

Smoking and its link to the human papillomavirus (HPV) and cervical cancer: Information for colposcopy staff

What are the risks of smoking in relation to HPV infection?

- Smoking increases the risk of having an active HPV infection.¹ While most HPV infections are cleared within 1–2 years, smoking reduces the chance of clearing HPV.
- Smoking increases the risk that HPV will cause cell abnormalities in the cervix, that can lead to cervical cancer.²

How does smoking lead to HPV infection?

Smoking weakens the body's immune response to HPV. It reduces the body's ability to clear HPV and to develop antibodies to protect against future HPV infections.³

What are the risks of smoking in relation to cervical cancer?

- Smoking increases the risk of cervical cancer in HPV-positive women and people with a cervix.
- An estimated 11–12% of all cervical cancer deaths are linked to smoking.^{1,4}
- Smokers have a higher risk of developing both pre-invasive and invasive cervical cancer when compared to people who do not smoke (i.e. CIN 1–3).⁵
- Smoking increases the risk of secondary cancers, poorer treatment outcomes and cancer recurrence in people with cervical cancer.^{6–8}

How does smoking lead to cervical cancer?

Smoking is associated with the progression of abnormal cervical cells into cancerous cells. Smoking can lead to persistent HPV infection,

damaging cells in the cervix and causing genetic changes in the infected cells. Additionally, smoking itself can cause genetic changes in the infected cells.⁹ These genetic changes, or mutations, can accumulate and allow the cervical cells to transform into cancerous cells.⁴

Does the risk of cervical cancer increase with the number of smoked?

The risk of developing and having persistent HPV increases with the number of cigarettes smoked daily. Smoking decreases the antibodies that protect against HPV.^{3,10} Moreover, the risk of developing cervical cancer and precancerous changes (i.e. CIN 1–3) increases with the number of cigarettes smoked daily and with the time spent smoking.^{5,11}

What are the benefits of stopping smoking for someone attending colposcopy?

Stopping smoking can reduce the risk of:

- future HPV infections
- pre-invasive lesions (i.e. CIN 1–3)
- cervical cancer^{3, 5, 12}

It can also reduce the size of existing low-grade precancerous changes (i.e. CIN 1).¹³

What services are available to someone attending colposcopy who wants to quit smoking?

There are many services available to people wishing to stop smoking. Getting the right help can double a person's chances of success.

These services include:

- signing up for a free, personalised Quit plan to help stop smoking
- joining a stop smoking support group

- meeting a trained stop smoking advisor in person, weekly for 6 weeks (before and after your quit date) with regular contact for up to 12 months.
- getting 1-to-1 support from a trained stop smoking advisor online or by phone.
- availing of nicotine replacement therapy (NRT) or medication prescribed by a GP.
- Getting support from a stop smoking advisor and using NRT makes it four times more likely that the smoker will quit for good.

Find out more information

hse.ie/quitsupport

How can I refer someone attending colposcopy to local or national QUIT services?

- You can make a referral online.
- You can also refer using Quit Manager (the national patient management system for Stop Smoking Services). You will need the person's name, date of birth, gender, county of residence and contact phone number to make the referral.

What information can I give to ex-smokers attending colposcopy?

Reassure people who have stopped smoking that they have made the right decision and encourage them to continue. You could tell them that their colposcopy treatment is more likely to be successful because of their hard efforts. The risk of cervical cancer and precancerous changes (i.e. CIN 1–3) has decreased and this risk will decrease further as they continue on their journey of not smoking.

References

1. White CM, Bakhiet S, Bates M, Ruttle C, Pilkington LJ, Keegan H, et al. Exposure to tobacco smoke measured by urinary nicotine metabolites increases risk of p16/Ki-67 co-expression and high-grade cervical neoplasia in HPV positive women: A two year prospective study. *Cancer Epidemiol.* 2020;68:101793.
2. Nagelhout G, Ebisch RM, Van Der Hel O, Meerkerk GJ, Magnée T, De Bruijn T, et al. Is smoking an independent risk factor for developing cervical intra-epithelial neoplasia and cervical cancer? A systematic review and meta-analysis. *Expert Rev Anticancer Ther.* 2021;21(7):781-94.
3. Eldridge RC, Pawlita M, Wilson L, Castle PE, Waterboer T, Gravitt PE, et al. Smoking and subsequent human papillomavirus infection: a mediation analysis. *Ann Epidemiol.* 2017;27(11):724-30.e1.
4. Koshiyama M, Nakagawa M, Ono A. The Preventive Effect of Dietary Antioxidants against Cervical Cancer versus the Promotive Effect of Tobacco Smoking. *Healthcare.* 2019;7(4):162.
5. Malevolti MC, Lugo A, Scala M, Gallus S, Gorini G, Lachi A, et al. Dose-risk relationships between cigarette smoking and cervical cancer: a systematic review and meta-analysis. *Eur J Cancer Prev.* 2023;32(2):171-83.
6. Mayadev J, Lim J, Durbin-Johnson B, Valicenti R, Alvarez E. Smoking Decreases Survival in Locally Advanced Cervical Cancer Treated With Radiation. *Am J Clin Oncol.* 2018;41(3):295-301.
7. Warren GW, Kasza KA, Reid ME, Cummings KM, Marshall JR. Smoking at diagnosis and survival in cancer patients. *Int J Cancer.* 2013;132(2):401-10.
8. Jassem J. Tobacco smoking after diagnosis of cancer: clinical aspects. *Translational Lung Cancer Research.* 2019:S50-S8.
9. Wei L, Griego AM, Chu M, Ozbun MA. Tobacco exposure results in increased E6 and E7 oncogene expression, DNA damage and mutation rates in cells maintaining episomal human papillomavirus 16 genomes. *Carcinogenesis.* 2014;35(10):2373-81.
10. Vaccarella S, Herrero R, Snijders PJF, Dai M, Thomas JO, Hieu NT, et al. Smoking and human papillomavirus infection: pooled analysis of the International Agency for Research on Cancer HPV Prevalence Surveys. *International Journal of Epidemiology.* 2008;37(3):536-46.
11. Kjellberg L, Hallmans G, Ahren AM, Johansson R, Bergman F, Wadell G, et al. Smoking, diet, pregnancy and oral contraceptive use as risk factors for cervical intra-epithelial neoplasia in relation to human papillomavirus infection. *Br J Cancer.* 2000;82(7):1332-8.
12. Roura E, Castellsagué X, Pawlita M, Travier N, Waterboer T, Margall N, et al. Smoking as a major risk factor for cervical cancer and pre-cancer: Results from the EPIC cohort. *International Journal of Cancer.* 2014;135(2):453-66.
13. Szarewski A, Jarvis MJ, Sasieni P, Anderson M, Edwards R, Steele SJ, et al. Effect of smoking cessation on cervical lesion size. *Lancet.* 1996;347(9006):941-3.