in

developing countries than cervical screening. The European Society of Gynecological Oncology sees the developing world as most likely to benefit from HPV vaccination. [ 87 ] However, individuals in many resource-limited nations, Kenya for example, are unable to afford the vaccine. [ 88 ] In more developed countries, populations that do not receive adequate medical care, such as the poor or minorities in the United States or parts of Europe also have less access to cervical screening and appropriate treatment, and are similarly more likely to benefit. [ 61 ] In 2009, Dr. Diane Harper , a researcher for the HPV vaccines, questioned whether the benefits of the vaccine outweigh its risks in countries where Pap smear screening is common. [ 89 ] She has also encouraged women to continue pap screening after they are vaccinated and to be aware of potential adverse effects. [ 90 ]

United States [ edit ] In 2012, according to the CDC, the use of the HPV vaccine had cut rates of infection with HPV-6, -11, -16, and -18 in half in American teenagers (from 11.5% to 4.3%) and by one-third in American women in their early twenties (from 18.5% to 12.1%). [ 91 ] Side effects [ edit ] HPV vaccines are safe and well tolerated and can be used in persons who are immunocompromised or HIV-infected. [ 92 ] Pain at the site of injection occurs in between 35% and 88% of people [ 20 ] :664 Redness and swelling at the site and fever may also occur. [ 20 ] No link to GuillainBarré syndrome has been found. [ 20 ] There is no increased risk of serious adverse effects. [ 47 ] Extensive clinical trial and post-marketing safety surveillance data indicate that both Gardasil and Cervarix are well tolerated and safe. [ 47 ] [ 93 ] When comparing the HPV vaccine to a placebo (control) vaccine taken by women, there is no difference in the risk of severe adverse events. [ 47 ] United States [ edit ] As of 8 September 2013 [update] , there were more than 57 million doses of Gardasil vaccine distributed in the United States, though it is unknown how many were administered. [ 94 ] There have been 22,000 Vaccine Adverse Event Reporting System (VAERS) reports following the vaccination. [ 95 ] 92% were reports of events considered to be non-serious (e.g., fainting, pain, and swelling at the injection site (arm), headache, nausea, and fever), and the rest were considered to be serious (death, permanent disability, life-threatening illness, and hospitalization). However, VAERS reports include any reported effects whether coincidental or causal. In response to concerns regarding the rates of adverse events associated

with the vaccine, the CDC stated: "When evaluating data from VAERS, it is important to note that for any reported event, no cause-and-effect relationship has been established. VAERS receives reports on all potential associations between vaccines and adverse events." [ 95 ] As of 1 September 2009 [update] , in the US there were 44 reports of death in females after receiving the vaccine. [ 95 ] None of the 27 confirmed deaths of women and girls who had taken the vaccine were linked to the vaccine. [ 95 ] There is no evidence suggesting that Gardasil causes or raises the risk of GuillainBarré syndrome . Additionally, there have been rare reports of blood clots forming in the heart, lungs, and legs. [ 95 ] A 2015 review conducted by the European Medicines Agency 's Pharmacovigilance Risk Assessment Committee concluded that evidence does not support the idea that HPV vaccination causes complex regional pain syndrome or postural orthostatic tachycardia syndrome . [ 96 ] As of 8 September 2013 [update] , the CDC continued to recommend Gardasil vaccination for the prevention of four types of HPV. [ 95 ] The manufacturer of Gardasil has committed to ongoing research assessing the vaccine's safety. [ 97 ] According to the Centers for Disease Control and Prevention (CDC) and the FDA, the rate of adverse side effects related to Gardasil immunization in the safety review was consistent with what has been seen in the safety studies carried out before the vaccine was approved and were similar to those seen with other vaccines. However, a higher proportion of syncope (fainting) was seen with Gardasil than is usually seen with other vaccines. The FDA and CDC have reminded healthcare providers that, to prevent falls and injuries, all vaccine recipients should remain seated or lying down and be closely observed for 15 minutes after vaccination. [ 60 ] The HPV vaccination does not appear to reduce the willingness of women to undergo pap tests . [ 98 ] Contraindications [ edit ] While the use of HPV vaccines can help reduce cervical cancer deaths by two-thirds around the world, [ 99 ] not everyone is eligible for vaccination. Some factors exclude people from receiving HPV vaccines. These factors include: [ 100 ] People with history of immediate hypersensitivity to vaccine components. Patients with a hypersensitivity to yeast should not receive Gardasil since yeast is used in its production. People with moderate or severe acute illnesses. This does not completely exclude patients from vaccination but postpones the time of vaccination until the illness has improved. [ 101 ] Pregnancy [

edit ] In the Gardasil clinical trials, 1,115 pregnant women received the HPV vaccine. Overall, the proportions of pregnancies with an adverse outcome were comparable in subjects who received Gardasil and subjects who received a placebo. [ 102 ] [ 103 ] However, the clinical trials had a relatively small sample size. As of 2018 [update] , the vaccine is not recommended for pregnant women. [ 47 ] [ 102 ] [ 104 ] [ 105 ] The FDA has classified the HPV vaccine as a pregnancy Category B, meaning there is no apparent harm to the fetus in animal studies. HPV vaccines have not been causally related to adverse pregnancy outcomes or adverse effects on the fetus. However, data on vaccination during pregnancy is very limited, and vaccination during the pregnancy term should be delayed until more information is available. If a woman is found to be pregnant during the three-dose series of vaccination, the series should be postponed until pregnancy has been completed. While there is no indication for intervention for vaccine dosages administered during pregnancy, patients and healthcare providers are encouraged to report exposure to vaccines to the appropriate HPV vaccine pregnancy registry. [ 100 ] [ 101 ] [ 106 ] Mechanism of action [ edit ] The HPV vaccines are based on hollow virus-like particles (VLPs) assembled from recombinant HPV coat proteins . The natural virus capsid is composed of two proteins, L1 and L2, but vaccines only contain L1. Gardasil contains inactive L1 proteins from four different HPV strains: 6, 11, 16, and 18, synthesized in the yeast *Saccharomyces cerevisiae* . Each vaccine dose contains 225 g of aluminum, 9.56 mg of sodium chloride, 0.78 mg of L-histidine , 50 g of polysorbate 80 , 35 g of sodium borate, and water. The combination of ingredients totals 0.5 mL. [ 107 ] HPV types 16 and 18 cause about 70% of all cervical cancer . [ 85 ] Gardasil also targets HPV types 6 and 11, which together cause about 90 percent of all cases of genital warts . [ 108 ] Gardasil and Cervarix are designed to elicit virus-neutralizing antibody responses that prevent initial infection with the HPV types represented in the vaccine. The vaccines have been shown to offer 100 percent protection against the development of cervical pre-cancers and genital warts caused by the HPV types in the vaccine, with few or no side effects. The protective effects of the vaccine are expected to last a minimum of 4.5 years after the initial vaccination. [ 48 ] While the study period was not long enough for cervical cancer to develop, the prevention of these cervical precancerous lesions (or dysplasias )



is believed highly likely to result in the prevention of those cancers. [ 109 ] History [ edit ] In 1983, Harald zur Hausen culminated decades of research with the discovery that certain variants of human papillomaviruses (HPVs) could be found in a majority of tested cervical cancer specimens. This provided strong scientific evidence for a link between the viral infection and cervical cancer, and provided strong motivations for further research into HPVs. [ 110 ] In 1990, Ian Frazer partnered with Jian Zhou and Xiao-Yi Sun at the University of Queensland in Australia to create synthetic HPVs for study in the lab. While working towards this goal, they were able to synthetically produce some of the capsid proteins of the HPVs, L1 and L2. Recognizing the potential of these proteins to form the basis of a vaccine, they filed a provisional patent on their production process in Australia in 1991. [ 110 ] The further invention then stalled while convincing developers of the market for the vaccine, and also while patent offices determined who the discovery belonged to. Three other organizations, the US National Cancer Institute , Georgetown University , and University of Rochester , were also vying for the patent as a result of contributions in the space. [ 111 ] After providing evidence of the correctness of their L1 sequencing in 2004, the US patent court of appeals accorded priority to the University of Queensland in 2009. [ 112 ] As a result, the University of Queensland receives royalty payments from the sale of these vaccines even today. [ 110 ] By the early 2000s, developers, convinced of the market of the vaccine, had begun refining, researching, and trialing L1-based HPV vaccines. [ 113 ] [ 48 ] In 2006, the FDA approved the first preventive HPV vaccine, marketed by Merck & Co. under the trade name Gardasil. According to a Merck press release, [ 114 ] by the second quarter of 2007 it had been approved in 80 countries, many under fast-track or expedited review. Early in 2007, GlaxoSmithKline filed for approval in the United States for a similar preventive HPV vaccine, known as Cervarix . In June 2007, this vaccine was licensed in Australia, and it was approved in the European Union in September 2007. [ 115 ] Cervarix was approved for use in the US in October 2009. [ 116 ] Harald zur Hausen was awarded half of the \$1.4 million Nobel Prize in Medicine in 2008 for his work showing that cervical cancer is caused by certain types of HPVs. [ 117 ] In December 2014, the US Food and Drug Administration (FDA) approved a vaccine called Gardasil 9 to protect females between the ages of 9 and 26 and males

between the ages of 9 and 15 against nine strains of HPV. [ 118 ] Gardasil 9 protects against infection from the strains covered by the first generation of Gardasil (HPV-6, HPV-11, HPV-16, and HPV-18) and protects against five other HPV strains responsible for 20% of cervical cancers (HPV-31, HPV-33, HPV-45, HPV-52, and HPV-58). [ 118 ] Society and culture [ edit ] Economics [ edit ] As of 2013 [update] , vaccinating girls and young women was estimated to be cost-effective in the low and middle-income countries , especially in places without organized programs for screening cervical cancer . [ 119 ] When the cost of the vaccine itself, or the cost of administering it to individuals, were higher, or if cervical cancer screening were readily available, then vaccination was less likely to be cost-effective. From a public health point of view, vaccinating men as well as women decreases the virus pool within the population but is only cost-effective to vaccinate men when the uptake in the female population is extremely low. [ 120 ] In the United States, the cost per quality-adjusted life year is greater than US\$100,000 for vaccinating the male population, compared to less than US\$50,000 for vaccinating the female population. [ 120 ] This assumes a 75% vaccination rate. In 2013, the two companies that sell the most common vaccines announced a price cut to less than US\$5 per dose to poor countries, as opposed to US\$130 per dose in the US. [ 121 ] Brand names [ edit ] The vaccine is sold under various brand names including Gardasil, Cervarix, Cecolin, [ 30 ] and Walrinvax. [ 30 ] [ 22 ] Vaccine implementation [ edit ] See also: Vaccination policy The primary target group in most of the countries recommending HPV vaccination is young adolescent girls, aged 9-14. [ 22 ] It's particularly cost-effective in resource-constrained settings. [ 20 ] :666 The vaccination schedule depends on the age of the vaccine recipient. [ 22 ] As of 2023, 27% of girls aged 9-14 years worldwide received at least one dose (37 countries were implementing the single-dose schedule). [ 30 ] Global coverage for the first dose of HPV vaccine in girls grew from 20% in 2022 to 27% in 2023. [ 31 ] As of 10 September 2024, 57 countries are implementing the single-dose schedule. [ 30 ] Vaccinating a large portion of the population may also benefit the unvaccinated by way of herd immunity . [ 33 ] HPV vaccine introductions have been hampered by global supply shortages since 2018. [ 30 ] Between 2019 and 2021, due to the COVID-19 pandemic , HPV vaccination programs have been significantly affected in the United

States, low-income and lower-middle-income countries. [ 122 ] [ 123 ] [ 124 ] [ 125 ] In developed countries, the widespread use of cervical " Pap smear " screening programs has reduced the incidence of invasive cervical cancer by 50% or more. Preventive vaccines reduce but do not eliminate the chance of getting cervical cancer. Therefore, experts recommend that women combine the benefits of both programs by seeking regular Pap smear screening, even after vaccination. [ 126 ] School-entry vaccination requirements were found to increase the use of the HPV vaccine. [ 127 ] [ 128 ] HPV vaccine included in national immunization program [ edit ] At least 144 countries (at least 74% of WHO member states) provided the HPV vaccine in their national immunization schedule for girls, as of November 2024. [ 32 ] [ 31 ] As of 2022, 47 countries (24% of WHO member states) also did it for boys. [ 20 ] :654 Africa [ edit ] Of the 20 hardest hit countries by cervical cancer, 19 are in Africa. [ 30 ] In 2013, with support from Gavi, the Vaccine Alliance , eight low-income countries, mainly in sub-Saharan Africa, began the rollout of the HPV vaccine. [ 129 ] Algeria [ edit ] No [ 130 ] Angola [ edit ] No [ 130 ] Chad [ edit ] No [ 130 ] Central African Republic [ edit ] No [ 130 ] Democratic Republic of Congo [ edit ] No [ 130 ] Ghana [ edit ] No (GAVI support in 2013) [ 130 ] [ 129 ] Guinea-Bissau [ edit ] No [ 130 ] Kenya [ edit ] Both Cervarix and Gardasil are approved for use within Kenya by the Pharmacy and Poisons Board. However, at a cost of 20,000 Kenyan shillings, which is more than the average annual income for a family, the director of health promotion in the Ministry of Health, Nicholas Muraguri , states that many Kenyans are unable to afford the vaccine. [ 88 ] It has received GAVI support in 2013. [ 129 ] Madagascar [ edit ] No (GAVI support in 2013) [ 130 ] [ 129 ] Malawi [ edit ] Yes (GAVI support in 2013) [ 130 ] [ 129 ] Mozambique [ edit ] Yes (GAVI support for HPV demonstration projects in 2014) [ 130 ] [ 129 ] Niger [ edit ] No (GAVI support in 2013) [ 130 ] [ 129 ] Nigeria [ edit ] Yes [ 130 ] Rwanda [ edit ] Yes (GAVI support in 2014) [ 130 ] [ 129 ] Senegal [ edit ] Yes [ 130 ] Sierra Leone [ edit ] Yes (GAVI support in 2013) [ 130 ] [ 129 ] South Africa [ edit ] Cervical cancer represents the most common cause of cancer-related deaths more than 3,000 deaths per year among women in South Africa because of high HIV prevalence, making the introduction of the vaccine highly desirable. [ 131 ] A Papanicolaou test program was established in 2000 to help screen for cervical cancer, but since this program has not

been implemented widely, vaccination would offer more efficient form of prevention. [ 132 ] In May 2013 the Minister of Health of South Africa, Aaron Motsoaledi , announced the government would provide free HPV vaccines for girls aged 9 and 10 in the poorest 80% of schools starting in February 2014 and the fifth quintile later on. [ 133 ] South Africa will be the first African country with an immunisation schedule that includes vaccines to protect people from HPV infection, but because the effectiveness of the vaccines in women who later become infected with HIV is not yet fully understood, it is difficult to assess how cost-effective the vaccine will be. Negotiations are currently [ when? ] underway for more affordable HPV vaccines since they are up to 10 times more expensive than others already included in the immunization schedule. [ 131 ] [ 133 ] United Republic of Tanzania [ edit ] Yes (GAVI support in 2013) [ 130 ] [ 129 ] Zimbabwe [ edit ] Yes (GAVI support for HPV demonstration projects in 2014) [ 130 ] [ 129 ] Australia [ edit ] In April 2007, Australia became the second country after Austria to introduce a government-funded National Human Papillomavirus (HPV) Vaccination Program to protect young women against HPV infections that can lead to cancers and disease. [ 134 ] The National HPV Vaccination Program is listed on the National Immunisation Program (NIP) Schedule and funded under the Immunise Australia Program. [ 135 ] The Immunise Australia Program is a joint Federal, State, and Territory Government initiative to increase immunisation rates for vaccine-preventable diseases. The National HPV Vaccination Program for females was made up of two components: an ongoing school-based program for 12- and 13-year-old girls; and a time-limited catch-up program (females aged 14-26 years) delivered through schools, general practices, and community immunization services, which ceased on 31 December 2009. During 2007-2009, an estimated 83% of females aged 12-17 years received at least one dose of HPV vaccine and 70% completed the 3-dose HPV vaccination course. [ 134 ] By 2017, HPV coverage data on the Immunise Australia website show that by 15 years of age, over 82% of Australian females had received all three doses. [ 136 ] Since the National HPV Vaccination Program commenced in 2007, there has been a reduction in HPV-related infections in young women. A study published in The Journal of Infectious Diseases in October 2012 found the prevalence of vaccine-preventable HPV types (6, 11, 16, and 18) in Papanicolaou test results of

women aged 18-24 years has significantly decreased from 28.7% to 6.7% four years after the introduction of the National HPV Vaccination Program. [ 134 ] A 2011 report published found the diagnosis of genital warts (caused by HPV types 6 and 11) had also decreased in young women and men. [ 137 ] In October 2010, the Australian regulatory agency, the Therapeutic Goods Administration, extended the registration of the quadrivalent vaccine (Gardasil) to include use in males aged 9 through 26 years of age, for the prevention of external genital lesions and infection with HPV types 6, 11, 16 and 18. In November 2011, the Pharmaceutical Benefits Advisory Committee (PBAC) recommended the extension of the National HPV Vaccination Program to include males. The PBAC made its recommendation on the preventive health benefits that can be achieved, such as a reduction in the incidence of anal and penile cancers and other HPV-related diseases. In addition to the direct benefit to males, it was estimated that routine HPV vaccination of adolescent males would contribute to the reduction of vaccine HPV-type infection and associated disease in women through herd immunity. [ 138 ] In 2012, the Australian Government announced it would be extending the National HPV Vaccination Program to include males, through the National Immunisation Program Schedule . [ 139 ] Updated results were reported in 2014. [ 140 ] Since February 2013, free HPV vaccine has been provided through school-based programs for: males and females aged 12-13 years (ongoing program); and males aged between 14 and 15 years until the end of the school year in 2014 (catch-up program). Canada [ edit ] HPV vaccines were first approved in Canada in July 2006 for use in females, [ 141 ] and February 2010 for use in males. [ 142 ] The vaccines Cervarix, Gardasil, and Gardasil 9 are authorized for use in Canada, [ 143 ] with Gardasil 9 the primary vaccine used. [ 144 ] All provinces and territories (except Quebec) administer Gardasil 9 on a two or three-dose schedule: individuals under age 15 are given two doses, while individuals who are immunocompromised, living with HIV, or age 15+ are given three doses. Quebec provides two doses to individuals under 18 years (the first dose is Gardasil 9, and the second dose is Cervarix) and three doses of Gardasil 9 to people age 18+. [ 144 ] The administration of free vaccination programs is provided by individual province and territory governments. All provincial and territorial governments offer free vaccination for school-aged

children, irrespective of gender. [ 145 ] The school grades in which the vaccine is provided varies by province and territory: grade 4 and secondary 3 (Quebec); grade 6 (British Columbia, Manitoba, Newfoundland and Labrador, Nunavut, Prince Edward Island, Saskatchewan, Yukon); grades 6 and 9 (Alberta); grades 4-6 (Northwest Territories); or grade 7 (New Brunswick, Nova Scotia, Ontario). [ 144 ] Publicly funded HPV vaccines are also provided in certain provinces and territories for other groups of people, such as men who have sex with men, individuals living with HIV, and individuals who identify as transgender. Individuals who do not qualify for any of the publicly funded programs can privately purchase the three-dose HPV vaccine series for \$510 to \$630. [ 144 ] China [ edit ] GlaxoSmithKline China announced in 2016, that Cervarix (HPV vaccine 16 and 18) had been approved by the China Food and Drug Administration (CFDA). [ 146 ] Cervarix is registered in China for girls aged 9 to 45, adopting 3-dose program within 6 months. [ 147 ] Cervarix was launched in China in 2017, and it was the first approved HPV vaccine in China. [ 148 ] Colombia [ edit ] The vaccine was introduced in 2012, approved for girls aged 9. [ 149 ] [ 150 ] The HPV vaccine was initially offered to girls aged 9 and older, and attending the fourth grade of school. Since 2013 the age of coverage was extended to girls in school from grade four (who have reached the age of 9) to grade eleven (independent of age); and no schooling from age 9 17 years 11 months and 29 days old. [ 151 ] Costa Rica [ edit ] Since June 2019, the vaccine has been administered compulsorily by the state, free of charge to girls at ten years of age. [ 152 ] [ 153 ] Europe [ edit ] As of 2020, the European Centre for Disease Prevention and Control (ECDC) reports that the vaccine uptake among females is the following: [ 154 ] Finland, Hungary, Iceland, Malta, Norway, Portugal, Spain, Sweden, and the UK have reported national coverage above 70%. In some countries, including France and Germany, coverage has been consistently below 50%, though recently increasing in France. [ 154 ] Country Date of introduction Gender(s) Target age group Financed by Policy Austria 2006 M/F [ 154 ] 1012 Fully financed by national health authorities [ 155 ] for everyone age 9 to 20 years [ 156 ] Voluntary immunization Belgium 2007 M/F [ 154 ] 1013 Fully financed by national health authorities Mandatory; part of the national immunization schedule Croatia 20 May 2016 M/F [ 154 ] 12 Fully financed by national health authorities Voluntary immunization for women not yet

sexually active Czech Republic M/F [ 154 ] Denmark [ 157 ] 1 January 2009 M/F [ 154 ] 12 Fully financed by national health authorities Part of the Danish Childhood Vaccination program Finland [ 158 ] 21 November 2013 for female, 20 May 2020 for male [ 159 ] M/F [ 154 ] 1112 Fully financed by national health authorities Part of the Finnish National Vaccination program France [ 160 ] 11 July 2007 F 1423 Financed 65% by national health authorities Voluntary immunization for women not yet sexually active Germany [ 161 ] [ 162 ] 26 March 2007 M/F [ 154 ] 914 Fully financed by mandatory health insurance Voluntary immunization Greece [ 163 ] [ 164 ] 12 February 2007 F 1226 Fully financed by national health authorities Mandatory for all girls entering 7th grade Hungary [ 165 ] September 2014 for females [ 166 ] and 2020 for males [ 167 ] M/F [ 167 ] 12-13 [ 166 ] Fully financed by national health authorities for 7th grade schoolgirls (1213 years old). [ 166 ] [ 168 ] Several local governments have decided to pursue their own earlier initiative, thus providing the vaccine to those who are not eligible for the national vaccination programme due to their age. [ 168 ] Subsidised by some local councils for 13- and 14-year-olds. Public vaccination program [ 166 ] Iceland 2011 12 Fully financed by national health authorities Ireland [ 169 ] 2009 M/F [ 154 ] 1213 Fully financed by national health authorities Offered to males and females in the first year of secondary school. Non-mandatory. HPV vaccination was introduced to the national immunisation scheme for males in 2019. Italy [ 161 ] 26 March 2007 M/F [ 154 ] 12 Fully financed by national health authorities initially for girls only. Offered to boys from 2017. Latvia 2009 12 Fully financed by national health authorities Liechtenstein M/F [ 154 ] Luxembourg 2008 12 Fully financed by national health authorities Netherlands 2009 M/F [ 154 ] 10-18 Fully financed by national health authorities Offered to boys starting from February 2022 [ 170 ] [ 171 ] North Macedonia 2009 F 12 Fully financed by national health authorities Mandatory; part of the national immunization schedule Norway 2009 M/F [ 154 ] 1213 Part of the national immunization program Portugal 2007 F 13 Fully financed by national health authorities Part of the national immunization program for both boys and girls Romania November 2008 F 10-18 Fully financed by national health authorities Part of the national immunization program, but not mandatory for 1014 years old girls until August 2021, up to 18 years old as of 3 September 2021 Slovenia 2009 1112 Fully financed by national health

authorities Spain 2007 1114 Fully financed by national health authorities Sweden [ 172 ] 2012 [ 173 ] M/F [ 154 ] 1011 The school-based vaccination program is fully financed by national health authorities, initially for girls only. Offered to all children in fifth grade from August 2020 (boys born in 2009 are included). [ 174 ] All vaccinations within the national vaccination programme for children are voluntary. Switzerland 2008 1114 Fully financed by national health authorities UK September 2008 M/F [ 154 ] M: 945 F: 945 Fully financed by national health authorities initially for girls only. Offered to boys aged 12 and 13 years from September 2019. [ 175 ] The HPV vaccine is available for free on the NHS up until a person's 25th birthday if they were eligible and missed the HPV vaccine offered in Year 8 at school,: [ 176 ] girls born after 1 September 1991 boys born after 1 September 2006 Also fully financed by national health authorities since 2018 for men aged up to and including 45 years of age who have sex with other men (MSM) when they visit sexual health clinics and HIV clinics in England. Trans women (people who were assigned male at birth) are eligible in the same way as MSM if their risk of getting HPV is similar to the risk of MSM who are eligible for the HPV vaccine. Trans men (people who were assigned female at birth) are eligible if they have sex with other men and are aged 45 or under. [ 176 ] Offered to males and females in the second year of secondary school, as well as at sexual health and HIV clinics in England. Non-mandatory. Hong Kong [ edit ] HPV vaccines are approved for use in Hong Kong. As part of the Hong Kong Childhood Immunisation Programme, HPV vaccines became mandatory for students in the 2019/2020 school year, exclusively for females at primary 5 and 6 levels. [ 177 ] India [ edit ] HPV vaccine (both Gardasil and Cervarix) was introduced in Indian markets in 2008, but it is yet to be included in the country's universal immunization programme. In Punjab and Sikkim (states of India), it is included in the state immunization program and the coverage is up to 97% of targeted girls. [ 178 ] HPV vaccination has been recommended by the National Technical Advisory Group on Immunization , but has not been implemented in India as of 2018. [ 179 ] In 2023, Serum Institute of India (SII) developed a new vaccine Cervavax targeting HPV types 6, 11, 16, and 18. The newly developed vaccine shows equal capability to Merck's Gardasil 9. Cervavax vaccine isn't commercially available yet. [ 180 ] In 2024, the HPV vaccine drive was announced by Finance



Minister Nirmala Sitharaman as part of Nari Shakti ("Women Power") campaign but hasn't been implemented yet. The vaccine is commercially available in the market at a price between 3,000 (\$35) and 15,000 (\$180). Ireland [ edit ] The HPV vaccination programme in Ireland is part of the national strategy to protect females from cervical cancer . Since 2009, the Health Service Executive has offered the HPV vaccine, free of charge, to all girls from the first year onwards (ages 12/13). Secondary schools began implementing the vaccine program on an annual basis from September 2010 onwards. [ 181 ] The programme was expanded to include males in 2019. [ 182 ] Two HPV vaccines are licensed for use in Ireland: Cervarix and Gardasil . To ensure high uptake, the vaccine is administered to teenagers aged 12/13 in their first year of secondary school, with the first dose administered between September and October and the final dose in April of the following year. [ 182 ] [ 183 ] Males and females aged 12/13 who are outside of the traditional school setting (home school, etc.) are invited to Health service Executive clinics for their vaccines. HPV vaccination in Ireland is not mandatory and consent is obtained before vaccination. [ 169 ] [ 182 ] For males and females aged 16 and under, consent is granted by a parent or guardian unless it is explicitly refused by the child. Any male or female aged 16 and over may provide their own consent if they want to be vaccinated. [ 182 ] HIQA has stated the vaccine will provide further protection, particularly to men who have sex with men. The vaccine has been extended following evidence that 25% of HPV cancers occur in men. [ 184 ] Additionally, HIQA is aiming to replace the current vaccination, which covers 4 major HPV strains, with an updated vaccine protecting against nine strains. The cost with the "gender-neutral nine-valent" vaccine is estimated to be nearly 11.66 million over the next five years. [ 169 ] Israel [ edit ] Introduced in 2012. Target age group 13/14. Fully financed by national health authorities only for this age group. For the year 2013/2014, girls in the eighth grade may get the vaccine free of charge only in school, and not in Ministry of Health offices or clinics. Girls in the ninth grade may receive the vaccine free of charge only at Ministry of Health offices, and not in schools or clinics. [ 185 ] Religious and conservative groups are expected to refuse the vaccination. [ 186 ] Japan [ edit ] The quadrivalent vaccine has been approved for males and the 9-valent one for females. [ 187 ] Since 2010, young women in Japan have been eligible to receive the cervical

cancer vaccination for free. [ 188 ] In June 2013, the Japanese Ministry of Health, Labor and Welfare mandated that, before administering the vaccine, medical institutions must inform women that the ministry does not recommend it. [ 188 ] However, the vaccine is still available at no cost to Japanese women who choose to accept the vaccination. [ 188 ] It is widely available only since April 2013. Fully financed by national health authorities to females aged 11 to 16 years. In June 2013, however, Japan's Vaccine Adverse Reactions Review Committee (VARRC) suspended the recommendation of the vaccine due to fears of adverse events. This directive has been criticized by researchers at the University of Tokyo as a failure of governance since the decision was taken without the presentation of adequate scientific evidence. [ 189 ] At the time, Ministry spokespeople emphasized that "The decision does not mean that the vaccine itself is problematic from the viewpoint of safety," but that they wanted time to conduct analyses on possible adverse effects, "to offer information that can make the people feel more at ease." [ 190 ] However, the suspension of the Ministry's endorsement was still in place as of February 2019, by which time the HPV vaccination rate among younger women fell from approximately 70% in 2013 to 1% or less. [ 191 ] Over an overlapping time period (2009-2019), the age-adjusted mortality rate from cervical cancer increased by 9.6%. [ 191 ] Japan to Resume Active Promotion of HPV Vaccinations in April 2022. [ 192 ] [ 193 ] In December 2021, the Ministry of Health, Labour and Welfare has decided to allow free vaccines to women born between fiscal year 1997 and 2005 after eight-year hiatus. [ 194 ] A panel of Japan's Ministry of Health, Labour and Welfare agreed to give women (born between fiscal 1997 and fiscal 2005), free vaccinations, if they missed the country's free vaccination program. [ 195 ] 225,993 girls were vaccinated for the first round of routine vaccination in 2022, and the vaccination rate was 42.2%. [ 196 ] The Osaka University Graduate School of Medicine and Faculty of Medicine reported the first vaccination rate and cumulative first vaccination rate for each year of birth in 2022 at a meeting of the Ministry of Health, Labor and Welfare. For 12-year-old girls born in 2010, the rate was 2.8%. [ 197 ] Human Papillomavirus Vaccination by Birth Fiscal Year in Japan [ 198 ] [ 199 ] Laos [ edit ] In 2013, Laos began implementation of the HPV vaccine, with the assistance of Gavi, the Vaccine Alliance . [ 129 ] Malaysia [ edit ] In 2010, Malaysia launched a national vaccination

program to provide three doses of HPV vaccines to all 13-year-old girls. In 2015, the program transitioned to a two-dose regimen. [ 200 ] High rates of school enrolment for 13-year-olds (96.0%) and retention of female students in secondary schools have made it possible for the HPV vaccination to be integrated into the School Health Service Program and ensure equal access to the HPV vaccine between urban and rural areas. [ 201 ] Mexico [ edit ] The vaccine was introduced in 2008 to 5% of the population. This percentage of the population had the lowest development index which correlates with the highest incidence of cervical cancer. [ 202 ] The HPV vaccine is delivered to girls 12–16 years old following the 0-2-6 dosing schedule. By 2009 Mexico had expanded the vaccine use to girls, 9–12 years of age, the dosing schedule in this group was different, the time elapsed between the first and second dose was six months, and the third dose 60 months later. [ 203 ] In 2011 Mexico approved a nationwide use of HPV vaccination program to include vaccination of all 9-year-old girls. [ 203 ] New Zealand [ edit ] Immunization as of 2017 is free for males and females aged 9 to 26 years. [ 204 ] The public funding began on 1 September 2008. The vaccine was initially offered only to girls, usually through a school-based program in Year 8 (approximately age 12), but also through general practices and some family planning clinics. Over 200,000 New Zealand girls and young women have received HPV immunization. [ 204 ] Panama [ edit ] The vaccine was added to the national immunization program in 2008, to target 10-year-old girls. [ 202 ] South Korea [ edit ] On 27 July 2007, South Korean government approved Gardasil for use in girls and women aged 9 to 26 and boys aged 9 to 15. [ 205 ] Approval for use in boys was based on safety and immunogenicity but not efficacy. Since 2016, HPV vaccination has been part of the National Immunization Program, offered free of charge to all children under 12 in South Korea, with costs fully covered by the Korean government. [ 206 ] For 2016 only, Korean girls born between 1 January 2003 and 31 December 2004 were also eligible to receive the free vaccinations as a limited-time offer. From 2017, the free vaccines are available to those under 12 only. [ 207 ] Trinidad and Tobago [ edit ] Introduced in 2013. Target Group 9–26. Fully financed by national health authorities. But was suspended later on that year owing to objections and concerns raised by the Catholic Board, but fully available in local health centers. [ 208 ] United Arab Emirates [ edit ] The

World Health Organization ranks cervical cancer as the fourth most frequent cancer among women in UAE, at 7.4 per 100,000 women, [ 209 ] and according to Abu Dhabi Health Authority, the cancer is also the seventh highest cause of death of women in the U.A.E. [ 210 ] In 2007, the HPV vaccine was approved for girls and young women, 15 to 26 years of age, and offered optionally at hospitals and clinics. [ 211 ] [ 212 ] Moreover, starting 1 June 2013, the vaccine was offered free of charge for women between the ages of 18 and 26, in Abu Dhabi. [ 213 ] However, on 14 September 2018, the U.A.E's Ministry of Health and Community Protection announced that HPV vaccine became a mandatory part of the routine vaccinations for all girls in the U.A.E. [ 214 ] The vaccine is to be administered to all school girls in the 8th grade girls, aged 13. [ 215 ] United Kingdom [ edit ] In the UK the vaccine is licensed for females aged 9-26, for males aged 9-15, and for men who have sex with men aged 18-45. [ 216 ] HPV vaccination was introduced into the national immunisation programme in September 2008, for girls aged 12-13 across the UK. A two-year catch-up campaign started in Autumn 2009 to vaccinate all girls up to 18 years of age. Catch-up vaccination was offered to girls aged between 16 and 18 from autumn 2009, and girls aged between 15 and 17 from autumn 2010. It will be many years before the vaccination programme affects cervical cancer incidence so women are advised to continue accepting their invitations for cervical screening. [ 217 ] Men who have sex with men up to and including the age of 45 became eligible for free HPV vaccination on the NHS in April 2018. They get the vaccine by visiting sexual health clinics and HIV clinics in England. [ 218 ] A meta-analysis of vaccinations for men who have sex with men showed that this strategy is most effective when combined with gender-neutral vaccination of all boys, regardless of their sexual orientation. [ 219 ] From the 2019/2020 school year, it is expected that 12- to 13-year-old boys will also become eligible for the HPV vaccine as part of the national immunisation programme. This follows a statement by the Joint Committee on Vaccination and Immunisation . [ 220 ] The first dose of the HPV vaccine will be offered routinely to boys aged 12 and 13 in school year 8, in the same way that it is currently (May 2018) offered to girls. [ 218 ] Boots UK opened a private HPV vaccination service to boys and men aged 12-44 years in April 2017 at a cost of £150 per vaccination. In children aged 12-14 years two doses are recommended, while those aged 15-44

years a course of three is recommended. [ 221 ] Cervarix was the HPV vaccine offered from its introduction in September 2008, to August 2012, with Gardasil being offered from September 2012. [ 218 ] [ 222 ] The change was motivated by Gardasil's added protection against genital warts. [ 223 ] United States [ edit ] Adoption [ edit ] On 30 August 2021, fifteen leading academic and freestanding cancer centers with membership in the Association of American Cancer Institutes (AACI), all National Cancer Institute (NCI)-designated cancer centers, the American Cancer Society , the American Society of Clinical Oncology , the American Association for Cancer Research , and the St. Jude Children's Research Hospital have issued a joint statement urging the US health care systems, physicians, parents, children, and young adults to get HPV vaccination and other recommended vaccinations back on track during the National Immunization Awareness Month. [ 124 ] [ 125 ] As of late 2007 [update] , about one-quarter of US females aged 13-17 years had received at least one of the three HPV shots. [ 224 ] By 2014 [update] , the proportion of such females receiving an HPV vaccination had risen to 38%. [ 225 ] The government began recommending vaccination for boys in 2011; by 2014 [update] , the vaccination rate among boys (at least one dose) had reached 35%. [ 225 ] According to the US Centers for Disease Control and Prevention (CDC), getting as many girls vaccinated as early and as quickly as possible will reduce the cases of cervical cancer among middle-aged women in 30 to 40 years and reduce the transmission of this highly communicable infection. Barriers include the limited understanding by many people that HPV causes cervical cancer, the difficulty of getting pre-teens and teens into the doctor's office to get a shot, and the high cost of the vaccine (\$120/dose, \$360 total for the three required doses, plus the cost of doctor visits). [ 59 ] [ 226 ] Community-based interventions can increase the uptake of HPV vaccination among adolescents. [ 227 ] A survey was conducted in 2009 to gather information about knowledge and adoption of the HPV vaccine. Thirty percent of 13- to 17-year-olds and 9% of 18- to 26-year-olds out of the total 1,011 young women surveyed reported receipt of at least one HPV injection. Knowledge about HPV varied; however, 5% or fewer subjects believed that the HPV vaccine precluded the need for regular cervical cancer screening or safe-sex practices. Few girls and young women overestimate the protection provided by the vaccine. Despite moderate uptake,

many females at risk of acquiring HPV have not yet received the vaccine. [ 228 ] For example, young black women are less likely to receive HPV vaccines compared to young white women. Additionally, young women of all races and ethnicities without health insurance are less likely to get vaccinated. [ 229 ] As of 2017, Gardasil 9 is the only HPV vaccine available in the United States as it provides protection against more HPV types than the earlier approved vaccines (the original Gardasil and Cervarix). [ 230 ] [ 231 ] Since the approval of Gardasil in 2006 and despite low vaccine uptake, prevalence of HPV among teenagers aged 14-19 has been cut in half with an 88% reduction among vaccinated women. No decline in prevalence was observed in other age groups, indicating the vaccine to have been responsible for the sharp decline in cases. The drop in number of infections is expected to in turn lead to a decline in cervical and other HPV-related cancers in the future. [ 232 ] [ 233 ]

Legislation [ edit ] Four states have laws that require HPV vaccination for school students: [ 231 ] Hawaii , Rhode Island , Virginia , and Washington D.C. Students in those states must have started HPV vaccination before entering the 7th grade. All school immunization laws grant exemptions to children for medical reasons, with other " opt-out " policies varying by state. [ 234 ] Shortly after the first HPV vaccine was approved, bills to make the vaccine mandatory for school attendance were introduced in many states. [ 235 ] Only two such bills passed (in Virginia and Washington DC) during the first four years after vaccine introduction. [ 235 ] Mandates have been effective at increasing uptake of other vaccines, such as mumps, measles, rubella, and hepatitis B (which is also sexually transmitted). [ 226 ] However most such efforts developed for five or more years after vaccine release, while financing and supply were arranged, further safety data was gathered, and education efforts increased understanding, before mandates were considered. [ 235 ] Most public policies including school mandates have not been effective in promoting HPV vaccination while receiving a recommendation from a physician increased the probability of vaccination. [ 236 ] In July 2015, Rhode Island added an HPV vaccine requirement for admittance into public schools. This mandate requires all students entering the seventh grade to receive at least one dose of the HPV vaccine starting in August 2015, all students entering the eighth grade to receive at least two doses of the HPV vaccine starting in August 2016, and all students entering the

ninth grade to receive at least three doses of the HPV vaccine starting in August 2017. [ 128 ] [ 237 ] [ 238 ] No legislative action is required for the Rhode Island Department of Health to add new vaccine mandates. Rhode Island is the only state that requires the vaccine for both male and female 7th graders. [ 128 ] Immigrants [ edit ] Between July 2008 and December 2009, proof of the first of three doses of HPV Gardasil vaccine was required for women ages 11-26 intending to legally enter the United States. This requirement stirred controversy because of the cost of the vaccine, and because all the other vaccines so required to prevent diseases that are spread by respiratory route and considered highly contagious. [ 239 ] The Centers for Disease Control and Prevention repealed all HPV vaccination directives for immigrants effective 14 December 2009. [ 240 ] Uptake in the United States appears to vary by ethnicity and whether someone was born outside the United States. [ 241 ] [ 242 ] Coverage [ edit ] Measures have been considered including requiring insurers to cover HPV vaccination and funding HPV vaccines for those without insurance. The cost of the HPV vaccines for females under 18 who are uninsured is covered under the federal Vaccines for Children Program . [ 243 ] As of 23 September 2010, vaccines are required to be covered by insurers under the Patient Protection and Affordable Care Act . HPV vaccines specifically are to be covered at no charge for women, including those who are pregnant or nursing. [ 244 ] Medicaid covers HPV vaccination in accordance with the ACIP recommendations, and immunizations are a mandatory service under Medicaid for eligible individuals under age 21. [ 245 ] In addition, Medicaid includes the Vaccines for Children Program. [ 246 ] This program provides immunization services for children 18 and under who are Medicaid eligible, uninsured, underinsured, receiving immunizations through a Federally Qualified Health Center or Rural Health Clinic, or are Native American or Alaska Native. [ 246 ] The vaccine manufacturers also offer help for people who cannot afford HPV vaccination. GlaxoSmithKline 's Vaccines Access Program [ 247 ] provides Cervarix [ 248 ] free of charge 1-877-VACC-911 [ 249 ] to low-income women, ages 19 to 25, who do not have insurance. [ 250 ] Merck 's Vaccine Patient Assistance Program 1-800-293-3881 [ 251 ] provides Gardasil free to low-income women and men, ages 19 to 26, who do not have insurance, including immigrants who are legal residents. [ 252 ] Opposition in the United States [ edit ] See also: Vaccine controversy The

idea that the HPV vaccine is linked to increased sexual behavior is not supported by scientific evidence. A review of nearly 1,400 adolescent girls found no difference in teen pregnancy, incidence of sexually transmitted infection , or contraceptive counseling regardless of whether they received the HPV vaccine. [ 253 ] Thousands of Americans die each year from cancers preventable by the vaccine. [ 253 ] A disproportionate rate of HPV-related cancers exists amongst LatinX populations, leading researchers to explore how communication and messaging can be adjusted to address vaccine hesitancy. [ 254 ] Insurance companies [ edit ] There has been significant opposition from health insurance companies to covering the cost of the vaccine (\$360). [ 255 ] [ 256 ] [ 257 ] Religious and conservative groups [ edit ] Opposition due to the safety of the vaccine has been addressed through studies, but there is still some opposition focused on the sexual implications of the vaccine. Conservative [ 258 ] [ who? ] groups in the US have opposed the concept of making HPV vaccination mandatory for pre-adolescent girls, claiming that making the vaccine mandatory is a violation of parental rights and that it will give a false sense of immunity to sexually transmitted infection, leading to early sexual activity. (See Peltzman effect ) Both the Family Research Council and the group Focus on the Family support widespread (universal) availability of HPV vaccines but oppose mandatory HPV vaccinations for entry to public school. [ 259 ] [ 260 ] [ 261 ] [ 262 ] Parents also express confusion over recent mandates for entry to public school, pointing out that HPV is transmitted through sexual contact, not through attending school with other children. [ 263 ] Conservative groups are concerned children will see the vaccine as a safeguard against STIs and will have sex sooner than they would without the vaccine while failing to use contraceptives. [ 263 ] However, the American Academy of Pediatrics disagreed with the argument that the vaccine increases sexual activity among teens. [ 264 ] Christine Peterson, director of the University of Virginia's Gynecology Clinic, said "The presence of seat belts in cars doesn't cause people to drive less safely. The presence of a vaccine in a person's body doesn't cause them to engage in risk-taking behavior they would not otherwise engage in." [ 265 ] [ 266 ] A 2018 study of college-aged students found that HPV vaccination did not increase sexual activity. [ 267 ] [ unreliable medical source ] Parental opposition [ edit ] Many parents opposed to providing the HPV



vaccine to their pre-teens agree the vaccine is safe and effective, but find talking to their children about sex uncomfortable. Elizabeth Lange, of Waterman Pediatrics in Providence, RI, addresses this concern by emphasizing what the vaccine is doing for the child. Lange suggests parents should focus on the cancer prevention aspect without being distracted by words like 'sexually transmitted'. Everyone wants cancer prevention, yet here parents are denying their children a form of protection due to the nature of the cancer. Lange suggests that this much controversy would not surround a breast cancer or colon cancer vaccine. The HPV vaccine is suggested for 11-year-olds because it should be administered before possible exposure to HPV, but also because the immune system has the highest response for creating antibodies around this age. Lange also emphasized the studies showing that the HPV vaccine does not cause children to be more promiscuous than they would be without the vaccine. [ 263 ] Controversy over the HPV vaccine remains present in the media. Parents in Rhode Island have created a Facebook group called "Rhode Islanders Against Mandated HPV Vaccinations" in response to Rhode Island's mandate that males and females entering the 7th grade, as of September 2015, be vaccinated for HPV before attending public school. [ 128 ] [ 263 ]

Physician impact [ edit ] The effectiveness of a physician's recommendation for the HPV vaccine also contributes to low vaccination rates and controversy surrounding the vaccine. A 2015 study of national physician communication and support for the HPV vaccine found physicians routinely recommend HPV vaccines less strongly than they recommend Tdap or meningitis vaccines, find the discussion about HPV to be long and burdensome, and discuss the HPV vaccine last, after all other vaccines. Researchers suggest these factors discourage patients and parents from setting up timely HPV vaccines. To increase vaccination rates, this issue must be addressed and physicians should be better trained to handle discussing the importance of the HPV vaccine with patients and their families. [ 268 ]

Ethics [ edit ] Some researchers have compared the need for adolescent HPV vaccination to that of other childhood diseases such as chicken pox, measles, and mumps. This is because vaccination before infection decreases the risk of several forms of cancer. [ 269 ] [ 270 ]

There has been some controversy around the HPV vaccine's rollout and distribution. Countries have taken different routes based on economics and social climate leading to issues of forced vaccination

and marginalization of segments of the population in some cases. [ 271 ] The rollout of a country's vaccination program is more divisive, compared to the act of providing vaccination against HPV. In more affluent countries, arguments have been made for publicly funded programs aimed at vaccinating all adolescents voluntarily. These arguments are supported by World Health Organization (WHO) surveys showing the effectiveness of cervical cancer prevention with HPV vaccination. [ 271 ] In developing countries, the cost of the vaccine, dosing schedule, and other factors have led to suboptimal levels of vaccination. Future research is focused on low-cost generics and single-dose vaccination in efforts to make the vaccine more accessible. [ 272 ] Research [ edit ] There are high-risk HPV types that are not affected by available vaccines. [ 48 ] Ongoing research is focused on the development of HPV vaccines that will offer protection against a broader range of HPV types. One such method is a vaccine based on the minor capsid protein L2, which is highly conserved across HPV genotypes. [ 273 ] Efforts for this have included boosting the immunogenicity of L2 by linking together short amino acid sequences of L2 from different oncogenic HPV types or by displaying L2 peptides on a more immunogenic carrier. [ 274 ] [ 275 ] There is also substantial research interest in the development of therapeutic vaccines , which seek to elicit immune responses against established HPV infections and HPV-induced cancers. [ 276 ] After exposure [ edit ] Although HPV vaccination is most encouraged before any exposure to the target strains, its use is still beneficial in women who have contracted some of the target types because it's unlikely for a person to have been exposed to all target types. According to an 2008 article by the editor-in-chief of Harvard Women's Health Watch , the quadrivalent vaccine is able to reduce the occurrence of warts and precancerous lesions in HPV-positive women, and also appeared to reduce the chance of infection by non-targeted types. [ 277 ] A 2023 review article finds that vaccination reduces the chance of further HPV-associated diseases even in those already showing HPV-related precancers and diseases. At this point the standard vaccine is not believed to be therapeutic, so this effect is attributed to the vaccine preventing the establishment of new infections. [ 278 ] Therapeutic vaccines [ edit ] In addition to preventive vaccines, laboratory research, and several human clinical trials are focused on the development of therapeutic HPV vaccines. In general, these vaccines focus

on the main HPV oncogenes , E6 and E7. Since expression of E6 and E7 is required for promoting the growth of cervical cancer cells (and cells within warts), it is hoped that immune responses against the two oncogenes might eradicate established tumors . [ 279 ] There is a working therapeutic HPV vaccine. It has gone through three clinical trials. The vaccine is officially called the MEL-1 vaccine but also known as the MVA-E2 vaccine. In a study it has been suggested that an immunogenic peptide pool containing epitopes that can be effective against all the high-risk HPV strains circulating globally and 14 conserved immunogenic peptide fragments from four early proteins (E1, E2, E6 and E7) of 16 high-risk HPV types providing CD8+ responses. [ 280 ] [ 281 ] [ 282 ] [ 283 ] Therapeutic DNA vaccine VGX-3100, which consists of plasmids pGX3001 and pGX3002, has been granted a waiver by the European Medicines Agency for pediatric treatment of squamous intraepithelial lesions of the cervix caused by HPV types 16 and 18. [ 284 ] According to an article published 16 September 2015 in The Lancet , which reviewed the safety, efficacy, and immunogenicity of VGX-3100 in a double-blind, randomized controlled trial (phase 2b) targeting HPV-16 and HPV-18 E6 and E7 proteins for cervical intraepithelial neoplasia 2/3, it is the first therapeutic vaccine to show efficacy against CIN 2/3 associated with HPV-16 and HPV-18. [ 285 ] In June 2017, VGX-3100 entered a phase III clinical trial called REVEAL-1 for the treatment of HPV-induced high-grade squamous intraepithelial lesions. [ 286 ] The estimated completion time for collecting primary clinical endpoint data is August 2019. [ 287 ] As of October 2020, there are multiple therapeutic HPV vaccines in active development and in clinical trials, based on diverse vaccine platforms (protein-based, viral vector , bacterial vector, lipid encapsulated mRNA ). [ 288 ] Awards [ edit ] In 2009, as part of the Q150 celebrations, the cervical cancer vaccine was announced as one of the Q150 Icons of Queensland for its role in "innovation and invention". [ 289 ] In 2017, National Cancer Institute scientists Douglas R. Lowy and John T. Schiller received the Lasker-DeBaakey Clinical Medical Research Award for their contributions leading to the development of HPV vaccines. [ 290 ] References [ edit ] ^ "Human papillomavirus vaccine Use During Pregnancy" . Drugs.com . 11 February 2019. Archived from the original on 5 April 2020 . Retrieved 3 April 2020 . ^ "Gardasil HPV 6 L1 Protein / HPV 11 L1 Protein / HPV 16 L1 Protein / HPV 18 L1

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Kostaive Moderna Novavax OxfordAstraZeneca PfizerBioNTech SanofiGSK Sinopharm BIBP  
 Skycovione Sputnik V Valneva Respiratory syncytial virus (RSV) Smallpox Tick-borne encephalitis  
 # Varicella zoster Chicken pox # Shingles Yellow fever # combination: Hepatitis A and B MMR  
 MMRV research: Cytomegalovirus Dengue # EpsteinBarr virus Hepatitis C Herpes simplex HIV Zika  
 Protozoan Malaria RTS,S research: Trypanosomiasis Helminthiasis research: Hookworm  
 Schistosomiasis Other Androvax (androstenedione albumin) Cancer vaccines ALVAC-CEA BCG #  
 Hepatitis B # HPV # Cervarix Gardasil Probstvac NicVAX Ovandrotone albumin (Fecundin) TA-CD  
 TA-NIC combination: DTaP-IPV/Hib DTaP-IPV-HepB DTwP-HepB-Hib Hexavalent vaccine  
 Inventors/ researchers Edward Jenner Louis Pasteur Hilary Koprowski Jonas Salk John Franklin  
 Enders Maurice Hilleman Stanley Plotkin H. Fred Clark Paul Offit Katalin Karikó Drew Weissman  
 Controversy General MMR ( Lancet MMR autism fraud ) NCVIA Pox party Thiomersal Vaccines and  
 AIDS Cedillo v. Secretary of Health and Human Services Alternative vaccination schedule Related  
 Epidemiology Eradication of infectious diseases Vaccinate Your Family List of vaccine topics #  
 WHO-EM Withdrawn from market Clinical trials : Phase III § Never to phase III Portals : Medicine  
 Viruses Retrieved from "  
[https://en.wikipedia.org/w/index.php?title=HPV\\_vaccine&oldid=1268761315](https://en.wikipedia.org/w/index.php?title=HPV_vaccine&oldid=1268761315) " Categories : Cancer  
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Chemical pages without DrugBank identifier Articles without InChI source Articles without UNII source Multiple chemicals in Infobox drug Multiple chemicals in an infobox that need indexing Drugboxes which contain changes to verified fields Drugs that are a vaccine Articles containing potentially dated statements from September 2013 All articles containing potentially dated statements Articles containing potentially dated statements from September 2009 Articles containing potentially dated statements from 2018 Articles containing potentially dated statements from 2013 All articles with vague or ambiguous time Vague or ambiguous time from October 2019 Articles containing potentially dated statements from 2007 Articles containing potentially dated statements from 2014 All articles with specifically marked weasel-worded phrases Articles with specifically marked weasel-worded phrases from July 2012 All articles lacking reliable references Articles lacking reliable references from July 2022 Wikipedia medicine articles ready to translate

Posted in Hong Kong Cases of respiratory virus HMPV remain low in Hong Kong, epidemiologist says, amid mainland China outbreak David Hui, a professor of respiratory medicine at the Faculty of Medicine at Chinese University of Hong Kong, said that while HMPV infections had risen in mainland China, Hong Kong had not witnessed a similar trend. by Irene Chan 15:39, 30 December 2024 15:39, 30 December 2024 Why you can trust Hong Kong Free Press HKFP Click to share on X (Opens in new window) Click to share on Threads (Opens in new window) Click to share on Facebook (Opens in new window) Click to share on LinkedIn (Opens in new window) Click to share on Telegram (Opens in new window) Click to share on Reddit (Opens in new window) Click to share on WhatsApp (Opens in new window) Click to print (Opens in new window) A leading epidemiologist has said that levels of human metapneumovirus (HMPV) remained low in Hong Kong amid an outbreak of the respiratory virus in mainland China. David Hui, a professor of respiratory medicine at the Faculty of Medicine at Chinese University of Hong Kong, told TVB on Sunday that while HMPV infections had risen in mainland China, Hong Kong had not witnessed a similar trend. Hong Kong people on the street. File photo: Kyle Lam/HKFP. As HMPV was not a new virus, having first been reported in 2001, Hui said that enhancing hygiene measures such as wearing face masks and

washing hands frequently could help prevent a local outbreak. According to Hong Kongs Centre for Health Protection, HMPV can cause acute respiratory tract infections in all ages, with similar symptoms to flu, including fever, cough, nasal congestion, and difficulty in breathing. The infection can progress to bronchiolitis or pneumonia. Currently there is no licensed vaccine for HMPV infection. The Chinese Center for Disease Control and Prevention said during a press conference last Friday that cases of HMPV infection had risen among those under 14, particularly in the northern provinces. David Hui. Photo: GovHK. Citing hospital statistics, Chinese state media reported a significant rise in HMPV infections in both northern and southern provinces. Meanwhile, Hong Kongs HMPV infection rate has remained low. According to the Centre for Health Protection, the infection rate of HMPV between December 14 and 21 was 0.72 per cent, which was slightly higher than the previous weeks 0.67 per cent but lower than the same period last year. Flu peak coming soon Separately, Hui said Hong Kong could expect to hit peak flu season in mid-January, as flu was spreading in Japan and Hongkongers who returned from holiday there may bring the virus back. The overloaded public hospitals suffered from a shortage of doctors and nurses. File photo: Kyle Lam/HKFP. According to the Centre for Health Protection, the flu infection rate between December 14 and 21 was 1.35 per cent, higher than the previous week, which was 1.09 per cent. Hui added that the Covid-19 infection rate remained low and was unlikely to lead to an outbreak.

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HPV: Sex, cancer and a virus Download PDF Download PDF News Feature Published: 20 November 2013 HPV: Sex, cancer and a virus Megan Scudellari 1 Nature volume 503 , pages 330-332 ( 2013 ) Cite this article 2252 Accesses 627 Altmetric Metrics details Subjects Cancer Cell biology Health care Virology Human papillomavirus is causing a new form of head and neck cancer leaving researchers scrambling to understand risk factors, tests and treatments. Human papillomavirus, seen in a coloured transmission electron micrograph. Credit: PASIEKA/SPL/GETTY On a sunny day in 1998, Maura Gillison was walking across the campus of Johns Hopkins University in Baltimore, Maryland, thinking about a virus. The young oncologist bumped into the director of the university's cancer centre, who asked politely about her work. Gillison described her

discovery of early evidence that human papillomavirus (HPV) a ubiquitous pathogen that infects nearly every human at some point in their lives could be causing tens of thousands of cases of throat cancer each year in the United States. The senior doctor stared down at Gillison, not saying a word. That was the first clue that what I was doing was interesting to others and had potential significance, recalls Gillison. Humans interbred with a mysterious archaic population How the capacity to evolve can itself evolve The weak statistics that are making science irreproducible She knew that such a claim had a high burden of proof. HPV was known to cause cervical cancer and small numbers of genital cancers, but no other forms. So Gillison started a careful population study comparing people with cancer to healthy individuals. Over seven years, she recruited 300 participants, collected tissue samples, and never once looked at the data. My policy, when doing a study, is that we wait until all the data are in, and do all the analyses at once, says Gillison, who is as careful as she is blunt. I don't know anything until the data tell me. Only in 2005 did Gillison finally sit down with a doctoral student to analyse the data. Within an hour, the fruits of those years of labour popped up on the computer screen: people with head and neck cancer were 15 times more likely to be infected with HPV in their mouths or throats than those without <sup>1</sup>. The association backed up some of Gillison's earlier work, which showed <sup>2</sup> how HPV DNA integrates itself into the nuclei of throat cells and produces cancer-causing proteins. Gillison leapt from her chair and began jumping up and down. The association was so incredibly strong, it made me realize this was absolutely irrefutable evidence, she says. Since then, she and a network of other researchers have amassed a mountain of evidence that HPV causes a large proportion of head and neck cancers, and that these HPV-positive cancers are on the rise. The finding has been a paradigm-shifting realization in the field, says Robert Ferris, chief of the division of head and neck surgery at the University of Pittsburgh Cancer Institute in Pennsylvania. Credit: SOURCE: M. GILLISON/A. K. CHATURVEDI ET AL. J. CLIN. ONCOL. 29, 42944301 (2011) The medical community is struggling to come to grips with the implications. There is currently no good screening method for HPV-caused cancer in the head and neck, and commercially available HPV vaccines are still prescribed only to people under the age of 26, despite evidence that they could prevent head and neck cancer in all

adults. Plus, if HPV can get into the mucous membranes of the mouth and throat, where does it stop? There are hints that HPV is a risk factor for other, even more common, types of cancer, including lung cancer. For now, researchers and doctors need to learn more about how HPV causes cancer, and how best to prevent and treat it, says Gillison. Our clinics are flooded with head and neck cancers triggered by HPV, she says, vexation clear in her voice. But though I talk about it constantly in public settings and the lay press, it amazes me that it's often as if no one has heard of it. New threat James Rocco, director of head and neck molecular oncology research at Massachusetts General Hospital in Boston, remembers the first signs that something was changing. Until the late 1990s, most cases of cancer in the back of the throat (the oropharynx) could be blamed on alcohol and tobacco use: the majority of Rocco's patients were men around 50 years old, who had been smoking and drinking for 30 years. But then 40-year-old marathon runners and people in otherwise good health began to trickle then stream into his office. And when treated with chemotherapy and radiation, these people seemed to have better survival rates than the other head and neck cancer patients. There were also irregularities in the laboratory. When biopsied, the site of the cancer was slightly different in this healthier cohort: instead of beginning on the surface of the tonsil as normal, tumours seemed to start deep in tonsil crevices. And more and more of the tumours lacked mutations in a protein called p53 then considered a hallmark of oropharyngeal cancer. We kind of knew we were dealing with something different, recalls Rocco. Gillison started pursuing the issue in 1996, after a passing comment by a colleague. Keerti Shah, a molecular microbiologist at the Johns Hopkins Bloomberg School of Public Health, had mentioned research in Finland that had identified HPV in a cell line developed from an oropharyngeal tumour 3 . As Shah and Gillison walked around campus one day, they talked about the finding. Was it an isolated case? Had HPV contaminated the sample? Or, as Shah suspected, could HPV cause some cases of head and neck cancer? Gillison went straight to her office to do a literature search. She began analysing tumour samples from the Head and Neck Cancer Center at Hopkins and found HPV in about 25% of them. She used multiple techniques to be sure that positive results were not attributable to laboratory contamination. She looked for the virus in early, middle and late stage tumours. HPV was

not just present; she found that its DNA had infiltrated the tumours and was producing two potent oncoproteins, an indication it was the cause of the cancer. Gillison also profiled people with HPV to learn about the cancer's clinical characteristics, and identified molecular biomarkers that were absent in tumours without HPV. She worked on the project for 18 months, without taking a day off. She, Shah and their colleagues published their results in 2000 (ref. 2 ), demonstrating that HPV-positive oropharyngeal cancer is a distinct type of cancer that starts deep in the tonsils, has HPV DNA present in the tumour-cell nuclei but not neighbouring cells, has fewer p53 mutations than HPV-negative cancer, has less association with smoking and alcohol consumption and has better survival rates. But many oncologists were sceptical: some suspected that HPV was just a passenger virus, or that its presence was the result of contamination. Others thought that HPV might be just a risk factor, rather than a cause, for head and neck cancer one of several ingredients, including drinking and smoking, that when combined together congealed into a cancerous stew. Maura Gillison: These diseases might look similar, but what drove the pathogenesis was completely different. Credit: OSU In 2007, Gillison published her seven-year population study showing the link between oral HPV infection and oropharyngeal cancer 1 ; the next year, she released a study 4 showing that HPV-positive and HPV-negative oropharyngeal cancers had completely different risk profiles. People with HPV-positive cancer tended to have had many oral-sex partners, but there was no statistical association with tobacco smoking or drinking; those with HPV-negative cancers were heavy drinkers and cigarette smokers but there was no association with sexual activity. These were two completely different diseases, says Gillison. They might superficially look similar a patient comes in with a neck mass and their throat hurts but I realized what drove the pathogenesis was completely different in the two cases. By then, all doubts had faded. In 2007, the World Health Organization's International Agency for Research on Cancer in Lyons, France, declared that there was sufficient evidence to conclude that HPV causes a subset of oropharyngeal cancers. Gillison's research has been definitive, says Jeffrey Myers, director of head and neck surgery research at the University of Texas MD Anderson Cancer Center in Houston. Community acceptance came not a moment too soon. The number of oropharyngeal cancers has been growing over the past 30 years:

there are now 10,000 cases in the United States each year, a number that is likely to climb to 16,000 by 2030 (see 'Emerging threat'). An overwhelming majority are caused by HPV. Worldwide, cancer centres report that the virus is responsible for between 45% and 90% of oropharyngeal cancers. In Europe, HPV-positive oropharyngeal cancers have almost quadrupled in number over a period of 10 to 15 years, says Hisham Mehanna, director of the Institute of Head and Neck Studies and Education at the University of Birmingham, UK, who has published a meta-analysis<sup>5</sup> of more than 250 papers on prevalence rates. Our projection suggests that it's going to continue to increase significantly. Why rates are escalating is unknown, although one suggestion points to increasing numbers of sexual partners.

**Problem proteins** It turns out that HPV causes throat cancer in much the same ways as it causes cancer in the cervix. The virus's DNA integrates into human DNA in the nuclei of healthy cells, and uses the cells' machinery to produce two harmful proteins, E6 and E7. These bind to, and shut down, two important tumour-suppressor proteins, p53 and pRb. Active pRb prevents excessive cell growth; without it, cells proliferate unchecked. Active p53 arrests the cell-division cycle when DNA is damaged, and then either activates DNA repair or initiates cell death. Without p53, a cell replicates wildly even if it has DNA damage. If HPV can get into the mucous membranes of the mouth and throat, where does it stop? In cancers caused by HPV, the virus silences p53 but leaves the gene that produces it intact; by contrast, in HPV-negative cancers, the gene is mutated, probably through exposure to carcinogens, and produces an ineffective version of the protein. This may explain why people with HPV-positive oropharyngeal cancer respond better to treatment: early evidence suggests<sup>6</sup> that chemotherapy or radiation may somehow reactivate p53 in HPV-positive cancers, turning the powerful protein back on to fight the tumour. There are other possibilities. It could be that people with HPV-positive cancer are generally healthier than their HPV-negative counterparts: they tend to be younger, generally don't smoke and are more likely to comply with treatment regimes. Another possibility, supported by a study<sup>7</sup> using sequencing data from 74 head and neck cancers, is that HPV-negative tumours are more heterogeneous than HPV-positive tumours. The cells have many more mutations, and a wider range of them. In an HPV-negative tumour, therefore, there's more likely to be something in there that will resist therapy,

says Rocco, a co-author of the study. Toxic treatment The fact that people with HPV-positive cancer have better outcomes has caused many clinicians, including Gillison and Ferris, to wonder whether these patients should get different treatments. The current standard therapy for oropharyngeal cancer is a combination of cisplatin a toxic, potent chemotherapy drug and radiation. This has many potential side effects, including damage to the voice box and throat, which can hinder the ability to speak and swallow. With the younger, healthier HPV-positive patients, who are 58% less likely to die within three years of treatment than HPV-negative patients, clinicians worry about the long-term effects of the treatment, and are exploring techniques including less-toxic chemotherapy regimens. Researchers are also looking at ways to prevent the disease in the first place. More than 90% of HPV-related oropharyngeal cancers are caused by HPV-16, a particularly dangerous strain and the main cause of cervical cancer. The two vaccines approved to prevent cervical cancer, Merck's Gardasil and GlaxoSmithKline's Cervarix, both protect against HPV-16. In theory, therefore, protection against HPV-positive oropharyngeal cancer is already in doctors' cabinets. A clinical trial of 5,840 women, published this year by researchers at the US National Cancer Institute <sup>8</sup>, showed that Cervarix is 93% effective at preventing oral HPV infection in both women with pre-existing cervical infections and those without, none of whom had been previously vaccinated. A major barrier stands in the way of official approval for using the vaccine to protect against oropharyngeal cancer: there is not yet a way to prove that it would work. For cervical cancer, doctors test cells taken from the cervix during routine screening, looking for changes that precede the emergence of cancer. Because HPV-positive oropharyngeal cancer arises deep in the tonsil, checks would have to be much more invasive. In theory, we could detect it, but we would need to do a tonsillectomy on everyone in the vaccine trial, says Gillison. That's never going to happen. There may be another way. Mehanna and his colleagues are in the process of analysing the tonsils of 1,250 people who underwent tonsillectomies for non-cancerous reasons. The researchers have identified what they think are pre-malignant lesions in some HPV-positive samples that may represent the earliest stages of the cancer, and could serve as a biomarker. We're now testing to make sure this pre-malignancy is driven by HPV and is not just random, says Mehanna. Other concerns and

questions linger. For example, scientists have yet to determine whether oral HPV infection comes only from sexual acts that involve contact between the mouth and genitals, or also from other acts including deep kissing. And most people who develop an HPV infection do not get oropharyngeal cancer: about 90% of those who become infected orally clear the infection within two years. No one is sure why. Researchers are also investigating whether HPV causes other types of cancer. There have been studies of the relationship between the virus and oesophageal cancer, but findings have been inconclusive. Another area of interest is the lung. There, too, tobacco has been the primary culprit for decades, but some 15-20% of lung-cancer cases in men and 50% in women are in people who have never smoked. Doctors have theorized that a virus lies behind them. The available data are conflicting. One paper<sup>9</sup> in 2001 identified HPV DNA in 55% of 141 lung tumours, compared with 27% of 60 non-cancer control samples. And in 2009, researchers led by Iver Petersen, director of the Institute for Pathology at Jena University Hospital in Germany, conducted a meta-analysis<sup>10</sup> of 53 publications examining 4,508 cases of lung cancer, and concluded that HPV is the second most important cause of lung cancer after cigarette smoking. They encouraged more research. But many other studies have refuted those observations, including one from Gillison and her colleagues, in which they used sensitive DNA assays to study the lung cancers of 450 patients, and found no HPV (ref. 11). With head and neck cancer, however, Gillison is optimistic that new knowledge about HPV as a cause of the disease will help physicians to treat it and eventually to prevent it with a vaccine. In terms of cancer, she says, there aren't many populations where we've identified the necessary cause and have a potential solution on the shelf.

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Health | Close to Half of American Adults Infected With HPV, Survey Finds <https://www.nytimes.com/2017/04/06/health/hpv-virus-survey-united-states.html> Share full article Advertisement SKIP ADVERTISEMENT You have a preview view of this article while we are checking your access. When we have confirmed access, the full article content will load. Supported by SKIP ADVERTISEMENT Close to Half of American Adults Infected With HPV, Survey Finds Share full article A magnification of stained HPV viruses. Nearly half of adult Americans are infected with genital human papillomavirus, researchers have found. Credit... Kwangshin Kim/Science Source By Nicholas Bakalar April 6, 2017 More than 42 percent of Americans between the ages of 18 and 59 are infected with genital human papillomavirus , according to the first survey to look at the prevalence of the virus in the adult population. The report , published on Thursday by the National Center for Health Statistics, also found that certain high-risk strains of the virus infected 25.1 percent



of men and 20.4 percent of women. These strains account for approximately 31,000 cases of cancer each year, other studies have shown. Two vaccines are effective in preventing sexually transmitted HPV infection , and researchers said the new data lend urgency to the drive to have adolescents vaccinated. If we can get 11- and 12-year-olds to get the vaccine, we'll make some progress, said Geraldine McQuillan, an epidemiologist at the Centers for Disease Control and Prevention, and lead author of the new report. You need to give it before kids become sexually active, before they get infected, Dr. McQuillan said. By the time they're in their mid-20s, people are infected and it's too late. This is a vaccine against cancer that's the message. (Do you have questions about HPV? Read some answers here .) She and her colleagues also found that 7.3 percent of Americans ages 18 to 69 were infected orally with HPV , and 4 percent were infected with the high-risk strains that can cause cancers of the mouth and pharynx. We are having trouble retrieving the article content. Please enable JavaScript in your browser settings. Thank you for your patience while we verify access. If you are in Reader mode please exit and log into your Times account, or subscribe for all of The Times. Thank you for your patience while we verify access. Already a subscriber? Log in . Want all of The Times? Subscribe . Advertisement SKIP ADVERTISEMENT

As it happened ended News Health HMPV virus latest: EU monitoring cases amid soaring infections across China Cases of the flu-like virus have spiked across northern Chinese provinces this winter Alexander Butler , Maroosha Muzaffar Thursday 09 January 2025 17:44 GMT Comments Independent Premium Subscribe to Independent Premium to bookmark this article Want to bookmark your favourite articles and stories to read or reference later? Start your Independent Premium subscription today. Subscribe Already subscribed? Log in Close India Lockdown Looms? First Cases Of New Virus Reported After HMPV Grips China | Top Updates Sign up for our free Health Check email to receive exclusive analysis on the week in health Get our free Health Check email Get our free Health Check email SIGN UP I would like to be emailed about offers, events and updates from The Independent. Read our privacy policy The European Union is monitoring cases of human metapneumovirus (HMPV) amid an outbreak of the disease in China . The European Centre

for Disease Prevention and Control said cases across Europe were not unusual for this time of year, but would continue to assess the situation . ECDC continues to monitor the situation in collaboration with the Chinese CDC and WHO/EURO to gather additional information, it said. The virus , which causes flu or cold-like symptoms, has seen cases spiking across northern Chinese provinces this winter, particularly among children. Photos and videos of people wearing masks in hospitals in China emerged on social media platforms and local reports compared the scenes to the initial outbreak of Covid . Meanwhile, Indonesia has started monitoring flights from China and Malaysia amid concern over rising HMPV infections across the region. Those travelling to Bali will have to fill out a form three days before their arrival to the island providing a record of passengers health, according to local health authorities.

Recommended What is HMPV? China steps up monitoring amid new virus outbreak Everything we know about HMPV in the UK: Symptoms, case numbers and how to get a test How worried should you be about the HMPV outbreak in China? Experts explain What is really behind the mystery new virus gripping China and the world Key Points EU monitoring HMPV cases Bali ramps up monitoring of arrivals from China Doctors say it is vital for China to share infection data India ramps up monitoring as cases rise Everything we know about HMPV cases in the UK Can HMPV virus spread to other countries? Hong Kong has reported a few cases of HMPV. Neighbouring countries like Cambodia and Taiwan are keeping a close watch on the situation. Cambodias Communicable Disease Control Department has issued warnings about HMPV, noting its similarity to Covid-19 and influenza. Taiwans Centers for Disease Control has said the viruss higher risks for children, the elderly, and immunocompromised individuals. In neighbouring India, officials said there is no need for panic as HMPV is like any other respiratory virus. There has been news doing the rounds about a metapneumovirus outbreak in China. Let me be very clear on that count. Metapneumovirus is like any other respiratory virus which causes the common cold, and in the very old and the very young it could cause flu-like symptoms, Directorate General of Health Services (DGHS) official Dr Atul Goel said. Alexander Butler 8 January 2025 00:01 How to prevent HMPV transmission HMPV (human metapneumovirus) spreads through direct contact with infected individuals or by touching contaminated surfaces, experts say. Unlike viruses

like flu, RSV, and Covid-19, there is no vaccine for HMPV, Dr Carla Garcia Carreno, director of infection prevention and control at Childrens Medical Center in Plano, Texas says. We dont have that advantage of priming or boosting our immune system to fight these viruses. But still, everything else that we learned for Covid can apply to metapneumovirus. She told CBS News: If somebodys sick, try to avoid crowding so they dont expose everybody, especially the vulnerable people. If that person is sick and can not avoid going to a place where other people are, then try to use a mask, use cough and sneezing etiquette and good hand washing. Alexander Butler 8 January 2025 01:00

How was Human metapneumovirus discovered? Researchers in the Netherlands discovered the virus in 2001. Scientists collected 28 samples from children in the Netherlands who had unexplained respiratory illnesses. No recognised illnesses were detected in their blood, despite the fact that a number of them had severe illnessess and required mechanical breathing. Before being viewed under an electron microscope, the samples were grown in several cell types from dogs, chickens, and monkeys. Alexander Butler 8 January 2025 03:00

Bali ramps up monitoring of arrivals from China and Malaysia amid HMPV outbreak In the wake of the rise in HMPV infections in China and Malaysia, authorities in Bali have started monitoring foreign arrivals from these countries. According to the local health authorities, nationals from China and Malaysia arriving in Bali have to fill out a health pass three days before their arrival to the island to keep a record of passengers health issues like body temperature, cold or flu symptoms. Maroosha Muzaffar 8 January 2025 03:02

How long has HMPV been circulating? The virus was first identified in 2001, but researchers believe it has been circulating in humans for at least six decades. Despite its longevity, it lacks the name recognition of influenza, Covid-19, or RSV, according to Dr Leigh Howard, an associate professor of paediatric infectious diseases at Vanderbilt University Medical Center. One reason for its obscurity is that it is rarely referred to by name, except in cases where individuals are hospitalised with a confirmed infection, Dr Howard told The New York Times . The clinical features are really difficult to distinguish from other viral illnesses, and we dont routinely test for HMPV the way we do for Covid, flu or RSV, Dr Howard said. So most infections go unrecognised and are chalked up to whatever respiratory thing is going around. Maroosha Muzaffar 8 January 2025 03:44

How HMPV is treated

Like most common respiratory illnesses, HMPV usually clears up on its own. Treatment of symptoms is usually in the form of medications to control pain and fever, such as ibuprofen and paracetamol. Patients with more severe wheezing and coughing may require a temporary inhaler, according to the American Lung Association.

Alexander Butler 8 January 2025 04:00

Singapore experienced spike in HMPV cases at end of 2024

Singapore experienced a rise in human metapneumovirus (HMPV) infections at the end of 2024, the ministry of health said, but added that it was consistent with previous year-end trends due to increased social gatherings and holiday travel. China, India, and Malaysia have also reported spikes in HMPV cases and Bali authorities have ramped up monitoring of Chinese and Malaysian nationals arriving in the city. Singapore's ministry of health has advised practising good hygiene, coughing and sneezing etiquette and hand washing practices to mitigate the spread.

Maroosha Muzaffar 8 January 2025 04:30

Nepal to step up testing for HMPV

Nepal plans to test respiratory illness patients for HMPV to assess its spread this winter, The Kathmandu Post reported. While the virus has been detected in the country in the past, officials aim to confirm its presence by testing those with influenza-like symptoms who test negative for influenza. Although infection of human metapneumovirus is not new to our country and has been detected several times in the past, we have decided to carry out testing on specimens from patients suffering from influenza-like symptoms who test negative for influenza virus, Dr Yadu Chandra Ghimire, director of the epidemiology and disease control division. Dr Ghimire advised against panic, saying: This virus has been circulating in our communities for years. We usually don't test unless there is a spike in new cases. We have decided to carry out testing, as the rise in infections in our neighbours have become headline news.

Maroosha Muzaffar 8 January 2025 04:49

What is really behind the mystery new virus gripping China and the world

What is really behind the mystery new virus gripping China and the world

As spikes in a respiratory virus and images of overwhelmed intensive care units emerge, there is a worrying echo of the early days of Covid. Zoë Beaty asks if Beijing is downplaying what is happening in the northern provinces and how worried the rest of us should be

Alexander Butler 8 January 2025 05:00

What is HMPV? China steps up monitoring amid new virus outbreak

China is experiencing a surge in infections of a respiratory virus, leading to

reports of overcrowded hospitals, new monitoring measures and public concerns about an outbreak. The virus, identified as human metapneumovirus (HMPV), has seen cases spiking across northern Chinese provinces this winter, particularly among children. The outbreak comes five years after the world was first alerted to the emergence of a novel coronavirus in Wuhan, China, which later turned into a global pandemic with seven million deaths reported. Photos and videos of people wearing masks in hospitals in China emerged on social media platforms and local reports compared the scenes to the initial outbreak of Covid-19. Health authorities are implementing new measures to monitor and manage the spread of pneumonia cases of unknown origin. Nonetheless, Beijing has downplayed the developments as an annual winter occurrence. What is HMPV? China steps up monitoring amid new virus outbreak Authorities in Beijing have downplayed surge in cases, which comes five years after world was first alerted to emergence of Covid-19 Maroosha Muzaffar 8 January 2025 06:05 Older 1 / 6 Newer More about virus China Kazakhstan Malaysia India Covid Beijing EU European Centre for Disease Prevention and Control Bali Join our commenting forum Join thought-provoking conversations, follow other Independent readers and see their replies Comments Most Popular Popular videos Sponsored Features

Edit Story Forbes Innovation Healthcare What Is The HMPV Virus Surging In China? Katherine Hignett Senior Contributor Opinions expressed by Forbes Contributors are their own. I write about health and U.K. health policy. Following Jan 6, 2025, 08:04am EST Updated Jan 6, 2025, 11:13am EST Share to Facebook Share to Twitter Share to LinkedIn Young man coughing and sneezing from a seasonal illness. Getty Plenty of viruses are having their strongest season in years. Flu, norovirus and RSV are all surging across numerous countries, including the United States. In northern China, a common illness called human metapneumovirus, or HMPV, is on the rise and sparking global headlines. But public health officials have urged calm about the disease, which is usually mild and has been circulating for decades even though many people have never heard of it before. Respiratory infections tend to peak during the winter season, Chinese foreign ministry spokesperson Mao Ning said about HMPV on Friday, per The Independent. The diseases appear to be less

severe and spread with a smaller scale compared to the previous year. So what is HMPV, and should you be worried about it? What is HMPV? Human metapneumovirus is a virus that causes cold and flu-like symptoms. It's common, accounting for roughly 10% to 12% of respiratory illness among children, per the Cleveland Clinic . It's in the same family of viruses as respiratory illness RSV . HMPV may cause coughing, fever, runny nose, wheezing, sore throat, shortness of breath and rash. Most people experience relatively mild symptoms, but it can progress to bronchitis or pneumonia. The elderly, young children and those with existing lung conditions or a compromised immune system are more likely to develop severe disease. MORE FOR YOU Google Starts Tracking All Your Devices In 6 WeeksForget Chrome And Android California Wildfire Live Updates: Newsom Launches Investigation Into Crucial Water Shortages As Blazes Continue Critical Warning For 100 Million Apple UsersNew Hack Attack Confirmed The illness normally resolves within a few days or a week, with more severe cases potentially lasting longer. There's no vaccine or specific medication for HMPV, but people with serious symptoms may be hospitalized and given treatments like oxygen therapy, intravenous fluids and steroids to aid their recovery. The virus spreads by coughing and sneezing, kissing and hugging, and contact with contaminated surfaces like doorknobs or keys. So you can protect yourself by washing your hands frequently and thoroughly, covering your nose and mouth with your elbow when you cough and sneeze, and staying away from people with cold symptoms. It's also a good idea to refrain from sharing utensils like knives and forks with other people or drinking from the same cup. Is HMPV in the U.S.? First discovered in 2001, HMPV is now found around the world. It's been documented in the U.S. for decades, tending to spread faster during the colder months. In fact, Chinese officials warned members of the public about U.S. HMPV cases at the tail end of spring 2023. The Centers for Disease Control and Prevention monitors HMPV by percentage of positive tests. Results show cases started gathering steam this season in the U.S. toward the end of November, with 1.94% of tests coming back positive during the last week of 2024. This compares to an annual low of 0.25% of tests back in mid-September. Should We Be Worried About HMPV? Experts have urged calm over HMPV, which they say isn't likely to result in a COVID-19-style pandemic. Governments don't typically consider it a

"notifiable" or "reportable" disease that needs to be flagged to officials. Per The Guardian , it's possible that improvements in monitoring technology are behind high rates in northern China, as opposed to an unusually strong season. Non-notifiable diseases "are very common and lots of people get them," Dr. Jacqueline Stephens, a senior lecturer in public health at Flinders University in Australia, told the newspaper. "They make us feel terrible for a few days but if we rest and recuperate for a few days then we get better." Stephens said the virus could be getting more attention simply because societies are more concerned about contagious disease following the pandemic. "I think we're just more cautious of outbreaks now," she said. "Everyone is hypervigilant, and you hear this term human metapneumovirus and it sounds kind of scary." Like other winter illnesses, individuals can protect themselves and others from HMPV by following standard hygiene measures. This is particularly important for those at the greatest risk from these viruses. Follow me on Twitter or LinkedIn . Katherine Hignett Following Editorial Standards Forbes Accolades Join The Conversation Comments One Community. Many Voices. Create a free account to share your thoughts. Read our community guidelines here . Forbes Community Guidelines Our community is about connecting people through open and thoughtful conversations. We want our readers to share their views and exchange ideas and facts in a safe space. In order to do so, please follow the posting rules in our site's Terms of Service. We've summarized some of those key rules below. Simply put, keep it civil. Your post will be rejected if we notice that it seems to contain: False or intentionally out-of-context or misleading information Spam Insults, profanity, incoherent, obscene or inflammatory language or threats of any kind Attacks on the identity of other commenters or the article's author Content that otherwise violates our site's terms. User accounts will be blocked if we notice or believe that users are engaged in: Continuous attempts to re-post comments that have been previously moderated/rejected Racist, sexist, homophobic or other discriminatory comments Attempts or tactics that put the site security at risk Actions that otherwise violate our site's terms. So, how can you be a power user? Stay on topic and share your insights Feel free to be clear and thoughtful to get your point across Like or Dislike to show your point of view. Protect your community. Use the report tool to alert us when someone breaks the rules. Thanks for reading our

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