CERVICAL CANCER SCREENING PROGRAMME IN FINLAND

CERVICAL CANCER SCREENING

ANNUAL REVIEW 2017

There are regional differences in the nationwide Finnish organised screening programme for cervical cancer. To unify the programme the national and regional steering systems need to be restructured. Additionally, quality assurance for the opportunistic testing is needed. Attendance rates can be improved by using good invitational practices. In the future, information on social inequalities with respect to screening outcomes should be collected.

SUMMARY

In 2015 272,000 women were invited to cervical cancer screening in Finland and 188,000 of them participated, 69% of invited. Approximately 94% of the screened women were tested negative, 4% were recommended for follow-up testing and 1.3% were referred to colposcopy and further examinations. Around 2,400 women undergo further examinations annually. Screening, diagnostic pap testing and improved cancer treatment has contributed to about 80% reduction of cervical cancer burden in Finland, compared to the time before screening was initiated.

1. INTRODUCTION

The Finnish cervical cancer screening programme started in 1963 and became nationwide in 1971. Screening prevents cancer by detecting precancerous lesions that can be treated at an early stage. The aim of the programme is to reduce cervical cancer incidence and mortality among those invited to screening.

The Finnish municipalities are responsible for organising the screening activities. These include personal invitations, primary screening test (mostly Pap, in some municipalities HPV) and, if needed, colposcopy and surgery. The screening tests are free of charge for the screening target population; for the colposcopy there is an outpatient clinic co-payment.

Finnish Cancer Registry

Individual data from all steps of screening are sent in electronic format to the Mass Screening Registry of the Finnish Cancer Registry for monitoring and evaluation. Monitoring ensures the quality and effectiveness of the programme and identifies pertinent issues and bottlenecks in the screening performance.

THE SCREENING PROCESS

The cervical cancer screening programmes's target population consists of women aged 30–60 years, who are invited to screening once in every five years. Some municipalities also invite women aged 25 and/or 65. The screening tests are performed in community health stations and laboratories and analysed in pathology laboratories, which are mostly run by private companies. The pathology laboratories also send the results letters to the women and provide referrals to further examinations if needed.

Those with borderline test results (ASC-US, AGC-NOS, LSIL or HPV+ without referral to further examinations) are invited to risk-based screening 12–24 months after the primary screening examination. Women with more severe results are referred to colposcopy. Colposcopies, surgeries and treatments of cervical lesions and cancers are performed in special health care.

ANNUAL REVIEW

The current monitoring report presents figures and tables on the coverage, attendance and results of the screening programme from the whole country and 21 hospital districts for the year 2015 and time series from 1991 onwards. These are based on individual screening invitations and visits derived from the data base of the Finnish Cancer Registry. The information on population counts stems from tabulations of the Population Register Centre.

2. CERVICAL CANCER SCREENING IN FINLAND

MAIN FINDINGS IN 2015

In 2015 altogether 272,000 invitations were sent and 188,000 women participated to screening (69%, Table 1). The invitational coverage in the national target age group, 30–64 years, was very close to 100%. Approximately 94% of the screened women were tested negative. A follow-up recommendation was given to 4% of the participants and the total amount of referrals to colposcopy and further examinations was around 2,400, corresponding to 1.3% of the participants (Table 2, Figure 1).

Follow-up screening was also performed due to self-reported symptoms (such as bleeding during sexual intercourse). Altogether 660 histologically confirmed lesions were detected and treated within the programme, corresponding to 3.5 lesions in a thousand screened women. The programme detected 27 cervical cancers, slightly over one in ten thousand screened women.

COMPARISON TO EARLIER YEARS

The coverage of screening invitations is currently high (Figure 2). Practically all municipalities invite the national target population, women aged 30—64, every five years. Meanwhile the attendance for to screening has declined. Attendance rates have been particularly low in the younger age groups (25—35) (Figure 3). Low attendance among young women is likely to be the result of opportunistic pap testing, which is specifically focused on young age groups.

The amount of borderline screening results, leading to follow-up screening, has declined slightly over the last few years (Figure 4). This can be considered as an improvement;

the risk of a borderline result is very high compared to the risk of a high grade lesion or cancer (see section 7, Benefits and harms of screening). The proportion of referrals as well as missing results have remained stable. The probability of both borderline result and a referral to colposcopy is highest among the young and middle aged target population (Figure 5, Figure 6).

3. CERVICAL CANCER SCREENING BY HEALTH CARE DISTRICT

All health care districts invite women aged 30–64 to screening every five years. However, attendance for routine screening has varied quite a lot between the districts, ranging between 61 and 79% (Figure 7) in 2011–2015. The reasons for the regional differences in attendance rates are not fully known.

There has also been variation in the screening results, mostly due to differences in the diagnostic criteria between different screening laboratories. The proportion of borderline results varied between 1.4 and 9.6% (Figure 8) and the proportion of referrals to colposcopy between 0.4 and 1.9% (Figure 9). Furthermore, the proportion of histological HSIL or more severe results varied between 0.1 and 0.4% (Figure 10). Both routine and follow-up screenings are included in the numbers.

4.COSTS OF THE SCREENING PROGRAMME

The average costs of the screening programme were approximately 30 euros per screened woman. This included e.g. taking and analysing the samples, sending answering letters and referrals and the costs of registration (Salo et al. 2014). However, probably there were regional variation in the prices. The costs of the diagnostics of precancerous lesions, treatment and patient follow-up ranged from around 1,000 euros (colposcopies and negative biopsies) to 3,000 euros (high grade lesions). The treatment of one cervical cancer was estimated to cost around 17,000 euros (Salo et al. 2013, Nieminen et al. 2011). The total costs of the screening programme, including treatments, was thus estimated to be 10 million euros in 2015.

The costs of opportunistic testing and treatment of precancerous lesions were estimated to be considerably higher than in the programme, since most of the tests are taken from young women below the screening target age. Young women have a low risk of cervical cancer, since precancerous lesions often heal spontaneously at younger ages. Also the costs of sample taking and analysis are higher outside the organised programme (Salo et al. 2014).

5. SCREENING AND THE BURDEN OF CERVICAL CANCER

At the time before screening started in the 1960s, the age-standardised incidence of cervical cancer was 15 cases and mortality 7 cases per 100,000 woman-years. The burden of cervical cancer has reduced by 80% since then, thanks to screening and other diagnostic pap tests as well as the development of cancer treatments. Consequently, the cervical cancer burden is currently only one fifth of what it was before. Each year there are around 170 new cervical cancers cases and nearly 60 cervical cancer deaths. Incidence and mortality have declined most among women aged 45 and older (Figure 11) and the trend has been favourable also at ages 35–44. In contrast, cervical cancer incidence has not declined much among women below the age of 35. However, cancers at younger ages are likely to be less severe with a better prognosis.

6.LIFETIME PROBABILITY OF CERVICAL ABNORMALITIES IN ORGANISED SCREENING AT AGES 30–64

In Finland a woman may go through up to nine cervical cancer screens during her lifetime. Even more, if borderline cervical abnormalities are detected and follow up tests are recommended. A recent study estimated that the cumulative probability of any abnormality detected by the Finnish organised screening programme was, on average, 34% by age 64, for women starting screening in their 30s (Pankakoski et al. 2017). The corresponding probability for histologically confirmed LSIL or more severe results was only 2%. Previous occurrences of mild abnormalities were associated with an increased risk of detecting new ones, specifically in older women.

7. BENEFITS AND HARMS OF SCREENING

The Finnish cervical cancer screening programme has reduced incidence of and mortality from cervical cancer among the screening invitees markedly, by 80%, since the 1960's. The lifetime cumulative probability of a cervical cancer diagnosis before the age of 85 is currently less than 0.5%, while it used to be around 2% at the time before screening (NordCan).

Screening can also cause harm. Pre-cancers or cancers that would not have been detected without screening are called overdiagnosis. In the Finnish cervical cancer screening programme, the cumulative probability of any abnormality in ages 30–64 years has been, on average, 34%. This is much higher than the probability of a cancer or a precancerous lesion. However, precancerous lesions may also be overdiagnosed by screening. It has been estimated that only around 30–60% of all precancerous cervical lesions would progress to a cancer during a woman's lifetime. Also, the progression probabilities vary significantly between different ages: young women below the age of 35 are at a very low risk of progression (Current Care Guidelines 2016).

Treatments of cervical precancerous lesions are usually done at a policlinic and they are non-invasive, compared to actual cancer treatments. Therefore, the screening programme improves the quality of life among the female population. However, unnecessary follow-up treatments due to overdiagnosed lesions may induce adverse effects, such as psychological distress as well as harms for reproductive health, e.g. increasing risk for pre-term delivery (Kyrgiou et al. 2014).

8. CONCLUSIONS AND RECOMMENDATIONS

Cervical cancer screening has been both effective and cost-effective in Finland. However, there have been significant differences between different organising units in the quality of diagnostics and possibly also in the practices used. To unify the programme the national and regional steering systems need to be restructured. The objective of the steering system could be both to improve the screening programme and also to perform quality assurance for the opportunistic screening activity.

The quality indicators of service use, diagnostics and screening results should be improved and followed-up, also taking into account the use of opportunistic services and treatment chains. Also, effectiveness and cost-effectiveness of screening should be more intensively evaluated. The quality assurance of all screen-like tests and related treatments can significantly improve the cost-effectiveness

of screening activities (Nieminen et al. 2011). All opportunistic tests and further examinations as well as data from the organised programme should be registered to the mass screening registry congruently.

Screening attendance should also be improved. Invitational practices have a great impact on the attendance rates. Time and place for the screening visit should be indicated in the invitation letter, and a reminder letter should be sent to non-attenders (Virtanen et al. 2015).

A large proportion of the screening organisers still do not follow these practices. Studies have shown that an acceptable level of screening attendance should be at least 80%, preferably 85% or higher (Anttila et al. 2015). Information on screening attendance is needed with respect to socioeconomic status and other variables measuring social inequality. Residential area, municipality type, distance to health care services and other indicators of regional inequality should also be reported in the future.

Diagnostic criteria of mild abnormalities should be improved to avoid excessive follow-up testing. On the other hand, a large proportion of cervical lesions are treated opportunistically, outside the organised programme, also among women who are within the screening target age. This activity should also be monitored and evaluated together with the organised programme.

Sometimes the screening result is missing completely, indicating that the screening process has been interrupted. The proportion of missing results should be minimal. The proportion of referrals to colposcopy in the programme, on the other hand, could be somewhat higher. Colposcopy referrals are expected to increase in the future, provided that the opportunistic Pap testing can be reduced.

Minimising the harms of screening is important. It is possible to reach an optimal balance between harms and benefits with the quality assurance of screening, other diagnostics and treatments. Unnecessary Pap testing should also be avoided in women below the screening target age (Current Care Guidelines 2016).

Information on prices of screening contracts would be useful for the future, for the evaluation of costs and cost-effectiveness. Costs of treatment, follow-up as well as Pap testing and treatment outside the organised screening programme should be routinely monitored, in addition to the monitoring of the direct costs of the programme. Data systems in health services should be able to record entire patient histories without any gaps. This would make it possible to trace and record the screening process all the way from routine testing until treatment and follow-up.

AUTHORS

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LINKS AND PUBLICATIONS

FINNISH CANCER REGISTRY
www.cancer.fi/syoparekisteri

INTERACTIVE SCREENING STATISTICS, 1991–2015
http://tilastot.syoparekisteri.fi/seulonta

ANNUAL STATISTICS
http://www.cancer.fi/syoparekisteri/joukkotarkastusrekisteri/tilastot

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TERMINOLOGY

BIOPSY	Tissue removed from the living body
CANCER INCIDENCE	The number of new cancer cases per population at risk or per person-time of the at risk population, during a given period
COLPOSCOPY	An examination of the cervix using a special magnifying device
COVERAGE	Proportion of those invited to screening (invitational coverage) or those attending (screening coverage) of the whole target population
CYTOLOGY SAMPLE	Cell sample
HISTOLOGY SAMPLE	Tissue sample
HPV	Human Papilloma Virus
HPV TEST	Detects high risk HPV virus types from a gynecological cell sample. Sample is collected similarly as with the Pap test. If the HPV test is positive the same sample is used to conduct a Pap test.
MORTALITY	The number of deaths per population at risk or per person-time of the at risk population, during a given period
OPPORTUNISTIC TESTING	The testing of nonsymptomatic persons outside the organised screening programme (in private or public health care services). Also symptom related testing and patient follow-up is performed outside the screening programme.
OVERDIAGNOSIS	The diagnosis of a cancer or a precancerous lesion that would not affect the person's health during her lifetime.
PAP TEST	Examination of a cytology sample
SCREENING PROCESS	The progression of the screening episode from the definition of the target population and sending invitations all the way to testing, possibly further examinations, treatments and patient follow-up.
SCREENING RESULTS	
ASC-US	Atypical squamous cells of undetermined significance
AGC-NOS	Atypical glandular cells not otherwise specified
LSIL	Low-grade squamous intraepithelial lesion
HSIL	High-grade squamous intraepithelial lesion
AIS	Adenocarcinoma in situ
LSIL OR MORE SEVERE	LSIL, HSIL, AIS, cancer
HSIL OR MORE SEVERE	HSIL, AIS, cancer

LIST OF FIGURES AND TABLES

TABLE 1 Target population, invited, screened and HPV-tested women in 2015.

	Target population 31.12.2014	Invited	Invitational coverage	Screened	Screened of invited	HPV-tested
Routine screening: ages 25–65	315,361	255,075	81	175,929	69	14,668
Routine screening: ages 30–60	242,923	242,022	100	167,885	69	14,663
Routine and follow-up screening: ages 25–69	315,361	271,750	86	187,495	69	15,228

TABLE 2 Screening results in 2015.

	Screenings	Negative / normal	Negative / normal (%)	Borderline	Borderline (%)
Routine screening: ages 25–65	176,240	167,356	95	7,206	4.1
Routine screening: ages 30–60	168,195	159,690	95	6,923	4.1
Routine and follow-up screening: ages 25–69	187,807	177,044	94	8,335	4.4

	Referral to colposcopy	Referral to colposcopy (%)	Histological HSIL or more severe	Histological HSIL or more severe (%)	Insufficient / missing
Routine screening: ages 25–65	1,645	0.9	493	0.3	33
Routine screening: ages 30–60	1,549	0.9	474	0.3	33
Routine and follow-up screening: ages 25–69	2,394	1.3	659	0.4	34

FIGURE 1 Screening results for women aged 25–69 in 2015.

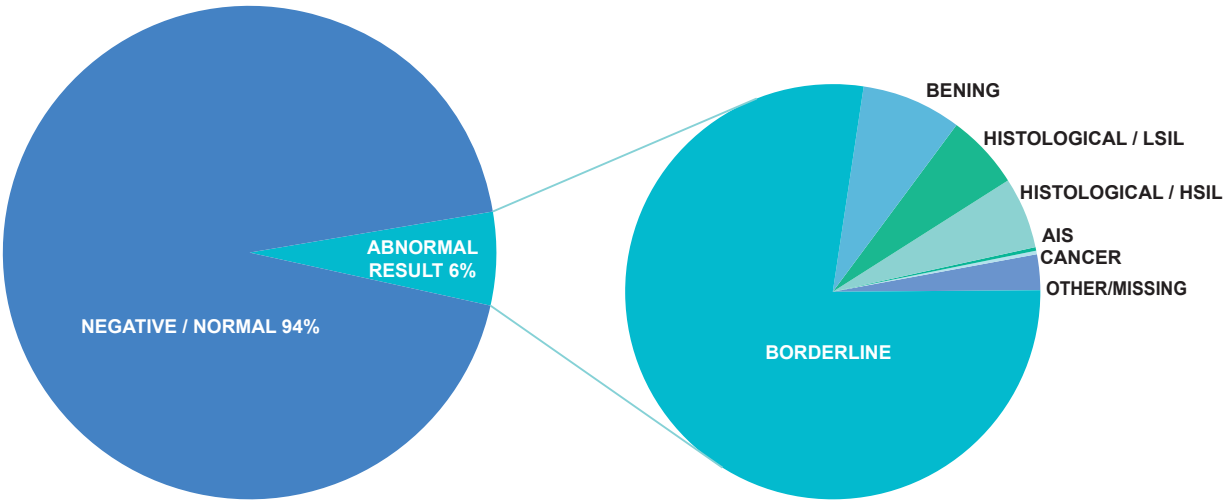

FIGURE 2 Invitational coverage (%) and attendance for cervical cancer screening (%) among women aged 30–64 in 1991–2015, routine invitations.

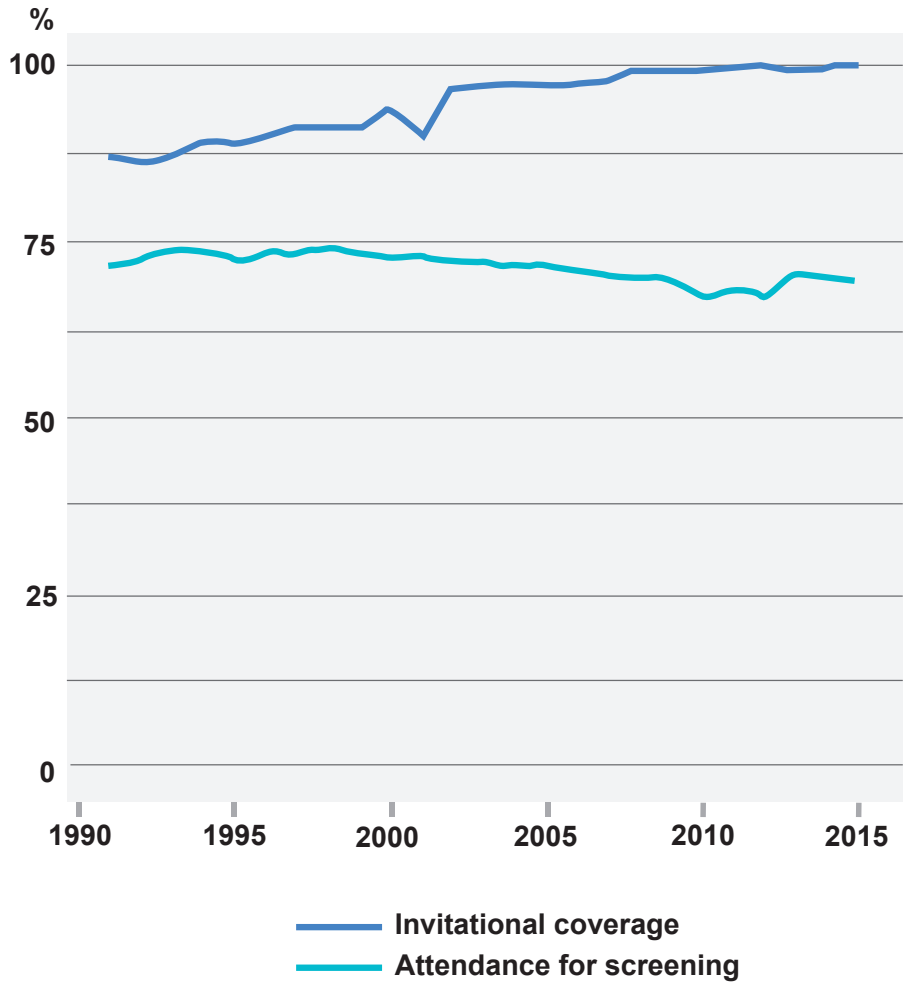

FIGURE 3 Attendance for cervical cancer screening (%) by age group in 1991–2015, routine invitations.

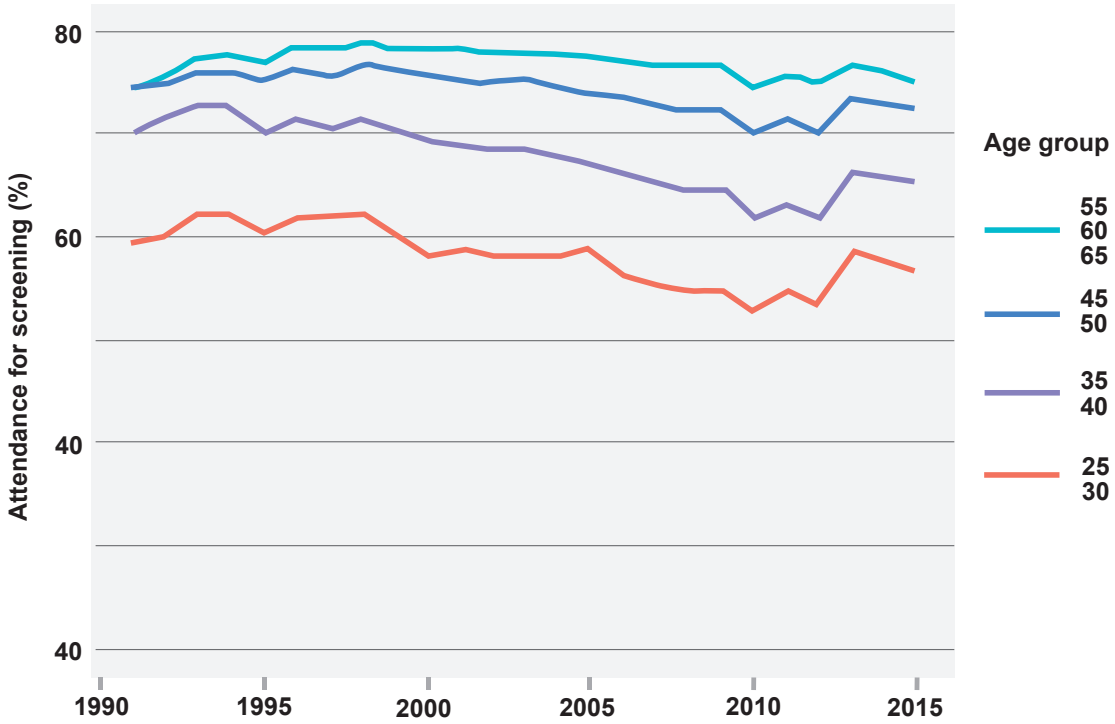

FIGURE 4 Screening results for women aged 30–64 in 1991–2015, routine and follow-up invitations.

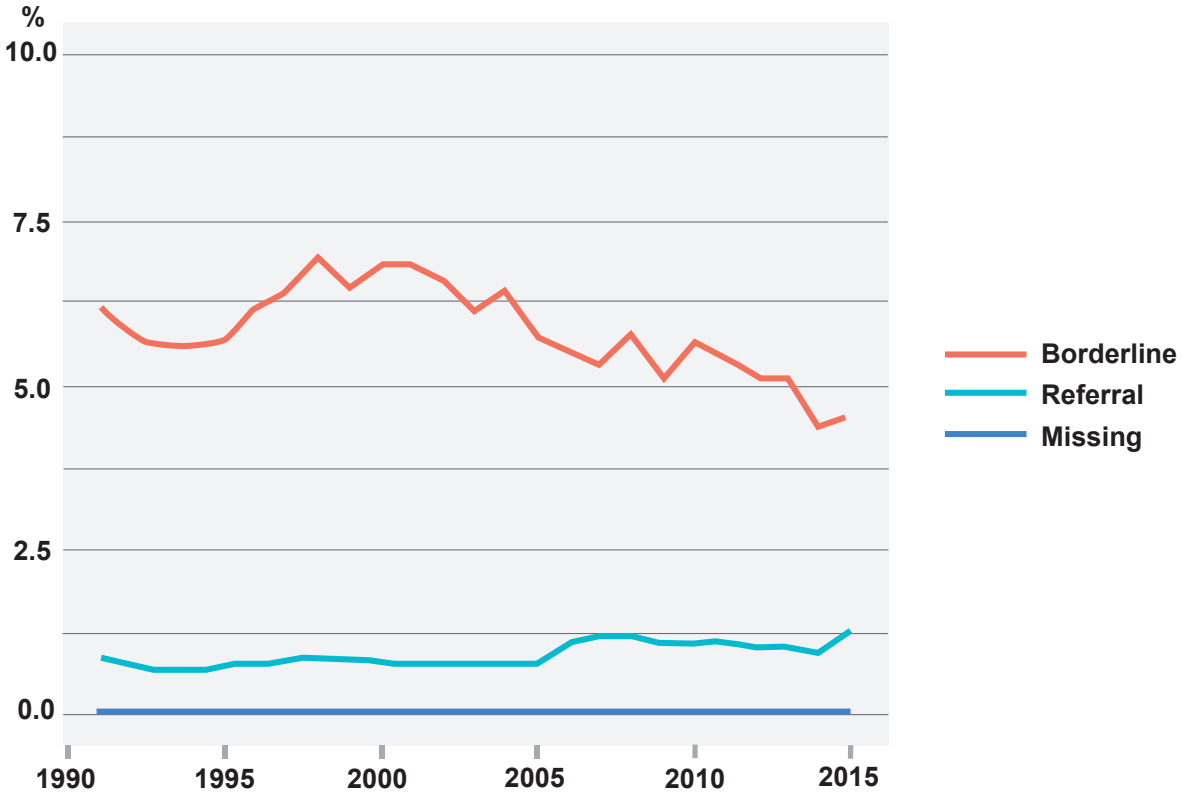

FIGURE 5 Borderline results (%) by age group in 1991–2015, routine and follow-up invitations.

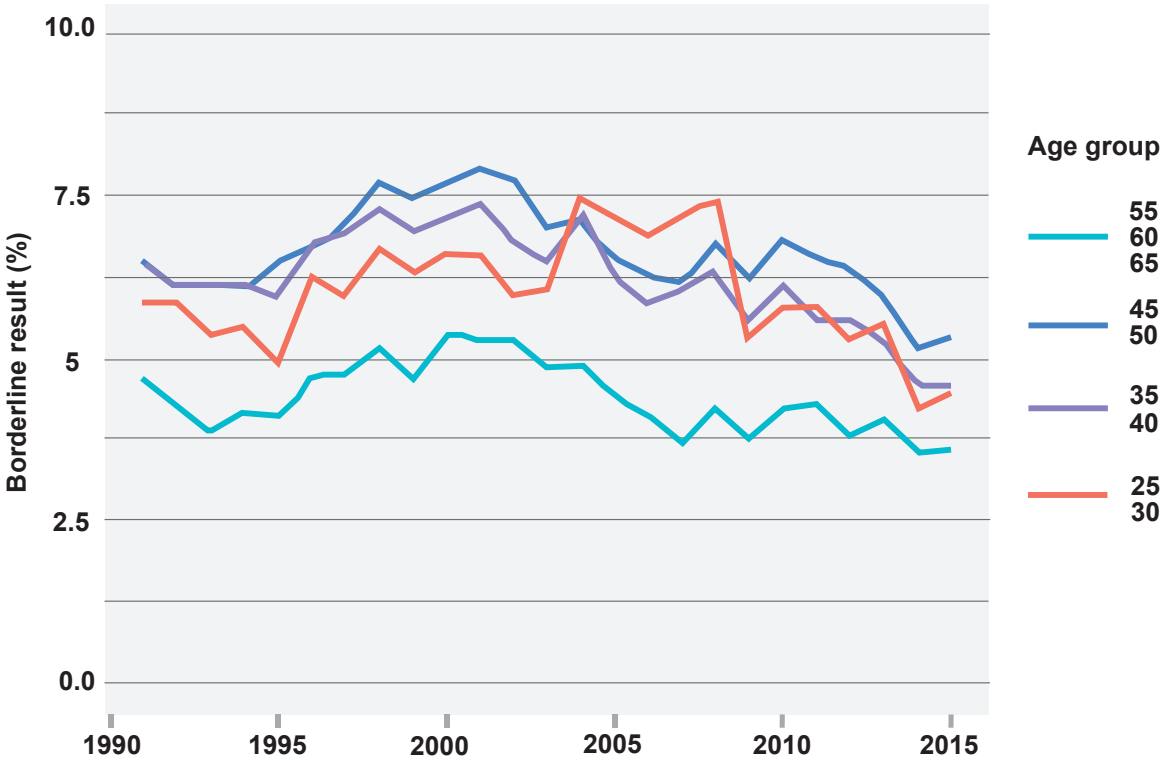

FIGURE 6 Referrals to colposcopy (%) by age group in 1991–2015, routine and follow-up invitations.

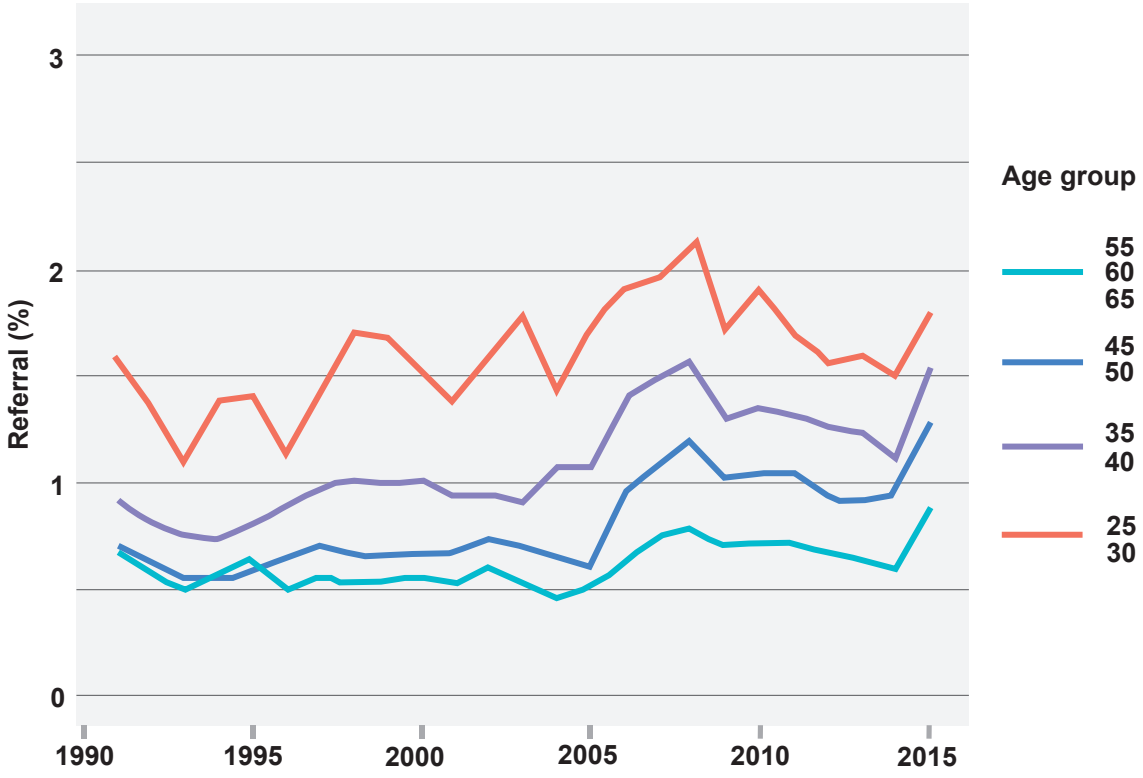

FIGURE 7 Screening coverage for women aged 30–60 by hospital district in 2010–2015, routine invitations.

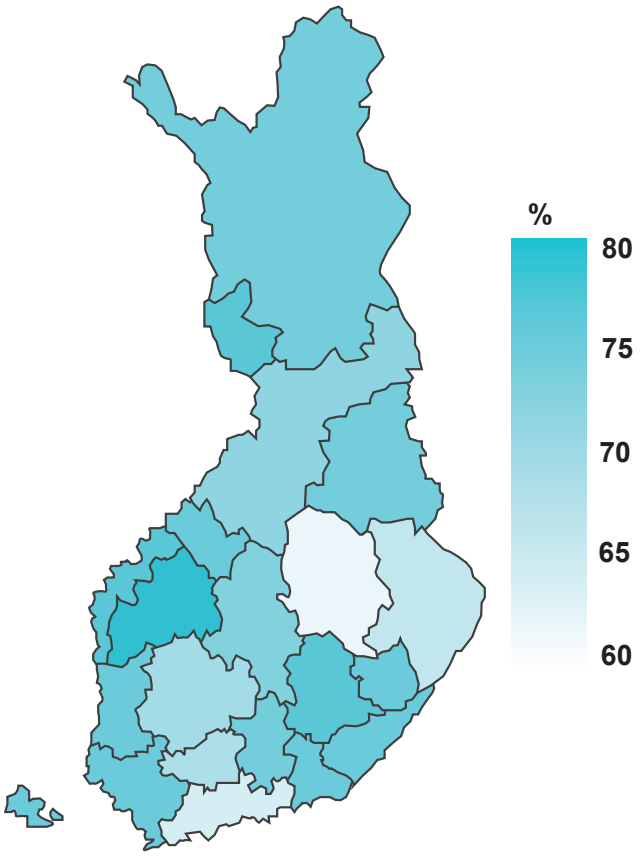

FIGURE 8 Borderline results (%) among women aged 25–69 by hospital district in 2011–2015.

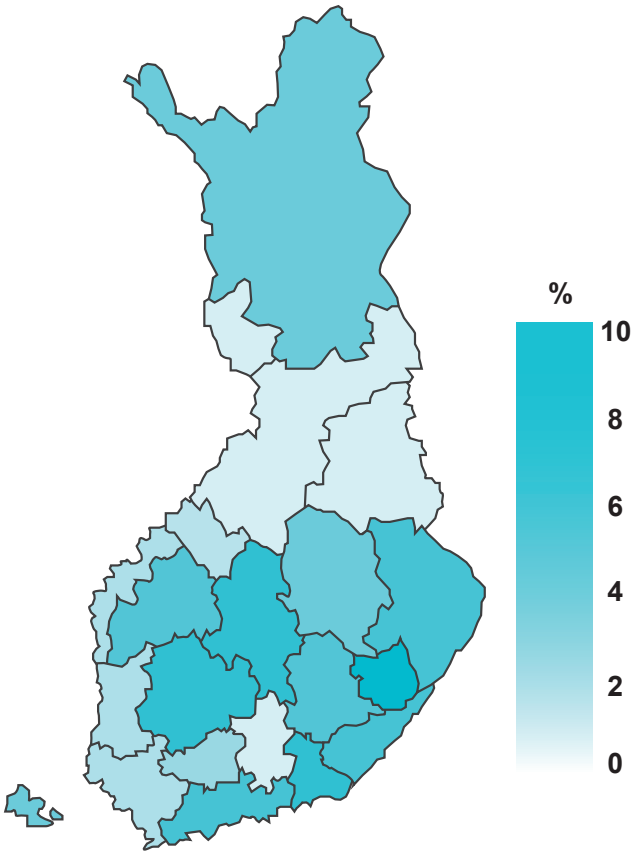

FIGURE 9 Referral to colposcopy (%) among women aged 25–69 by hospital district in 2011–2015.

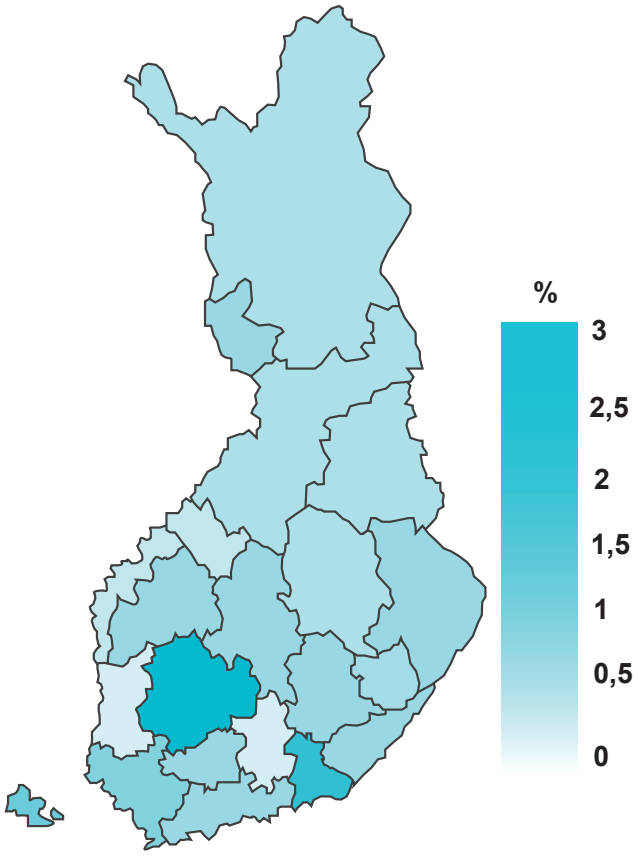

FIGURE 10 Histological HSIL or more severe result (%) among women aged 25–69 by hospital district in 2011–2015.

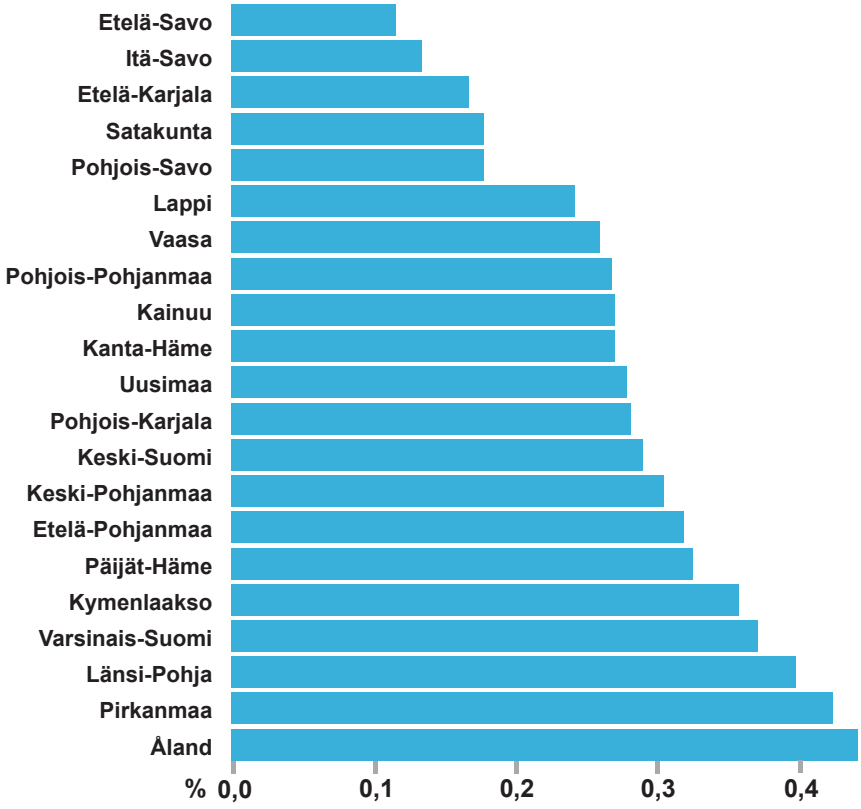

FIGURE 11 Cervical cancer incidence and mortality by age group in two different time periods (1960–1964 and 2010–2014).