The human papilloma virus (HPV) was at one time deemed benign, with few variants. Further research revealed 150 serologically identifiable varieties, some benign, but many having oncogenic genes. Vaccines against some of the latter varieties are Gardasil (Merck, Kenilworth, NJ, U.S.A.) and Cervarix (GlaxoSmithKline, Brentford, U.K.), introduced and recommended for girls before their sexual debut. Some theological leaders were against vaccination, believing that vaccination leads to promiscuity. To reduce residual host infection pools, inoculation advice eventually included boys. Most vaccines successfully impart life-long immunity. Consequently, the earlier the vaccination, the longer and stronger the likelihood of preventing HPV morbidity.

**Protection and New Vaccine**

Anamnestic responses to viral antigens rapidly boost immunity and prevent disease recrudescence. Early immunity to HPV is derived from 4 HPV varieties, and the available HPV vaccines have been successfully used in national vaccination campaigns. Cervarix protects against HPV-16 and HPV-18; Gardasil, a quadrivalent vaccine, protects against HPV-16, HPV-18, HPV-6, and HPV-11. The additional HPV-6 and 11 addressed by the Gardasil formulation are causally related to genital condylomata and recurrent respiratory papillomatosis. Other HPV involved in oncogenesis are HPV-31, HPV-33, HPV-45, HPV-52, and HPV-58.

Antibody induction is rarely complete with a single administration, and small significant groups fail to respond adequately, needing triple inoculation to reach efficacy. Moreover, the existing protection from early vaccines has limits, and a new broader-based HPV vaccine called V503 (with activity against 9 HPV varieties) was therefore developed. In 2014, the vaccine developer, Merck, made a Biologics License Application for registration of the product, which is now under review by the U.S. Food and Drug Administration.

**DISCUSSION**

The causes of many cancers have been defined. For example, asbestos induces mesothelioma, radiation induces neoplasias, aniline dyes cause urogenital carcinogenesis, nitrosamines precipitate oncogenesis in the gut, petrochemicals act as carcinogens, genes (BRCA, for instance) predispose carriers to certain types of cancer, tobacco generates lung-cancer, and alcohol stimulates neoplastic change.

Surgery, chemotherapy, and radiation remain the main therapies for established cancer, but they have limited success, with significant morbidity and mortality. Despite the definition of many cancer causes, absolute cures remain stubbornly obscure. Prophylaxis remains the most desirable approach, and for cause-defined cancers, prevention with immunity is successful. High-levels of anti–HPV-16 and -18 antibodies persist for up to 7 years, and boosters are recommended. The HPV vaccinations stimulate immunomodulation and contribute to the prevention and lowered prevalence of HPV-positive head-and-neck squamous cell carcinomas and urogenital cancers. Accordingly, vaccination is now advised for all boys and girls before their sexual debut. Transmission of HPV can occur during sexual activity or orogenital contact, and even during social kissing or inhalation of spray from sneezes or coughs by HPV carriers. After barrier methods of contraception diminished in the mid-1950s (yielding to major use of contraceptive hormone pills), sexual behaviors and mores changed, and HPV, together with other sexually transmitted infections, became more prevalent.

**CONCLUDING REMARKS**

Vaccination protection lasts decades and takes a long time to wane. Human papilloma viruses are implicated in cancers other than anogenital neoplasias. Vaccination against HPV should be considered essential for all and should become part of the battery of inoculations received in the first decade of life. Without HPV vaccination, a HPV pandemic is predicted, and use of broad-based vaccines is desirable to optimize HPV prophylaxis. Clinical tests to detect HPV infection are available, and vaccines will protect against HPV morbidity. The HPV oncogenic protein p53 can be detected during histopathology examination, and a search for proteins to moderate protein p53 is needed. Because of the proven immune response, all adults who are not inoculated against HPV, who are sexually active, and who face the probability of more than one sexual partner, are well advised also to be vaccinated against HPV. Further research into the clinical management of HPV is needed. The global cancer incidence is 14 million new cases annually, with a resultant mortality of 8 million individuals. Prophylaxis remains the main mission. In health care, anamnestic or freshly acquired immunity is used to prevent cancers from returning once patients are in remission. Traditional vaccines are given to healthy patients to induce immunity. ImMucin (Vaxil Israel, Rehovot, Israel) is given to people who are already sick, and yet it behaves like a drug with biologic effects, acting like a cross between a drug and a vaccine as a two-pronged hybrid therapy. Targeting viruses predisposing to cancer is what vaccines can accomplish; they also create immunity against viruses.
implicated in oncogenesis. Vaxil Israel claims that their immunity works against mutated cells with initial neoplastic changes, consequently lowering the incidence of early cancers without affecting healthy cells. Vaxil Israel reports success with multiple myeloma and has tried the same approach on other cancers.

CONFLICT OF INTEREST DISCLOSURES
I have read and understood Current Oncology’s policy on disclosing conflicts of interest, and I declare that I have none.

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