Reviewer's report

Title: Social equity in Human Papillomavirus vaccination: A natural experiment in Calgary Canada

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Reviewer: Per-Olof Ostergren

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The manuscript deals with an issue of great public health interest, the equity of uptake of HPV immunization depending on type of delivery mechanism. The topic has both a great general interest as well as a specific interest, i.e. regarding prevention of cervical cancer.

The authors have very elegantly seized the opportunity provided by a “natural experiment” where some schools in the Zone of Calgary, Canada, opted out from a school-based delivery model of HPV-immunization for girls in primary school and this service was replaced with a community-based delivery model that was offered the girls from those schools as an alternative.

The study was possible because of the existence of a complete registry of all the individuals who were eligible for the mentioned immunization services and included information whether they had completed all three of the necessary sessions for becoming completely immunized. Based on postal codes, which could identify small geographical units of residential area, a probable classification of socioeconomic status was performed for all individuals and information concerning type of school was also available for each individual, as well as information whether immunization against Hepatitis B had been completed.

Based on this information, immunization rates were compared between the two different modes of delivery. Potential confounding from type of school was handled by stratification and by means of applying a logistic regression model where completed hepatitis B immunization was used as a proxy for individual behavior, which was another potential source of confounding.

The equity effect between the two types of service delivery was operationalized as the effect modification of SES on the association between mode of service delivery and immunization coverage.

The authors observed as the main results of their analyses, that immunization coverage was much higher for the school-based delivery model compared with the community-based model, and that SES significantly modified the effect in the community based model, so that the coverage was decreasing with low SES. Thus, the community-based model potentially contributed to future health inequalities in terms of higher risk for cervical cancer among girls in low SES-positions, whereas this was not the case for the school-based model.
The study design must be considered as very well suited for the purpose of the study. The participation rate was extremely high, excluding the possibility of selection bias. The authors have used appropriate statistical tools in a very convincing manner, so that they could account for potential confounding of any importance. The possibility of clustering effects was also accounted for in the analyses. There is a possibility of misclassification of SES on the individual level since postal codes were used for this purpose. However, the geographical areas designated by the postal codes were rather small, which ought to minimize such misclassification, which anyway must have been largely non-differential and therefore might have biased the results towards the null, if anything.

The policy implications of the results of the study are considerable, both from a HPV-prevention perspective, as from a more general health equity perspective.

The manuscript is written in a very clear linguistic style. If the space can allow so, it would be valuable to also include the table with the specific results of the logistic regression analyses in the manuscript proper, since it contains valuable information for the reader.

I declare that I have no competing interests.

**Level of interest:** An article of outstanding merit and interest in its field

**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.