Effectiveness of cervical cancer screening programme and its overall uptake as well as reach to vulnerable groups

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Background

Cervical cancer is the fourth most common cancer and the second leading cause of cancer deaths among women worldwide. Cervical cancer can largely be prevented with either vaccination against high-risk Human Papilloma Virus (HPV) or screening of those with HPV infection and treatment of pre-cancerous lesions. Other factors have also been reported to increase cervical cancer risk, including smoking, immunosuppression, poor sexual health, and screening non-attendance.

Although a number robust clinal trials show that cervical cancer screening is effective in detecting cancer early, recent evince shows that, existing screening programmes don't always reach women from disadvantaged and marginalised groups. These groups include those from certain ethnic minorities, incarcerated women, LGBTQ+ women, transgender women, sex workers and migrants. Women with comorbidities such as HIV, mental illness, alcohol or substance misuse and disabilities are also underscreened. Data shows that cervical cancer incidence across the UK is highest in women aged 25–29 years and those living in areas of greatest deprivation. Despite this, screening uptake is lowest in these groups. In addition, there is now considerable evidence that those women who have not been vaccinated against HPV are less likely to be screened, leading to widening inequalities.

Purpose

The purpose of this briefing:

- Outline the effectiveness of cervical cancer screening programme and its overall uptake as well as reach to vulnerable groups
- Provide recommendations to increase cervical screening uptake and HPV vaccine coverage

Summary of evidence

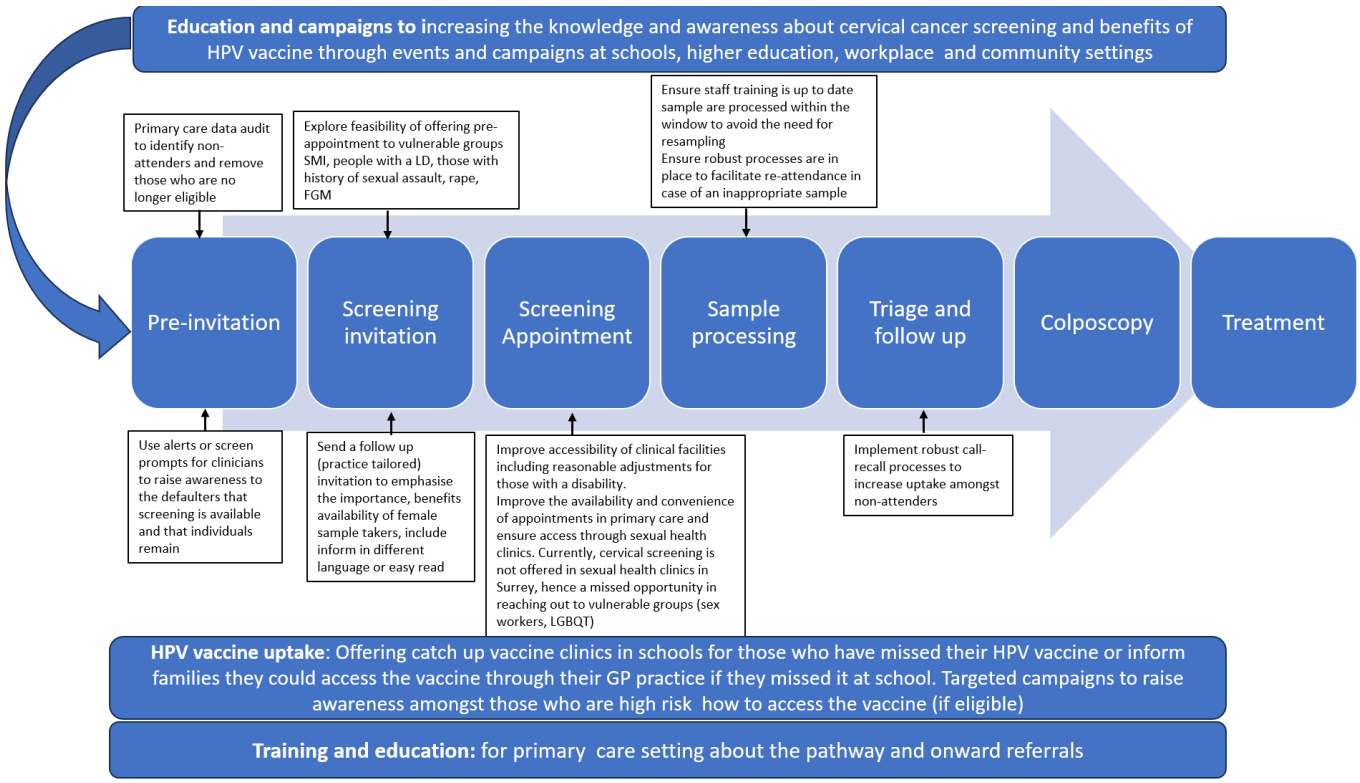
- The coverage of cancer screening uptake has been declining across the country and in Surrey.
- Of the practices in Surrey Heartlands with the lowest uptake amongst 25-49 years old, 13 are located in the key neighbourhood areas (wards that encompass the LSOAs that are in deciles 2-3 of the IMD (2019) in Surrey which also make up the Core20 areas[1].
- The largest decrease in the cervical cancer screening has been amongst 29-39 year age group.
- Women from certain ethnic minorities, incarcerated women, LGBTQ+ women, transgender women, sex workers and migrants are less likely to take part in screening. Women with comorbidities such as HIV, mental illness, alcohol or substance misuse and disabilities are also underscreened. This is a concern as these groups also show a lower uptake of HPV vaccine.
- HPV testing as part of cancer screening is acceptable, however the rationale for including it as part of cervical cancer screening programme is not always well understood. Similarly, the

[1] NHS England Core20PLUS5 – An approach to reducing health inequalities.

knowledge about the benefits of HPV vaccine and cervical cancer prevention is limited with some assumptions that those who are vaccinated no longer need to attend their cervical cancer screening.

- Key barriers in relation to cervical cancer screening at patient level include psychosocial factors (including knowledge and health literacy), deprivation linked to smoking, sexual health behaviours, transport, financial factors and timing (particularly if they need to re-attend due to inappropriate samples). Most of these studies were self-reported therefore the generalizability of the findings needs to be considered to Surrey population. At system level the key barriers were availability and convenience and of appointment, clinic facilities including reasonable adjusted for these with a disability, call- recall mechanism to address non-attenders, healthcare professional training on cervical cancer screening pathway and onward referrals.
- HPV vaccine hesitancy included fear of unknown side-effects of vaccines, having inadequate knowledge of the HPV vaccine or HPV-related diseases, low awareness of the benefits of the HPV vaccination of boys against a predominantly female disease.

Summary of recommendations across the cervical cancer screening pathway



Causes of cervical cancer

There are two main types of cervical cancer. The most common is squamous cell carcinoma (derived from a type of cell that covers the outside of the cervix). The other type is adenocarcinoma derived from the cells in the cervical canal (the endocervix). High-risk Human Papilloma Virus (HPV) accounts for 95% of cervical cancer.

Importance of cervical cancer

Cervical cancer is the fourth most common cancer and the second leading cause of cancer deaths among women worldwide[2]. Cervical cancer can largely be prevented with either vaccination against high-risk Human Papilloma Virus (HPV) or screening of those with HPV infection and treatment of pre-cancerous lesions[3]. Other factors have also been reported to increase cervical cancer risk, including smoking, immunosuppression, poor sexual health, and screening non-attendance [4].Most cervical cancer deaths that occur today can be largely attributed to unvaccinated women with low cervical cancer screening rates, disproportionately concentrated in women with a variety of characteristics that render them vulnerable[5,6,7,8.] Uptake of cervical cancer screening in the UK with historically high screening rates, has been falling in recent years to 71% in 2019, despite previously being over 80% [9].

Descriptive epidemiology of HPV

HPV is a common sexually transmitted infection which currently effects around 8 in 10 people. Most HPV infections are transient, and slightly abnormal cells often go away on their own when the virus clears. If HPV persists, abnormal cells can, if left untreated, turn into cancer over time. HPV infection occurs rapidly after sexual 'debut', with around 50% of females acquiring infection of the cervix within six months. Almost all sexually active people will be infected at some point in their lives, usually without symptoms. Persistent infection with high-risk HPV can cause abnormal cells to develop, which go on to become cancer. Typically, it takes 15–20 years for abnormal cells to become cancer, but in women with weakened immune systems, such as untreated HIV, this process can be faster and take 5–10 years. Risk factors for cancer progression include the grade of oncogenicity of the HPV type, immune status, the presence of other sexually transmitted infections, number of births, young age at first pregnancy, hormonal contraceptive use, and smoking**.**

There's no treatment for HPV. Most HPV infections do not cause any problems and are cleared by the body's immune system within 2 years. Treatment is needed if HPV causes problems like genital warts or changes to cells in the cervix.

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[2] Bray, F., et al.: Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J. Clin. 68(6), 394–424 (2018)

[3] Ginsburg, O., et al.: The global burden of women's cancers: a grand challenge in global health. Lancet 389(10071), 847–860 (2017)

[4] Cohen P.A., Jhingran A., Oaknin A., Denny L. Cervical cancer. *Lancet.* 2019;393:169–182. doi: 10.1016/S0140-6736(18)32470-X. [PubMed] [CrossRef] [Google Scholar]

[5] European Institute of Women's Health. Policy Brief: Women and cervical cancer in the EU (2017). 2017 [cited 2022 1st October]; Available from: https://eurohealth.ie/wp-content/uploads/2018/ 05/Cervical-Cancer.pdf

[6] Spence, A.R., Goggin, P., Franco, E.L.: Process of care failures in invasive cervical cancer: systematic review and meta-analysis. Prev. Med. 45(2–3), 93–106 (2007)

[7] Moser, K., Patnick, J., Beral, V.: Inequalities in reported use of breast and cervical screening in Great Britain: analysis of cross sectional survey data. BMJ 338, b2025 (2009)

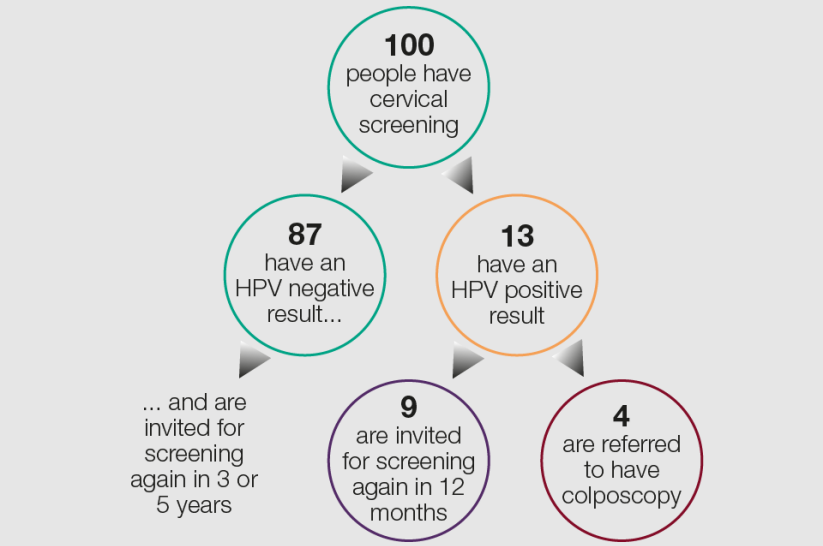
[8] Webb, R., et al.: Uptake for cervical screening by ethnicity and place-of-birth: a population-based cross-sectional study. J. Public Health (Oxf) 26(3), 293–296 (2004)

[9] NHS England, Independent review of national cancer screening programmes in England (2019)

The HPV vaccination is offered to girls and boys aged 12 to 13 years (born after 1 September 2006) and could have a positive impact on current prevalence rates. However there has been a noticeable decline in uptake rates in the younger cohort who were vaccinated in the early rounds and are now eligible for cervical screening.

The current cancer screening programme uses HPV testing to identify HPV infection which can go on to cause cervical cancer. The diagram below is used in the cervical cancer screening programme invitation to help individuals make an informed choice about taking part in the cervical cancer screening programme, in particular in relation to the possible outcomes.

Diagram 1: showing the results for every 100 people who have cervical screening.



Source: Cervical screening: helping you decide - GOV.UK (www.gov.uk)

Local picture

Cancer screening coverage

The uptake of cancer screening uptake in Surrey Heartlands ICB and England has been less than 80.0% for a number of years. The latest full year data available is for 2022/23:

25 to 49 years old: Only 69.8% of eligible people aged 25 to 49 were screened in 2022/23 compared to 77% in England showing a reduction compared to the coverage in the previous year. Guilford East PCN has the highest percentage coverage of 75.6% and the GRiPC PCN the lowest percentage coverage of 59.5% (Figure 1A), indicating a large degree of clinical variation across the ICB. The GP practices with the uptake lower than Surrey Heartlands average (69.8% of eligible population) are shown in Figure 1B. Of the practices with the lowest uptake, 13 are located in the key neighbourhood areas [10]and core20[11] most deprived areas.

[10] The Surrey Context: People and Place | Surrey-i (surreyi.gov.uk)
[11] NHS England » Core20PLUS5 (adults) – an approach to reducing healthcare inequalities

Figure 1 Cervical cancer screening coverage in Surrey Heartlands aged 25-49 (2022/2023)

A

Cervical screening coverage: aged 25 to 49 years old 2022/23

Proportion - %

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	↓	7,097,011	67.0	67.0	67.1
Surrey Heartlands ICB - 92A	↓	130,563	69.8	69.6	70.0
Guildford East PCN	→	6,595	75.6*	74.7	76.5
South Tandridge PCN	↑	3,824	75.4*	74.2	76.6
North Tandridge PCN	→	6,001	74.9*	73.9	75.8
Banstead Healthcare PCN	→	5,236	73.8*	72.8	74.8
East Waverley PCN	→	6,740	73.7*	72.8	74.6
Wham PCN	→	5,892	73.3*	72.3	74.2
Wb PCN	↓	3,553	73.3*	72.0	74.5
Dorking PCN	→	4,787	73.1*	72.0	74.2
Sasse Network 1 PCN	→	6,046	72.6*	71.6	73.5
Healthy Horley PCN	↓	4,230	72.5*	71.4	73.7
Care Collaborative (Redhill) PCN	→	6,736	72.3*	71.4	73.2
West Of Waverley PCN	→	4,882	72.0*	70.9	73.1
Coco PCN	↑	5,514	70.7*	69.6	71.7
Woking Wise 1 PCN	→	3,479	69.6*	68.4	70.9
Leatherhead PCN	→	6,658	69.5*	68.6	70.4
East Elmbridge PCN	→	7,020	69.4*	68.5	70.3
Sasse Network 2 PCN	→	4,835	68.8*	67.7	69.8
Epsom PCN	↓	7,266	68.6*	67.7	69.4
Redhill Phoenix PCN	→	3,620	67.7*	66.4	68.9
Woking Wise 2 PCN	↓	5,665	67.2*	66.2	68.2
Walton PCN	→	2,658	64.5*	63.1	66.0
Sasse Network 3 PCN	↓	5,215	64.1*	63.0	65.1
Integrated Care Partnership PCN	↓	3,185	63.7*	62.4	65.0
Woking Wise 3 PCN	↓	3,946	62.2*	61.0	63.4
Gripc PCN	↓	6,772	59.5*	58.6	60.4

B

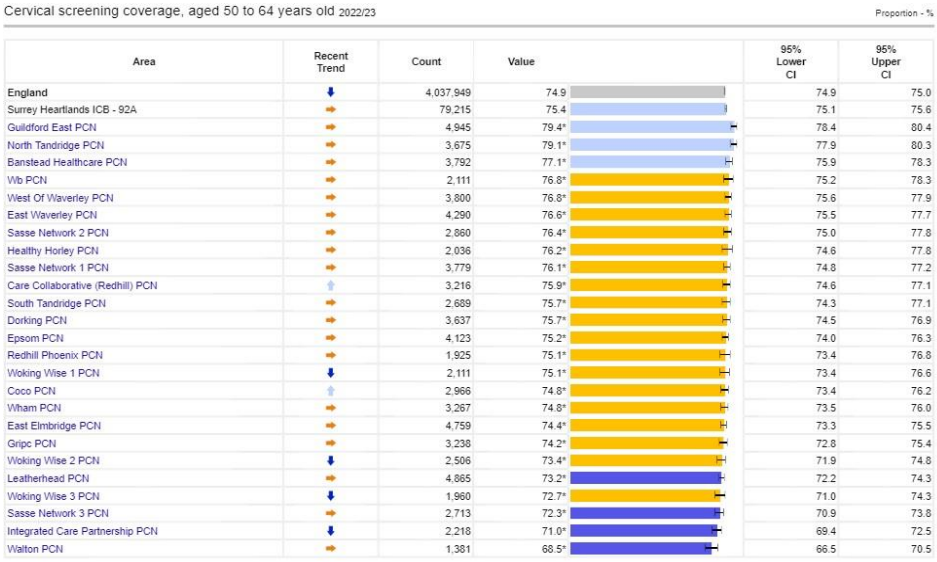
GP practice	PCN	% uptake (25-49) 2022/23
H81642 - Upper Halliford Medical Centre	North West Surrey	69.9
H81017 - Ashlea Medical Practice	Surrey Downs	69.8
H81656 - Shadbolt Park House Surg	Surrey Downs	69.5
H81613 - Stoneleigh Surgery	Surrey Downs	69.5
H81003 - Sunbury Group Practice	North West Surrey	69.4
H81057 - Fordbridge Medical Centre	North West Surrey	69.3
H81086 - Thorkhill Surgery	Surrey Downs	69.2
H81033 - Chertsey Health Centre	North West Surrey	69.1
H81036 - Parishes Bridge Medical Practice	North West Surrey	68.9
H81048 - Holmhurst Medical Centre	East Surrey	68.9
H81099 - Esher Green Surgery	Surrey Downs	68.9
H81055 - Hawthorns Surgery	East Surrey	68.0
H81078 - Glenlyn Medical Centre	Surrey Downs	67.9
H81123 - Sheerwater Health Centre	North West Surrey	67.7
H81071 - Ashley Centre Surgery-Epsom	Surrey Downs	66.9
H81019 - Sunny Meed Surgery	North West Surrey	66.5
H81058 - Woodlands Road Medical Centre	East Surrey	66.1
H81094 - The Red Practice Walton	North West Surrey	66.1
H81107 - Oxshott Medical Practice	Surrey Downs	65.8
H81134 - Staines Health Group	North West Surrey	65.7
H81073 - Church Street Practice		65.4
H81104 - Stanwell Road Surgery	North West Surrey	65.2
H81131 - Dr S Morcos-Walton Health Centre -	North West Surrey	65.2
H81087 - St David's Family Practice	North West Surrey	65.1
H81032 - Heathcot Medical Practice	North West Surrey	64.4
H81030 - Greystone House Surgery	East Surrey	63.9
H81644 - Fountain Practice	Surrey Downs	63.9
H81133 - The Integrated Care Partnership (old	Surrey Downs	63.7
H81051 - Derby Medical Centre	Surrey Downs	63.6
H81643 - Maybury Surgery	North West Surrey	62.9
H81002 - Knowle Green Medical	North West Surrey	62.9
H81041 - Southview Medical Practice	North West Surrey	62.6
H81067 - Cobham Health Centre	Surrey Downs	61.3
H81029 - Dapdune House Surgery	Guildford & Waverley	60.7
H81122 - Hythe Medical Centre Surgery	North West Surrey	58.2
H81024 - Goldsworth Park Health Centre	North West Surrey	57.8
H81090 - Woodbridge Hill Surgery	Guildford & Waverley	55.4
H81663 - Ashley Medical Practice-Walton	North West Surrey	54.8
H81010 - Guildowns Group Practice	Guildford & Waverley	52.9
H81038 - Littleton Surgery	Surrey Downs	50.1
H81641 - The Practice College Road	North West Surrey	44.4
England		67.0
Surrey Heartlands ICB - 92A		69.8

Figure 1A: Percentage coverage of cervical cancer screening in 25–49-year-olds (2022/2023) by PCN in Surrey Heartlands

Figure 1B: GP Practices with lower cervical cancer screening coverage than ICB average value. Red text indicates GP practices in the key neighbourhood/Core 20 areas.

50-64 years old: The percentage uptake overall in higher than the younger age group (25-49 years old). In 2022/23, the proportion of eligible people screened in Surrey Heartlands ICB area was 75.4% compared to 74.9% of eligible people screened in England (Figure 3). The highest percentage coverage of cervical cancer screening for this age group was in Guilford East PCV (79.4%) and the lowest was Walton PCN with 68.5% (Figure 2).

Figure 2 Cervical cancer screening coverage in Surrey Heartlands aged 50-64 (2022/2023)



Cervical screening coverage, aged 50 to 64 years old 2022/23

Proportion - %

Area	Recent Trend	Count	Value	95% Lower CI	95% Upper CI
England	⬇	4,037,949	74.9	74.9	75.0
Surrey Heartlands ICB - 92A	➡	79,215	75.4	75.1	75.6
Guildford East PCN	➡	4,945	79.4*	78.4	80.4
North Tandridge PCN	➡	3,675	79.1*	77.9	80.3
Banstead Healthcare PCN	➡	3,792	77.1*	75.9	78.3
Wb PCN	➡	2,111	76.8*	75.2	78.3
West Of Waverley PCN	➡	3,800	76.8*	75.6	77.9
East Waverley PCN	➡	4,290	76.6*	75.5	77.7
Sasse Network 2 PCN	➡	2,860	76.4*	75.0	77.8
Healthy Horley PCN	➡	2,036	76.2*	74.6	77.8
Sasse Network 1 PCN	➡	3,779	76.1*	74.8	77.2
Care Collaborative (Redhill) PCN	⬆	3,216	75.9*	74.6	77.1
South Tandridge PCN	➡	2,689	75.7*	74.3	77.1
Dorking PCN	➡	3,637	75.7*	74.5	76.9
Epsom PCN	➡	4,123	75.2*	74.0	76.3
Redhill Phoenix PCN	➡	1,925	75.1*	73.4	76.8
Woking Wise 1 PCN	⬇	2,111	75.1*	73.4	76.6
Coco PCN	⬆	2,966	74.8*	73.4	76.2
Wham PCN	➡	3,267	74.8*	73.5	76.0
East Elmbridge PCN	➡	4,759	74.4*	73.3	75.5
Gripc PCN	➡	3,238	74.2*	72.8	75.4
Woking Wise 2 PCN	⬇	2,506	73.4*	71.9	74.8
Leatherhead PCN	➡	4,865	73.2*	72.2	74.3
Woking Wise 3 PCN	⬇	1,960	72.7*	71.0	74.3
Sasse Network 3 PCN	➡	2,713	72.3*	70.9	73.8
Integrated Care Partnership PCN	⬇	2,218	71.0*	69.4	72.5
Walton PCN	➡	1,381	68.5*	66.5	70.5

Source: [Cancer Services - OHID (phe.org.uk)]

The last quarterly report (reported up op 30th Sep 2023) suggests, 18,894 (aged 25-49 years old) and 4,709 (aged 50-64) need to be screened across Surey Heartlands in order to meet the 80% coverage standard (Table 1).

Table 1. Quarterly Cervical Screening Coverage Sub ICB Level Data (for period up to 30 September 2023)

Surrey Heartlands (ICB)	Eligible Individuals	Screened Individuals	% Screened (Coverage)	Rank (All Sub ICBs)	No of screens required to achieve 80% standard	Previous Quarters Coverage
Ages 25 to 49	187,430	131,050	69.92%	55	18,894	70.07%
Ages 50 to 64	105,630	79,795	75.54%	54	4,709	75.55%

Source: Quarterly Cervical Screening Coverage Report [Microsoft Power BI]

HPV vaccine uptake

The HPV vaccine is recommended for children aged 12 to 13 years old and people at higher risk from HPV.

- **Children aged 12-13:** All children aged 12 to 13 (school year 8) are offered the HPV vaccine. If missed when at 12 or 13, the HPV vaccine is available for free on the NHS for all girls under 25 and boys born after 1 September 2006.
- **Men under 5 who have sex with men:** Gay, bisexual and other men who have sex with men are at higher risk from HPV. Any man under 45 who has sex with men and who attend a sexual health or HIV clinic, can get vaccinated against HPV.
- **Other people at higher risk from HPV**: the HPV vaccine is also sometimes recommended for other people at higher risk from HPV, such as: any transgender people who are felt to have the same risk as men who have sex with men, sex workers and people with HIV.

The lates data for HPV vaccine coverage is available for 2021/22 which shows less than 80% for both male and female for does one and does two of the HPV vaccine in Surrey. The vaccine is now give on

one does, but this data is not available for this report. The HPV vaccine coverage for does one (12-13 year old male) was 68.8% compared with 62.4% in England. The uptake for does one was higher in girls of the similar age; this was shown to be 76.7% in Surrey compared to 73.8% in the Southeast region and 69.6%. in Engand. The vaccine coverage for does two in 13-14 male was 69.3% and 77.4% in girls of the similar age in Surrey. Both boys and girls in this age group had a higher coverage of two doses. The coverage of does two was higher in girls in Surrey compared regionally (Figure 3).

Figure3 Population HPV vaccine coverage (201/22 uptake)

Indicator	Period	Surrey			Region England	England	England		
		Recent Trend	Count	Value	Value	Value	Worst	Range	Best
Population vaccination coverage: HPV vaccination coverage for one dose (12 to 13 year old) (Male) <80% 80% to 90% ≥90%	2021/22	–	5,665	68.8%	66.8%	62.4%	27.8%		%
Population vaccination coverage: HPV vaccination coverage for one dose (12 to 13 year old) (Female) <80% 80% to 90% ≥90%	2021/22	↓	5,878	76.7%	73.8%	69.6%	34.3%		93.2%
Population vaccination coverage: HPV vaccination coverage for two doses (13 to 14 years old) (Male) <80% 80% to 90% ≥90%	2021/22	–	5,755	69.3%	69.0%	62.4%	0.0%		90.6%
Population vaccination coverage: HPV vaccination coverage for two doses (13 to 14 years old) (Female) <80% 80% to 90% ≥90%	2021/22	→	5,963	77.4%	74.1%	67.3%	0.0%		91.6%

Source: [Public health profiles - OHID (phe.org.uk)]

Cervical cancer screening programme

National Health Service Cervical Screening Programme (NHSCSP) was first introduced in England, in 1988. Now known as the UK National Screening Committee (UKNSC, an independent committee) makes recommendations on population screening, using internationally recognised criteria and a rigorous evidence review process. Table 2 shows the populations who are eligible for the cervical cancer screening in UK.

It has been estimated that in England cervical screening prevents 70% of cervical cancer deaths and that if everyone attended screening regularly, 83% of cervical cancer deaths could be prevented.

Table 2 Eligibility and recommended screening intervals by age group

Screening test	Age group	Frequency
N/A	20-24.5	Not eligible The UK Nation Screening Committee reviewed the starting age for cervical screening in 2013 and recommended it should be increased from 20 to 25. This is because the committee found that cervical screening in women under 25 would do more harm than good.
high-risk human papillomavirus (HR-HPV)	24.5	Eligible for screening, and first invitation issued (to ensure screening test can be completed by their 25th birthday).
	25 to 49	Three-yearly
	50 to 64	Five-yearly
	65+	Those aged 65 or older will not be invited for cervical screening if their last test was normal. This is because the likelihood of developing cervical cancer is low. If they are aged 65 or over and have never had cervical screening, they are entitled to a test and should speak with their GP surgery about booking an appointment. If they are 65 or older and have had abnormal results, they will be invited for cervical screening

Additional, cervical cancer screening test should also be offered to:

- Eligible People who have had a sub-total hysterectomy where cervical tissue remains
- LGBTQ+ community: All people with a cervix between age 25 and 64 should be invited to regular cervical screening, including; women who are sexually active with women, trans men and non-binary people assigned female at birth.
- HPV vaccinated people who are in the eligible age group for cervical cancer screening

Diagnostic test

Initially the primary assessment has been based on cytology testing to identify cervical abnormalities.

In 2013, a pilot study of implementing screening in which the primary assessment is a test for HR-HPV was initiated at several sites across England. The clinical evidence suggests that HPV testing has higher sensitivity for high-grade lesion detection and provides stronger negative predictive power than cytology. This means using primary high-risk HPV (HR-HPV) testing to screen people will identify more patients at risk of developing cervical cancer and will save more lives by determining an individual's risk earlier. HR-HPV testing also has a lower false negative rate than cytology. Currently, testing for HR-HPV is used to determine management of women with borderline or low-grade abnormalities, and as a test-of-cure for recently treated women. The sensitivity and specificity rates for the HR-HPV test as a primary screening test were 98.66% (95% confidence interval [95CI]: 97.67–99.3%) and 87.15% (95CI: 84.93–89.15%), respectively[12].

The evidence supporting primary HPV screening HPV primary cervical screening has also been evaluated in four large European trials, which included POBASCAM)[13](Netherlands), SWEDSCREEN[14] (Sweden), NTCC[15] (Italy), and (ARTISTIC)[16](England). All except ARTISTIC. In all four trials the a greater sensitivity was achieved by HPV testing. A pooled analysis of these studies involving over 176,000 women with a median of 6.5 years follow up, showed clear evidence of a reduction in the incidence of cancer in the HPV arms compared with cytology alone (the hazard ratio for developing cancer was 0.618).

Subsequently in 2017, the UK NSC recommended changing the primary screening test from cytology to testing for high-risk human HPV.[17] This is because HPV causes over 99% of cancers, vaccinated children strengthen the case of using HPV testing as the primary screening test. If a women does not have high risk HPV, then there is a less chance of her developing cancer within 5 years. The test can detect cancer earlier due to is high sensitivity and specificity which mean the screening interval can be extended to 5 years.

Treatment pathway

The treatment pathway is shown in Figure 3. Those who are informed of an abnormal result that are highly are referred to cytology to look for dyskaryosis. If present, those individuals will be invited for another screening in 12 months' time. However, if dyskaryosis is reported on cytology, women will be

[12] High sensitivity and specificity rates of cobas® HPV test as a primary screening test for cervical intraepithelial lesions in a real-world setting - PMC (nih.gov)

[13] Bulkmans NW, Rozendaal L, Snijders PJ, et al. POBASCAM, a population-based randomized controlled trial for implementation of high-risk HPV testing in cervical screening: design, methods and baseline data of 44,102 women. *Int J Cancer* 2004; **110**(1): 94-101.

[14] Naucler P, Ryd W, Tornberg S, et al. Human papillomavirus and Papanicolaou tests to screen for cervical cancer. *N Engl J Med* 2007; **357**(16): 1589-97.

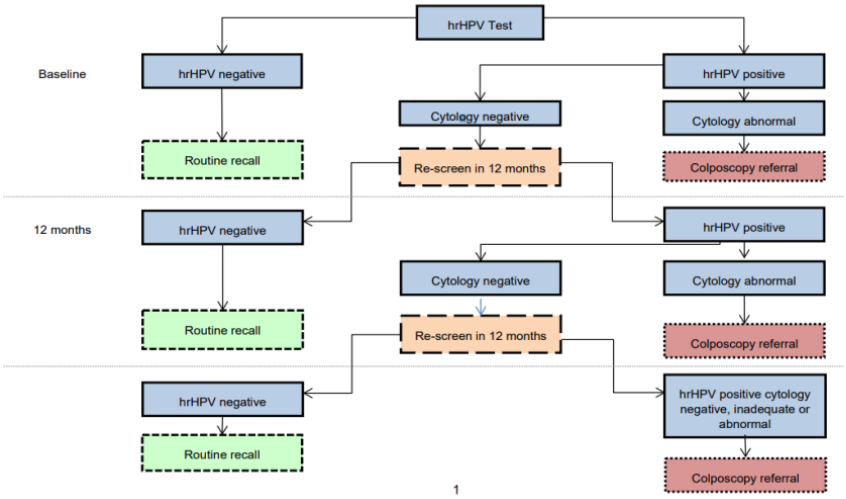
[15] Ronco G, Giorgi-Rossi P, Carozzi F, et al. Efficacy of human papillomavirus testing for the detection of invasive cervical cancers and cervical intraepithelial neoplasia: a randomised controlled trial. *Lancet Oncol* 2010; **11**(3): 249-57.

[16] Kitchener HC, Almonte M, Thomson C, et al. HPV testing in combination with liquid-based cytology in primary cervical screening (ARTISTIC): a randomised controlled trial. *Lancet Oncol* 2009; **10**(7): 672-82.

[17] Cervical cancer - UK National Screening Committee (UK NSC) - GOV.UK (view-health-screening-recommendations.service.gov.uk)

offered a colposcopy, to ensure a further detailed examination of the cervix. Subsequently, women with severe dyskaryosis may be offered large loop excision of the cervical transformation zone (LLETZ) to remove abnormal cells, a procedure that has been hugely beneficial in reducing the overall mortality rate[18].

Figure 3 Cervical cancer screening pathway



If a cancer diagnosis is made, it will be treated as per worldwide practice (surgery, chemotherapy; radiotherapy as clinically indicated based on cancer stage).

Cost-effectiveness

The modelling of moving from cytology to HPV screening protocol predicted it will lead to[19]:

- a 4% increase in primary screens; an 18% increase in number of colposcopies; and a 29% increase in detection of cervical intraepithelial lesions of grade 2 or worse.
- the total health-related costs, including the cost of cancer treatment, to increase to £153 million under primary cytology, and £136 million under primary HPV; resulting in a median saving of £15.8 million). The median discounted cost savings over the lifetime was forecast to be £14 per woman.
- a median decrease in cervical cancer incidence of 310 cases per year, and reduction in cancer related deaths of 73 per year
- a saving of 0.0026 discounted life years per women. However, the impact on quality adjusted life years (QALY) were not determined due it sensitivity to the choice of screening-derived QALY detriments.

Acceptability of HPV screening

A recent cross-sectional online survey of clinical trial (HPV FOCAL) participants[20] conducted a formal evaluation of the acceptability and attitudes HPV testing for cervical cancer. Most respondents (63%)

[18] Manley K., Wills A.K., Morris G.N., Hogg J.L., López Bernal A., Murdoch J.B. The impact of HPV cervical screening on negative large loop excision of the transformation zone (LLETZ): A comparative cohort study. *Gynecol. Oncol.* 2016;141:485–491. doi: 10.1016/j.ygyno.2016.03.032.

[19] Clinical impact and cost-effectiveness of primary human papilloma virus testing, Centre for Infectious Disease Surveillance and Control (CIDSC), Public Health England, London, UK

[20] Original research: Women's acceptability of and experience with primary human papillomavirus testing for cervix screening: HPV FOCAL trial cross-sectional online survey results - PMC (nih.gov)

were accepting of HPV testing, with the majority of 69%. Only half of participants (54%) were accepting of an extended screening interval of 4–5 years as they we worried about a missed cancer diagnosis in the interim. Almost 75% of the respondents indicated they felt an HPV positive result would affect their relationship with their partner (stigma and being accused of infidelity), or they were not sure, and almost 80% would be concerned about transmitting HPV to their partners, with many feeling that they would be judged for being HPV positive. Interestingly, women who received an HPV positive screen test result during the trial (OR=1.41 95% CI 1.11 to 1.80) or were older (OR=1.01, 95% CI 1.00 to 1.02) were more likely to report HPV testing as acceptable, with no associations between income, martial status and education.

This heterogeneity in concerns and experiences surrounding HPV testing provide insights for the development of education, information and communication strategies during implementation of HPV-based cervical cancer screening. The study suggested that emphasis should be placed on the high prevalence of HPV in the population, the transient nature of most HPV infections and bringing awareness to the fact an infection may have been acquired several years prior to a positive test result. Differentiating HPV from other STIs may minimise anxiety and facilitate normalisation and acceptance[21,22,23,24.]

Impact on infrastructure

Early modelling indicated that there will be some challenges in terms of laboratory, reconfiguration, computer systems and staffing, but in an era of primary prevention through HPV vaccination, HPV based screening offers the prospect for a more effective, more streamlined, cheaper programme which is more tailored to individual risk. However, the impact of the pandemic on the uptake of cervical cancer screening should not be overlooked. A 2022 cohort study predicted an additional 919 cervical cancer cases due to the COVID-19 pandemic[25]. Therefore, extra resource may be required to increase availability of appointments and processing of samples to enable appropriate triage of patients.

Management and monitoring and quality assurance

Management

The cervical cancer screening programme in England is managed by:

- The UK national screening Committee (UKNSC)
- The department of health and social care (DHSC)
- UK Health Security Agency
- NHS England

[21] Tatar O, Thompson E, Naz A, et al.. Factors associated with human papillomavirus (HPV) test acceptability in primary screening for cervical cancer: a mixed methods research synthesis. *Prev Med* 2018;116:40–50. 10.1016/j.ypmed.2018.08.034

[22] Smith L, van Niekerk D, Coldman A, et al.. Recommendations for implementing human Papillomavirus-Based cervical cancer screening: lessons learned from the HPV focal trial. *J Obstet Gynaecol Can* 2016;38:723–6. 10.1016/j.jogc.2016.04.009

[23]McCaffery K, Waller J, Forrest S, et al.. Testing positive for human papillomavirus in routine cervical screening: examination of psychosocial impact. *BJOG* 2004;111:1437–43. 10.1111/j.1471-0528.2004.00279.x

[24] Waller J, Marlow LAV, Wardle J. The association between knowledge of HPV and feelings of stigma, shame and anxiety. *Sex Transm Infect* 2007;83:155–9. 10.1136/sti.2006.023333

[25] Davies J.M., Spencer A., Macdonald S., Dobson L., Haydock E., Burton H., Angelopoulos G., Martin-Hirsch P., Wood N.J., Thangavelu A., et al. Cervical cancer and COVID-an assessment of the initial effect of the pandemic and subsequent projection of impact for women in England: A cohort study. *BJOG.* 2022;129:1133–1139. doi: 10.1111/1471-0528.17098.

In Surrey, the regional screening and immunisation tam as well as Surrey and Susses Cancer Alliance are the key partners.

Ethical consideration (harm vs benefits)

There is compelling amount of evidence to show that there are more favourable outcomes when comparing harm vs benefits of the cervical cancer screening in detecting cancer early. Eligible women are invited to attend a cervical screening appointments at their local GP appointment after receiving a the invitation for the national team and are encouraged to take part through an informed consent process (see diagram 1 . They are free to opt out of the programme at any time. They are also informed that occasionally a sample may be called 'inadequate' due to a technical problem and that they might be asked to have cervical screening again in 3 months' time.

Effectiveness in reach and coverage

Although a number robust clinal trials show that cervical cancer screening is effective in detecting cancer early, recent evince shows that, existing screening programmes don't always reach women from disadvantaged and marginalised groups effectively. These groups include those from certain ethnic minorities, incarcerated women, LGBTQ+ women, transgender women, sex workers and migrants[26, 27,28].Women with comorbidities such as HIV, mental illness, alcohol or substance misuse and disabilities are also underscreened [29]. In addition, data shows that cervical cancer incidence across the UK is highest in women aged 25–29 years and those living in areas of greatest deprivation[30] Despite this, screening uptake is lowest in these groups[31],[32]. In addition, there is now considerable evidence that those women who have not been vaccinated against HPV are less likely to be screened, leading to widening inequalities[33,34]. Therefore, efforts to improve burden of disease due to cervical cancer need to consider increasing both cervical cancer screening uptake and HPV vaccination[35].

Causes of low cancer screening uptake

Socioeconomic factors

Incidence rates of cervical cancer in England were reported to be 65% higher in the most deprived areas compared with the least and have a lower cervical cancer screening uptake. This could be due to a number of factors:

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[26] Moser, K., Patnick, J., Beral, V.: Inequalities in reported use of breast and cervical screening in Great Britain: analysis of cross sectional survey data. BMJ 338, b2025 (2009)

[27] Parikh, S., Brennan, P., Bofetta, P.: Meta-analysis of social inequality and the risk of cervical cancer. Int. J. Cancer 105(5), 687–691 (2003)

[28] Brzoska, P., Aksakal, T., Yilmaz-Aslan, Y.: Utilization of cervical cancer screening among migrants and non-migrants in Germany: results from a large-scale population survey. BMC Public Health 20(1), 5 (2020)

[29] Harder, E., et al.: Factors associated with non-participation in cervical cancer screening—a nationwide study of nearly half a million women in Denmark. Prev. Med. 111, 94–100 (2018)

[30] Full article: What factors are most influential in increasing cervical cancer screening attendance? An online study of UK-based women (tandfonline.com)

[31] Douglas, E., Waller, J., Duffy, S. W., & Wardle, J. (2016). Socioeconomic inequalities in breast and cervical screening coverage in England: Are we closing the gap? *Journal of Medical Screening*, *23*(2), 98–103. doi: 10.1177/0969141315600192

[32] NHS Digital. (2019). Cervical screening programme England, 2018-19. https://www.gov.uk/government/statistics/cervical-screening-programme-england-2018-19

[33] Malagón, T., et al.: Changing inequalities in cervical cancer: modeling the impact of vaccine uptake, vaccine herd efects, and cervical cancer screening in the post-vaccination era. Cancer Epidemiol. Biomark. Prev. 24(1), 276–285 (2015)

[34] Leinonen, M.K., et al.: Personal and provider level factors infuence participation to cervical cancer screening: a retrospective register-based study of 1.3 million women in Norway. Prev. Med. 94, 31–39 (2017)

[35] HPV and Cervical Cancer: A Review of Epidemiology and Screening Uptake in the UK - PMC (nih.gov) Pathogens. 2023 Feb; 12(2): 298

- **Smoking**: increasing the likeliness of death by 21% compared to non-smoker patients [36,37.] Smoking rates are higher among deprived socioeconomic status individuals, and more specifically, characteristics such as income, housing, car availability, lone parenting, and neighbourhood deprivation significantly affect smoking prevalence[38] .
- **Multiple sexual partners and risky sexual behaviour**: unprotected sexual intercourse with multiple partners, which increases HPV transmission risk[39]
- **Early age of first coitus.**
- **Transport, financial, and timing** issues may contribute to non-attendance in lower socioeconomic areas.

There also remains the financial burden for individuals who fall outside of the eligibility criteria for HPV vaccination on the NHS. In the private sector, as of January 2023, two doses would cost around £329 whilst three doses would cost £469[40]. This is a tremendous cost to an individual, who in the context of a cost-of-living crisis in the UK, may not identify HPV vaccination as a priority and may experience future health complications due to financial limitations.

Impact of pandemic

The rate of cervical cancer screening uptake has been showing a general decline since 2010. In England From April 2010 to March 2018, the number of patients screened from invitation decreased by 6% and age-appropriate coverage decreased by 4%. The most significant increase was from April 2018 to March 2019, patients screened from invitation astronomically increased by 6% compared to the previous year. However, this was still a 0.7% decrease compared with the 2012/2013 uptake in England. The most significant decline was amongst the younger age group 25-29. Although the pandemic affected the update in cannot solely explain the overall decline since 2010.

Psych-social factors

Cervical cancer screening uptake is influenced by various psycho-social factors, most of which are included in behavioural models (such as Health Belief Model COM-B- Model of behaviour change (Appendix 1) or Health Belief Model (HBM), Theory of Planned Behaviour (TPB) and Theory of Care-Seeking Behaviour (TCSB). Unlike demographic characteristics (e.g. such as socioeconomic status, age, education, or employment cannot easily be modified, psychological factors (e.g. knowledge about disease and screening or cognitive barriers like beliefs and perceptions are likely to be modifiable and should be considered in tailoring service delivery through targeted promotion and communication /awareness raising campaigns.

Table 3 describes the key psycho-social factors in the update of cervical cancer screening mapped against COM-B model (Appendix 1) of behaviour change by population groups who are more likely to report them. However, the generalisability of findings from recent studies should be considered with caution as the results are often self-reported surveys which do not always reach out to seldom herd or vulnerable population groups.

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[36] Cervical Cancer Statistics. Cancer Research UK. 2015. [(accessed on 9 January 2023)]. Available online: https://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/cervical-cancer

[37] Fonseca-Moutinho J.A. Smoking and Cervical Cancer. *ISRN. Obstet. Gynecol.* 2011;2011:847684. doi: 10.5402/2011/847684

[38] Hiscock R., Bauld L., Amos A., Fidler J.A., Munafò M. Socioeconomic status and smoking: A review. *Ann. N. Y. Acad. Sci.* 2012;1248:107–123. doi: 10.1111/j.1749-6632.2011.06202.x

[39] Vukovic D., Bjegović-Mikanović V. Association between socio-economic status and sexual behavior of adolescents. *Srp. Arh. Celok. Lek.* 2007;135:321–325. doi: 10.2298/SARH0706321V

[40] Gardasil 9 (HPV Vaccine). LloydsPharmacy Online Doctor UK. 2023. [(accessed on 13 January 2023)]. Available online: https://onlinedoctor.lloydspharmacy.com/uk/hpv-vaccine/gardasil-9-vaccine

Table 3 psycho-social factors in the update of cervical cancer screening mapped against COM-B model of behaviour change

COM-B Model Domain	
Capacity (Physical)	
Theme: Education, knowledge and health literacy	Population
Cervical screening: This relates to people's perception of own risk, the relevance of screening, knowledge of risk factors and the role of screening in preventing cancer. Knowledge is lower in individuals who have never attended. In a survey by Cancer Research UK, it was reported that over two thirds (70%) of 25-29 year olds don't think cervical screenings reduce a woman's risk of cervical cancer [41].	All eligible groups, those who have not attended, those with a language barrier, those with a learning disability
HPV infection and its link with cervical cancer: A new study funded by Cancer Research UK has revealed a gap in many women's understanding of HPV infection and its role in cervical screening (previously known as smear tests). A survey of 2000 women in the UK showed that just 12% of women understood the role of HPV testing within the screening process. It also found only 14% of participants mentioned HPV as a cancer risk factor[42].	All eligible groups
Transient nature of **HPV infection:** There is also lack of awareness that cancer develop can as result of persist infection over many years following the initial exposure to HPV**.**	Those in a long-term relationship (including older women
Knowledge about what HPV testing Some feel that HPV testing (rather than cytology testing) misses abnormal cells.[43]	
Capacity (Psychological)	
Theme: emotional and psychological factors	
Feeling embarrassed: about the procedure and feeling uncomfortable getting undressed. In a survey by cancer research UK, it was shown that 72% of the 25-29 year olds surveyed do not feel comfortable getting undressed in front of doctors or nurses[44].	Young age group and women from ethnic minority groups
Worried: about what the results may say	Younger women
Fear: People may fear the test being painful or have had a previous bad experience of screening **Anxiety:** About making the necessary arrangements to attend the appointment	Experienced traumatic birth, history of sexual assault, rape, FGM, those with SMI
Anticipation of pain: Those who experience pain or discomfort during the test could result in non-reattendance	Post-menopausal
Motivation (positive and negative factors)	
Positive experience via a competent and experienced smear **Knowing that they can request for a female sample taker** **Knowing it is potentially lifesaving and offers early cancer detection-** recent studies shows messages that target the fundamental motive of kin care can be used to deliver tailored personally relevant messages to those who wish future childbirth and parenting[45].	All eligible groups
Conflicting priorities (with unintended delay) Some people give low priority to their health needs and may need regular, repeated encouragement to attend for screening and advice.	Mostly younger groups, those from poor socioeconomic backgrounds

[41] Barriers to cervical screening among 25-29 year olds ccpw17_survey_summary.pdf (jostrust.org.uk)

[42] Just 12% of women understand use of HPV test in cervical screening - King's College London (kcl.ac.uk)

[43] The following comment was posted on the Cancer Research UK website in Jan 2024 "*I have a huge concern that screening now only looks for HPV rather than testing for abnormal cells. Surely we should always be testing for abnormal cells in all screening just to be sure that there are no changes occurring, whether or not HPV is present. It doesn't make sense that when there is a test that can pick up early cell changes, we stop doing that and only look for HPV. I say this as someone who was diagnosed with stage 1A back in 2017 and this was picked up because my smear picked up CIN3. I would much rather my test look for any abnormal cell changes rather than just HPV"- From Cancer Research UK comments section*

[44] Barriers to cervical screening among 25-29 year olds. ccpw17_survey_summary.pdf (jostrust.org.uk)

[45] Encouragement of cervical cancer screening via an evolutionary theoretical approach: A randomized controlled study in Japan - ScienceDirect

Recent health concerns in the family	
Cultural beliefs: Some may perceive that screening is not relevant based on their marital status or sexual activity or they may fear the sample taker may be male or known to the patient or requirement to gain the approval of family/friends	Certain ethnic minority groups
Opportunity	
Accessibility: For some it is difficult to find time to attend or get an appointment at a time that is convenient. Some people may not be entitled to have time off work for appointments. **Social influences:** Friends, family and community attitudes and social pressure influence whether people will attend. **Reminders:** Reminder from the national to book an appointment with the GP. Appointment reminder from local GP Practice through text/SMS messaging with an option to amend/change appointment.	All eligible groups, people with a physical or learning disability

Self-sampling as a strategy to address non- attendance for screening

Although a number of systematic reviews have highlighted self-sampling as a strategy to address non-attendance for screening, this is currently not recommended by the UK NSC due to the following limitations:

- cost effectiveness of the strategy had not been evaluated
- there was insufficient information on the circumstances in which the approach should be used. This might include the overall level of uptake, length of time following the initial invitation and the number of subsequent prompts
- the review suggested that it would be useful to understand more about how to approach women regarding self-sampling. However higher uptake was reported when sampling kits were directly mailed to women compared to an offer to collect or order a kit
- the potential for a negative impact on usual responders had not been explored.

The validation of self-testing is currently being investigated through HPValidate study (set up in 2021[46] to find out test if vaginal self-sampling could be offered as an alternative option alongside the traditional clinician-taken cervical screening test. HPValidate is expected to report its final results early in 2024 to provide a validated HPV self-sampling device and test combination. This validated combination will be used in an in-service evaluation that will provide the UK NSC with real world evidence on the effectiveness of offering HPV self-sampling in the NHS Cervical Screening Programme in England. Until then, self-sampling is not included and offered as part of the national cancer screening programme in the UK.

Accessibility of clinic facilities

Research on access to cancer screening in people with learning disabilities in the UK found that people with learning disabilities are 45% less likely to be screened for cancer compared to their counterparts without learning disabilities**.** This is also the case locally. The recent LD Joint Strategic Need Assessment (JSNA) in Surrey[47] highlighted that reasonable adjustments for cervical cancer screening appointments in GP practices for people with LD variers across the county. In some cases, cervical sample taking is particularly challenging for those with mobility problems. Previous bad

[46] HPValidate cervical screening self-sampling study nears completion - UK National Screening Committee (blog.gov.uk)
[47] People with learning disabilities | Surrey-i (surreyi.gov.uk)

experience may put some patients with LD off attending future appointments. Transport and generally preparation for attending any clinic appointment can be changing for people with LD and their carers.

Availability and flexibility of screening appointments

Various research studies have shown that lack of provision in variation of appointment times during the day and in the evening that help women in choosing when they can attend for screening can impact on coverage**.**

Failure to re-attend appointment following an inappropriate samples

This may occur when samples are inappropriate or rejected by the lab. In some cases, women may not re-attend if they are from vulnerable groups or have conflicting priorities e.g. (in full time employment, busy life schedule).

Lack robust process for non-attenders

Very few GP practices have process in place to identify and follow-up with non-attenders. This is not exclusive to Surrey.

Causes of low HPV vaccination uptake

In a large pan-European cross-sectional survey including the UK showed a high degree of acceptability with the UK observing the highest compliance. The main parents reason to reject vaccine was included fear of unknown side-effects of vaccines in general and having inadequate knowledge of the HPV vaccine or HPV-related diseases[48]. I another study (based in Sweden) it was shown that vaccine hesitancy, particularly among parents of boys, was due to low awareness of the benefits of the HPV vaccination of boys against a predominantly female disease [46]. These studies suggest that the lack of information or misinformation amongst the general population must be addressed.

Recommendations

<u>Local Authority</u>

- Targeted communication in key neighbourhood areas with low uptake
- Work directly with GP surgeries to raise awareness of screening to raise awareness of cervical cancer and HPV-related diseases, educating women on the symptoms of cervical cancer to improve early identification of the disease.
- Raising awareness of cervical cancers, and risk factors associated with cervical cancer, including, smoking and sexual behaviours through:
    - local resident magazines, issuing press releases and using digital channels such as social media
    - posters and information across a wide range of venues including hairdressers, pharmacies, libraries, gyms, children's centres, job centres and public toilets
    - directly with women in their communities
    - through targeted information provision

[48] Gottvall M., Stenhammar C., Grandahl M. Parents' views of including young boys in the Swedish national school-based HPV vaccination programme: A qualitative study. *BMJ Open.* 2017;7:e014255. doi: 10.1136/bmjopen-2016-014255.

- Explore provision of screening though sexual health services
- Work with schools imms team to inform and educate pupils alongside their parents or guardians about them about the benefits and importance of the HPV vaccination and address any concerns they may have.

Primary Care

Data cleansing and up to date primary care list

GP list validation (including recording of key clinical and demographic indicators such as IMD, ethnicity, record of SMI, LD/physical disability). Conducting practice level audit to remove patients who are no longer eligible for screening (e.g. women who have gone through hysterectomy with cervix removal) and enable targeting those are eligible but not attending. Also, those who have optout from the programme due to:

- Female genital mutilation (FGM)
- Vaginismus
- Cervical stenosis
- Physical conditions and disabilities
- Terminal illness
- Mental capacity

Or

- if an individual can request to have their name removed from the screening register. However, they change their mind about withdrawing from the screening programme, they can ask for a new screening appointment at any time and will return to routine call and recall. If a person is aged over 65 and has not been screened since the age of 50, they are entitled to a screening appointment if they request one.

Screen prompts and alerts

Use alerts or screen prompts for clinicians to raise awareness to the defaulters that screening is available and that individuals remain

Open Exeter

Sample takers may to use the Open Exeter IT system to check screening status and follow up non-responder notifications. Also use the system to download the electronic HMR 101 (cytology request) form.

Invitation letter

The registered GP to send out a tailored practice invitation (following the national invitation letter) according to the services the practice provides and the practice population. Helpful content includes:

- surgery opening times
- reassurance that the sample taker will be female
- offering opportunities for a conversation about any screening concerns
- Design and inclusion of easy read leaflets and infographic to explain what cervical screening is for and its benefits regardless of being sexually [Link to Language translations of the screening invitation leaflet are available but use of infographic and providing the information in easy read can be helpful for all eligible on rather than those with a learning disability or those with a language/cultural barrier]

Offering pre-appointments and tailoring of approach to increase uptake amongst vulnerable groups.

For example, including but not limited to:

- Mental health issues/SMI
- Previous traumatic experience and sexual abuse
- Women with a learning disability

Appointments

- Providing a variation of appointment times during the day and in the evening will help women in choosing when they can attend for screening
- For women with LD, consider offering home visits for housebound patients and working with carers to discuss and offer screening

Opportunistic screening offer

- In people with LD, use the annual health check to makes sure screening is up to date or consider if a cervical cancer screening can be booked at the same time as attending their annual health checks to reduce number of visits. However, this requires planning and a need to ensure the patients and carers are accept a longer appointment
- Consider if cervical screening can be offered in the sexual health clinics

Clinic facilities and sample taking

Review the layout and location of rooms to ensure there is a confidential quiet, private area that is welcoming. Extra considerations are required for the following groups:

- **People with disabilities/mobility difficulties**

If sample taking in primary care is difficult due to the patient's mobility or other physical factors, liaise with the local colposcopy service to arrange an appointment where appropriate equipment might be available.

If colposcopy is unable to accept the patient for sample taking, consider offering a home visit if appropriate. Conduct a risk assessment in advance including an action plan for managing a potential abnormal result requiring referral to colposcopy

- **Popole with a learning disability**

- Double appointments booked
- Explore if attendance by a carers would be helpful
- Explore using the practice care navigators to make the experience as a positive as possible (from pre-appointment to follow up as per clinical cervical cancer screening pathway)

Support with completion following an inadequate sample

- It is the responsibility of the sample taker to ensure that where a sample was rejected and a repeat is required, that the patient is informed, receives an apology as appropriate and are offered a repeat test no sooner than 12 weeks from date of previous test.
- The sample vial should not have passed its expiry date and should have a minimum of 14 days remaining. HPV testing cannot be carried out on expired vials.

Training and education

- holding educational events or sessions on cervical screening as part of GP Protected Learning Time
- provide training to staff including receptionists and health trainers so they can positively promote cervical screening
- work with public health to promote local awareness campaigns and to train non-clinical cancer champions
- Plan and deliver regular training session on cancer screening and the current local Standard Operational Procedure on **NHS cervical screening programme for primary care,** including roles and responsibilities and considering the special need of vulnerable groups

Appendix 1 COM-B Mode of behaviour change

Capability refers to whether we have the knowledge and skills needed to do a particular behaviour. Its two components are:

- Psychological capability: our knowledge and our psychological and information processing skills (e.g. attention, memory, mental models).

- Physical capability: our physical strength and skills.

Motivation refers to all the cognitive and emotional processes that influence us and make us actually do a particular behaviour instead of any other possible behaviour. Its two components are:

- Reflective motivation: high cognitive processes, such as beliefs, values and goals. Your sense of self-identity and your beliefs about your ability to do things.

- Automatic motivation: automatic processes that are often outside of our awareness, such as emotional responses, habits, impulses and inhibitions.

Opportunity refers to the external factors that either facilitate a behaviour or make it less likely to happen. Its two components are:

- Social opportunity: social norms and cues that can encourage or discourage our behaviour.

- Physical opportunity: environmental cues and resources, such as time or money.

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Effect of organised cervical cancer screening on cervical cancer mortality in Europe: a systematic review - ScienceDirect

LSHTM Research Online

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IJCMPH-11100+R.pdf (surreycc.local)

Cervical cancer - UK National Screening Committee (UK NSC) - GOV.UK (view-health-screening-recommendations.service.gov.uk)

A systematic review of the cost-effectiveness of interventions to increase cervical cancer screening among underserved women in Europe | The European Journal of Health Economics (springer.com)

Cervical cancer screening: women with HPV may benefit from more (nihr.ac.uk)