HPV VACCINATION AND CERVICAL DYSPLASIA SCREENING: THE SYNERGY OF PRIMARY AND SECONDARY PREVENTION

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1 BACKGROUND

Persistent infection with high-risk human papillomavirus (HPV) is the main cause of cervical intraepithelial neoplasia (CIN).

HPV vaccination (primary prevention) and screening (secondary prevention) are complementary strategies that significantly reduce the incidence of CIN.

The integration of vaccination and screening creates a synergistic effect, ensuring a greater reduction in CIN burden than either strategy alone.

2 AIM

To analyze the role of HPV vaccination and screening in the prevention and early detection of cervical dysplasia and to evaluate their synergistic effect on reducing the incidence of CIN.

3 RESULTS

3.1 HPV VACCINATION (PRIMARY PREVENTION)

Recommended for girls (and boys) aged 9–14 years, with catch-up vaccination up to 26 years (if not vaccinated earlier).

Use of 9-valent HPV vaccine covering HPV types 6, 11, 16, 18, 31, 33, 45, 52, 58.

High efficacy against persistent infection with HPV 16/18 (≈90%) and significant reduction in CIN2+ (systematic reviews).

Population vaccination programs are recommended to achieve high coverage (≥70–90%) to maximize the public health impact.

3.2 SCREENING FOR CERVICAL DYSPLASIA (SECONDARY PREVENTION)

Screening methods

Primary HPV testing (preferred approach).

Cytology (if HPV testing is not available).

Colposcopy and biopsy for triage and diagnostic evaluation.

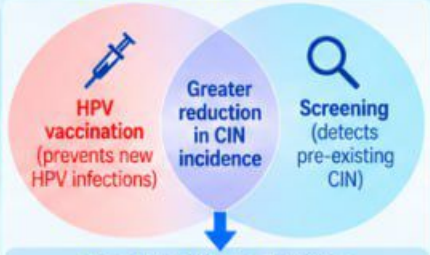
Target population and interval

Women aged 25–65 years.

Primary HPV test every 5 years (if resources allow).

Risk based management of abnormal results according to ASCCP risk-based guidelines.

3.3 THE SYNERGY OF VACCINATION AND SEREENING

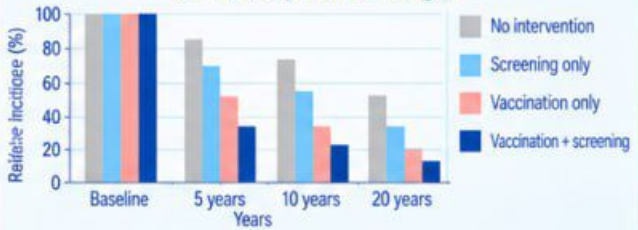


Complementary mechanisms

- Vaccination reduces the prevalence of high-risk HPV types.
- Screening detects and treats existing CIN lesions.
- Together they accelerate the decline in CIN incidence and prevent future cases.
- Mathematical models and real-world data confirm a synergistic effect.

3.4 IMPACT ON THE INCIDENCE OF CIN

Projected reduction in CIN incidence with different prevention strategies



Key evidence

Up to 70–90% reduction in CIN2+ with high vaccination coverage (systematic reviews).

Screening alone reduces CIN incidence by 50–60% in organized programs.

The combination of vaccination and screening can reduce the incidence of CIN by 40% or more in the long term (modelling studies).

4 CONCLUSIONS

1. HPV vaccination and screening are effective, evidence-based strategies for the prevention and early detection of cervical dysplasia in Ukraine and worldwide.
2. Their integration provides a synergistic effect, leading to a more pronounced and sustainable reduction in the incidence of CIN compared to each strategy alone.
3. Implementation of high HPV vaccination coverage and organized screening programs according to current international and national guidelines should be a priority for the healthcare system in Ukraine.
4. Adherence to guideline-recommended vaccination and screening algorithms will contribute to reducing the burden of cervical dysplasia and improve women's reproductive and overall health.