

Risk of Occupational HPV Exposure Among Medical Trainees: A Call for HPV Vaccination

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Received March 1, 2023; Accepted for publication April 11, 2023; Published online May 25, 2023
<https://doi.org/10.17161/kjmvoll6.19567>

The global COVID-19 pandemic has brought new scrutiny to aerosol-generating medical procedures (AGMPs) and the risk that they pose to healthcare workers, namely through the transmission of aerosolized viral particles and viral DNA. As a result, there is now widespread knowledge of the risks posed by the SARS-CoV-2 virus and the measures that protect against it, including personal protective equipment and vaccination. However, healthcare workers regularly encounter another virus that is known to be highly contagious in multiple contexts and leads to significant morbidity and mortality. This is the human papillomavirus (HPV), which accounts for up to 79% of all oropharyngeal cancers in the U.S. and is a known cause of respiratory conditions such as recurrent laryngeal papillomatosis.¹⁻²

While studies into the respiratory transmission of HPV mainly have examined the risk posed by exposure to and inhalation of surgical smoke during procedures such as loop electrocautery excision procedure and CO₂-laser ablation,³ many non-surgical AGMPs, such as mechanical ventilation and even endotracheal suctioning, have been shown to result in the airborne transmission of other virus-containing aerosols.⁴ Although more research is needed to determine the risk of HPV transmission specifically in procedures that are common to general and critical care medicine, the list of known AGMPs includes sputum induction, nebulized or aerosol therapy, high-flow oxygen therapy, non-invasive and manual ventilation, endotracheal intubation and extubation, tracheostomy and tracheostomy procedures, high frequency oscillatory ventilation, airway suctioning, bronchoscopy, cardiopulmonary resuscitation, and autopsy;³ in short, procedures that are encountered commonly in any clinical discipline requiring direct patient contact. Despite the theoretical risk of exposure that these procedures pose, however, many medical trainees have not received even a single dose of the HPV vaccine.

Guidelines concerning HPV vaccination have changed significantly over the past 15 years since the introduction of Gardasil® in the U.S. in 2006. Originally recommended only for adolescent women,⁵ guidelines regarding the use of Gardasil® gradually were broadened to include adolescent men, and eventually, adults of any sex up to age 26 (with consideration of others up to age 45 based on risk factors and patient preference).⁶ As the HPV vaccine was originally designed to prevent anogenital warts and cancer, it was not until 2020 that the indications for the vaccine were expanded to include the prevention of oropharyngeal cancer.⁷ According to the U.S. Centers for Disease Control and Prevention, only 39.9% of adults aged 18-26 had received one or more doses of the HPV vaccine in 2018, and rates among those older than

26 were naturally even lower.⁸ These changes in recommendations have resulted in a conspicuous “vaccine gap”, particularly among young adults who comprise the majority of physicians in training. This gap is even more pronounced among males, who are themselves at higher risk for oropharyngeal cancer.⁹

Immunization requirements are a longstanding and uncontroversial occupational health and safety measure taken for medical students, residents, and other trainees. Training programs historically have been early adopters of safety measures for their early career physicians. Even so, the vaccine gap would suggest that relatively few trainees are vaccinated against HPV. In fact, neither the standard immunization requirements of the Association of American Medical Colleges nor the majority of individual training institutions require or even mention HPV vaccination for aspiring medical professionals.¹⁰

Calls for the vaccination of healthcare workers against HPV already have been made from within training programs for obstetrics and gynecology.¹¹ Given their regular exposure to AGMPs, this practice should be extended, at minimum, to trainees in otolaryngology, pulmonology, critical care medicine, and anesthesia. In keeping with the latest recommendations for HPV vaccination up to age 45⁶ and given the wealth of evidence linking HPV exposure to oropharyngeal, laryngeal, and respiratory disease¹⁻², medical educators and graduate medical program directors in all specialties should consider making HPV vaccination available to trainees as part of their routine immunization and occupational health requirements. The alternative may be a future where an entire generation of healthcare providers is burdened disproportionately by preventable oropharyngeal and laryngeal diseases.

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Keywords: aerosols, human papillomavirus, vaccination, medical students, internship and residency