

Human papillomavirus (HPV) vaccines

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Human papillomavirus (HPV) infection has been estimated to cause 270 000 deaths worldwide annually from cervical cancer and approximately 80% of these occur in resource-poor countries.¹ In South Africa, cervical cancer is the second most common malignancy among women, with the highest rate among black women aged 66 - 69 years.² With the development of prophylactic HPV vaccines there are prospects of significant reduction in morbidity and mortality due to HPV infection and its complications.³

Currently, two prophylactic HPV vaccines are available commercially (Table I). Cervarix (GlaxoSmithKline Biologicals) is a bivalent vaccine and Gardasil (Merck & Co) is a quadrivalent vaccine. HPV genotypes 16 and 18 currently contribute to approximately 70% of cervical cancer cases.⁴

From a public health perspective, the primary target population for vaccination with the HPV vaccine is females naïve to vaccine-related HPV types. Therefore the focus has been on adolescent girls prior to initiation

of sexual activity, often cited as age 9 - 13 years.⁶ The main aim is to attain high vaccine coverage, exceeding 70% in this population group. This approach has been shown to have the most cost-effective reduction in disease burden. Vaccination of older females (already sexually active) has been suggested as a possible secondary target group worth investigating. Vaccination in males has been debated. The WHO does not advocate vaccination in this population group based on cost-benefit analyses.⁴

Vaccine safety has been evaluated as part of licensing requirements as well as in post-licensure monitoring studies.^{3,7} All available data currently point to adequate safety for use in routine vaccination programmes.¹⁰ Inadvertent vaccination of pregnant women has been described and it has not been associated with any adverse effects.⁴ Similarly, reports of vaccination during breastfeeding, specifically with the quadrivalent vaccine, have not been associated with any vaccine-associated adverse effects.⁸

Efficacy studies at this point are limited to evaluation of reduction in infection with HPV genotypes present in the vaccines.³ However, as the final end-point of vaccination efficacy, the reduction in malignancies remains important and this has to be evaluated in long-term studies.⁹ Follow-up studies for Cervarix and Gardasil have shown efficacy for up to 5 years.³ The need for subsequent booster vaccines has not been established, and these data will become evident upon continuation of long-term follow-up studies.⁴ Inter-changeability of these vaccines in the three-injection course has not been studied, and this practice is not encouraged. However, should the particular vaccine used not be available for subsequent doses, vaccination should not be deferred and an alternative may be used.⁴

Both HPV vaccines contain non-live, non-infectious particles and co-administration with

other non-live or live vaccines is considered safe, provided separate syringes and injection sites are used.⁴ The potential benefit of HPV prevention among immunocompromised persons may be far-reaching as these patients are at increased risk of HPV-associated disease morbidity and mortality.¹⁰ Safety and immunogenicity have not been definitively established in this population,⁴ and further research is required.

The WHO⁴ advocates introduction of routine HPV vaccination as part of a national EPI programme provided HPV prevention is considered a health priority, and the programme is logistically feasible and financially sustainable. High vaccine costs are often cited as barriers to national public health usage. However, a recent study in Cape Town showed a cost benefit for routine HPV vaccination use.¹ Cervical cancer screening programmes should continue,¹¹ as genotypes not included in the vaccines may still cause malignant transformation.¹²

A further theoretical obstacle remains public acceptance. However, in a survey evaluating patient and clinician perceptions, cost remained the greatest barrier to vaccination, with the commonly cited misconception of promotion of promiscuity being an issue in less than 2% of subjects.¹³ Adequate education of both clinicians and patients is an essential component to ensure effective implementation of a national vaccination programme.⁴

References available at www.cmej.org.za

Infection prevention and control for viral infections

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Infection prevention and control (IPC) is the new terminology used for what was previously referred to as simply 'infection control'. It is an important component of health care and all health care workers (doctors, nurses, allied health workers, etc.) need to know at least the essential principles of infection prevention and control,^{1,2} as this will equip them with the knowledge and skills needed to provide safe and effective health care.

Table I. Characteristics of Cervarix and Gardasil prophylactic vaccines

	Cervarix	Gardasil
Genotypes included ⁵	16, 18	16, 18, 6, 11
Vaccination schedule ⁵	0, 1 and 6 months	0, 2 and 6 months
Administration ⁵	0.5 ml dose IM	0.5 ml dose IM
Adjuvant ⁶	ASO4 which includes 3-O desacyl-4' monophosphoryl lipid A and aluminium salt	Aluminium hydroxy-phosphate sulphate
Duration of proven efficacy ³	Proven efficacy studied up to 4.5 years	Proven efficacy studied up to 5 years
Registration in South Africa ²	Since March 2008	Since March 2008
Availability in South Africa		
Private sector	Available	Available
Government sector	Not available	Not available
Cost per vaccine (wholesale)	R550.96	R770.00 ⁷ - R877.80

More about

There are two main components of IPC, namely the standard precautions (previously referred to as universal precautions) which should be applied to all patients, and transmission-based precautions which are often used empirically, according to the clinical syndrome and the likely aetiological pathogen.

Furthermore, in order to do risk assessment and implement IPC measures one needs to have an understanding of the chain of infection (Fig. 1).¹ This includes knowledge of the size of the inoculum of the causative micro-organism, virulence of the pathogen, route of transmission and entry into susceptible host. This valuable information is not always readily available, hence the need to adhere to standard precautions, of which hand hygiene is the most important. The principles of IPC are outlined in Table I.¹

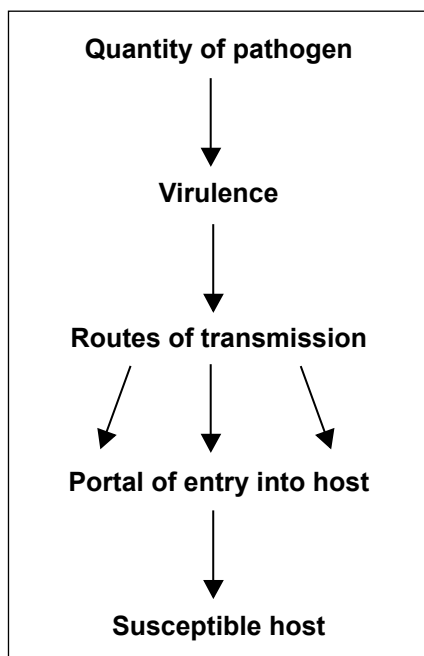


Fig. 1. Chain of infection from WHO influenza training package.¹

Table I. The principles of infection prevention and control^{1,2}

- Early recognition and reporting
- Infection control precautions
- Hand hygiene: alcohol-based hand rub, hand washing
- PPE: gloves, gowns, masks/respirators, eye protection
- Patient accommodation
- Environmental cleaning and waste disposal
- Occupational health management

Respiratory viruses

Influenza and other respiratory viruses cause substantial morbidity among children and

high-risk adult groups. Annual vaccination against influenza plays an important role in the prevention of circulating strains. However, for people with respiratory infections the following transmission-based precautions are recommended:^{1,2}

- Droplet precautions for protection against respiratory pathogens transmitted by large droplets:
 - use a medical mask when <1 m from patient
 - maintain a distance >1 m from infectious patient
 - place patient in a single room or cohort with similar patients
 - limit patient movement.
- Airborne precautions for protection against inhalation of tiny infectious droplet nuclei:
 - use particulate respirator (e.g. N95 mask)
 - place the patient in adequately ventilated room (≥ 12 air changes per min)
 - limit patient movement.

Airborne precautions should be adhered to when performing any aerosol-generating procedure.

Blood-borne viruses

Blood-borne viral infections are transmitted by needle-stick injury (NSI), from mother to child and by use of blood and blood products. NSI are mainly due to unsafe practices, which are easily preventable.³ Theoretically any infectious agents that may be present in sufficient quantity in the blood may be transmitted through NSI, but in practice the most commonly reported infections are hepatitis B, HIV and hepatitis C.³

Injuries usually arise when personnel come into contact with sharps that have not been properly disposed of or accidents occurring in the operating theatres during handling of surgical equipment. Safe practices should be strictly followed and every health care worker vaccinated against hepatitis B.

General infection control measures for prevention of blood-borne infections include:^{4,5}

- applying good basic hygiene practices
- covering existing wounds or skin lesions with waterproof dressings
- avoiding invasive procedures, if suffering from chronic skin lesions on hands
- avoiding contamination by appropriate use of protective clothing
- protecting mucous membrane of eyes, mouth and nose from blood splashes
- avoiding sharps usage where possible
- instituting safe procedures for handling and disposal of needles, other sharps and appropriate disposal of all contaminated waste
- instituting adequate procedures for sterilisation of surgical instruments and disinfection of contaminated surfaces.

Viral haemorrhagic fever viruses

Viral haemorrhagic fevers (VHFs) are a group of illnesses caused by several distinct families of viruses: arenaviruses, filoviruses, bunyaviruses and flaviviruses. Some of these viruses cause relatively mild illnesses, while others cause severe, life-threatening disease. Most viruses associated with VHFs are primarily zoonotic but some may be transmitted from person to person.⁶

In conjunction with the World Health Organization, the Centers for Disease Control has developed practical, hospital-based guidelines, titled *Infection Control for Viral Haemorrhagic Fevers in the African Health Care Setting*.⁶

For haemorrhagic fever viruses that are transmitted between persons, important IPC measures include:

- avoiding contact with body fluids
- barrier nursing with proper isolation of infected individuals
- wearing adequate protective clothing
- proper disinfection and disposal of instruments used, e.g. needles, thermometers, etc.

Cases of VHF are often first suspected or diagnosed in hospitals or clinics which lack special facilities for isolation of patients. Nevertheless, every effort should be made to isolate the patient and to apply the principles of high security barrier-nursing as soon as a diagnosis of VHF is suspected. The precautionary measures must remain in force until the possibility of VHF has been excluded or the patient has been transferred to a designated secondary hospital for treatment of VHF.

References available at www.cmej.org.za