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## Human Papillomavirus prevalence and associated risk factors in women with cervical pre-cancer and cancer in Switzerland at the beginning of the cantonal vaccination programmes: The CIN3+plus study

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**Introduction:** The Swiss Federal Office of Public Health has recommended vaccination against human papillomavirus (HPV) to prevent cervical cancer since 2007. To monitor the future public health impact of vaccination, baseline population-based data are required. The objectives of this study were to determine the prevalence of HPV and examine associated risk factors in women with cervical intraepithelial neoplasia stage 3 or more severe lesions (CIN3+) in Switzerland.

**Materials and methods:** We conducted a cross-sectional study with women diagnosed with CIN3+ in Switzerland. Ten pathology institutes from six cantons and three language regions participated. We conducted HPV typing on formaldehyde fixed-paraffin embedded specimens from 2014 and 2015. Women enrolled in 2015 were asked to complete a questionnaire. We described frequencies of HPV types. We also compared demographic characteristics and socioeconomic status (according to the Swiss neighbourhood index of socioeconomic position, Swiss-SEP) in the CIN3+plus group with the Swiss National Cohort (SNC) in 2014 and compared risk factors for HPV infection with the Swiss Health Survey (SHS) in 2012.

**Results:** We included 768 biopsies from 767 women aged 17-81 years with CIN3+ in 2014 and 2015. Of these, 745 (97.0%) were positive for any HPV type, 5 (0.7%) were negative and 18 (2.3%) were not evaluable. Overall, 475/768 (61.8%) biopsies contained HPV 16 and/or 18 and 687 (89.5%) contained an oncogenic HPV type covered by the nonavalent HPV vaccine (16, 18, 31, 33, 45, 52, 58). In 2015, 273 women completed a questionnaire. Compared with the SNC, fewer women with CIN3+ were born in Switzerland (49.0 vs. 63.4%;  $p < 0.001$ ) and more were single (48.9 vs. 28.1%;  $p < 0.001$ ), but mean Swiss-Sep index was similar ( $64.6 \pm 10.8$  vs.  $65.2 \pm 10.9$ ;  $p = 0.135$ ). Amongst women with CIN3+, higher proportions reported  $\geq 2$  sexual partners in the last 12 months (15.4% vs. 4.1%), smoking (38.5% vs. 22.0%) and hormonal contraception use in the last 12 months (35.5% vs. 22.4%) than women in the SHS.

**Conclusion:** This is the first study of HPV in women with CIN3+ covering all three language regions in Switzerland. Women with CIN3+ have levels of socioeconomic position that are similar to the Swiss general population but higher levels of some risk factors for HPV. Surveillance of HPV types in CIN3+ lesions is feasible and can be used to measure the future impact of HPV vaccination on clinical outcomes.