Allocation for breast screening services for 1988-89

Agenda paper on current issues

Regional steering group on breast screening services constitution

Provision of breast screening services in the North Western region. This paper includes detailed reports on the planning for provision of mammography screening services in the region.

Questionnaire instrument for ascertaining current facilities for breast cancer screening in the region.

Results of previous survey

Quality assurance for breast screening services: an overview paper

Population projections and Forrest unit requirements for the North Western region

THE JARVIS BREAST CANCER SCREENING CENTRE IN GUILDFORD, UK

1. AIMS

It was recommended that the major components of any program to reduce breast cancer mortality must be:

a. to improve diagnostic mammography
b. to promote awareness among women of the need to seek care for localised non-cyclical breast pain

The view was expressed that mammography should not be performed in women under age 35 unless there was a very strong clinical indication.

3. FUNDING SOURCES AND MECHANISMS

It was strongly recommended that first and second stage screening should be free to women.

In England private mammography screening clinics have started to operate. These clinics tend to refer women to clinicians with strong economic incentives to maximise the number of services.

7. POPULATION COVERAGE

The Surrey Screening Program comprises an assessment clinic, two mobile vans, eight radiographers, two radiologists and a clinical director. 800 invitations are sent per week and 550 screens are conducted per week. With a 3-year screening interval, this program services the Surrey region of 1.1 million people and 100,000 women aged 50-64.

8. AGE RANGE

In deciding whether the upper age limit should be 65 or 69, the considerations should be financial and related to attendance behaviour of women. If all the women are excluded from the program they may feel rejected.

The cancer detection rate is age dependent, especially above age 65. Thus detection rate data should be stratified by age.

11. RECRUITMENT METHODS

Screening is offered primarily through mobile units to take screening to women, thereby maximising compliance.

With individualised recruitment, most success has been achieved with the offer of a specific appointment time rather than a general invitation to contact the screening program.

When a new area is to be screened, the local medical profession are invited to attend lectures at post-graduate medical lunches and members of the screening program visit individual general practices.

In remote areas, it may be more economical to mass transport women to screening centres than to take screening units to the women. This arrangement may be particularly attractive to women who live in remote areas.

12. LOCATION AND TYPE OF SCREENING FACILITIES

Women are screened in mobile vans. If the films are technically unsatisfactory (currently 3%), women are called back for re-screening at the assessment centre, where the films are processed and read on the spot. Second stage screening can be undertaken immediately if needed.

Radiographers are trained to inspect women for breast abnormalities. If a woman has symptoms or an obvious abnormality, she is still screened. She is also told that she will certainly be recalled for second stage screening.

There are four radiographers in the screening program. At any one time, two are on the mobile unit, one is working in the second stage screening clinic and one is film processing, mounting the films etc.

Two radiographers are employed in the screening unit for security and safety.

100 women are booked to be screened each day and it is expected that 60-70 will attend.

16. NUMBER OF VIEWS

Professor Price expressed the view that it had not been proven that two views is any better than one view. The strongest evidence for this comes from the UK with screening study where Edinburgh used two views at the initial screen and Guildford used one view, with all other procedures being the same. Their cancer detection rates were very similar.

One argument for two views is that it reduces the recall rate. There is no strong evidence for this. The recall rate is heavily dependent upon the confidence of the radiologists. Performing two views compared to one view reduces the throughput rate from 80 women per day to 60 women per day.

In Guildford, grids were introduced four years ago. This has increased the proportion of tumours detected which are less than 1cm from 40% to 60%. There is very high radiation scatter in mammography (40% of the radiation reaching the film).

While the use of a grid doubles the radiation dose, the use of one view rather than two halves the radiation dose.

Guildford has very satisfactory cancer detection rates using single views only.

The opinion was expressed that if two view is introduced first, radiologists will become emotionally dependent on the second view and it will be very difficult to reduce the number of views.

17. SCREENING INTERVAL

Guildford has had to increase screening intervals from two years to three years with the introduction of the national mammography program. It is now being observed that the interval cancers are larger than before and there are proportionately more interval cancers.

It was agreed that it is acceptable to have a three year interval initially. This should be reduced to two years once the program is established.

18. LOCATION OF FILM PROCESSING

All film processing is done centrally. The mobile units receive daily supplies of film, appointments and labels.

It is strongly recommended that films be processed within 48 hours of screening to preserve the image. This means that screening tends not to be undertaken on Fridays, because the films wouldn't be able to be processed until Monday.

In terms of maintaining high quality radiography with remote film processing, it is important for the radiographers to be fully trained and confident in a centre where they get quick feedback on the quality of their films before they work in a mobile clinic with remote processing.

19. FILM READING

The screening program has two film readers, who may be radiologists and/or breast clinicians. Medico-legally, it is considered desirable to have a radiologist in the system, although the radiologist has the authority to delegate tasks to other clinicians.

The two film readings are conducted independently. The readers then discuss discrepancies to reach a consensus. Only one recommendation is recorded.

It is possible to train film readers to have high call rates. The positive films can then be screened by an authoritative film reader.

It was suggested that the ideal system is to have two medically qualified readers who are trained to over-call films, with a third reader who arbitrates differences. One of these three readers should be a radiologist, preferably the arbitrator.

If it is proposed that there be only one film reader, it was strongly advised that there should be two readers for at least the first 5,000 screens.

The film readers are able to recommend that women be called back for an early re-screen.

21. LOCATION AND TYPE OF FOLLOW-UP FACILITIES

It was strongly recommended that new nomenclature be used for the screening process. The initial screening should be called first stage screening. Follow-up assessment should be called second stage screening and both first and second stage screening comprise full screening. It is suggested that this will reduce anxiety among women recalled for assessment.

At the assessment centre, there are two kinds of recall clinics: recall for technically unsatisfactory films and recall for second stage screening.

It is important to minimise the number of biopsies because of the psychological and clinical effects of a breast scar, anxiety among women and cost.

25. QUALITY ASSURANCE ADMINISTRATIVE STRUCTURE

(See Pritchard report for proposed organisation of radiological quality control)

The South-West Thames Region has a mammography quality assurance physicist. The role of this post is acceptance testing of new equipment and the quality assurance of all screening equipment. Data collected from daily quality assurance procedures undertaken by radiographers are collated by the physicist.

In Malmo, new film as provided by the manufacturer is tested to see whether it is acceptable.

A simple test of quality of a mammogram is whether skin pores are visible.

Attempts will be made to extend screening mammography quality assurance to diagnostic mammography.

29. WORKFORCE PROVISION

Radiologist training at Guildford

The Royal College of Radiologists approves courses and issues certificates of attendance.

At Guildford, radiologist training comprises a two day intensive course which enables the radiologists to assess their level of interest and aptitude. There is then a two weeks secondment to the screening program, in which 80 films are read each morning and they are then reviewed. The radiologist then undertakes 6-12 months screening at a screening centre. There is then a one week secondment to refine technique. The radiologists are free to come back to the training centre to discuss issues at any time.

Radiographer training at Guildford

There are 35 hours of theory. This is followed by one week of closely supervised screening in which the radiographer undertakes 50 mammograms. The radiographer then returns to their screening program where they undertake over 200 mammograms. 50 of these films are then assessed by a training centre radiographer.

Training of surgeons at Guildford

Surgeons undergo an informal attachment to the senior surgeon in the screening program for several days.

Pathologist training at Guildford

The senior pathologist holds two-day courses.

In Nottingham formal multi-disciplinary courses are run for all clinicians involved in mammography screening.

31. RECORD SYSTEM

Guildford has developed its own computing system on Honeywell Bull hardware. The system runs on PIC. It is a much smaller system than the one developed by Oxford.

INFORMANTS

Professor Paddy Boulter
Surgeon

Professor P W Horton
Medical Physicist

Mrs Pattie Pearce
Trainer, Radiographer

Mrs Pat Pocock
Administrator

Professor John L Price
Radiologist

DOCUMENTS OBTAINED

National Breast Screening Education Program: Learning from the Guildford experience.

Flow chart for women passing through the first and second stage screening.

Geographic areas served by different screening units in the South West Thames Health Region.

Letters sent to women.

Data collection forms.

Pamphlets provided to women.

Result letters sent to women.

Guildford Breast Screening Project Seventh Annual Report.

Jarvis Screening Centre, Guildford. National Screening Mammography Program 1988. (An overview of the screening program and early results).

SWEDISH MAMMOGRAPHY PROGRAM

1. AIMS

To provide nation-wide screening mammography to detect early breast cancer and thus reduce deaths due to breast cancer.

To provide further statistical information on mammography screening and continued evaluation.

2. STATUS

The National Board of Health and Welfare (NBHW) issued national guidelines for mammography screening in 1986, recommending the establishment of mammography screening programs by county councils.

In the Malmo study, a 20% reduction in mortality from breast cancer was found. The Swedish Board of Health and Welfare concluded that because of the design of the study and screening outside the study, the beneficial effects of mammography were underestimated. It has been decided that the current policy in relation to mammography should remain.

3. FUNDING SOURCES AND MECHANISMS

The central government initially provided funding for training courses and supervision for personnel involved in screening.

County council taxes pay for all of the mammography program within each county. This is in line with the counties' responsibility for health.

5. PATTERNS OF EXPANSION

Program expansion relies on the uptake of national recommendations on mammography screening by individual county councils. 40% of eligible women were covered by screening programs by the end of 1988. 80% of eligible women are expected to be offered screening by 1990.

6. ADMINISTRATIVE STRUCTURE

The NBHW provides national guidelines on mammography screening for county councils. County councils are "fairly independent" politically and decide if, how and when to implement such guidelines.

Screening programs are designed, supervised and administered by county councils.

NBHW guidelines recommend one central co-ordinating unit per county be established to register the relevant population, prepare recruitment and screening protocols, register and maintain screening records, co-ordinate subsequent clinical investigations and follow-up results.

7. POPULATION COVERED BY INDIVIDUAL PROGRAMS

25 of 26 counties in Sweden.

8. AGE RANGE

NBHW guidelines recommend women 40-74 years be invited for mammography screening. However, women over 74 years should have access to mammography screening, although a poor response to invitation is seen. The recommended age range is reduced to 50-69 if local resources are limited. In Kopparberg County, women of any age can have mammography if they wish.

The rationale behind offering mammography to women aged 40+ is that the HIP studied screening in women aged 40-64 and the WE study examined screening in women aged 40-74, and in both studies the screening was found to be effective for the study group as a whole.

It was suggested that even if mammography has no effect on mortality in the 40-49 age range, there are benefits from conducting screening in this age group:

1. To relieve anxiety about breast cancer.

2. To detect breast cancer at an earlier stage when more conservative surgical procedures can be used.

The principal reason for ceasing screening above age 69 is the low participation rate. It may be desirable to make screening available for women over 69 but not publicise it and not call women over 69 for screening.

In Goteberg, a trial of screening 40-59 year women is underway.

11. RECRUITMENT METHODS

All women are called by individualised letter. Letters are sent out three weeks prior to the appointment time.

It is desirable to mix screening of young and elderly women to even out the workload at the assessment clinic.

All letters for the screening locations throughout each county are sent from the central unit. This unit uses that part of the national register which is applicable to its

county. The national register is updated weekly.

If a woman moves between counties, the new county has to write to the old one to get access to the films. This is only done when an abnormality is found. Women moving to new counties are handled as new screening cases (i.e. two views).

The ID label for each case has the woman's name, birth date, identity number, number of views required, interval since previous examination and number of previous examinations.

12. LOCATION AND TYPES OF SCREENING FACILITIES

Ostergotland County has 110,000 women aged 40-74. 42,000 are called each year. There are three fixed screening units and one mobile unit. One of the fixed units is located within the central screening office and assessment centre.

Each screening clinic screens 80-90 women per day using one mammography machine and two radiographers. Within the county, the mobile van has 5 pre-designated locations that it cycles through. For most locations, staff drive from Linkoping daily. The longest drive is 1 hour. For distant locations, the radiographers stay with the van for 4 days per week. With the longer days due to lack of travelling time, the same amount of work is achieved as in a 5-day week.

The staff use a health services car for transport and receive extra payment for working on the mobile unit.

Each morning, on the way to the screening van, the staff deliver the films from the previous day to the screening office and collect the films for the next day. At distant locations, couriers transport the films.

Between one half and one week is lost each time the van is moved. The locations have been chosen to minimise travelling distance for women. The maximum travelling distance for women is 25 kilometres.

13. TYPE OF SCREENING EQUIPMENT

In Dr Tabar's opinion, it is of little import whether or not a grid is used. It is most important to not use a grid to attempt to overcome problems in film processing and elsewhere.

14. ROLE OF PE AND BSE

Non-cyclical localised breast pain is not considered to be a symptom of breast cancer.

If a woman feels a breast lump or there is bleeding or if the radiographer sees an abnormality, the woman will be referred

for assessment even if the mammogram is normal. i.e. women are screened irrespective of symptoms.

16. **NUMBER OF VIEWS**

The national recommendation is for two views for the initial screen in 40-54 year women, thence single view if breast has low density, and one view for 55-74 year women.

Policies on number of views vary in different counties. In Ostergotland, for women aged 54 and less, two views are taken at the first examination and a decision is taken based on the appearance of these films as to whether two views or one view will be required at subsequent examinations. If there are previous mammograms, then only one view is taken. For women aged 55+, only one view is taken.

If the mammograms are difficult to read, the radiologist may specify that two views should be taken at the next examination. This occurs in 20% of pre-menopausal women and 5-10% of post-menopausal women, for a total two view rate for subsequent films of 10%.

Two view mammography increases specificity, resulting in fewer recalls. It has little impact on sensitivity.

The availability of previous films greatly increases the specificity of one view mammography.

Ideally, two views would be taken. If resources are limited, then the second view should be discretionary after examining the first screen.

The availability of films from previous examinations is of great importance. Women moving between counties are regarded as new screens due to the lack of availability of previous films. Thus, they always receive two views at the first screen on their arrival in a new county.

SCREENING INTERVAL

NBHW recommends: 18 months for women 40-54 years and 24 months for women 55 years & over (should not exceed 3 years).

According to Dr Fagerberg, under age 55, the screening interval should be 12 to 18 months. From age 55+ the screening interval should be two years.

18. LOCATION OF FILM PROCESSING

In both counties examined, all film processing is undertaken in the central screening office. Films are transported to and from satellite screening clinics daily, including from fixed screening units. This system operates throughout most of Sweden.

The processing time should be 90 seconds. If films are under-developed, there is then a temptation to over-expose the films. This is obviously completely unacceptable. Great emphasis must be placed on high quality processing.

19. FILM READING

Throughout Sweden, it is accepted that there should be two independent radiologist readers. The conclusion is reached by consensus discussion. Two readers improve sensitivity and specificity. No formal trials have been undertaken of this issue. When previous films are available, it may be satisfactory to have only one reader. One of the readers must be a radiologist or experienced clinician while the second reader could be a radiographer.

In Goteberg, a trial is being undertaken of non-radiologist film readers. The results of this should be available in late 1989.

When previous films are available, it has been found most useful to compare the current film with the films not from the most recent examination but from the examination before that. This increases the contract produced by any new abnormalities.

23. LOCATION AND TYPES OF FOLLOW-UP AND DIAGNOSIS FACILITIES

The NBHW recommends that the central unit be responsible for providing/co-ordinating subsequent investigations up to the point of localisation. The central unit should also follow up clinical results and final outcome.

The NBHW will specify recommended clinical protocols for follow-up.

At Linkoping, because very high quality cytology is available, it is possible to exclude a diagnosis of cancer on the basis of cytology if the mammogram is equivocal. The assessment procedure comprises:

1. Additional mammography views with recommendations on the additional examinations required.

2. Clinical examination and explanation by a surgeon.

3. Fine needle aspiration cytology.

Cytology saves many biopsies because if cancer is diagnosed then definitive treatment can be provided. It is also possible for cytology to exclude cancer if the mammogram is equivocal.

Even if the mammogram shows very definite cancer, cytology is still undertaken in order to make a cytological diagnosis. This provides definitive information for the surgeon, the woman and the cancer registry.

If the mammogram is normal but a lump is present, the surgeon decides what action should be taken.

Women are not brought back for early re-screens as this results in great anxiety. At the assessment clinic a definitive diagnosis is made one way or the other on the same day.

In Linkoping, fine needle aspiration cytology has sensitivity of over 99% using non-stereotactic localisation for impalpable lesions. This is regarded as an exceptional level of sensitivity.

In Linkoping, assessment involves teamwork between the radiologist, the surgeon and the cytopathologist. All fine needle aspirations are performed by the cytologist. Having the cytologist take the samples means they can be processed and read immediately.

Women are usually operated on within one week of a diagnosis of cancer.

In Falun, the radiologist undertakes all of the assessment. The surgeon and the cytologist are used only as adjuncts.

Recent Medicare legislation in the US requires that screening clinics be certified by the US College of Radiologists before they will get Medicare fees. Only two thirds of the clinics inspected pass this certification.

29. WORKFORCE PROVISION

Clinical and radiographic personnel should be trained to a high level of proficiency in centres of excellence.

It was suggested that to organise training in Australia it may be necessary to import overseas experts. Suggestions were made of a cytopathologist from the Karolinska hospital in Stockholm (Dr Torsten ?). In pathology, Dr Roland Holland from Nijmegen was suggested.

30. COST

Screening is free of charge to women.

The cost for mammography screening plus necessary clinical investigations is $US26 per examined woman and between $US3,300 - 8,700 per breast cancer detected depending on whether it was detected during 'prevalence' screening or 'incidence' screening. (For costs in Swedish Kronor see Ref (2)).

33. COUNSELLING

In Linkoping, everything is fully explained by the surgeon. Few emotional problems are encountered. Nurses are available for support.

37. DATA

A study about to be published in the Lancet has found that fine needle aspiration cytology of non palpable breast lumps has a sensitivity of over 99% for diagnosing cancer and a specificity of 99.8%.

Fine needle aspiration cytology may reduce the need for surgery by 80%.

90% - 95% of palpable breast cancers are visible on mammograms.

In Linkoping, for first round screening, 5% - 6% are recalled for assessment. For subsequent screening, 3% are called for assessment. Only 1% require clinical examination. For every one biopsy for benign disease, there are 9 biopsies for cancer.

In the 40-49 year age group, more breast cancer deaths were observed in the study group than in the control group in both WE and Malmo. There was a very small excess in the study group in the 45-49 and 60-64 year age group in the HIP study. The reasons for this excess are not known.

38. BIBLIOGRAPHY

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(2) Guidelines from the Swedish National Board of Health and Welfare No. 1986:3. Mammographic screening for early detection of breast cancer.

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DOCUMENTS OBTAINED

Mammographic screening for early detection of breast cancer. Guidelines from the National Board of Health & Welfare of Sweden, 1986. (An excellent overview of the requirements of a mammography program.)

Tabular summary of status of mammography screening in Sweden.

IMPLEMENTATION OF SWEDISH MAMMOGRAPHY PROGRAM AS AT 10 JANUARY 1989

County	Year in which studies started	Year in which screening program		Using national screening guidelines	Number of central units	Age range	Interval	Number of women to be screened per year (x 1000)	Type of departure from guidelines	Shortage of:		Training required for:	
		Comm.	Planned							radiologists	radiographers	radiologists	radiographers
AB[1]	77	88[2]	89[2]	Y	5	40-74	Nat rec[3]	170	-	Y	Y	Y	Y
C		88		Y	1	40-74	NR	29	-	Y	-	Y	Y
D			89-90	Y	1	40-74	NR	28	-	-	Y	-	Y
E	78	86		Y	1	40-74	NR	42	-	-	-	-	-
F		87		Y	2	40-74	24m	23-38	-	Y	Y	-	-
G			90	Y	1	50-69	24m	9	Age range	-	-	Y	Y
H		86		Y	1	40-74	21m	28	Inteerval	-	Y	-	Y
I	No screening because population too small												
K		88		Y	1	45-69	NR	11	-	-	-	Y	-
L		89		Y	2	40-74	NR	29	-	-	-	Y	Y
M		87[2]	89[2]	y	3	40-74	NR	87	-	-	-	Y	Y
MM	76		No[4]		1	45-70	14m	18	-	-	-	-	-
N		89		Y	1	50-69	21m	26	Age range	Y	Y	Y	Y
O		86		N		45-74	24m	17	?	-	Y	-	-
OG	82	87		Y	1	45-74	18m	?	Age range	Y	Y	Y	Y
P		89		Y	1	40-74	NR	25	-	Y	-	Y	Y
R			89	?	1	50-74	24m	18	Age range	Y	Y	Y	Y
S			Yes			50-74	24m	18	Age range, others	Y	Y	Y	Y
T		87[2]		Y	1	40-74	NR	15	Part of county only	-	Y	-	Y

County	Year in which studies started	Year in which screening program		Using national screening guidelines	Number of central units	Age range	Interval	Number of women to be screened per year (x 1000)	Type of departure from guidelines	Shortage of:		Training required for:	
		Comm.	Planned							radiologists	radiographers	radiologists	radiographers
U		86		Y	1	40-69	22m	23	Interval	-	-	Y	Y
W	77	86		Y	1	40-69	18-22m	34	Interval	-	Y	-	-
X		74		Y	1	40-74	20m	35	Interval	-	-	Y	Y
Y			90	Y	1	40-74	NR	28	-	-	Y	Y	Y
Z			Yes										
AC			90/91	Y	1	40-74	18m	24	Interval	Y	-	Y	Y
BD			89	Y	1	40-74	20m	25	Interval	Y	-	Y	Y

NOTES:

1. AB = Stockholm
2. Part of county only
3. National recommendation: - 54 years : 18 months
   55+ years : 24 months
4. Routine screening not planned for Malmo county (MM)

FINNISH MAMMOGRAPHY PROGRAM

1. AIMS

To provide an organised mammographic screening program to all eligible women on a national basis, with provision for ongoing evaluation.

2. STATUS

In 1986 the National Board of Health (NBH) provided final guidelines on organised mammography screening.

Screening was recommended to start in 1987. Uptake of the recommended procedures has been variable, with the programs of some municipalities starting before 1987, some programs commencing since the guidelines were produced and some programs yet to start.

3. FUNDING SOURCES AND MECHANISMS

The screening is undertaken by the Finnish Cancer Society on behalf of the municipalities. The municipalities are charged fees for each woman screened.

The Finnish Cancer Society sets the fees which are charged to municipalities. The full cost of mammography is recovered from municipalities.

Mammography is free to women.

Most radiologists are paid FIM 40 ($13) for reading the mammography films of each woman screened.

The fee for mammography follow-up/assessment is FIM 360 ($120).

In the private sector, mammography costs FIM 450 ($125). This high charge results in very high participation rates in the free mass mammography program.

5. PATTERNS OF EXPANSION

Mammography is being introduced through the systematic recruitment of individual year of birth cohorts of women. The current program started in 1987 and is planned to run until 1991. There are no plans for mammography screening beyond 1991 as yet. It has been suggested that the gradual introduction of mammography using this approach will reduce the initial cost of screening and also provide an opportunity to assess the effectiveness of mammography.

6. ADMINISTRATIVE STRUCTURE

Screening recommendations for national screening policies are developed by the Finnish Cancer Society and it is up to the counties to decide whether to use those policies in their areas.

The Finnish National Board of Health has given the Finnish Cancer Society responsibility for operating and evaluating mass screening.

There are 11 fixed mammography clinics in Finland, one in each county. They are operated by the Finnish Cancer Society or by the Cancer Society of each county. The fixed clinics are responsible for screening, servicing the mobile screening units and follow-up assessment.

The city of Tampere (170,000 people) is in the county of Pirkanmaan (total of 450,000 people). The Pirkanmaan Cancer Society is responsible for screening women in the county outside Tampere, while Tampere City Hospital is responsible for screening women in Tampere.

8. AGE RANGE

The current recommended age range at entry into the screening program is 50-59.

10. NUMBERS

Total Finnish population is 5 million. There are approximately 560,000 women aged 50-69 years.

11. RECRUITMENT METHODS

The national population register is used to send individual invitations to women.

Public education is being used to explain the birth cohort approach to selecting women for invitation in order to maximise participation and to explain to women why they have not been invited.

The Finnish Cancer Society is responsible for producing the invitations. The 11 county cancer societies add appointment times to these invitations and then send them out.

It has been observed that in all countries around the World, (except East Germany) individual call has been much more successful in recruiting women than non-individualised recruitment.

In Finland, the approximate participation rate in the organised mammography program is 90% while the participation rate in the organised cervical program is around 70%.

In Pirkanmaan, in addition to personalised invitations, publicity campaigns are run in areas in which the mobile unit is about to open.

12. LOCATION AND TYPES OF SCREENING FACILITIES

Urban Areas: the majority of screening occurs in multipurpose clinics of the Finnish Cancer Society. There are also some private clinics.

Rural: screening occurs mainly in municipal health centres.

Two types of mobile vans have been tested in Finland. The first is the conventional large caravan. This has worked well. The second is a small van which transports mammography equipment to health centres. The van also has a processor. This van has been found to be much less successful than the self contained caravan, and no more of these vans will be ordered.

It has been found that 30-40 women can be screened per 7-8 hour day in the caravan.

The Pirkanmaan screening program covers 280,000 people. In 1989 it will screen 6,600 women, in 1990 8,600 women and 1991 11,500 women. The screening program currently comprises one mobile unit and one fixed unit. Due to the low screening rates at present, the mobile unit does all of the screening while the fixed unit does all of the assessments. The mobile unit spends on average one week in each location. It only screens for 8 months of the year. It is staffed by two radiographers and screens 40-50 women per day. Two view mammograms are taken.

The fixed unit also does diagnostic mammography on referral due to excess capacity.

Both the mobile and the fixed unit each have two radiographers.

16. NUMBER OF VIEWS

The national recommendation is for two view mammography. Consideration is being given to reduce the number of views to one.

17. SCREENING INTERVAL

The national recommendation is for a two year interval.

18. LOCATION OF FILM PROCESSING

Centralised processing is the preferred mode of operation in Finland.

19. FILM READING

The general policy in Finland is for there to be two radiologist film readers per film. They tend to read independently and then discuss any differences. Consideration is being given to reducing the number of readers to one. This is an important issue in Finland, because much of the film reading is on a fee for service basis. One radiologist considered that an acceptable system would be to have one radiologist and one radiographer film reader. This would be a very viable compromise.

Having two film readers is an excellent way of teaching film reading, and perhaps could be advocated initially for this reason alone.

Where available, previous mammograms are always presented when current films are being read.

21. NOTIFICATION OF RESULTS

All women are informed of both normal and abnormal results in writing. In addition, women are telephoned about abnormal results.

Results are available within 10 days of screening.

The letter advising the woman that her mammogram is normal also contains a recommendation that she perform BSE.

23. LOCATION AND TYPE OF FOLLOW-UP FACILITIES

Assessment is undertaken in fixed mammography clinics. If open biopsy or definitive treatment is required, the woman is referred to the local hospital.

In Pirkanmaan, assessment relies very heavily on ultrasound. The radiologist in Pirkanmaan has found that ultrasound guided fine needle aspiration biopsies have a sensitivity of 80% (this is considerably lower than the 99% sensitivity achieved in mammographically controlled biopsies in Linkoping, Sweden.)

25. QUALITY ASSURANCE ADMINISTRATIVE STRUCTURE

Quality control is largely the responsibility of local screening teams. Emphasis is placed on individual responsibility, motivation and a meticulous approach to screening.

Follow-up data are collected on all mammographically detected abnormalities.

A national mass screening registry monitors data on compliance, interval cancers, mortality etc.

27. PHASES OF IMPLEMENTATION

Implementation was designed in an experimental framework, with random allocation of year-of-birth cohorts to be screened first to allow further evaluation of the effectiveness of an organised mammography screening program.

	New cohorts screened	Cohorts re-screened
1987	3	-
1988	3	-
1989	2	3
1990	3	3
1991	3	5

29. WORKFORCE PROVISIONS

There is a 50% shortfall of radiologists and it is difficult to recruit them to screening.

There is no provision for systematic education of staff involved in mammography. The Finnish Mammography Society meets approximately 4 times a year and organises radiologist training, although this training is not very intensive.

30. COST

Each screening unit costs FIM $800,000 (A$250,000).

The cost of providing mammography varies greatly in different areas (FIM 190-450), however all municipalities are charged the same fee. The standard fee charged to municipalities is FIM 260 ($A90).

The Finnish Cancer Society sustained a loss of FIM 1 million last year on its mammography operations.

The fee for private sector mammography is FIM 440 ($A140), with a rebate of FIM 200 ($A70). This fee includes follow-up assessment using ultrasound and additional views, but not other assessment procedures.

The Finnish government subsidises the cost of mammography for municipalities which are comparatively poor.

Where screening only is performed, the fee is FIM 240. Where individual women require follow-up assessment, the additional fee is FIM 750. The all inclusive fee for screening and follow-up assessment is FIM 260.

These fees are regarded as being fairly high, but need to cover the cost of the initial investment.

31. RECORD SYSTEM

There is no systematic national computerised mammography data collection system, although one is being planned.

Each screening program has to submit an annual statistical return separated for initial mammograms, second mammograms etc. and for each one year age group. Both numbers and percentages are provided. The specific data items are:

- number of women invited
- number of women attending (All subsequent percentages are a proportion of the number of women attending.)
- number recalled
- number requiring extra views only
- number requiring extra views only who are normal
- number requiring full assessment
- number who are found to be benign or normal after full assessment
- number of women biopsied
- number of benign tumours
- number of malignant tumours

33. COUNSELLING

Counselling is provided by radiographers.

37. DATA

In Pirkanmaan, in the first round of screening many small malignant tumours were found. Concern was expressed that many of these may have no invasive potential. This can be assessed using DNA flow cytometry.

Screening results in Finland for 1987-88

Note: all percentages from 're-called' down are expressed as percentages of the number of women who attended.

	Finland	Pirkanmaan
Invited	164,000	8,160
Attended	89%	89%
Re-called	4%	7%
Biopsy	0.96%	1.29%
Cancer	0.31%	0.71%
Benign	0.55%	0.58%

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OVERVIEW OF CERVICAL CYTOLOGY LABORATORY SERVICES IN CANADA

BRITISH COLUMBIA

One laboratory only; public sector, fully funded by government.

ALBERTA

The majority of smears are read in private laboratories with fee for service funding.

SASKATCHEWAN

Smears are processed in both public and private laboratories, with most smears being read by public laboratories located in hospitals.

MANITOBA

All smears are read in public laboratories. Efforts are being made to set up a centralised cytology registry.

ONTARIO

There are multiple private laboratories with fee for service. 95% of smears are read in private laboratories.

QUEBEC

Almost all smears are read in public hospital laboratories.

NEW BRUNSWICK

Most smears are read in public laboratories.

NOVA SCOTIA

70% of smears are read in the Victoria General Hospital laboratory. 30% of smears are read in a dozen small hospitals, with fee for service. Since 1976, there has been a central cytology smear registry.

NEW FOUNDLAND & PRINCE EDWARD ISLAND

All smears are read in public laboratories.

NORTH WEST TERRITORIES

The smears are read in either British Columbia, Alberta or Manitoba.

CERVICAL CANCER SCREENING PROGRAM IN THE UNITED KINGDOM

1. AIMS

To provide cytology screening for all eligible women in England and Wales.

2. STATUS

Cervical cancer screening has been available in the UK through general practitioners for several decades. Intermittently, efforts to improve population coverage and the quality of smear taking and follow-up services have been made. The current cervical cancer screening programme lacks strong central co-ordination.

The government recommended that from 1 April 1984 local schemes should be set up by District Health Authorities (DHA's) to replace the previous national recall scheme. As of 1986 no guidelines had been issued to suggest how this may be achieved, other than the Minister of Health directing DHA's to fund Family Practitioners Committees (FPCs) to computerise their female age-sex registers and make them available to the DHA's to run automated call and recall systems.

A Labour Party survey circa 1985-6 found only 5 of 201 health districts in England and Wales had a full call and re-call system as recommended by the DHSS in 1981.

3. FUNDING SOURCES AND MECHANISMS

Currently, GPs receive a fee for each smear taken from a woman if she is over 35 or has had 3 or more pregnancies and then only if the most recent smear was more than 5 years ago.

Opinion was expressed that the introduction of item for service for pap smear hampered screening because it means that to increase the screening frequency means increase cost. It also means that GPs expect to receive a fee for all preventative activities.

If there was no fee for service, GPs would offer a variable level of service and women could register with GPs who offer the best service. This would be an incentive for GPs to improve their services.

The new white paper on the organisation of primary medical care indicates that GPs will receive remuneration for doing pap smears only if they smear at least 80% of the eligible population every five years from the age of 20.

Due to the under-funding of NHS pathology labs, the private sector is picking up excess smear readings.

5. PATTERNS OF EXPANSION

In 1987, the Department of Health issued a directive that by 1 April 1988 computerised call and re-call systems were to be established by District Health Authorities using Family Practitioner Committee registers. This deadline was met by over 50% of the District Health Authorities. The Family Practitioner Committee registers are now being linked with pathology records and all of the FPC registers are being used to compile a National Health Service central register.

6. ADMINISTRATIVE STRUCTURE

Forman responsibility for cervical screening lies with District Health Authorities. The Department of Health is responsible for policy only. However, FPCs are directly responsible to the Department of Health. While there is formerly a national cervical program, there is very little national co-ordination. Apparently there are difficulties in liaison between various groups involved in cervical screening due to lack of direction from the DHSS. (3.)

While there is a national policy on cervical cancer screening, the District Health Authorities have freedom to set their own screening parameters.

Successful cervical screening programs need a designated individual who is responsible for their conduct. The view is expressed that this should be a cytopathologist.

In fact, currently the Regional Health Authorities have very limited responsibility for cervical cancer screening. They will be requested to take more responsibility. The Faculty of Community Medicine is developing a national cervical screening network comprising approximately 220 program managers (one in each Health District) who will be responsible for cervical cancer screening.

An important role for the cervical cancer screening program co-ordinators (who are mostly community physicians) is to help GPs with the computerised call and re-call system, as well as liaising between the District Health Authority, the GPs and the Family Practitioner Committee. When the community physician is known by the practices and the general practitioners, it is much easier to sell the cervical cancer screening program.

The Family Practitioner Committee areas are similar to Health Districts.

8. AGE RANGE

The national recommendation is for screening to commence at age 35 and cease at age 65 years if there is no history of abnormal smears.

Smears are also recommended on the following occasions:

- at antenatal visits
- women 22-30 attending for family planning advice who have not had a smear during the previous 5 years
- any other woman 22-35 years who is, or has been, sexually active should be screened on one occasion in this age interval if she requests a test.

No data are available on which to make a recommendation whether a 65 year old woman who has had three clear smears over the preceding 10 years should have another smear at age 70.

Health Districts can use locally determined screening policies for cervical cytology.

9. EXCLUSIONS

Some laboratories are refusing to examine smears where the screening history indicates the woman is being over-screened. In such situations, the lab writes back to the general practitioner saying that there is no clinical indication for an early smear. This policy has the written backing of the local health authority.

10. NUMBERS

With 100% attendance of eligible women and compliance with recommendations, 3 million screening smears/year would be done. Adjusting for probable reduced compliance and additional diagnostic smears, 2.6-2.8 million smears/year are expected. This was the number taken in 1982.

11. RECRUITMENT METHODS

Recruitment is by personalised invitation using Family Practitioner Committee address lists. It is recommended that a publicity campaign be conducted to encourage all women >35 years who have never had a smear to attend for screening. (Based on the assumption that even one smear taken is protective.)

The District Health Authorities are responsible for call and re-call, but the Family Practitioner Committee holds the register. The DHA's fund the FPC's to issue invitations.

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The FPC call, re-call system is very flexible in its call, re-call parameters. Every month, it generates a list of women who need smears. This list is checked by the general practitioner for women who shouldn't be screened. The list is then sent back to the FPC, which produces invitation letters, reminder letters, non-responder lists and suspended lists to be checked by the general practitioner.

Some GPs are suspending young women who are presumed to not be sexually active (i.e. not on the pill). This approach is being discouraged.

The Family Practitioner Committee registers were computerised with Department of Health support. The Regional Health Authorities are responsible for the call, re-call registers.

The Exeter Family Practitioner Committee Services Computer Unit developed software for call, re-call registers for both mammography and cervical. These facilities were made available to the Regional Health Authorities.

The main role of the FPCs is to administer contracts for GPs, pharmacists, dentists, and opticians, as well as patient registration for general practitioners.

In the UK there 92 FPCs, which are co-ordinated by the NHS.

A major problem in the recruitment of women is the accuracy of addresses on the FPC list, as there are very few mechanisms for maintaining these addresses. There is no official requirement for people to register with the general practitioners. This is one of the contributors to the FPC having incorrect addresses.

In the United Kingdom there is no organised public education, although the Health Education Authority produces material for use nationally. The District Health Authority health education departments are grossly under-funded.

It is important to involve the receptionist and practices nurses in the cervical screening program, especially in recruiting women.

Often the GP's receptionist recruits people for preventive health consultation within a practice.

Manchester

In Manchester the following regime applies: if no smear result is received within 16 weeks, the FPC produces a reminder letter. If no result is received within a further 8 weeks, then a non-responder card is produced which is sent to the general practitioner and to the district health authority to contact the patient at home.

If the smear result is negative the FPC notifies the woman directly. If the smear is positive the FPC notifies the smear taker. Smear takers are also notified of all results by the laboratory.

In Manchester it has been found that only 20% of women invited from the FPC list actually attend for smears. 30% of the invitations never reach the woman, and an unknown percentage have been screened in the last 5 years or refuse to attend for a smear. General practitioners report greater attendance for pap smears since the introduction of systematic invitation of women for smears.

Oxford Prevention of Heart Attack and Stroke Project

The Oxford Prevention of Heart Attack and Stroke Project invites people attending general practitioners to have a blood pressure check and then counsels women to have a pap smear. The aims of the project are to find and train nurses to undertake these examinations, to train receptionists to invite women, to audit the general practitioner practice profile (to ascertain the frequency of preventive health measures) and to provide a method of inviting women in for preventive health activities.

If a general practitioner employs a practices nurse to take smears (or for any other purpose) the government pays 70% of the salary.

When a woman attends the GP, the receptionist offers a preventive examination, with an appointment time agreed to. This is then reinforced by the GP when he sees the patient.

The check is sold as a free health check to "reduce the risk of heart attack, stroke and other diseases".

A key to the success of this program is to employ facilitators/co-ordinators to negotiate with general practitioners and to liaise with practiced nurses.

History of cervical cytology recruitment in United Kingdom - Views of Professor Alwyn Smith

Approximately 30 years ago it was found that individualised call using birth records was a very successful way of increasing the immunisation rate among children in the UK. This system was adopted in Sweden and Finland, where it was also applied with great success to cervical cytology.

The first attempt at recruiting women for cervical cytology in the United Kingdom comprised media campaigns. This was unsuccessful, with only a 20% to 25% uptake. Other problems were that the uptake was by young women and women of upper

socio-economic status. For this reason cervical cytology had very little impact on cervical mortality. (Incidentally, it was found that 30% of women who had been screened were unaware of the fact, presumably because the smear had been taken as part of another procedure.)

The second attempt to increase cervical cytology uptake was for a specific item of service payment for general practitioners who screened women over 35 if they had not had a smear in the previous 5 years. This system was very unpopular and had no impact on the distribution of screening activity.

In the late 1960s and early 1970s, an attempt was made to use the electoral rolls to recruit women. However, problems with the electoral rolls were that they had no information on age, date of birth or sex. Attempts were made to determine the sex of people on the rolls. However there were cases where invitations were sent to men and this created much adverse publicity. (In 1974, there was a major re-organisation of the health services which resulted in preventive health activities being shifted from the local government authorities to Regional Health Authorities.)

In the mid 1970s, a committee on gynaecological cytology reported to the Department of Health that computerised family practitioner lists should be developed and used for call/re-call. The Department of Health adopted this recommendation and broadened it to include the capacity to offer other preventive activities. This activity is the basis of the current cervical cytology recruitment program.

In Manchester a trial has been conducted of "consumer oriented, service initiated" screening services which comprised computerised call and re-call and ensuring that services are acceptable to women. However, this trial has not been successful. Research is currently underway to find out why. Possible reasons are that there is no specific individual who is given responsibility for conducting the program, where there were specific individuals nominated they had many other tasks to perform, the inadequacy of the database (especially wrong addresses in 20% to 30% of cases), the screening being inconvenient and a small proportion of women not wanting smears. One of the roles of the general practitioner is to check their lists of women to be invited before the letters are printed. This has not worked because of neglect by some general practitioners. It appears to be very difficult to make general practitioners adhere to a system.

12. LOCATION AND TYPES OF FACILITIES FOR TAKING SMEARS

In Manchester, 85% of GPs have made a formal commitment to take smears.

13. TYPE OF SMEAR TAKER

There is a very variable capacity among GPs to take smears. There are very limited alternative options, comprising practiced nurses and genito-urinary disease clinics.

There are many local initiatives for improving screening. Usually smears are taken by practice nurses, although some doctors insist on the doctors taking the smears.

Oxfordshire is setting up training for nurses in smear taking. General practitioners are reluctant to attend such training.

The British Society for Clinical Cytology has just produced a video and a booklet on taking smears. This can be obtained from Dr Keith Randall, Red Tree House, Pine Glade, Keston Park Orpington, Kent, BR6 8NT United Kingdom.

Increasingly, general practices are employing nurses to take smears.

14. QUALIFICATIONS OF SMEAR TAKER

Laboratories have individual guidelines on the quality of smears. Laboratories are in a strong position to educate and put pressure on general practitioners to improve their smear taking. However, with multiple different types and sites of smears taking, the quality control of smear taking is difficult.

15. SCREENING INTERVAL

Since 1985, the government has only funded and is only advocating screening once every 5 years for women aged 35 to 65. Around 1/3 of District Health Authorities have a policy of 3 yearly screening, and 30-40% have a mixed 3-5 year policy. Most of those with 5 yearly policies are planning to go to 3 yearly screening.

The view was expressed that the only thing that prevents the UK government advocating three year screening is that it would cost more.

It is possible that one could select high risk groups for annual screening. These might be women with a family history of cervical cancer, those with multiple partners, those immuno-suppressed and those where the partner has wart virus. (Recent evidence suggests that wart virus may not be implicated in the development of cervical cancer.)

Cervical screening interval - Views of Professor Alwyn Smith

It was suggested that there are no impirical data on cervical screening interval. Most of the information is based on modelling. In Finland, where there has been a substantial reduction in mortality there is a five year interval policy. However, many women have extra smears in between their official smears.

The aim of the screening program should be to have the smears distributed as evenly as possible among the female population. A useful calculation is to work out what the smear interval would be if the current smears taken were distributed evenly among the population. The significance of this calculation is that re-distributing the smears should result in very little increased cost of a screening program.

One possible advantage of increasing smear frequency, is that pathologists may be less likely to refer women for colposcopy and so a shorter interval may not result in increased cost. It was suggested that the referral rate should be 0.8%.

In the past, referral for an abnormal smear meant that the women had to undergo a cone biopsy. This would have resulted in substantial reluctance to refer. Colposcopy and cervical ablative therapies have lowered the threshold for referrals. There has also probably been an increase in referral for medico- legal reasons.

A paper by Giles in the British Medical Journal in 1988 found that 11% of smears showed significant abnormalities. At this rate of referral, a cervical cytology program becomes very difficult to justify.

In the UK, the mammography response rate may be higher than for cervical cytology because the general practitioner doesn't have to undertake any action other than checking the invitation.

16. QUALITY ASSURANCE OF SMEAR READING AND REPORTING

Annually, laboratories and Family Practitioner Committees have to submit standard statistical returns. These are compiled at the District, Region and national levels.

External laboratory control involves a program of test slides being sent to the laboratories.

There are no national standards or guidelines for internal quality control of laboratories. This is left to the individual laboratory and is quite variable. Common practices are a hierarchial staff structure, spot checks of smear reading and looking at previous smears when a slide is positive.

18. SMEAR READING RATES

It is the UK recommendation that a smear reader should read at a rate of 35 slides per day. The public labs tend to read 50 slides per day and the private labs tend to read 80 slides per day.

The view is put that cytology reading is impossible to do as a full time occupation. At the Manchester laboratory, most readers work a 20 hour week. In the four hours per day they read an average of 25 slides.

In the UK, a one month turnaround time between receiving a pap smear and sending the report is considered satisfactory.

19. SMEAR REPORTING CODES

There are variations among Districts in the policy for referral to colposcopy. The intercollegiate working party report has recommendations on referral for colposcopy.

Dr Nick Day's recommendation is that if a smear is mild or moderate dysplasia, the smear should be repeated every three to six months. If the abnormality resolves then no action is required. If the abnormality persists for 6-12 months then the woman should be referred for colposcopy. For severe dysplasia, the woman should be referred for colposcopy. (A regime like this could be built into the fee schedule.)

20. NOTIFICATION OF RESULTS

In some regions if a smear is abnormal, a letter is sent to the woman asking her to contact her GP and the result is both phones and mailed to the GP.

21. FUNDING MECHANISMS

The funding for the cervical cytology program is poorly organised. Funds come from the community services budget, from the acute care budget, from the laboratory services budget and from special grants from the Department of Health.

Currently GPs receive a fee for each smear taken if the woman is over 35 years or has had three children and the previous smear was more than 5 years ago. There is a proposal to change this so that GPs will receive a block grant when their smear rate reaches 80% of the eligible population. This proposal is meeting with considerable disquiet.

Under the current system, a doctor receives a second smear fee for repeating inadequate smears but does not receive a second fee for repeating smears to follow-up mild abnormalities. The rationale is that in the second situation

the woman is now a patient and is covered by the usual remuneration mechanisms for patients, i.e. capitation.

If a general practitioner employs a practiced nurse, the government pays 70% of the salary.

22. LOCATION AND TYPES OF FOLLOW-UP FACILITIES

For each District Health Authority, one to two gynaecologists are responsible for colposcopy. Most colposcopy is done in gynaecology departments in hospitals. Some GPs have been especially trained in colposcopy and undertake colposcopy in these clinics. Colposcopy by general practitioners in their surgery has been strongly discouraged.

Colposcopy training courses are provided around the UK for gynaecologists and GPs who will work in these colposcopy clinics.

Generally, the laboratories assume the responsibility for following up women with abnormal smears.

In Oxford, three deaths from cervical cancer resulted because positive results were sent to general practitioners who did not ensure that the women received treatment. Because of cases like this, the Department of Health has insisted that the laboratories develop fail-safe mechanisms.

UK colposcopists are starting to query the need to perform colposcopy on minor lesions (see UK intercollegiate working party report P.12).

There is a UK proposal to conduct a study of mild dysplasia in which women will be randomised between repeat smears and colposcopy. The outcomes to be investigated at 3 years post randomisation will be the prevalence of CIN III, women's feelings and cost. If it is not possible to conduct this study then a similar study will be done on an observational basis.

26. ADMINISTRATIVE STRUCTURES OF QUALITY ASSURANCE

Laboratories tend to observe the British Societies for Clinical Cytology guidelines except that laboratories are very short staffed. There is a national move towards proficiency testing with circulation of sets of slides. However, there is no commitment of funds to enable laboratories to overcome deficiencies and no procedures have been developed to address the situation in which slide readers do not pass the proficiency test.

The slide circulation program is known as the External Quality Assessment. It is being administered by Regional Health Authorities and will be conducted by a regional facilitator.

If there is a high level of consistency among laboratories for circulated slides, there may be no need for a tough proficiency scheme.

There are informal slide exchanges between cytology laboratories. One concern is that this informal exchange may be disbanded when formal proficiency testing is introduced.

In the United States, the New York proficiency testing program is used in New York State, California and Texas.

A major shortcoming of the new UK proficiency testing system is that no mechanism has been developed for handling slide readers who fail the proficiency testing after an initial re-training and re-testing.

The proficiency testing scheme tests very low standards of reading. Its aim is to identify poor readers, not to educate. The slides are limited to unambiguous cases and apply the notion of the gold standard. In mammography in the UK quite a different system is being adopted, whereby difficult and ambiguous cases are circulated among pathologists in order to contain a consensus on the diagnosis. One difficulty in cytology slide circulation schemes is that it is very difficult to get multiple slides, since they are not made from a single block.

The suggestion was put forward of a Standing Committee which conducts confidential enquiries into the reasons behind all deaths from cervical cancer.

The Manchester laboratory examined the reporting profile of individual readers.

Most laboratories retain slides for a long period of time e.g. 10 years.

28. PROGRAM REVIEW AND REVISION

Annually, the Health Regions and Districts systematically review their performance and adjust programs.

31. WORKFORCE PROVISIONS

The adequate provision of workforce is regarded as one of the principal determinants of the quality of a screening program. This applies in all areas, including secretarial and obviously technical support staff.

In England the minimal qualifications for entry into cytological screening are very low (e.g. partially completed high school).

In Manchester, the laboratory employs part time people and trains them in cytology screening for one year. It tends to recruit mature women.

32. COST

In Manchester it is estimated that a smear costs UK Pounds 3.50 to process and read.

Brunel University are studying the economic aspects of the UK trial of early detection of breast cancer. Data should be available in 1990.

33. RECORD SYSTEM

Two types of information systems are used in cervical screening: the FPC Information and Recruitment System developed in Exeter and cytology laboratory information systems developed by individual laboratories. The Oxford computing unit is developing mechanisms for linking these two databases.

The location of data on two systems makes it difficult to produce statistical reports.

Details of the pap smear result are entered onto the FPC system. Apparently, the analysis of these FPC data is very limited although the capability is available to analyse them.

The FPC registers are to be linked with smear histories of individual women being transferred between FPCs when women move.

The FPCs are also used to compile the NHS central register, which is currently being computerised.

It is possible that only some of the FPCs enter cervical cytology data.

There is mandatory provision of data from District Health Authorities (pathology laboratories and FPC) to Regional Health Authorities and to the Department of Health.

Data on screening throughout the UK should become available within the next two years.

There are plans to add colposcopy and quality assurance data to laboratory systems.

34. CONFIDENTIALITY

The Data Protection Act may present potential problems for the FPC providing laboratories and GPs with lists of women.

Many STD clinics do not record women's names or will not disclose them.

Informed consent is not obtained for colposcopy.

37. OVERLAP WITH OTHER HEALTH PROGRAMS

The only overlap between the mammography and cervical programs is the use of the same population register for recruitment i.e. the FPC register.

38. DATA

50%-60% of cervical cancer deaths occur among women who have not been screened.

Currently 60%-80% of women are screened once every 5 years.

In Oxford it has been found that 15%-20% of smears are unsatisfactory.

In Manchester, at least 45% of at-risk women have had a smear in the last 5 years.

Ref. (1.)

	1985/8	1973	1980
No. of smears taken	0.7 mill	-	2.9 mill
Positive smear rate per 1000 smears *	6.3	4.3	6.8
No. of deaths from cervical cancer	2434	-	2068
Deaths from Cx Ca/1,000,000 (Eng & Wales)(3.)	124	-	102 (82%)

* Severe dysplasia/carcinoma in situ or carcinoma in situ/? invasive

\- estimated proportion of positive smears at ages 25-29 and 30-34 have recently shown an apparent increase of 80% over a period of 4 years T2 (2.)

However:

Interpretation of these data is difficult as the number of women screened (and also the distribution of number of smears per woman) is unknown.

- A small (approximately 15%) reduction in mortality has occurred from 1966-80 ($98/10^6$ to $82/10^6$). The most notable decrease in mortality was in the age groups 35-44 and 45-54. ($202/10^6$ to $110/10^6$).

  The mortality rate for 25-34 years more than doubled ($11/10^6$ to $27/10^6$ in 1968-70 and 1978-80). Despite this increase, deaths under 35 years were only 6% of total deaths in 1980.

- Trends in mortality are present in different year-of-birth cohorts.

- Smear rates/1000 women (15-64years) 1967-84 by region - England, Wales and Scotland Ref (4.).

- Possible reasons for failure of the previous national recall program:

  1. Concentration of screening among low (1.) risk women (higher SES, young). 55% of smears are taken from women under 35 years, and those who are frequently tested). But this does not explain the high positive rate seen.

  2. It is possible there has been an increase in the risk of CIS/?invasive Ca among younger women, which has been kept in check by increased screening. (This may be a cohort-specific effect, rather than a change in the natural history of the disease.)

  3. Uncertainty of the relationship between CIN and invasive CA (i.e. progression is not inevitable.) (p.38).

Estimated total smears and positive cases by source of smear: 1980 T1 (2.)

GP's	Smears 1,000's	(/1,000 smears)
GP's	1,252	(5.0)
Area health authority	708	(2.7)
Family planning clinics	356	(5.9)
Hospital clinics	570	(16.0)
Other clinics	42	(13.1)
All sources	2,928	(6.8)

Estimated total smears and positive cases by age: 1980 T2 (2.)

Age (years)	Smears 1,000	(/1,000 smears)
< 25	701	(13.0)
25-29	469	(8.6)
30-34	404	(11.4)
35 and over	1,354	(6.8)
All ages	2,928	(6.8)

Results of biopsy - 1980 T4(2.)

Biopsy result	Estimated No.	% of total
Negative	640	3.2
Dysplaysia	3,240	16.2
Carcinoma in-situ	7,810	39.2
Micro-carcinoma	600	3.0
Invasive squamous carcinoma	1,660	8.4
Other	490	2.5
Pre-biopsy observation	2,180	10.9
Biopsy not done or results not known	3,300	16.6
TOTAL	19,920	100.0

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CERVICAL CANCER SCREENING PROGRAM IN SWEDEN

1. AIM

To provide regular cervical cancer screening to all eligible women.

3. FUNDING SOURCES AND MECHANISMS

Screening is paid for by county councils, and is free for individual women.

5. PATTERNS OF EXPANSION

In Sweden, cervical cytology programs are operated by individual counties. A national program was commenced in the mid 1960s and by 1973 all of Sweden was covered by organised county council cytology programs.

6. ADMINISTRATIVE STRUCTURE

Counties vary in population from 200,000 to 1.8 million inhabitants.

(See 1984 JAMA paper by Stenvist on the Organisation of Pap Smear Programs. This paper provides the rationale for pap smear registers.)

In the Stockholm region, screening is organised in the following way: a form with each woman's name is printed by a private sector computer facility using the Stockholm population register. This form is then sent to the woman's doctor or clinic by the screening office. The clinic has a separate sheet with the appointment time and then sends the material to the woman. The woman then attends for screening by either a doctor or nurse. The form and the slide are then sent to the laboratory where the diagnosis is added to the form. The form is then sent to the screening office. One copy is sent to data entry. If an abnormality has been found the result is sent to the doctor. If no abnormality is found then no information is sent to the doctor.

It is the responsibility of the doctor to inform the woman of an abnormality. Women are not informed of normal results.

7. POPULATION COVERED BY INDIVIDUAL PROGRAMS

In Sweden it is estimated that only one quarter of smears are taken in organised cytology programs. There are around 200,000 smears taken in organised programs and another 1 million smears per year taken by doctors. It is believed that the efficacy of the cervical cytology program arises

very largely from the smears taken in the organised program. The ineffectiveness of smears in disorganised programs arises from poor smear quality and the mal-distribution of smears. (This highlights the importance of having a register to monitor smear activity in the absence of individualised call.) Even though the number of smears per woman has been the same in Norway as in Finland and Sweden, it has only been in the latter two countries, where there is an organised cervical cytology program, where significant reductions in cervical cancer incidence and mortality have been observed.

8. AGE RANGE

Until 1985, the national recommendations were for screening every 4 years for women aged 30-50. It is of interest that no mortality reduction has been observed in women under age 30, while a mortality reduction has been observed in women aged 30+, consistent with an effect of screening on cervical mortality. From 1985, the national recommendation is for screening every 3 years for the age group 20-60.

10. NUMBERS

Total female population is approximately 4 million (1985). Approximately 200,000 smears are taken by organised programs per year. From 1970 about 1 million smears in total are taken annually (i.e. 80% of smears are taken outside organised programs).

11. RECRUITMENT METHODS

Women are personally invited.

In Stockholm, women are called according to their year of birth. Due to the lack of feedback from the laboratory to the call register, the system does not know whether a smear has been taken. Thus if a woman misses a smear, the next invitation will be in 3 years. The recruitment rate in Stockholm is around 80%.

Women are sent a small pamphlet on what is involved in having a smear taken and a form which flows throughout the screening system and is the key document (see 6. above).

12. LOCATION AND TYPES OF FACILITIES

Women have designated doctors or clinics for taking smears.

13. TYPE OF SMEAR TAKER

It has been found that nurses take higher quality smears than doctors.

90% of smears in the organised screening program are taken by nurses especially trained to take pap smears.

15. SCREENING INTERVAL

(See 8. Age Range above.)

Women treated for CIN are still at increased risk of cervical cancer. Such women should be screened annually by a gynaecologist, including endocervical curretage. This annual screening should be undertaken even if they have been hysterectomised for CIN or carcinoma. If a woman has been hysterectomised for any other reason, she should be screened at the usual interval.

The screening policy in Stockholm is as follows:

- first call at age 25-26.
- call every 3 years between age 30-40.
- call every 4 years between age 40-60.

Each woman is informed that if she has had a smear in the previous 12 months she does not need to attend for a smear as part of the organised program.

The most cost-effective interval is screening every 3 years. (See reference in UICC book for cost-effectiveness: Summary in BMJ.)

In Stockholm, no follow-up data are collected upon women with abnormal smears.

In Stockholm, it is planned to link the cytopathology laboratory smear registry with the individualised call system in 1990.

16. QUALITY ASSURANCE PROTOCOLS

There appear to be no national guidelines on cytology laboratory quality control. Laboratories appear to have their own quality control systems similar to those used in the British Columbia cytology lab.

19. REPORTING CODES

The form has the following codes:

- new test recommended because of unsatisfactory smear
- benign/normal (plus microbiological diagnosis where applicable)
- text description of smear
- SNOMED code

recommendation:
- new test in X months
- referral to specialist
- treat inflammation/infection and take new test
- notify cancer registry
- biopsy recommended

All of these data items except the text description of the smear are computer entered along with the woman's name, address and number as well as the date of smear and the practice/hospital identification number.

20. NOTIFICATION OF RESULTS

In Stockholm, the doctor is informed by the laboratory only if there is an abnormal result. Informing the woman is left to the doctor.

22. LOCATION AND TYPES OF FOLLOW-UP FACILITIES

Where a smear is positive, the woman is referred to the regional gynaecology department which is located in a hospital. Only a small proportion of gynaecologists undertake the colposcopy involved in the smear program. Colposcopy training is not organised.

There is no standardised data collection or quality control for colposcopy or hystopathology.

26. ADMINISTRATIVE STRUCTURE FOR QUALITY ASSURANCE

It is suggested that cases of cancer of the cervix still occur in Sweden because of false negative smears and because screening is much less effective for non-squamous cell carcinoma of the cervix. There has also been an increase in the prevalence of risk factors e.g. smoking.

33. RECORD SYSTEM

In between 1968 and 1975, the results of all smears in Sweden taken as part of the organised program were sent to a central registry. Since 1975, data have been held by counties. These data have been linked with the cancer registries. Some counties have recorded all smears taken since 1980, not just those taken as part of the organised program.

The Swedish Central Screening Register keeps records of in situ or invasive cervical cancer. There is also a Central Cancer Registry. (2.)

Clinicians and pathologists are required by legislation to report CIS and invasive cancer to the Central Cancer Registry.

38. DATA

Internationally, there has been an improvement in survival from carcinoma of the cervix. This is due to the increased proportion being diagnosed in stage 1.

Note: Laara et al (3) suggest that mortality from cervical cancer was probably falling in the Nordic countries before the screening era, and that the apparent increase in incidence was due to under-reporting up until the late 1960s.

No. of smears taken within organised programs from 1967-75 (x age group - see T1 (1.)

Year	No. of smears
1967	9,149
1968	51,014
1969	97,817
1970	158,175
1971	156,210
1972	159,569
1973	174,677
1974	184,108
1975	185,971
TOTAL	1,176,690

Screening was mainly among women born in 1920-44.

- No. of cases of Ca in situ of cervix in 1958-1978 by year of birth cohort - see T2 & T3 (1.)

- Approximately half C.I.S's in 1920-44 cohorts were detected independently of organised programs. (1.)

- Age-specific incidence of invasive cervical Ca. Per 100,000 woman-years by year-of-birth cohorts - see Fig 1, 2 & 3 (1.).

  A small increase in women 25-29 years (incid. low tho'), variable for 30-34 years; reduced for 40-59 years. The annual age-standardised incidence of invasive carcinoma of the cervix fell by 30% between 1960 and 1980. there was a successive and substantial decrease in cervical Ca incidence in year of birth cohorts for age groups 30-54. (p.525)

- Age-specific mortality from cervical Ca per 100,000 woman-years by year of birth cohort Fig. 5, 6, 7 (1.) Reductions in mortality for 30-59 years old women were seen.

- The cumulative mortality rate from Cx Ca fell 34% from 1965 to 1982 (3.) (x age group, see TII (3.)).

- A clear relationship has been found between increased detection rate of CIS in year of birth cohorts, attributed to screening and falling incidence of invasive Ca in the following five year period. See T4 (1.)

- a direct relationship has also been found between fall in incidence of invasive Ca and subsequent mortality decrease in the different year of birth cohorts. See T5 (C1.)

- Risk of cervical cancer after negative smears according to interval since last smear. See ref (2.)

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FINNISH CERVICAL CANCER SCREENING PROGRAM

1. AIM

To provide a cervical cancer screening service for all eligible women in Finland and thus reduce mortality from cervical cancer.

2. STATUS

Since 1970 there has been full coverage of the national population by an organised mass screening program (1.). Cervical smears are also done outside of this program.

3. FUNDING SOURCES AND MECHANISMS

Individual municipalities are responsible for health care, but the cost is subsidised by the government (2.)

Cervical cytology as part of the organised screening program is free to women.

Laboratories charge municipalities approximately $10 for each smear. This includes subsequent examinations.

Treatment is paid for by the patient, with partial recovery of the fee from National Health Insurance.

The level of fees is set by the Finnish Cancer Society.

The pap smear program tends to be subsidised to ensure as many pap smears as possible come through the Finnish Cancer Society's part of the organised program. This under-charging is balanced by profits made by the laboratories from other tests.

For a woman to have a pap smear taken outside the organised program the cost is FIMs 130 (approx $40).

National Health Insurance meets 40% of the cost of smears taken outside the organised program.

4. LEVEL OF FUNDING

To minimise costs, nurses take all smears in the organised program and a 5-year screening interval is used.

6. ADMINISTRATIVE STRUCTURE

The screening is organised nationally by the Finnish Cancer Society. The program began in 1963.

In 1987, attendance was 71%. The low rate of participation is attributed to the large number of smears taken outside the organised program. There are 11 cytology laboratories of the Finnish Cancer Society in Finland. Each one services one of the 11 Finnish counties.

The 5 year screening interval policy has been determined nationally. Each municipality is free to decide its screening policy in relation to age range.

The Finnish Cancer Society is responsible for sending out the invitations and implementing the age range which has been decided by each municipality. (There are 450 municipalities in Finland). In 20 of the municipalities, the Finnish Cancer Society does not run the organised screening program.

8. AGE RANGE

The minimum age range used by municipalities is 30-55. A number of municipalities have extended the age range from 20-65.

11. RECRUITMENT METHODS

Recruitment is by individualised mailing. A computerised system selects women from the national population register. Personal invitations with appointment location and time are sent to eligible women. This is organised by the Finnish Cancer Society using their national population register.

There are no ongoing mass media/publicity campaigns to facilitate recruitment. In Tampere the attendance rate is approximately 80%.

As observed in England, participation rates are higher for mammography than for cervical screening.

Attendance rates

Over the 10 years to 1985 has been around 80%. In the Helsinki area it has fallen to 70% (may be reduced by private sector screening).

Non-attenders are not over-represented by high risk characteristics (age, SES) - this is attributed to the personal letter of invitation (1., 2.)

12. LOCATION AND TYPES OF SCREENING FACILITIES

The population of Finland is 5 million. There are approximately 2 million women aged 15 or more.

Approximately 150,000 smears are taken per year in the organised program and approximately 500,000 smears are taken per year outside the organised program. Smears taken outside the organised program tend to be read in private laboratories or hospitals.

13. TYPE OF SMEAR TAKEN

All smears taken in the organised screening program are taken by nurses employed by municipal health centres.

Approximately half the smears taken outside of the organised program are taken by nurses as well.

14. QA OF SMEAR TAKING

In the Tampere organised program, three smears are taken from each woman: vagina, endocervix and exocervix. If the woman is over 50 a Cytobrush is used for the endocervical sample.

Smear quality is regarded as the most important quality issue in the cervical program. The Helsinki laboratory has undertaken studies of the influence of different types of spatulas and has found that the Aylesbury achieves much higher rates of endocervical cells (88%) compared with the Ayre spatula (20%). A study was done in Helsinki of the effect of training smear takers on the quality of smears. In the absence of training, the dysplasia detection rate fell 40% while in the group receiving training the dysplasia detection rate increased 80% over the span of one year.

In Helsinki, nurses receive refresher training in taking pap smears every second year.

Labs notify the nurse if a smear is inadequate.

15. SCREENING INTERVAL

The screening interval recommended by the Finnish Cancer Society and adopted by all municipalities for organised screening is 5 years. Even with this interval, substantial reductions in cervical cancer mortality have been observed over the duration of the program.

However, most women have additional smears outside the organised program. A check of a small sample of smear request forms indicated that over 90% of women have had smears within the previous 5 years.

16. QUALITY ASSURANCE OF SMEAR READING

Since 1985, if a smear shows benign atypia or worse, the smear is repeated in 1 year.

Provincial labs of the Finnish Cancer Society (eleven in number) report 95% of screening program smears. They can also be examined free by private labs, and this facility is used by 5% of invited women. (1.)

All smears are read by cytotechnicians. Some are checked by a senior technician. Cytopathologists check all smears showing at least benign atypia changes i.e. 15-20% of all smears. (1.)

There is no organised national quality assurance program. Individual laboratories have their own procedures. Every year a 2-day session is held for the continuing education of cytologists and smear readers.

Intermittently, the Chief Cytotechnologist from Helsinki examines a large sample of smears from every laboratory and checks for the adequacy of the smear and the accuracy of the diagnosis.

There is no routine retrospective checking of smears for cases of cervical cancer.

In the Tampere Cytology Laboratory (which reads 30,000 smears per year) there are four smear readers without a hierarchial structure. The cytologist check all smears which are called abnormal plus a 20% sample of all other smears.

In the Helsinki laboratory, all pap smears are read twice and 20% are read by the cytologist.

18. SMEAR READING RATES

In Helsinki, smears are read at the rate of 60 smears per day.

20. NOTIFICATION OF RESULTS

Women are informed of both normal and abnormal smear results.

22. LOCATION AND TYPES OF FOLLOW-UP FACILITIES

The Finnish Cancer Society has colposcopy clinics in Helsinki.

Generally, in other areas of Finland women are sent to central hospitals for follow-up where a smear detected abnormality is present.

It had been observed that when a woman has an abnormal smear and is referred to a gynaecologist, the false negative rate for the 2nd smear taken by the gynaecologist is around 50%. This is attributed to tentative sampling of the cervix due to concern about causing bleeding.

Much colposcopy is undertaken in policlinics. These resemble comprehensive cancer outpatient clinics.

26. ADMINISTRATIVE STRUCTURE OF QUALITY ASSURANCE OF SCREENING PROGRAMS

At the Tampere laboratory, anatomical pathology results are always sought for every woman referred for gynaecological assessment.

Mechanisms are present to ensure that all women with abnormal smears receive gynaecological follow-up.

27. QUALITY ASSURANCE PERFORMANCE INDICATORS

In a study undertaken by the Helsinki laboratory, it was found that 10% of invasive cervical cancers had a history of a false negative smear. (6% in squamous cell carcinoma and 25% in adenocarcinoma of the cervix.)

It has been observed that in some communities, the endocervical cell (strike) rate is 15%. The current rate in Helsinki is 85%. The acceptable minimum endocervical rate is 60% to 65%.

32. COSTS

The fee for reading and reporting on a smear in the private sector is FIM 110 ($35). The Health Insurance rebate is FIM 50.

The Finnish Cancer Society charges each municipality FIM 46 ($12) for each pap smear.

33. RECORDS SYSTEM

A computer based mass screening registry, operating within the Finnish Cancer Registry, is run by the FCS. Labs summarise screening results by municipality and send the result cards to the registry, where data are linked to previous records and the original population register. Follow-up clinics are responsible for reporting diagnoses and treatment to the lab concerned. (1.,2.)

38. DATA

The greatest reduction in the incidence of invasive cervical cancer has been in women aged 35-54. Incidence has decreased 75% in the 35-54 year age group since 1968. This is in line with the organised program being aimed at women aged 30-55.

In Tampere approximately 12% of smears are referred for inflammatory causes and 0.5% are referred for suspicion of CIN/cancer. A neoplastic abnormality is found in 0.25% after investigation.

NOTE: Laara et al (3) suggest that mortality from cervical cancer was probably falling in the Nordic countries before the screening era, and that the apparent increase in incidence was due to under-reporting up until the late 1960s.

Cervical Cancer Incidence

- Annual number of CIS and invasive cervical cancer 1953-1980 see figure 1 (2.)

  From 1967-1980 there was ~ 60% reduction in new cases of cervical cancer.

- Age specific incidence 1953-1980 - see Figure 2 & 3 (2.)

  More than a 70% reduction up to age 50 years. Changes in incidence over 60 years were relatively small.

  Incidence rates by birth cohort also confirm the decrease (Fig 4 (2.))

- Incidence of CIN rose dramatically from 1961 to 1968 then fell, but remained above pre-screening level (Fig 1,5 (2.))

- Based on the available data, an estimated 61.72% of CIN are not likely to proceed to invasive cervical ca but receive treatment (6.)

Annual age-specific incidence rates of cervical cancer in unscreened women before and after intense screening (per 10^5 WY)T 4 (6.)

	Age					
	30-34	35-39	40-44	45-49	50-54	55-59
Unscreened before program	7	20	35	46	47	46
Unscreened after program (non-attenders)	19	34	37	82	68	26

Incidence is higher in non-attenders than in a comparable group before intense screening began. RR of cervical Ca of non-attenders c.f. population in 1962-65 before screening is 1.6 (signif.) (6.)

Cervical cancer mortality

- mortality fell by 50% from 1965-1982 (3.) Fig 5 (2.)

- age-specific mortality rates - See Table II (3.)

Mortality and incidence of cervical cancer 1955-74 T2 (5.) (age adjusted to world population)

Year	Mortality		Incidence (invasive)	
	No.	Per 100 000 WY	No.	Per 100 000 WY
1955	167	6.5	338	13.6
1960	197	7.3	388	14.5
1965	198	6.7	432	15.3
1970	160	5.1	351	11.8
1974	112	3.2	260	8.0
1980 (2)		~ 3.2		~ 5.0

Estimated reduction in frankly invasive cervical cancer

After the 1st screening compared to before the screening program was 80% i.e. for 30-59 years:

Prob of invasive cervical cancer before screening program (1962-65) = 0.010

Prob of invasive cervical cancer after first screening = 0.002 (6.)

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CERVICAL CANCER SCREENING PROGRAM IN THE NETHERLANDS

1. AIMS

To reduce the number of deaths due to cervical cancer.

2. STATUS

Organised population screening for cervical cancer began in 1976. Cervical cancer screening was rare before 1970. (2.)

3. FUNDING SOURCES AND MECHANISMS

In 1988, general practitioners negotiated a fee to take smears with the Dutch government. The current fee is DG12.50 ($A7.50).

6. ADMINISTRATIVE STRUCTURE

There is a poor organisational framework for cervical cancer screening.

8. AGE RANGE

The national policy is for there to be organised screening for women aged 35-54 years. Recent cost effectiveness data from Erasmus University suggests the age range should be 35-70. It is noteworthy that currently in The Netherlands 50% of smears are taken from women aged less than 35.

9. EXCLUSIONS

Women with clinical symptoms are directed to gynaecologists. (1.)

11. RECRUITMENT METHODS

Personalised call is used to invite women to attend their local doctor. Municipal registers are used for this purpose, as there is no national register. Since it is not known which woman attends which GP, the invitations are necessarily open.

12. LOCATION AND TYPES OF SCREENING FACILITIES

In 1985 the government shifted smear taking from nurses to general practitioners.

15. SCREENING INTERVAL

The national policy on screening interval is 3 years. Cost-effectiveness data from Erasmus University suggests that the interval should be at least 5 years.

22. LOCATION AND TYPES OF FACILITIES

The follow-up protocol for abnormal smears is standardised. Women with CIN I or II are re-smeared. If the repeat smear shows CIN I or worse the woman is referred to a gynaecologist for colposcopy or biopsy. (1.)

37. OVERLAP WITH OTHER HEALTH PROGRAMS

It was recommended by Dutch commentators that cervical and mammography programs should use a common administrative structure at national, municipal and regional levels.

38. DATA

Cervical cancer mortality rates and numbers 1936-1984 T1(2)

Years	Mortality /1000 000	Mean no. deaths/year
1936 - 1939	12.3	292
1940 - 1944	10.6	267
1945 - 1949	9.9	266
1950 - 1954	13.2	332
1955 - 1959	12.4	388
1960 - 1964	12.4	413
1965 - 1969	11.7	415
1970 - 1974	8.9	341
1975 - 1979	9.0	375
1980 - 1984	7.0	315

An analysis of Dutch cervical cancer mortality rates showed a decline in the number of cervical cancer deaths since 1960. This decline predates the introduction of population cervical cancer screening so screening cannot be responsible for the total decline seen. The decline accelerated around 1975 - the screening program may be partly responsible for this. Other factors which may play a role in the declining rates may be a fall in incidence due to improved genital hygiene (what?), improved treatment or diagnosis at an earlier stage (data on stage not available nationally to allow confirmation of this). Increased hysterectomy rates since the 1970's only account for 6% of the fall in mortality. (2).

Ref (1) provides data on 2 rounds of screening from 6 regions:

Histological diagnosis rates for 6 regions combined T1.(1)

	Diagnoses/100 000 women		
	Round 1	Round 2	Total
Severe dysplasia	0.80	0.83	0.81
CIS	2.53	1.05	1.80
Squamous carcinoma	0.53	0.17	0.35
Adenocarcinoma in situ	0.02	0.02	0.02
Adenocarcinoma	0.04	0.06	0.05
Total	3.93	2.12	3.04

NOTE:

- There were statistical significant differences in diagnosis rates between regions both in terms of absolute numbers and patterns of diagnosis. T3(1)
- There were differences in the distribution of abnormalities between round 1 and 2
- Rates of severe dysplasia remained constant
- Rates of CIS and invasive squamous cell cancer decreased in all regions. T4&5(1)
- Abnormality rates were found to increase with the degree of urbanisation. p864(1)

Ref 3 - data from a population-based case-control study in the region of Nijmegen city.

	% screened
Cases - 36 women with invasive cervical cancer	47
Controls - 130 age & marriage-matched women	68

	O.R. of getting invasive cervical cancer
≥ 1 screen cf. never screened	0.32 (0.12 - 0.80)
" adj. for age 1st intercourse	0.22 (0.07 - 0.69)
last smear 2-5 years ago	0.18 (0.05 - 0.62)
last smear > 5 years ago	0.30 (0.09 - 1.02)

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DOCUMENTS OBTAINED

Statistical reports in Dutch from the screening programs in Nijmegen, Rotterdam and Utrecht.