



**Karolinska
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Institution för Medicinisk Epidemiologi och Biostatistik

Assessing infection risk and evaluating prevention strategies in the era of HPV-vaccines

AKADEMISK AVHANDLING

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av

Amy Levál

RN, BSc, BA

Huvudhandledare:

Professor Pär Sparén
Karolinska Institutet
Institution för Medicinsk Epidemiologi och
Biostatistik

Bihandledare:

Assistant Professor Julia Fridman Simard
Karolinska Institutet
Institutionen för Medicin
Enheten för Klinisk Epidemiologi

Dr. Catarina Widmark
Karolinska Institutet
Institutionen för lärande, informatik,
management och etik;
Institutionen för neurobiologi,
vårdvetenskap och samhälle

Fakultetsopponent:

Assistant Professor Rachel Winer
University of Washington
Department of Epidemiology
HPV Research Group

Betygsnämnd:

Docent Sven-eric Olsson
Kvinnokliniken
Danderyds Sjukhus

Dr. Mark Clements
Karolinska Institutet
Institution för Medicinsk Epidemiologi och
Biostatistik

Docent Kerstin Sandell
Lunds Universitet
Samhällsvetenskapliga fakulteten
Centrum för genusvetenskap

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ABSTRACT

Aim: This thesis aims to provide a multidimensional assessment of infection risks and to evaluate strategies for HPV prevention including vaccination with quadrivalent HPV-vaccines, dose-level vaccine effectiveness and condom use in high STI risk situations.

Methods: Multiple population-based registers and questionnaire responses provided data for this thesis. Various multivariable and univariate regression models were fit.

Findings: Overall, quadrivalent HPV-vaccination was highly effective against genital warts (GW) also referred to as condyloma, which is the first HPV disease endpoint possible to measure. However, effectiveness was contingent upon young age-at-first vaccination, with effectiveness declining steadily the older the age-at-first vaccination. Among women above 20 years of age there was low to immeasurable effectiveness and suggestive evidence vaccinations in this age group tended to reach women at high GW risk. There were marked socioeconomic disparities in the opportunistic (on-demand with co-pay) vaccination strategy evaluated, with women and girls who have parents with the highest education level compared to the lowest having a 15 times greater likelihood to be vaccinated (Study III). Once vaccination was initiated, however, high parental education level was unrelated to vaccination completion. Maximum protection against GW was found among girls vaccinated under the age of 17 who had received three doses of the vaccine. No differences in effectiveness were found for girls who received two-doses between ages 10-16 with that of those who received three-doses between ages 17-19 (Study IV). GW affects more men than women in Sweden as of 2010 with 453 per 100 000 men and 365 per 100 000 women treated. A decline between 25-30% was seen between 2006 and 2010 among women in the age groups with the highest vaccination coverage. No decline was found amongst men and their GW incidence has steadily increased between 2006 and 2010 (Study II). Reported condom use in high risk situations was low among both men and women, with 41% of men and 34% of women reporting always/almost always condom use with temporary partners. STI risk perception was also low, with approximately 10% of sexually active respondents considering themselves at large risk of contracting an STI. There was no association between men's condom use and their STI risk perception but there was an association for women (Study I).

Conclusions: Results suggest that males bear a substantial burden of HPV-related condyloma where incidence has dropped among women. When planning HPV-vaccination among females, efforts should target girls under age 14 for maximum effectiveness. Quadrivalent HPV-vaccination offers most protection against condyloma at three doses. Gross social inequity was found with opportunistic HPV-vaccination. There were large gender differences in factors associated with condom use in high risk situations and STI risk perceptions.

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