HHS Public Access

Author manuscript

Lancet Glob Health. Author manuscript; available in PMC 2024 April 15.

Published in final edited form as:

Lancet Glob Health. 2023 July ; 11(7): e997–e998. doi:10.1016/S2214-109X(23)00203-6.

Impact of the human papillomavirus vaccine in low-resource settings

Gad Murenzi,

Einstein-Rwanda Research and Capacity Building Program, Research for Development and Rwanda Military Hospital, Kigali, Rwanda

Chemtai Mungo

Department of Obstetrics and Gynecology, University of North Carolina Chapel Hill, Chapel Hill, NC, USA

Despite being approved since 2006, adoption of the human papillomavirus (HPV) vaccine in low-income and-middle-income countries (LMICs), especially in sub-Saharan Africa, has been slow. As of 2019, 14 (26%) of 54 countries in sub-Saharan Africa had national HPV vaccination programmes,[1] despite the evidence that the vaccine significantly reduces the incidence of cervical cancer, especially when provided before sexual debut.[2]

Rwanda was among the first African countries to implement a national school-based HPV vaccination programme,[3] which has consistently shown high (≥90%) coverage over the past decade.[4] Rwanda's success provides an opportunity to assess the effectiveness of the vaccine at the population level, with the first cohort of girls vaccinated in 2011 now becoming sexually active. In *The Lancet Global Health*, Felix Sayinzoga and colleagues[5] report the findings of a study that aimed to provide the first results on HPV vaccine effectiveness from Africa. Using repeated cross-sectional surveys in sexually active young women in Rwanda before (in 2013–14) and after (in 2019–20) HPV vaccine introduction, this study showed an adjusted overall vaccine effectiveness of 47% (95% CI 31–60) against vaccine-targeted HPV types (HPV6, 11, 16, and 18). Although the overall vaccine effectiveness in this study was lower than the efficacy estimated in clinical trials,[6] these results are highly encouraging for LMICs working to improve HPV vaccine coverage rates or introduce the vaccine.

Although it is still too early to assess the effect of the HPV vaccine on the incidence of cervical cancer in Rwanda, Sayinzoga and colleagues[5] found a reduction in the prevalence of vaccine-targeted HPV types from 12% in the baseline survey to 5% in the repeat survey. These data can serve as a foundation for future studies to assess the effect of the vaccine on the incidence of cervical cancer, as well as other HPV-associated anogenital and head and neck cancers. The efficacy of the HPV vaccine in reducing cervical cancer cases has been shown in several studies,[2] primarily in high-income countries where HPV-vaccinated cohorts are older. If Rwanda continues to have high population-level vaccine coverage, evaluation of

gadcollins@gmail.com .

We declare no competing interests.

the vaccine effect on cervical cancer incidence might be possible in a few decades due to the tremendous vaccination efforts.

The study by Sayinzoga and colleagues[5] highlights the complexity of HPV prevention among women living with HIV. The authors found that the overall vaccine effectiveness was lower among women living with HIV compared with HIV-negative women (24% [95% CI −62 to 64] *vs* 55% [36 to 69]). Although this result might be confounded by education or possible earlier exposure to HPV, this finding is concerning for sub-Saharan African countries, which also face the greatest burden of HIV infection, and requires further studies. Ongoing efforts to understand HPV vaccine effectiveness in women living with HIV include an ongoing observational study in Kigali, Rwanda.[7] Preliminary findings show that the HPV vaccine is not as effective among women living with HIV compared with HIV-negative women.[8] Although this is not good news, these findings provide an opportunity to investigate alternative ways to improve primary prevention in women living with HIV, including the use of a booster vaccine to maximise protection, or other strategies. More studies are required to answer these questions related to vaccine effectiveness in women living with HIV.

Overall, the present study fits well in the current cervical cancer research and practice context, where essential evidence from sub-Saharan Africa and other low-resource settings needed to guide policy is scarce. The key message from this manuscript is that the HPV vaccine can reduce the prevalence of HPV infection following introduction of a school-based vaccination campaign in an African nation. It is expected that, over time, the vaccine will result in a reduction in the incidence of cervical cancer in Rwanda, as shown by evidence from Sweden.[2] It is important to note that Rwanda's universal primary education enables the success of the school-based vaccination programme, resulting in high HPV vaccination coverage. To replicate Rwanda's success, countries with low primary school enrolment rates should find innovative ways of reaching girls who are not in school at their vaccine-eligible age. Sayinzoga and colleagues[5] found that HPV vaccine coverage was lower among participants who had completed less years in school, hence the lower vaccine effectiveness in this group.

These findings support WHO's global call for cervical cancer elimination with a target of 90% or greater HPV vaccination rates for girls and vaccine coverage is most crucial in LMICs, where women bear the greatest burden of this preventable cancer. National governments that have not introduced the HPV vaccine and other international partners can use this evidence to formulate relevant policies to urgently implement and scale-up vaccination for girls everywhere.

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