Reviewer’s report

Title: Is expanding HPV vaccination programs to include school-aged boys cost-effective? A cost-utility analysis in a setting with an existing school-girl program

Version: 2 Date: 10 December 2013

Reviewer: Johannes Berkhof

Reviewer's report:

Major Compulsory Revisions

1. The main conclusion of the analysis (male HPV vaccination is not cost-effective) is much too strong given the weak level of evidence provided by a model. The model presented by the authors, in particular, has some shortcomings that are not easily resolved and therefore the conclusion should be toned down. Shortcomings are:

   a. The evidence against male vaccination is mainly based on a Canadian transmission model. According to the Canadian model (Table 1), vaccinating girls gives nearly equal protection for females and males, regardless the level of coverage among girls (1G and 2G). A direct consequence of this precision is that vaccinating boys hardly provides any additional protection; they are already indirectly protected. However, it is well known that the level of herd immunity strongly depends on the sexual heterogeneity which may be different in Canada and NZ. Furthermore, different transmission models may predict different levels of herd immunity in particular when the vaccine uptake among girls is low; compare for instance the Canadian model with an early model by Garnett and colleagues in which the impact of vaccinating girls on the HPV prevalence in males was low if the uptake among girls was low.

   b. Oropharyngeal cancer and in particular anal cancer are more prevalent in MSM than in the heterosexual population. The former group is not included in the model which may lead to an underestimation of the impact of male vaccination.

2. The model description is very limited. A complete list of Markov transition parameters, utility measures, survival probabilities etc. etc. should be added to the Supplementary material. It should also be shown that the model is calibrated to current NZ registry data.

3. Vaccine prices decrease rapidly. The cost paid per dose in the NZ program is much higher than in several European countries with comparable GDP per capita levels. The administrative costs ($141 per dose) are five to tenfold higher than in other countries with an immunization program and deserves explanation. At much lower cost level for both vaccine + administration, the picture will look different. The authors consider administration costs of NZ $19 (per dose?) as very low but for other countries such figures have been reported.
4. To compare HPV male vaccination with interventions in tobacco control, alcohol control and diet (policy implications) is somewhat tendentious. It is not the idea of gender inequality in health that worries policy makers but the idea of gender inequality in offering health prevention measures. Furthermore, some policy makers think that uptake among girls will be higher in a gender-neutral program than in a female-only program.

5. The authors claim that the study fills a gap in the knowledge base for NZ which might come under public pressure to "follow Australia". I got the impression the cervical cancer disease model is essentially an Australian model so it seems that the current article also serves as a knowledge base for Australia that should rethink their male vaccination policy. Either the authors leave out the NZ - AUS comparison or better explain the main reason for Australia to adopt male vaccination.

Minor Revision

Is HALY a widely accepted term? I am more used to DALYs or QALYs.

**Level of interest:** An article whose findings are important to those with closely related research interests

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

'I declare that I have no competing interests'