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Title: Exploring variation in human papillomavirus vaccination uptake in Switzerland: A multi-level spatial analysis of a national vaccination coverage survey

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Abstract

Objective: Understanding the factors that influence human papillomavirus (HPV) vaccination uptake is critically important to the design of effective vaccination programmes. In Switzerland, HPV vaccination uptake (≥ 1 dose) by age 16 years among women ranges from 31 to 80% across 26 cantons (states). Our objective was to identify factors that are associated with the spatial variation in HPV vaccination uptake.

Methods: We used cross-sectional data from the Swiss National Vaccination Coverage Survey 2009-2016 on HPV vaccination status (≥ 1 dose) of 14-17 year old girls, their municipality of residence and their nationality for 21 of 26 cantons (N=8,965). We examined covariates at municipality level: language, degree of urbanisation, socio-economic position, religious denomination, results of a vote about vaccination laws as a proxy for vaccine scepticism; and, at cantonal level, availability of school-based vaccination and survey period. We used a series of conditional auto regressive (CAR) models to assess the effects of covariates while accounting for variability between cantons and municipal-level spatial autocorrelation.

Results: In the best-fit model, living in cantons that have school-based vaccination (adjusted odds ratio, OR: 2.51, 95% credible interval, CI: 1.77-3.56) was associated with increased uptake, while living in municipalities with lower acceptance of vaccination laws was associated with lower HPV vaccination uptake (OR: 0.61, 95% CI: 0.50-0.73). Overall, the covariates explained 88% of the municipal-level variation in uptake.

Conclusions: In Switzerland, both cantons and community opinion about vaccination play a prominent role in the variation in HPV vaccination uptake. To increase uptake, efforts should be made to mitigate vaccination scepticism and to encourage school-based vaccination.