

HPV vaccine for cervical cancer prevention in Botswana

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Cervical cancer remains an important public health issue around the world, and reflects the inherent inequalities between the north and south. Every year there are more than 500,000 new cases and close to 300,000 deaths, with 85 per cent of these deaths occurring in low-resource settings (WHO, 2013). In Sub-Saharan Africa, cervical cancer ranks as one of the top two causes of cancer deaths in women and this is also true for Botswana. According to the national cancer registry, 26 per cent of all cancers in women in Botswana were attributable to cervical cancer during the period of 2003–11 (see Figures 1 and 2). One of the important contributors to this high burden of disease is the concurrent high prevalence of human immunodeficiency virus (HIV). The risk for developing cervical cancer in women infected with HIV is threefold to sixfold compared to HIV uninfected (Wright, 1994). The World Health Organization (WHO) predicts that morbidity and mortality due to cervical cancer will increase by more than 20 per cent by 2025 in women under the age of 65, if no change occurs in the current trends. This is a staggering number which will put even more strain on the already limited resources.

The good news is that cervical cancer is potentially preventable through regular screening. The screening method of choice over the last five decades has been the Pap smear test, which has been successful in dramatically reducing the disease in most developed countries. The overall incidence of invasive cervical cancer remained stable from 1971 to the mid-1980s (3,900 cases per year on average), when the cervical cancer-screening programme in England was largely ineffective because of problems with how it was organised. Upon instituting improvements in the screening programme, coverage increased to around 85 per cent, resulting in a continuous decline in the incidence of invasive cervical cancer from 1990 onwards. By 1995, the incidence was 35 per cent lower than in the mid-1980s (Quinn, 1999).

However, for this prevention model to work it requires an organised, sophisticated and expensive infrastructure to be in place, with a high enough screening coverage of the target population, repeated over regular intervals and linked to timely and appropriate treatment, to achieve significant impact on the disease. The bad news for most developing countries, many of which bear the greater burden of cervical cancer, is that these types of infrastructure developments have proven too costly and complex to initiate and maintain. Often these countries have many other competing needs, including communicable diseases like HIV, malaria and tuberculosis. This disparity has necessitated the search for alternative, simple and cost effective screening and treatment methods as well as other preventative strategies over the last two

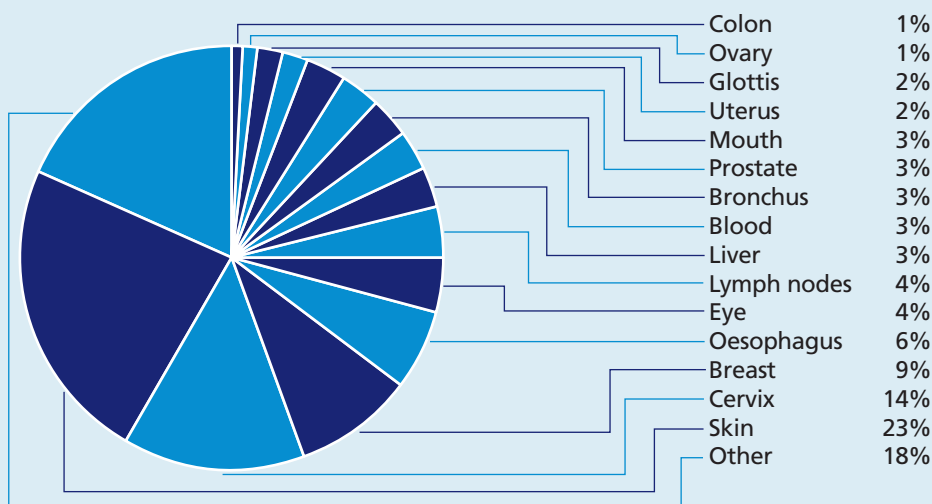
decades. One of these strategies is the use of vaccines for cervical cancer prevention.

Vaccines have been seen as the mainstay of many effective public interventions, leading to control of infectious diseases such as small pox, polio and measles (Chauke-Moagi, 2012; Levine, 2011). The opportunity for development of vaccines for non-communicable diseases came with the realisation that some viral infections and some cancers, such as hepatitis B virus in the case of liver cancer, are causally linked (Chang, 2009). The breakthrough for cervical cancer was the recognition of human papillomavirus (HPV) as the cause of cervical cancer, with later conclusion that virtually all cases of cervical cancer required HPV infection as an initiating factor (Walboomers, 1997).

HPV are a group of many small viruses that are highly transmissible through skin-to-skin contact, the majority of which do not cause any problems. This means that many men and women will, at some point in life, harbour an HPV infection without ever knowing it. Most people acquire genital HPV infection shortly after the time of sexual debut and may get re-infected later in life (Bosch, 2003). The lifetime risk for a sexually active adult for acquiring HPV can be as high as 80 per cent. Clearance of HPV occurs spontaneously in the majority of cases within two years, leaving a small percentage of individuals with a persistent infection. Of the many known HPV types, there is extensive evidence that it is only chronic infection with the few 'high risk' (HR) types, when accompanied by other enabling factors, which has the potential for causing cervical cancer.

There are currently two commercially available HPV vaccines that have been proven to be safe and effective (Harper, 2004; Villa, 2005). Both of these vaccines are protective against HR-HPV types 16 and 18, which together account for 60–70 per cent of all cervical cancer cases around the world. However, proof of effectiveness of new medical interventions does not automatically translate to uptake into everyday clinical practice. This becomes even more difficult when the interventions are preventative in nature, as the benefits associated with the activity are often only realised many years in the future. Although cost is an obvious barrier, other concerns, especially for new vaccines, relate to safety, lack of knowledge or lack of recommendation by a trusted provider, which can play a big role in vaccine acceptability (Dorell, 2011). Specific vaccines may have their own peculiarities, which can trigger other concerns. For instance, by virtue of needing administration to pre-sexual adolescents for maximum effect, the prophylactic HPV vaccine has in some instances raised concerns

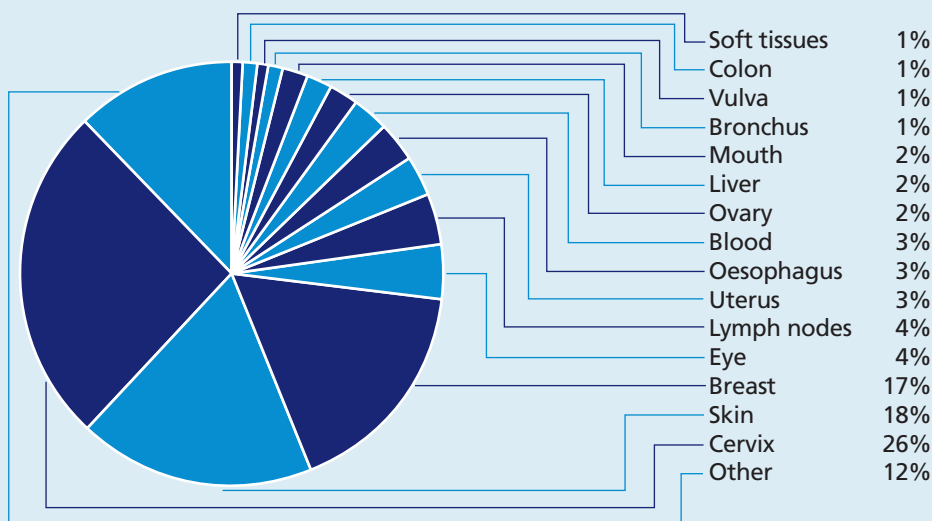
Figure 1 Top 15 cancers in Botswana, 2003–11



Source: Botswana Ministry of Health, HGM, 2012

Figures are rounded to nearest percentage point.

Figure 2 Top 15 cancers in females, Botswana, 2003–11



Source: Botswana Ministry of Health, HGM, 2012

about sexual reproductive consequences such as adverse sexual behaviour and potential interference with future fertility (Allen, 2010; LaMontage, 2011). This has been primarily driven by public perception of the effects of the vaccine, and this understanding has influenced how vaccine information is crafted and packaged, taking into consideration different societal and religious norms within various communities.

So how well has the new HPV vaccine done around the world? Within the first five years of vaccine availability, only a few countries, mainly from the developed world, were able to incorporate it into national cervical cancer prevention programmes (Markowitz, 2012). In 2009, WHO released a position paper recommending inclusion of HPV vaccines in routine national

immunisation programmes as a public health priority (WHO, 2009). Following that call, only two low resource countries, Bhutan in Asia (2010) and Rwanda in Sub-Saharan Africa (2011), were able to introduce nationwide HPV vaccination programmes. However, both were made possible due to vaccine donations, subsequently raising questions about future sustainability of such programmes, a critical question for the donor community as well.

How has Botswana prepared for the HPV vaccine programme? Before the decision to include the HPV vaccine in the Botswana national cervical cancer prevention programme was made, a study was undertaken to assess the acceptability of an HPV vaccine among parents and adults attending a public hospital (DiAngi, 2011). This cross-sectional survey of 376 men and women,

including both HIV infected and non-infected individuals, took place at two separate clinics, a general medicine and an HIV clinic, in 2009. The findings of the study concluded that 'HPV vaccination of adolescent girls would be highly acceptable if the vaccine became widely available to the daughters of health care seeking parents in Gaborone, Botswana', in keeping with findings from other studies. As anticipated, cost was perceived as a potential barrier if the vaccine was not provided for free by the government like other health services in the public health setting. Importantly, none of the reproductive issues discussed above were raised as concerns. The study identified both school- and clinic-based vaccination programmes as potentially acceptable.

The second national cervical cancer prevention strategy for Botswana was finalised in 2012, after the completion of the acceptability study. This took a comprehensive approach to addressing the cervical cancer disease continuum through primary and secondary prevention, and tertiary care, and incorporated a carefully considered monitoring and evaluation plan.¹ Primary prevention of cervical cancer involves prevention of HPV infection through various means, including biomedical mechanisms like HPV vaccination. As HPV vaccines are also thought to be effective in HIV infected patients, it is reassuring to use them in high HIV prevalent countries like Botswana and they remain the best long-term strategy to reduce the incidence of cervical cancer in the absence of robust secondary screening and treatment programmes, especially where the disease burden is high.

Outlined in the 2012–16 strategy was the need to carry out a phased approach to the introduction of the HPV vaccine, with the first phase executed as a demonstration project to prepare Botswana for a national vaccination programme. This first phase, which targeted 2,000 girls, was undertaken in schools in one district in 2013. The preliminary evaluation indicates that more than 80 per cent of the targeted population received the vaccine, with logistical issues such as 'absent at school during the day of the vaccine' cited as the main reason for missing a dose.² The high acceptability observed during this demonstration confirms the findings of DiAngi et al. (2011). The next phase of the vaccine programme will incorporate both school- and health facility-based approaches to cater for as many girls as possible, including the few that are out of school.

As already stated, countries likely to benefit most from the introduction of new vaccines are often those with the high burden of disease, but without the necessary resources to implement. It makes economic sense to implement an HPV vaccination programme as part of the national cervical cancer prevention strategy for Botswana, but the short-term cost implications can sometimes derail the discussions. This is why the phased approach of the Botswana HPV vaccination programme makes sense – it aims to allow better logistical as well as financial planning for optimal and sustainable national roll out.

Endnote

1 Botswana Ministry of Health, 2012. *National Cervical Cancer Prevention Programme – Five-Year Comprehensive Prevention and Control Strategy (2012–16)* [unpublished document].

2 Personal communication with Dr M. Raesima, National Cervical Cancer Prevention Programme Manager, Ministry of Health, 11 March 2014.

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