

The Moral Justification for a Compulsory Human Papillomavirus Vaccination Program

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Compulsory human papillomavirus (HPV) vaccination of young girls has been proposed as a public health intervention to reduce the threat of the disease. Such a program would entail a symbiotic relationship between scientific interests in reducing mortality and morbidity and philosophical interests in promoting morality. This proposal raises the issue of whether government should use its police powers to restrict liberty and parental autonomy for the purpose of preventing harm to young people. I reviewed the scientific literature that questions the value of a HPV vaccination. Applying a principle-based approach to moral reasoning, I concluded that compulsory HPV vaccinations can be justified on moral, scientific, and public health grounds. (*Am J Public Health*. 2009;99:616–622. doi:10.2105/AJPH.2007.131656)

Early in the 1950s, polio hysteria erupted across the United States in the wake of a rash of new cases. Thousands of people, mostly young children, were crippled. In 1952, more than 58 000 cases of polio were reported, including 21 000 cases of paralytic polio and more than 3000 deaths. Terrified parents, worried that polio would render their children unable to walk or force them into iron lungs,¹ kept their children away from beaches and movie theaters. Medical researchers conducted experimental studies in public schools. Polio became one of the most feared and studied diseases in the mid-20th century.^{2,3}

In retrospect, the decision to implement a compulsory vaccination program for polio was an effective, legal, and ethical use of public health authority. The vaccine was effective: the incidence rate for polio was 3.6 times higher for unvaccinated than vaccinated children, the Salk vaccine was 80% to 90% successful in preventing paralytic poliomyelitis, and over the 2- to 3-year period after the Salk vaccine was introduced, an overall 60% to 70% prevention rate was achieved.^{1,2,4} As a result, the elimination of poliomyelitis has been called one of the 10 great public health achievements of the 20th century in the United States.⁵

Compulsory vaccination of children for polio seems to be legally compatible with a precedent established by the 1905 Supreme Court ruling in *Jacobson v. Massachusetts*. Bayer and Moreno point out that the Court in this

case decided that a compulsory vaccination program that addressed a smallpox outbreak was legal.⁶ According to the authors,

The Supreme Court held the U.S. Constitution permits states to enact “such reasonable regulations [to] protect the public health and public safety” as long as such efforts did not “contravene the Constitution of the United States, nor infringe any right guaranteed or secured by the instrument.”^{6(p249)}

Thus, the Court set a precedent for allowing compulsory vaccination programs to control epidemics and prevent the spread of infections. Any implementation of a compulsory human papillomavirus (HPV) vaccination program should follow legal precedents that include the right of states to allow exceptions for individuals with medical, religious, and philosophical objections.

A compulsory HPV vaccination program also appears to be ethically permissible according to the harm principle proposed by John Stuart Mill in *On Liberty*.⁷ Mill argued that “the only purpose for which power can be rightfully exercised over any member of a civilized community, against his will, is to prevent harm to others.”^{7(p13)} In the polio vaccination campaign, the diminution of individual autonomy and liberty was justified by the collective interest of the public in preventing harm from disease and promoting the common good. The ethical principles of beneficence and nonmaleficence and the desire to prevent harm overrode the ethical principles of autonomy and liberty.

POLIO AND HUMAN PAPILOMAVIRUS

Today, parents and guardians of children, politicians, and medical and public health professionals who help protect the health of Americans face a similar dilemma: should vaccination against HPV be made compulsory among young girls and women who have not yet engaged in sexual activity (and therefore almost certainly have not been infected by HPV)? Even as the new HPV vaccine created a scientific and public health breakthrough in cancer prevention, it also generated great interest in and controversy about making it compulsory.⁸

Similar to polio, HPV is a common infectious disease in humans. According to research by Cates⁹ and Weinstock et al.,¹⁰ and a report from the Centers for Disease Control and Prevention,¹¹ approximately 6.2 million new cases of HPV infection are reported every year, and 20 million people in the United States already have HPV. A recent study estimated that 26.8% of US women are infected with some form of HPV, meaning that 1 in 4 US women aged 14 to 59 years is infected with this sexually transmitted virus that in some forms can cause cervical cancer.¹² In addition, reports from the American Cancer Society¹³ and the Centers for Disease Control and Prevention^{14–16} estimate that every year between 10 520 and 12 200 women will develop invasive cervical cancer and between 3900 and 4100 women will die from this disease. Thus a major similarity between polio and HPV is that both are infectious diseases that cause harm.

Polio is a highly contagious disease, and the poliovirus is transmitted primarily through oral contact with the feces of an infected person. Polio also can be spread through contaminated food or water, especially in areas with poor sanitation systems.² Some infected persons have no symptoms, but polio can produce a range of effects, from nonparalytic forms of the disease, with sore throat, fever, nausea, diarrhea, and

other mild symptoms, to paralytic polio that can cause muscle fatigue and paralysis. In 1% of infections, the virus spreads to the bloodstream and central nervous system, causing varying degrees of paralysis and, in extreme cases, death from paralysis of the muscles that control respiration.

The term HPV encompasses a group of more than 100 viruses; 30 are sexually transmitted.¹⁷ Genital HPV infections vary in their effects: some produce no symptoms, low-risk types cause abnormalities or genital warts, and high-risk types may lead to cancer of the cervix, vulva, vagina, anus, or penis.¹⁸ A key difference between polio and HPV is that many of the serious detrimental physical effects of polio are immediate and visible (e.g., paralysis and death), whereas some of the more serious consequences of HPV (e.g., cervical cancer and death) occur much later in the course of the disease.

Another significant similarity between polio and HPV is that health professionals have access to effective vaccines to help prevent their spread. In the case of polio, vaccination is the best way to prevent the disease.² Today, most children in the United States receive 4 doses of inactivated polio vaccine; this vaccine is 90% effective after 2 doses and 99% effective after 3 doses. The HPV vaccine, Gardasil (Merck and Co, Inc, Whitehouse Station, NJ), is the first vaccine developed to prevent cervical cancer, precancerous genital lesions, and genital warts. One form of this vaccine is given in a series of 3 injections over a 6-month period and is reported to be highly effective in preventing 4 types of infection in young women who have not been previously exposed to HPV.¹⁹ Gardasil targets the types of HPV that cause up to 70% of all cervical cancers and approximately 90% of genital warts.^{20,21}

Polio and HPV are also alike in that, despite the publicity they have received and the emotion they have provoked, the most serious cases of both diseases have low incidence rates. At its peak in the 1950s, polio's average incidence was approximately 50 per 100 000 people, fewer than 1% of all polio infections resulted in flaccid paralysis, and during the most intense outbreak, in 1952 to 1953, 145 people died.²² Reports of the incidence rates for HPV infection and for genital warts specifically have been relatively imprecise, but it is estimated that in the United States as many as 100 per 100 000

people develop genital warts.²³ Saraiya et al. report that in the United States in 2002, there were 11 071 cases of invasive cervical cancer and the incidence rate was 8.5 per 100 000 people.²⁴ Gerberding reports that an estimated 4100 women die from this disease annually.¹⁶

Polio is not the only disease for which mandatory vaccination has been successful and publicly accepted. Vaccination is required for measles, a highly contagious acute viral disease that can cause mild to serious harm. Before the introduction of the measles vaccination in 1963, the United States had approximately 3 to 4 million cases of measles annually; approximately 400 to 500 persons died, 48 000 were hospitalized, and 1000 developed chronic disability from measles encephalitis.²⁵ In response to this health threat, society mandated that children receive the measles, mumps, and rubella vaccine. The immunization of many reduced harm in a few. This is the nature of public health vaccination programs.

The desire of some health professionals to prevent illness and deaths from diseases that have low morbidity and mortality rates raises questions about whether the ends—lowered morbidity and mortality rates—justify the means—compulsory vaccinations. The key moral dilemma is whether a utilitarian perspective that weighs the social and health care consequences and costs should override a deontological perspective that it is always good to act to prevent harm, disease, and death. In other words, is the utility and good of a compulsory vaccine in preventing harm greater than the utility and good of preserving individual liberty and choice?

OPPOSITION TO THE HUMAN PAPILOMAVIRUS VACCINE

The segments of society that oppose the use of an HPV vaccine present several reasons. I limited my analysis to 2 general yet important rationales for opposing a compulsory vaccination program. The first arises from the strong association of HPV with sexual contact, in contrast to contagious diseases such as polio that are usually associated with casual contact.²⁶ A major consequence of the association of HPV with sexual contact has been that opposition groups link concerns about preventing morbidity and mortality with concerns about

morality regarding sexual behavior, especially among youths. This relationship between HPV infection and its mode of transmission has led some parents and conservative groups to resist having their children vaccinated by mandatory or voluntary means because they believe that exposing children to an HPV vaccine will increase sexual activity among youths, undermine family values forbidding premarital sexual relationships and promoting abstinence, and create a false sense of security about being protected from sexually transmitted infections (STIs).^{27–30} In place of a vaccination program, these groups advocate abstinence education and better communication between parents and children to foster family values that prohibit premarital sexual relationships.

Scientific literature offers a second reason to oppose compulsory vaccination: the benefits of vaccination are not great enough to warrant such a controversial step. Some researchers have argued that the mortality rate of cervical cancer is too low to be considered an imminent harm that justifies overriding individual liberty and autonomy. After considering epidemiological data, mortality trends in cervical cancer, and the unknown long-term effects and efficacy of the HPV vaccine, some health professionals have argued in favor of voluntary vaccination, improved screening and treatment, or both instead of mandatory vaccination to reduce the threat of cervical cancer.^{8,31–38} Others, however, argue that the ethical principles of beneficence, nonmaleficence, autonomy, and justice can justify compulsory vaccination programs.

ETHICS AND MORALITY OF COMPULSORY VACCINATION

To begin the process of moral reasoning on this dilemma, it is reasonable to acknowledge that health professionals and members of society who support a compulsory vaccination program and their counterparts who oppose compulsory vaccination programs and prefer alternatives such as voluntary vaccinations, premarital abstinence programs, improved screening and treatment, and other options, appear virtuous. None of the proposed alternatives to compulsory vaccination are intended to do harm. Rather, all parties to the debate desire good, achieved through differing means. Furthermore, neither the act of making a

compulsory HPV vaccination program available nor implementing alternative programs possesses any inherent or intrinsic feature that is wrong or harmful. Therefore, from a public health perspective, a judgment about the rightness or wrongness of a compulsory vaccination program should be determined by assessing whether key ethical principles justify such action, whether this action reduces harm to individuals and society, and whether this action produces consequences that are at least as good as, if not better than, alternative actions that are available for preventing disease and death.

Beneficence and Nonmaleficence

HPV infection can lead to suffering and harm. Scientific observations have documented that young people in the United States engage in sexual practices that place them at risk for STIs and subsequent illnesses such as cervical cancer. For example, it is estimated that 46% of high school students have sexual intercourse with another person by the time they graduate and 75% of young people have sexual relationships before they marry.^{39–43} STIs are reportedly common among sexually active adolescent girls. For example, the Centers for Disease Control and Prevention estimates that 3.2 million adolescent girls have STIs, and of these, 18.3% are infected with HPV.⁴⁴ The transmission of 2 common HPV types, types 6 and 11, are responsible for 90% of genital warts; types 16 and 18 account for approximately 70% of all cervical cancers worldwide. The HPV vaccine can reduce and prevent this harm. Thus, providing access to HPV vaccination to potentially at-risk sexually active young people is a significant and reasonable act of beneficence and nonmaleficence because it can help to reduce the incidence of this communicable disease and maintain health. A policy that forbids or interferes with this harm-reducing action and may thus lead to unnecessary suffering is at least morally questionable.

Those segments of society that oppose the use of the HPV vaccine, because of the belief that it will increase undesirable sexual behaviors or interfere with certain family values, focus not on prevention of immediate physical harm but on a social desire to uphold deeply rooted moral values about how the young should sexually behave. Eradicating physical disease that resides in people becomes

secondary to sustaining social ideas that some segments of society hold among themselves.

From a public health perspective, treating and reducing real harm should be preferred over adhering to a belief about interventions that do not exist or are not effective. For example, studies—including a major research project that analyzed 4 abstinence programs⁴⁵—have found that teaching abstinence from sexual activity outside marriage has no statistically significant effect on eventual behavior.^{46–48} In addition, studies of communication between parents and children have documented that such communications have a positive effect^{49–51}; however, research has also shown that not all parents discuss sexuality issues with their children and that the rate of this communication varies greatly and is affected by such factors as the parents' gender, religious affiliation, and self-efficacy in communication; the topic of discussion; and the risk-taking behavior of the child.^{52–54} Research also has found that perception of the quality of communication between parents and children differs depending on whether the parent or the child is interviewed.⁵⁵ Furthermore, studies have demonstrated that parents frequently lack adequate sexual knowledge and communication skills to effectively deal with personal and human sexuality issues.^{56,57}

Evidence about the rates of HPV infections and sexual activity among the young, the ineffectiveness of abstinence programs, and the quantity and quality of communications between parents and children on sexual issues demonstrates a need for public health interventions that prevent the harm that HPV causes among young people. A compulsory or voluntary vaccination program could greatly improve disease prevention over the status quo. It would be wrong to uphold a symbolic ideal of no sexual intercourse among youths by prohibiting an alternative that can alleviate a real harm. In an ideal world, all people would stop engaging in risky sexual behaviors and all parents would engage in meaningful and effective discussions with their children about sexual (and other important) matters. However, these worthy ideals are not realistic enough, nor likely to occur soon and often enough, to match the effectiveness of a vaccine that is available now to eliminate real and immediate harm. Reducing the transmission of HPV infection among youths is an act of beneficence,

and the alternative—opposing vaccinations that can reduce real and probable harm or simply failing to provide them—is an act of malevolence.

Autonomy

An important question is, whose autonomy should have a higher priority, the child's or the parent's? It is reasonable to consider who is at greater risk and who stands to gain a greater benefit. In the case of HPV vaccination of youths who have not yet been exposed to HPV, the right of the child to receive the preventive measure should override respect for the parents' autonomy and the parents' desire to teach social beliefs that restrict health care action, because the health threat directly involves the life of the child. The rights, autonomy, and desires of parents are important, but the consequences of the decision affect them indirectly. If respect for parental autonomy leads to denying children access to effective health care, the probability of harm and the loss of benefits are much greater for the children than for their parents.

Disease, disability, and loss of life are burdens—for both individuals and society—that outweigh the benefits derived from upholding parental rights and authority. Furthermore, the availability of a voluntary or compulsory vaccination program does not deprive parents of the opportunity, or the right, to teach their own values to their children. It simply helps to ensure health care for all. As Colgrove pointed out in his essay on ethics and politics associated with an HPV vaccine,

Minors have a right to be protected against vaccine-preventable illness, and society has an interest in safeguarding the welfare of children who may be harmed by the choices of their parents and guardians.^{26(p2390)}

Justice

The risks of polio, STIs, and cancer are present in society, and all people, regardless of age, are exposed to these health problems, albeit at different rates during different stages of life. It would be wrong, according to Rawls's principle of justice, to provide health care to one group and withhold health care from another group because of a bias about age, race, gender, socioeconomic status, religion, or other factors.⁵⁸ The opportunity for justice,

according to Rawls, should be provided to all impartially. This principle implies that an HPV vaccine should be made available to everyone in need. Universal access is fair, and withholding the vaccine on grounds of age, potential sexual behavior, or competing values about sexual engagement among youths is unfair.

Making age, marital status, or sexual activity a criterion for receiving health care is discriminatory. That the mode of HPV transmission is sexual in nature and that youths choose their sexual behaviors are inconsequential to the correctness of an action to reduce harm in adolescents and young adults. Causes of death or disease—whether polio or smoking, AIDS or cancer—should never enter into decisions about access to health care, regardless of whether human behavior is a factor. Society best provides health care justice by offering all citizens the opportunity to receive health care, such as HPV vaccination. Justice is not served by limiting opportunity to vaccination because of age, social views about sexual behavior, the mode of transmission of a disease, or a desire to blame the victim for harmful consequences of sexual activity.

STIs and cancer are real risks in society, and they should not be exacerbated by an unequal distribution of health resources. Withholding vaccination would be unjust, and making HPV vaccination voluntary would significantly reduce the number of youths who would benefit from it. As several public health professionals have pointed out, mandates are the most effective way of ensuring accessibility for young people and achieving widespread protection against disease.^{26,35,37} Charo, noting the disproportionate burden placed on certain races and socioeconomic groups, stated that compulsory vaccinations are the most effective means of protecting poor and disadvantaged women from the scourge of cervical cancer.³⁴ In addition, Saraiya et al. suggested that these populations, which are at the greatest risk for cervical cancer, are being missed by current vaccine initiatives.²⁴ Therefore, compulsory vaccinations would be a more effective means of protecting poor and disadvantaged women from cervical cancer.

In theory, both compulsory and voluntary vaccination programs allow all individuals access to treatment. However, as Saraiya et al. pointed out, racial and socioeconomic

inequalities exist in incidence patterns of cervical cancer and in cervical cancer screening rates. For example, these researchers found that in the United States, incidence of cervical cancer was 50% higher among African American women and 66% higher among Hispanic women than among White women.²⁴ These groups not only have greater risk for cancer but also have lower rates of screening, do not receive the same benefits from screening as do other populations, and are at greatest risk of being missed by vaccine initiatives.

Raffle suggested that an uneven distribution of risk and resources could affect uptake of an HPV vaccine in certain socioeconomic and ethnic groups.³¹ He further suggested that a high uptake of vaccinations in lower socioeconomic groups is important because these groups are at the greatest risk of developing cervical cancer. It is likely that the populations with a disproportionate burden of disease are the hardest to reach with a voluntary vaccination program. Consequently, if justice is to be served by a voluntary program, then special attention, as provided by such efforts as the Vaccines for Children program, should be given to marketing, delivery, and accessibility of vaccinations to impoverished or underserved adolescent girls.

In all probability, however, voluntary vaccination programs will preserve the disparity between advantaged and disadvantaged populations, and the groups at greatest risk will continue to have the highest rates of HPV infections and cervical cancer. A compulsory vaccination program will better serve populations that are at greatest risk and in most need of health care and social justice. A utilitarian cost–benefit approach may lead to the greatest good for the greatest number of people, but a compulsory approach may produce the greatest utility for populations who are at greatest risk of disease. A compulsory vaccination program, therefore, appears to be a better alternative for ensuring justice and a fair opportunity for all in reducing harm caused by HPV infections.

SCIENTIFIC CONCERNS ABOUT COMPULSORY VACCINATION

Concerns have been raised in the scientific literature about mandating an HPV

vaccination. In general, these objections evolve from a traditional utilitarian public health perspective that assesses the costs, benefits, outcomes, and risks of a compulsory vaccination program aimed at preventing health problems associated with HPV infection, including cervical cancer, that have low morbidity and mortality rates.

Scientists who question the use of a compulsory program recognize that an HPV vaccination can provide a highly effective means of protection from cervical cancer but caution against mandatory measures before research provides evidence of the vaccine's relative value. For example, Gostin and DeAngelis argue that the benefits from reducing an already low incidence rate of cervical cancer may be minimal.³² Others assert that no imminent harm exists,^{31,32,35} an alternative method of screening has been effective in reducing this threat,^{31,32} achieving universal uptake will be difficult,³¹ the vaccine is expensive,^{31,32,35} long-term efficacy is not known,^{8,31,32} and the ethics of limiting autonomy remains an issue.^{26,31,32,35} Lo stated,

Mandatory public health polices can be ethically justified if voluntary measures have failed, no less coercive alternatives exist, the scientific rationale is compelling, and members of the general public are unknowingly at risk.^{33(p357)}

I cannot thoroughly address here all of these reasons for opposing compulsory vaccination, but 3 central points deserve note: that rates of cervical cancer have been relatively low, that existing measures of screening and treatment have been effective in reducing cervical cancer, and that the added value of vaccinations may be modest.

Epidemiological data have shown that HPV is a common sexually transmitted infection in the United States. However, the data also revealed that the high-risk HPV types associated with cervical cancer, types 16 and 18, have a low prevalence among women (3.4%) and that not all women who are infected with high-risk HPV types will develop cervical cancer.^{12,32,59–61} Researchers have questioned the cost-effectiveness of requiring a vaccination to reduce already low rates of cervical cancer. Raffle wrote that in England, morbidity and mortality rates for cervical cancer have dropped, with an incidence rate of 15.4 per 100 000

people in 1986 and 9.6 in 2000 and a mortality rate of 10.9 per 100 000 people in 1950 and 3.4 in 2004.³¹ Saraiya et al. reported a similar trend in the United States: incidence declined from 10.2 cases per 100 000 people in 1998 to 8.5 per 100 000 in 2002.²⁴

Raffle and others interpreted this data to mean that improved screening and treatment played a major role in reducing cervical cancer incidence and mortality rates. Raffle concluded that high-quality cervical screening has reduced deaths from cervical cancer by an estimated 80% and that a mandatory vaccine would add only a small benefit.³¹ Sawaya and Smith-McCune also pointed out that although studies have shown the vaccine to be up to 99% effective, they were short-term studies with young women who had not been exposed to HPV types 16 and 18.⁸ These authors hypothesized that a study of the effect of vaccination on populations that included sexually active and nonactive women and that used grades 1 to 3 intraepithelial neoplasia or adenocarcinoma in situ as an outcome measure might find that the overall efficacy for all women would be modest.⁸

Sawaya and Smith-McCune analyzed results from Females United to Unilaterally Reduce Endo/Ectocervical Disease (FUTURE) I and II trials. Their analysis of FUTURE I results concluded that rates of grades 1 to 3 cervical intraepithelial neoplasia or adenocarcinoma in situ per 100 person-years were 4.7 in vaccinated women and 5.9 in unvaccinated women, an efficacy of 20%. Their analysis of the FUTURE II results concluded that rates of grade 2 or 3 cervical intraepithelial neoplasia or adenocarcinoma in situ were 1.3 in vaccinated woman and 1.5 in unvaccinated women, an efficacy of 17%. In addition, the authors calculate that the difference in risk was modest, 3.6% for vaccinated women and 4.4% for unvaccinated women.⁸

The scientific literature contains both data and questions about whether compulsory HPV vaccination would produce the desired cost-effective outcomes. Some researchers hypothesize that reductions in cervical cancer rates might be modest and the societal consequences great: a mandatory program's infringement of individual liberty and autonomy could impair citizens' trust in a public health care system.

CONCLUSIONS

A major goal of public health is to prevent disease and illness and promote health through community-wide organization and health care actions. This can involve prevention measures such as the use of compulsory vaccinations to reduce harm in individuals.

The incidence, prevalence, and health threats of HPV infection are similar to those of other diseases that have given rise to mandatory vaccination programs. HPV is the most common STI in the United States, with an estimated 6.2 million individuals newly infected annually. An estimated 11 000 newly diagnosed cases of HPV-associated cervical cancer occur annually in the United States, resulting in an estimated 3700 to 4100 deaths. The Centers for Disease Control and Prevention recommend HPV vaccination for 30 million girls and women aged 11 to 26 years in the United States—a classic case of treating the many to prevent harm to a few.⁶¹

In the United States, it is common to use vaccinations to reduce disease, including mandatory vaccinations for diseases such as measles and polio that have relatively low incidence rates for serious harm. The difference with HPV infection is that vaccination is being recommended to prevent cancer and genital warts that are related to sexual behavior, which raises moral, social, and scientific concerns among some segments of society. But youths who face the threat of STIs and cancer are in as great a need of disease prevention as children who faced the threat of polio in the 1950s. To withhold available and effective measures that prevent disease and death is immoral, as is advocating for alternative programs such as abstinence education that are unrealistic and ineffective.

Opposition in the scientific literature to compulsory vaccination arises from important and valid objections to an unspecified definition of imminent harm, given low rates of morbidity and mortality from cervical cancer and lack of long-term evidence for the safety and efficacy of the vaccine. However, there is precedent for mandating vaccinations against diseases that have low incidence rates of serious harm. Although the vaccine is less effective for sexually active women, it is nonetheless an important preventive measure for young

women who have not been exposed to HPV types 16 and 18.

The HPV vaccine is not a replacement for cervical cancer screening and treatment. Rather, as Saraiya suggested, it is an additional and valuable tool for fighting cancer.²⁴ Combining a 70% reduction of cervical cancer by vaccination with the 80% efficacy of screening and treatment of cervical cancer will achieve a greater good for society than can be produced by either of these health measures alone. In addition, although vaccination will not eliminate the continued need to improve screening methods for detecting cervical cancer, it could potentially reduce the need for the intrusive treatment required for cervical cancer.

As more becomes known about the long-term consequences of an HPV vaccine, it is reasonable to hope that the goals of science—development of a safe and effective vaccine—will ally with moral ideals to offer all citizens equal access to a vaccine that reduces harm, which will be especially valuable to the disadvantaged populations at greatest risk. Ideally, this would occur on a voluntary basis, but history teaches us that it will be best accomplished by implementation of a compulsory vaccination program.

Some have proposed as an ethical test for mandatory public health policies that such policies can only be justified if voluntary measures have failed, no less coercive alternatives exist, the scientific rationale is compelling, and members of the general public are unknowingly at risk. I propose that the rightness or wrongness of a compulsory vaccination program should be determined from a public health perspective by assessing whether key ethical principles justify such action, whether the action reduces harm to individuals and society, and whether the action produces consequences that are at least as good as, if not better than, alternative actions that are present in society for preventing disease and death. Compulsory HPV vaccination meets this test. ■

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