



## LJMU Research Online

**Westwood, R and Lavery, JV**

**Meeting the challenges of cervical cancer screening and HPV vaccination in the UK**

<http://researchonline.ljmu.ac.uk/id/eprint/15714/>

### Article

**Citation** (please note it is advisable to refer to the publisher's version if you intend to cite from this work)

**Westwood, R and Lavery, JV (2021) Meeting the challenges of cervical cancer screening and HPV vaccination in the UK. Primary Health Care, 31 (5). ISSN 0264-5033**

LJMU has developed **LJMU Research Online** for users to access the research output of the University more effectively. Copyright © and Moral Rights for the papers on this site are retained by the individual authors and/or other copyright owners. Users may download and/or print one copy of any article(s) in LJMU Research Online to facilitate their private study or for non-commercial research. You may not engage in further distribution of the material or use it for any profit-making activities or any commercial gain.

The version presented here may differ from the published version or from the version of the record. Please see the repository URL above for details on accessing the published version and note that access may require a subscription.

For more information please contact [researchonline@ljmu.ac.uk](mailto:researchonline@ljmu.ac.uk)

<http://researchonline.ljmu.ac.uk/>

**Roxanne Westwood<sup>1</sup> and Joanna Lavery<sup>2</sup>**

**Challenges of Cervical Cancer Screening and the Human  
Papillomavirus Vaccination (HPV) in the UK.**

## **Abstract**

Cervical cancer is one of the most common cancers in women worldwide, despite being identified as one of the most preventable and successfully treatable forms of cancers. The majority of deaths could be avoided if women had regular cervical screening along with the Human Papillomavirus (HPV) vaccination. Poor education, lack of resources, fear and embarrassment, along with cultural traditions, have been identified as challenges that prevent women from having the HPV vaccination and cervical screening. This report will provide an overview of cervical cancer, whilst acknowledging health disparities and the innovations used to tackle these health inequalities in the struggle to eradicate cervical cancer.

**Key Words:** Cervical Cancer, Cervical Screening, Cancer, Human Papillomavirus (HPV), Vaccination, Prevention, Challenges, Health Inequalities, Innovations

## **Introduction**

This report will identify the causes of cervical cancer, its signs, symptoms, and the current preventative and educational strategies available. The report will analyse innovations, and exploring the challenges women face which may inhibit them from attending cervical screenings or receiving the Human Papillomavirus (HPV) vaccination. The aim is to promote women's health through contemporary research and address these challenges to significantly reduce premature deaths.

## **Background**

Cervical cancer is identified as a global public health issue with over half a million women diagnosed in 2018, with mortality from developing or under developed countries accounting for an estimated 85% of deaths, (Small et al., 2017). Factors contributing to the prevalence of cervical cancer have been identified as: failure to comply with cervical screening programmes, lack of access, unvaccinated individuals, socioeconomic status, healthcare access and cultural beliefs (Hull et al., 2020). The World Health Organization (WHO) (2020) acknowledged cervical cancer as the fourth most common cancer among women worldwide, despite the effective preventable vaccination and cervical screening programme.

In 2017, there were more than eight new cases of cervical cancer every day in United Kingdom (UK), and it is identified as the second most common cancer in women aged 15-44, (Office for National Statistics [ONS], 2019). The HPV vaccination has been highlighted as a primary preventative approach, reducing cervical cancer cases by over 70% (PHE, 2019a). In England, the HPV programme has seen a reduction in

HPV types 16 and 18, between the ages of 16-24, from 8.2% in 2010 to 1.6% in 2016 (Meshar et al., 2018).

Figures suggest that a health promotion programme including both the HPV vaccination and cervical screening can dramatically reduce the prevalence of developing cervical cancer and significantly improve life expectancy (Arbyn et al., 2019). The WHO (2018) estimates that no single intervention strategy such as the HPV vaccination can eliminate disease on its own and would only achieve a 0.01% reduction in cervical cancer mortality rates by 2030.

### **Causes of Cervical Cancer**

Over 99% of all cases of cervical cancer are due to infections caused by HPV (Garg et al., 2020). HPV is predominantly a result of any skin-to-skin contact of the genital area, through vaginal, anal or oral sex, but can be transmitted from an infected person via non-sexual means or from mother to child through delivery (Boda et al., 2018, Sabeena et al., 2017). There are over 150 types of HPV, of which around 13 can be identified as high risk as they are connected to cervical cancer, with HPV 16 and 18 the leading variants (Lindsay et al., 2020). Over time, HPV can lead to abnormal cells in the cervix and when left untreated can develop into cervical cancer, despite 90% of cases clearing up independently within two years, without harm (Schiffman et al., 2016).

Women who were exposed to diethylstilboestrol (DES) medication before birth are also at risk of cervical cancer (National Institutes of Health, 2011). DES was licensed to prevent miscarriages over 40 years ago, but was later found to cause a high risk of

developing abnormal cells in the cervix in female offspring and annual screenings are recommended (Verloop et al., 2010).

## **Signs and Symptoms**

Symptoms of cervical cancer are vaginal bleeding during or after sex, in between periods or after menopause, experiencing pain or discomfort during or after sex, vaginal discharge with a strong odour, unexplained weight loss and lower back or persistent pelvic pain (Al-Darwish et al., 2014). These symptoms highlight the need to attend screening since they are not always present, and it is reported that 49% of UK women diagnosed with cervical cancer when screened had previously reported symptoms to a health professional, (Aasbo et al., 2019). Consequently, a third of women who reported symptoms faced follow-up and treatment delays of around three months resulting in poor patient satisfaction (Lim et al., 2014). Experience has improved with research, enhancing health professionals' understanding of the symptoms, thereby encouraging them to investigate when previously they may have been overlooked (Funston et al., 2018).

## **Cervical Screening**

Cervical screening first occurred in 1964, with women receiving opportunistic screening and those who were found to have cervical cancer received substandard follow-ups (Raffle and Muir Gray, 2020). The National Health Service (NHS) produced a more effective cervical screening programme in 1988, in order to reduce the rising number of cervical cancer diagnoses and mortality rates dropped by approximately 50% (Albrow et al., 2012).

Women aged 20 were invited to attend their first cervical cancer screening and every three to five years thereafter until the age of 64, whereby the risk is thought to reduce (Albrow et al., 2012,). Castanon et al. (2014) advised screening over 64 is not cost effective, believing that only women who have a high risk or show symptoms are appropriate candidates for screening. Yost and Hoekstra (2018) however, identified that 20% of cervical cancer cases are women over 65, advocating that screening should continue and that vaccinating this group would prove cost effective in the long-term to reduce cases.

European guidelines for quality assurance (QA) in cervical cancer screening led to a more robust UK cervical screening programme in 2004, introducing an organised call and recall system for women aged 25-64. Screening was required every three years, until the age of 50 where it extended to every five years, until the programme was updated in 2012, inviting women from the age of 24.5 to ensure all women were screened by the age of 25 (Chrysostomou et al., 2018, Castanon, Tataru and Sasieni, 2020). This increase in age caused a public concern, with cervical cancer rates rising in women aged 20-24 years, there were allegations that younger women were overlooked, creating inequity in care which went against the ethos of the public health strategy for cervical screening (PHE, 2019a, Moscicki et al., 2018). Despite this, the policy remains unchanged with studies confirming that screening earlier can cause more harm than good by over-diagnosis and over-treatment (Castanon and Sasieni, 2018).

## **Quality in Screening**

Quality control (QC) and QA are vital in order to instil excellent and reliable standards in care, requiring regular monitoring through all the stages of protocols and organisations to ensure they are current, safe and effective (Manghani, 2011). All steps should be taken in line with trusts' local policies and procedures whilst adhering to national guidelines to eliminate risks and deliver outstanding care (Jhugrsing, Dimmock and Mulchandani, 2017). The accuracy of cervical screening is of the utmost importance, a liquid based cytology (LBC) test was developed in an improvement to the original Papanicolaou (PAP) and now accounts for 90% of the cytology tests taken today (Gibb and Martens, 2011). The LBC was also designed to improve detection of cancerous cells, in line with QC, preventing false-negatives in order to initiate appropriate treatment and avoid false-positives to avert unnecessary investigations (Lim and Woo Yoo, 2019). There is an increased risk of developing cervical cancer should a patient receive a false negative. However false positives can also be harmful, leading to unnecessary investigations and treatment that not only impact patients' wellbeing but, in some instances, can affect their sexual life and reproductive system (Schiffman and Sanjose, 2019).

Studies have found the quality of the initial PAP test was thwarted by blood, mucus and poor cell distribution, leading to errors in detecting and interpreting abnormal cells sensitivities (Gibb and Martens, 2011, Jeong et al., 2017). This highlights that women must attend screening mid menstrual cycle, to prevent the propensity for false results and rescheduling of appointments, (NICE,2020). QA procedures such as staff training, evaluation, auditing and reviews of the screening programme can ensure it is safe and in line with best evidence-based practice (Chryostomou et al., 2018).



## **Barriers to screening**

Barriers that prevent women from attending cervical screening are thought to be anticipation of pain or embarrassment, fearing the outcome, accessibility and poor patient-nurse relationship (Cooper, 2011). It is stated the current programme is invasive and uncomfortable, resulting in low patient satisfaction and participation (Williams et al., 2017). Traditional beliefs, poor understanding, lack of education and communication barriers were also identified as challenges to cervical screening among Black, Asian and Minority Ethnic (BAME) groups (Ferdous et al., 2018). Certain cultures discourage unmarried women from undertaking cervical screening believing it will bring dishonour and stigma to the family, due to HPV's association with sexually transmitted infections (STIs) (Kim, 2014). Some cultural customs forbid women from having nurses of the opposite gender attend to them, highlighting the need for cultural competence practice (Davies and Thate, 2017). Being aware of cultural customs with influenced by religion, older generations or societal beliefs, enables nurses to deliver high standards of care to patients and providing women with the appropriate gender practitioner to conduct their cervical screening (NHS, 2014).

A good patient-nurse rapport is also said to encourage women to attend cervical screening and avoiding jargon can overcome communication barriers with patients (McMunn 2019, Payton, 2018).

## **Media influence**

Current cervical screening invitations are sent to women with patient information leaflets (NICE, 2020). Screening is at a 20-year low, falling below the national target

for cervical screening coverage by nearly 10% (NHS Digital, 2020). Therefore, in order to promote cervical screening, new innovations are explored with the aim to encourage and support more women to take part.

PHE (2019c) launched a national multimedia campaign called 'Cervical Screening Saves Lives', in order to promote and encourage more women to attend cervical screening by providing information and highlighting the risks of cervical cancer. The media has previously had a positive effect and was responsible for a significant increase in cervical screening following the publicised story of celebrity Jade Goody, who was diagnosed and later died of cervical cancer at the age of 27 in 2008 (Marlow et al., 2012). Known as the Jade Goody effect, the following year, attendance in England increased to over half a million, but consequently decreased, mirroring the pattern of the media coverage (Lancucki et al., 2012). This highlights the success and importance of the role the media plays in promoting health and wellbeing, by spreading awareness and education (Sharma and Gupta, 2017).

The 'Lifesaving Wax campaign' is partnered with Treatwell (2020), a leading hair and beauty company which has targeted over 1.2 million women between the ages of 25-34 who use salons to maintain pubic hair. It has promoted cervical screening during intimate appointments and encouraged women to overcome fear and embarrassment, with more than 86,000 more cervical screenings recorded since the campaign started, (Gwynn, 2019, Stubbs and Pearmain, 2019).

## **Innovations in Cervical Screening**

NHS England (2021) is trialling YouScreen, a HPV home testing self-sampling kit that will be available to over 31,000 women in England, aged between 25-64. YouScreen will be offered to women whose screening is overdue by 6-15 months often as a consequence of COVID, to improve uptake as part of a study in North Central and North East London, (NHS England, 2021). Castanon et al (2020) acknowledged COVID-19 delays and emphasised that there must be equity in care for those affected by screening delays in addition to extra screening capacity. YouScreen may be an innovation to help address this imbalance by increasing uptake. However, Wong et al., (2018) suggests home tests could be financially ineffective and unsafe, leading to inaccurate results or unnecessary investigations. The effectiveness of YouScreen is unclear, although a developing evidence base from predominantly high-income countries suggests self-sampling can increase screening uptake compared with standard care, yet more evidence is needed to establish accuracy and reliability of results (Yeh et al 2019, Chao and McCormack, 2019).

Another innovation is ZedScan, a new diagnostic tool designed to be less-invasive during colposcopy (Peron et al., 2018). Its probe is used to capture images of the cervix in real time, allowing healthcare professionals to make a real time accurate and informed decision by identifying any precancerous cells (NICE, 2018). ZedScan has been seen to reduce unnecessary biopsies and improve patient satisfaction. The early detection can support positive patient outcomes although there is a high risk of misinterpretation which can cause distress (Byrom et al., 2020, NICE, 2018).

## **HPV Vaccination**

HPV is responsible for nearly all cases of cervical cancer and the prophylactic vaccination protects against the main strains of HPV 16 and 18, plus HPV 6 and 11, which are responsible for 90% of anal, genital, head and neck cancers (Cubie, 2013). The HPV vaccination programme was introduced in 2008, targeting girls in England aged 12-13 years, therefore the full impact of the vaccine and its effects on cancer survival rates may not be realised for years to come, (Cervantes and Doan, 2018) . Since its introduction cervical cancer cases have fallen but not all strains of HPV are covered and it is important women still attend cervical screenings (Henderson et al., 2011).

The rate of girls having the HPV vaccination fell in 2017-2018 to 86.9%, compared to 89.4% in 2014-2015 (PHE, 2018b). The vaccination may have triggered ethical dilemmas for parents because of the age it is administered to children. Some parents believe that by promoting the HPV vaccination, they are encouraging sexual relationships and risky behaviour at an inappropriate age, but studies dispute this (Donken et al., 2018). Cross sectional and longitudinal surveys in England highlighted that neither receiving the vaccine nor being offered it affected a girl's sexual behaviour (Forster et al, 2012). In England, the programme is rolled out in schools with a health education and promotion focus, which may account for a significantly higher uptake than alternative non-school-based schemes (Hopkins and Wood, 2013). Promoting awareness to parents about HPV and its link to different cancers and genital warts

enables parents to make an informed decision regarding the vaccination (Ganczak, Owsianka and Korzeń, 2018). Furthermore, poor education in parents appeared to be a common factor, as to why parents did not allow their children to have the HPV vaccination (Griffioen et al., 2012). It had been suggested that BAME communities have a lower vaccine uptake, with parents not agreeable to the HPV vaccination due to strong religious beliefs about sex outside of marriage (Forster et al., 2017). Research demonstrates these communities would benefit from tailored education to promote vaccination (Netfa et al., 2020).

The vaccination engages more people when dual prevention of both HPV and cervical cancer is promoted and it was announced that the HPV vaccination would be available to boys from the age of 12-13 years, in England, from 2019 (Merriel et al., 2018), Cartmell et al., 2018). The strategy of extending the HPV vaccination programme to boys acknowledges the value of prevention and early intervention, yet the results of this development will not be determined for some time, (Every Child Matters, 2003, NHS long term plan, 2019b)..

## **Conclusion**

The HPV vaccination has been acknowledged as a primary preventative innovation in reducing the risk of cervical cancer. Cervical screening is a proven invaluable tool in preventing cervical cancer in women, with both the NHS and WHO having identified the programme as a primary strategy to eradicate cervical cancer.

Challenges to the success of both cervical screening and HPV vaccination uptake have been highlighted as a lack of education in some communities. Healthcare

professionals require cultural competence in order to effectively address parental concerns and encourage uptake of cervical screening and HPV vaccination. Moving forward it is clear that many barriers to cervical screening need to be overcome. Patient focused strategies are key, such as ensuring privacy and dignity, offering a chaperone to all women as standard practice, demonstrating responsiveness within the assessment process to reassure and actively address patient concerns. Further encouragement to engage and overcome practical challenges such as the introduction of self-testing home kits show potential for increasing screening participation, as do the introduction of vaccinations to boys. These will inevitably require research to establish its impact on cervical and associated cancer rates across all populations.

## References

Aasbo, G., Solbrække, K.N., Waller, J., Trope, A., Nygard M. and Hansen, B.T. (2019) Perspectives of non-attenders for cervical cancer screening in Norway: a qualitative focus group study. *BMJ Open*, 9(8), pp1-8.

Albrow, R., Kitchener, H., Gupta, N. and Desai, M. (2012) Cervical screening in England: The past, the present and future. *Cancer Cytopathology*, 120(2), pp.87-96.

Al-Darwish, A.A., Al-Naim, A.F., Al-Mulhim, K.S., Al-Otaibi, N.K., Morsi, M.S. and Aleem, A.M. (2014) Knowledge about Cervical Cancer Early Warning Signs and

Symptoms, Risk Factors and Vaccination among Students at a Medical School in Al-Ahsa, Kingdom of Saudi Arabia. *Asian Pacific Journal of Cancer Prevention*, 15(6), pp.2529–2532.

Arbyn, M., Anttila, A., Jordan, J., Ronco, G., Schenck, U., Segnan, N., Wiener, H., Herbert, A. and Von Karsa, L. (2010) European Guidelines for Quality Assurance in Cervical Cancer Screening. Second Edition— Summary Document. *Annals of Oncology*, 21(3), pp.448-458.

Arbyn, M., Weiderpass, E., Bruni, L., Sanjosé, S., Saraiya, M., Ir, J.F. and Bray, F. (2019) Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. *Lancet Global Health*, 8(2), pp.E191-E203.

Boda, D., Docea, A.O., Calina, D., Ilie, M.A., Caruntu, C., Zurac, S., Neagu, M., Constantin, C., Branisteanu, D.E., Voiculescu, V., Mamoulakis, C., Tzanakakis, G., Spandidos, D.A., Drakoulis, N. and Tsatsakis, A.M. (2018) Human papilloma virus: Apprehending the link with carcinogenesis and unveiling new research avenues (Review). *International Journal of Oncology*, 52(3), pp.637–655.

Byrom, J., Dunn, P., Ferguson, G., Leeson, S., Redman, C., Smith, J. and Tidy, J. (2020) Using technology to harmonise treatment approaches in colposcopy in the face of a changing environment. *European Journal of Obstetrics and Gynaecology and Reproductive Biology*, 255, pp.40-43.

Cartmell, K.B., Young-Pierce, J., McGue, S., Alberg, A.J., Luque, J.S., Zubizarreta, M. and Brandt, H.M. (2018) Barriers, facilitators, and potential strategies for increasing HPV vaccination: A state-wide assessment to inform action. *Papillomavirus Research*, 5, pp.21–31.

Castanon, A., Landy, R., Cuzick, J. And Sasieni, P. (2014) Cervical Screening at Age 50–64 Years and the Risk of Cervical Cancer at Age 65 Years and Older: Population-Based Case Control Study. *Public Library of Science Medicine*, 11(1), pp.1-13.

Castanon, A. and Sasieni, P. (2018) Is the recent increase in cervical cancer in women aged 20-24years in England a cause for concern? *Preventive Medicine*, 107, pp.21–28.

Castanon, A., Tataru, D. and Sasieni, P. (2020) Survival from Cervical Cancer Diagnosed Aged 20–29 Years by Age at First Invitation to Screening in England: Population-Based Study. *Cancers*, 12(8), p.2079.

Castanon, A., Matejka, R., Pesola, F and Sasieni, P (2020) The impact of COVID-19 disruption to cervical cancer screening in England on excess diagnoses  
medRxiv 2020.11.30.20240754;

Cervantes, J.L. and Doan, A.H. (2018) Discrepancies in the evaluation of the safety of the human papillomavirus vaccine. *Memorias Do Instituto Oswaldo Cruz*, 113(8), pp.1-4.



Chao, Y.S. and McCormack, S. (2019) HPV Self-Sampling for Primary Cervical Cancer Screening: A Review of Diagnostic Test Accuracy and Clinical Evidence – An Update. [online] Available at: <https://www.ncbi.nlm.nih.gov/books/NBK545378/> [Accessed 23<sup>rd</sup> March 2021]

Chrysostomou, K., Stylianou, D.C., Constantinidou, A. and Kostrikis, L.G. (2018) Cervical Cancer Screening Programs in Europe: The Transition Towards HPV Vaccination and Population-Based HPV Testing. *Viruses*, 10(12), p.729.

Cooper, M. (2011) Reasons for non-attendance at cervical screening. *Nursing Standard*, 25(26), pp.41-46.

Cubie, H.A. (2013) Diseases associated with human papillomavirus infection. *Virology*, 445(1-2), pp.21-34.

Davies, D.J. and Thate, M.J. (2017) *Religion and the Individual: belief, practice, and Identity*. MDPI AG: Basel, Switzerland.

Department of Health and Social Care (2018) *Prevention is better than cure: Our vision to help you live well for longer*.

Department of Health (2019b) *Long Term Plan*. DOH.

Donker, R., Ogilvie, G.S., Bettinger, J.A., Sadarangani, M. and Goldman, R.D. (2018) Effect of human papillomavirus vaccination on sexual behaviour among young females. *Canadian Family Physician*, 64(7), pp.501-513.

El-Zein, M., Bouten, S., Louvanto, K., Gilbert, L., Gotlieb, W., Hemmings, R., Behr, M.A., Franco, E., CASSIS Study Group. (2018) Validation of a new HPV self-sampling device for cervical cancer screening: The Cervical and Self-Sample in Screening (CASSIS) study. *Gynaecologic Oncology*, 149(3), pp.491-497

Ferdous, M., Lee, S., Goopy, S., Yang, H., Rumana, N., Abedin, T. and Turin, T.C. (2018) Barriers to cervical cancer screening faced by immigrant women in Canada: a systematic scoping review. *BMC Women's Health*, 18(165), pp.1-13.

Forster, A. S, Marlow, L. A.V, Stephenson, J., Wardle, J, and Waller, J. (2012) "Human Papillomavirus Vaccination and Sexual Behaviour: Cross-sectional and Longitudinal Surveys Conducted in England." *Vaccine* 30.33: 4939-944.

Forster, A. S., Rockliffe, L., Marlow, L., Bedford, H., McBride, E. and Waller, J. (2017) Exploring human papillomavirus vaccination refusal among ethnic minorities in England: A comparative qualitative study. *Psycho-oncology*, 26(9), pp.1278–1284.

Funston, G., O'Flynn, H., Ryan, N.A.J., Hamilton, W. and Crosbie, E.J. (2018) Recognizing gynecological cancer in primary care: risk factors, red flags, and referrals. *Advances in Therapy*, 35(4), pp.577-589.

Ganczak, M., Owsianka, B. and Korzeń, M. (2018) Factors that Predict Parental Willingness to Have Their Children Vaccinated against HPV in a Country with Low HPV Vaccination Coverage. *International journal of environmental research and public health*, 15(4), 645.

Garg, A., Galvin, A.M., Matthes, S. and Thompson, E.L. (2020) The connection between social determinants of health and Human Papillomavirus testing knowledge among women in the USA. *Journal of Cancer Education*.

Gibb, R. and Martens, M. (2011) The impact of liquid-based cytology in decreasing the incidence of cervical cancer. *Reviews in Obstetrics & Gynecology*, 4(1), pp.2-11.

Griffioen, A.M., Glynn, S., Mullins, T.K., Zimet, G.D., Rosenthal, S.L., Fortenberry, J.D. and Khan, J.A. (2012) Perspectives on Decision Making About Human Papillomavirus Vaccination Among 11- to 12-Year-Old Girls and Their Mothers. *Clinical Paediatrics*, 51(6), pp.560-568.

Gwynn, S. (2019) *Public Health England partners Treatwell for 'Life saving wax' initiative*. [online] Available at: <https://www.campaignlive.co.uk/article/public-health-england-partners-treatwell-life-saving-wax-initiative/1582926> [Accessed 30<sup>th</sup> October 2020]

Henderson, L., Clements, A., Damery, S., Wilkinson, C., Austoker, J. and Group, S.W. (2011) A False Sense of Security? Understanding the role of the HPV vaccine on

future cervical screening behaviour: A qualitative study of UK parents and girls of vaccination age. *Journal of Medical Screening*, 18(1), pp.41-45.

Hopkins, T.G. and Wood, N. (2013) Female human papillomavirus (HPV) vaccination: global uptake and the impact of attitudes. *Vaccine*, 31(13), pp.1673–1679.

HM Treasury (2003) *Every Child Matters*. [online] Available

at: [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/272064/5860.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/272064/5860.pdf) [Accessed 8th December 2020]

Hull, R., Mbele, M., Makhafa, T., Hicks, C., Wang, S.M., Reis, R.M., Mehrotra, R., Mkhize-Kwitshana, Z., Kibiki, G., Bates, D.O. and Dlamini, Z. (2020) Cervical cancer in low and middle-income countries. *Oncology Letters*, 20(3), pp.2058–2074.

Jeong, H., Hong, S.R., Chae, S. W., Jin, S.Y., Yoon, H.K., Lee, J., Kim, E.K., Ha, S.T., Kim, S.N., Park, E.J., Jung, J.J., Sung, S.H. and Lim, S.C. (2017) Comparison of Unsatisfactory Samples from Conventional Smear versus Liquid-Based Cytology in Uterine Cervical Cancer Screening Test. *Journal of Pathology and Translational Medicine*, 51(3), pp.314–319.

Jhugursing, M., Dimmock, V. And Mulchandani, H. (2017) Error and root cause analysis. *BJA Education*, 17(10), pp.323-333.

Kim, H.W. (2014) Awareness of Pap testing and factors associated with intent to undergo Pap testing by level of sexual experience in unmarried university students in Korea: results from an online survey. *BMC Women's Health*, 14(100), pp.1-13.

Lancucki, L., Sasieni, P., Patnick, J., Day, T.J. and Vessey, M.P. (2012) The impact of Jade Goody's diagnosis and death on the NHS Cervical Screening Programme. *Journal of Medical Screening*, 19(2), pp.89–93.

Lim, A.W., Ramirez, A.J., Hamilton, W., Sasieni, P., Patnick, J. and Forbes, L.J. (2014) Delays in diagnosis of young females with symptomatic cervical cancer in England: an interview-based study. *The British Journal of General Practice: the journal of the Royal College of General Practitioners*, 64(627), pp. e602–e610.

Lim, S. and Woo Yoo, C. (2019) Current Status of and Perspectives on Cervical Cancer Screening in Korea. *Journal of Pathology and Translational Medicine*, 53(4), pp.210–216.

Lindsay, A.C., Delgado, D., Valdez, M.J. Restrepo, E. and Guzman, Y.M. (2020) I don't Think He Needs the HPV Vaccine because Boys Can't Have Cervical Cancer: A Qualitative Study of Latina Mothers' (Mis) Understandings About Human Papillomavirus Transmission, Associated Cancers, and the Vaccine. *Journal of Cancer Education*. [First published online 11<sup>th</sup> July 2020]

Manghani, K. (2011) Quality assurance: Importance of systems and standard operating procedures. *Perspectives in Clinical Research*, 2(1), pp.34-37.

Marlow, L.A.V., Sangha, A., Patnick, J. and Waller, J. (2012) The Jade Goody Effect: Whose Cervical Screening Decisions Were Influenced by Her Story? *Journal of Medical Screening*, 19(4), pp.184-188.

McMunn, V. (2019) Improving women's uptake of cervical screening in primary care. *Primary Health Care. Nursing Standard*, 30(5), pp.1-7.

Merriel, S.W., Nadarzynski, T., Kesten, J.M., Flannagan, C. and Prue, G. (2018). Jobs for the boys: time to deliver on HPV vaccination recommendations. *The British Journal of General Practice*, 68(674), pp.406–407.

Meshher, D., Panwar, K., Thomas, S., Edmundson, C., Choi, Y.H., Beddows, S. and Soldan, K. (2018) The Impact of the National HPV Vaccination Program in England Using the Bivalent HPV Vaccine: Surveillance of Type-Specific HPV in Young Females, 2010–2016, *The Journal of Infectious Diseases*, 218(6), pp.911–921.

Moscicki, A. B., Perkins, R. B., Saville, M. and Brotherton, J. (2018) Should Cervical Cancer Screening be Performed Before the Age of 25 Years? *Journal of lower genital tract disease*, 22(4), pp.348–351.

National Health Service Digital (2020) *Cervical Screening Programme - Coverage Statistics [Management Information]*.

National Health Service England (2021) *NHS gives women Human Papillomavirus Virus (HPV) home testing kits to cut cancer deaths* [online] Available at: <https://www.england.nhs.uk/2021/02/nhs-gives-women-hpv-home-testing-kits-to-cut-cancer-deaths/> [Accessed 23<sup>rd</sup> March 2021]

National Institutes of Health (2011) *Women exposed to DES in the womb face increased cancer risk*.

National Institute for Health and Care Excellence (2018) *Adjunctive colposcopy technologies for assessing suspected cervical abnormalities: the DYSIS colposcope with DYSIS map and the ZedScan*.

National Institute for Health and Care Excellence (2020) *Cervical Screening*.

National Institute for Health and Care Excellence (2020b) *Human Papillomavirus Vaccines*.

Netfa, F., Tashani, M., Booy, R., King, C., Rashid, H. and Skinner, S. R. (2020) Knowledge, Attitudes and Perceptions of Immigrant Parents Towards Human Papillomavirus (HPV) Vaccination: A Systematic Review. *Tropical Medicine and Infectious Disease*, 5(2), pp.58.

Office for National Statistics (2019) *Cancer registration statistics, England: 2017*.

Payton, J. (2018) Improving Communication Skills within the Nephrology Unit. *Nephrology Nursing Journal*, 45(3), pp.269-272.

Peron, M., Llewellyn, A., Moe-Byrne, T., Walker, S., Walton, M. Harden, M., Palmer, S. and Simmonds, M. (2018) Adjunctive colposcopy technologies for assessing suspected cervical abnormalities: systematic reviews and economic evaluation. *National Institute for Health Research*, 22(54), pp.6-31.

Public Health England (2018b) *Human papillomavirus (HPV) vaccination coverage in adolescent females in England: 2017/18 Report for England*.

Public Health England (2019b) *Cervical screening: programme overview*.

Public Health England (2019c) *PHE launches 'Cervical Screening Saves Lives' campaign*.

Raffle, A.E. and Muir Gray, J.A. (2020) The 1960s cervical screening incident at National Women's Hospital, Auckland, New Zealand: insights for screening research, policy making and practice. *Journal of Clinical Epidemiology*. 122, pp.8-13. DOI: 10.1016/j.jclinepi.2020.04.008



Schiffman, M. and Sanjose, S. (2019) False positive cervical HPV screening test results. *Papillomavirus Research*, 7, pp.184-187.

Sharma, S.K. and Gupta, Y.K. (2017) Mass Media for Health Education (A Study in the State of Rajasthan). *Multidisciplinary International Journal*, 1(1), pp.26-39.

Small, W., Jr, Bacon, M.A., Bajaj, A., Chuang, L.T., Fisher, B.J., Harkenrider, M.M., Jhingran, A., Kitchener, H.C., Mileskin, L.R., Viswanathan, A.N. and Gaffney, D.K. (2017) Cervical cancer: A global health crisis. *Cancer*, 123, pp.2404-2412.

Stubbs, R. and Pearmain, P. (2019) Cervical screening saves lives – highlights from the nation campaign. *PHE Screening* [blog], 13th September 2019.

Treatwell (2020) *Lifesaving wax*. [online] Available at: <https://www.treatwell.co.uk/inspiration/lifesavingwax/faqs/> [Accessed 30<sup>th</sup> October 2020]

Verloop, J., van Leeuwen, F.E., Helmerhorst, T.J., van Boven, H.H. and Rookus, M.A. (2010) Cancer risk in DES daughters. *Cancer causes and control*, 21(7), pp.999–1007.

Williams, D., Davies, M., Fiander, A., Farewell, D., Hillier, S. and Brain, K. (2017) Women's perspectives on human papillomavirus self-sampling in the context of the UK cervical screening programme. *Health expectations: an international journal of public participation in health care and health policy*, 20(5), pp.1031–1040.

Wong, E.L.Y. Cheung, A.W.L., Huang, F. and Chor, J. (2018) Can Human Papillomavirus DNA Self-sampling be an Acceptable and Reliable Option for Cervical Cancer Screening in Female Sex Workers? *Cancer Nursing*: 41(1), pp.45-52.

Yeh, P.T, Kennedy, C.E, De Vuyst, H and Narasimhan, M (2019) Self-sampling for human papillomavirus (HPV) testing: a systematic review and meta-analysis. *BMJ Global Health* 2019;4:e001351.

World Health Organization (2018) *To eliminate cervical cancer in the next 100 years, implementing an effective strategy is critical.*

World Health Organization (2020) *Cervical Cancer*. [online] Available at: [https://www.who.int/health-topics/cervical-cancer#tab=tab\\_1](https://www.who.int/health-topics/cervical-cancer#tab=tab_1) [Accessed 11<sup>th</sup> October 2020]

Yost, S. and Hoekstra, A. (2018) Cervical cancer in women over 65: An analysis of screening. *Gynaecologic Oncology Reports*, 25, pp.48-51. DOI: 10.1016/j.gore.2018.05.010

