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Asia Pacific: Cervical cancer screening and HPV vaccination policy and delivery

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Abstract

The Human Papillomavirus (HPV) etiology of cervical carcinoma was first proposed in the 1970's and it was soon clear that HPV infections were the most important risk factor for this cancer [1–3]. By the late 1990's, epidemiologic, virologic and molecular studies from all over the world established that all cervical cancers were the end result of a process that was initiated by sexually transmitted infections by a group of high-risk (cancer-causing) HPVs [4–9]. Initially, the prospects of developing prophylactic HPV vaccination against a sexually transmitted infection did not appear to be very high. However, animal studies showed that papillomavirus-based vaccines protected rabbits, dogs and cattle against their respective papillomavirus-induced diseases [10,11]. This led to the development of HPV vaccines based on the major viral protein which when expressed, self-assembles into virus-like particles [12]. Because HPV-16 and 18 are found in almost all cervical cancers, cancer prevention appeared to be within reach.

In the industrialized world, the incidence of cervical cancer was reduced markedly following the implementation of cervical cancer screening programs in the 1950s. Cervical cancer precursor lesions identified by follow-up investigations of abnormal Pap smears were readily treatable. However, in emerging nations, implementation of a Pap smear screening program is a very complex and difficult public health service to provide. The minimal or complete lack of screening means that in these nations most women with cervical cancer remain undiagnosed until an advanced stage. The many barriers to effective Pap smear screening include difficulties in collection of smears of adequate quality, unavailability of trained cytologists, lack of infrastructure to ensure women receive regular Pap smears and return for follow-up of abnormal smears, and inadequate facilities for treatment of women with cancer precursor lesions. The recent advances in knowledge opened up many new areas for translational research and implementation of preventive strategies. They included cervical cancer screening based on novel methods for the detection of high-risk HPVs in the genital tract and identification of cellular markers of cervical neoplasia, simplified treatment options which reduce the need for repeat patient visits and complicated equipment, and above all, the implementation of immunization with prophylactic HPV vaccines.

HPVs are etiologically linked with cancers as well as with non-malignant tumors. These occur in men and women, expanding the role of prophylactic HPV vaccines. The currently licensed HPV vaccines - quadrivalent (Gardasil®, Merck & Co., Whitehouse Station, NJ USA) and bivalent (Cervarix®, GlaxoSmithKline Biologicals, Rixensart, Belgium) contain virus-like particles for HPV-16 and HPV-18, and are expected to prevent an estimated 70% of cervical

cancers. Immunization of young women with virus-like particles of oncogenic HPV types –16 and 18 has shown to confer almost 100 % protection against infection and disease related to these virus types [13–20]. The quadrivalent vaccine, which also contains virus-like particles of HPV-6 and HPV-11, is expected to prevent a large proportion of genital warts and nearly all cases of adult-onset and juvenile-onset respiratory papillomas in both men and women. In addition, these vaccines could provide protection to prevent HPV-related cancers at several other sites in which HPV-16 accounts for an overwhelming majority of HPV-associated cancers. These include cancers of the vulva and vagina in women and penile cancers in men, and cancers of the anal canal and of oropharyngeal/tonsillar region in both men and women. Prevention of HPV infection and disease by immunization greatly energized the efforts to control cervical cancer, especially in regions of Asia, Africa and South America where the incidence of HPV-related cancers remains very high. The next generation of HPV vaccines is now in development and will further extend the scope of the benefits derived from the prophylactic vaccination.

The recognition of HPV as the cause of a major human cancer and the development of a vaccine to prevent this cancer is a unique scientific achievement in the area of cancer control. But the challenge of transforming this knowledge into reducing the burden of this cancer remains to be achieved. A major step in this direction would be if HPV vaccines could become available to the neediest populations at affordable costs. No doubt attempts are being made by international public health and philanthropic organizations and national governments to bring this about. In view of the strong commitment of scientists and public health professionals, the urgent need of the affected populations and the desire on the part of the peoples of the world to provide resources for this aim, one can confidently predict that cervical cancer incidence, in all parts of the world, will continue to decline with time. One can also hope that some decades from now, death from cervical cancer may become a rare event in all regions of the world.

In order to aid these activities related to HPV and cervical cancer control, the community of HPV investigators has made major efforts to bring together and publish information and ideas that would be useful to researchers and public health officials in all parts of the world. In 2006, a monograph titled ‘HPV Vaccines and Screening for the Prevention of Cervical Cancer’ was published as a supplement to the journal *Vaccine*. The current monograph series extends these efforts by updating the 2006 monograph with current data and literature, and in addition, describing the current status and options for HPV vaccines and cervical cancer screening for the Latin America and the Caribbean region as well as the Asia Pacific region.

The Asia Pacific regional report, coordinated by Dr. Suzanne M. Garland and Dr. Jack Cuzick, has nine articles contributed by collaboration of over 50 investigators, most of them from the Asia Pacific region. These articles describe the burden and trends of HPV-associated cancers and other diseases, mathematical models of cervical cancer prevention and recommendations for cervical cancer prevention. In addition, identification and description of local/national data on HPV exposure and co-factors for carcinogenesis, current status of cervical cancer screening, determinants of HPV vaccine acceptability and HPV vaccination policy and delivery are reported. Together, these articles provide current information and concepts to support those who are engaged in efforts to prevent cervical cancer in the Asia Pacific region.

Biography

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