RECRUITMENT FOR CERVICAL CANCER SCREENING

A REVIEW OF THE LITERATURE

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INTRODUCTION

Invasive cancer of the uterine cervix is largely preventable, through the use of the Papanicolaou smear to detect pre-cancerous changes of the cervix, and appropriate management of the abnormalities detected. Despite this, cervical cancer is still an important problem in Australia, as each year approximately 350 women die from invasive cancer of the cervix and 1000 new cases are diagnosed. Both the incidence rates and mortality rates from cervical cancer in Australia are highest in women over 60 years of age. Cervical cancer is the sixth most common cancer among women in this country, and the lifetime risk of developing cervical cancer has been estimated to be one in 90. The probability of developing cervical cancer in the absence of screening has been estimated at one in 64.

Invasive cervical cancer may arise from squamous cells at the transformation zone in the cervix between squamous and columnar epithelium (squamous cell carcinoma) or in the endocervical columnar epithelium (adenocarcinoma). Squamous cell carcinomas constitute 80-85% of invasive cervical cancers, and adenocarcinomas 12-15%, with other rare forms 3-5%. Although adenocarcinoma can occasionally be detected on cervical smears, cervical smears are designed to detect changes in the squamous epithelium. This review will therefore focus on squamous cell carcinoma, and the term invasive cancer will be taken to refer to squamous cell carcinoma.

The examination of cells exfoliated from the uterine cervix by means of the Papanicolaou or cervical smear, in order to detect cellular abnormalities considered to be precursors of invasive squamous cell carcinoma, has been one of the most widely used and most well documented screening procedures in medicine. The usefulness of the Papanicolaou smear in preventing squamous cell carcinoma lies in the ability to detect cytological changes related to degrees of abnormality (sometimes referred to as Cervical Intra-epithelial Neoplasia - CIN) where undifferentiated neoplastic cells are present to varying degrees but do not invade the basement membrane. These cytological changes may be present and detectable for some years before invasive cancer develops.

Although never subjected to randomised controlled trials, the effectiveness of cervical screening has been well documented from observational studies. The evidence comes from ecological studies comparing trends in incidence and
mortality over time between countries or communities with varying intensities of screening, from cohort and from case-control studies.1, 6, 10-14

The best results in reducing morbidity and mortality from invasive cervical cancer have been in those countries and communities which have developed an organized approach to cervical screening and which have ensured that a high proportion of eligible women have been screened.1 These include the Nordic countries, Finland, Iceland and Sweden, British Columbia in Canada and Aberdeen in Scotland.11, 13, 15-19 In Iceland, for example, where there has been organized screening since 1969 and where since 1986 over 70% of eligible women have been adequately screened, there has been a 70% reduction in incidence of cervical cancer and 62% reduction in mortality since 1965.11

Studies from the International Agency for Research on Cancer show that three yearly screening has the potential to prevent 91% of cases of cervical cancer, 20 and evidence from the Nordic countries indicates that organized programs can achieve up to 80% protective effect at the population level in the age groups targeted for screening.6, 9, 11

It must be noted, however, that the burden of cervical cancer is influenced by changes in risk factors for cervical cancer as well as by the effectiveness of screening. Changes in sexual behaviour in recent years have been associated with increased rates of the disease among younger generations of women.21 22 The cohort effect of the ageing of these generations with increased rates of cervical cancer makes it unlikely that the striking reductions in incidence and mortality seen in some Nordic countries in the 1960's and 1970's will be achieved in other countries.23 Cox and Skegg have shown, in their projections of incidence and mortality from cervical cancer in New Zealand under various screening scenarios, that improved screening would lead to a reduction in the burden of cervical cancer, but if screening did not improve, both incidence and mortality from cervical cancer could increase substantially over the next 15 years.23 It is reasonable to apply similar arguments to the Australian situation.

The requirements for an effective organized cervical screening program have been outlined by a number of authorities.2, 6, 9, 24-27 They all include attention to comprehensive coverage of women at risk, as well as quality control for each component of what has been referred to as the 'screening pathway'.2 These components are: a means of identifying and reaching the target population (recruitment for screening); provision of acceptable and accessible services for taking cervical smears; high quality laboratory services for interpreting and
reporting on smears; diagnostic and treatment facilities to ensure appropriate management of women with abnormalities; and finally, provision for monitoring, evaluation and co-ordination of the whole program. An organized approach should also have the potential to reduce overuse of services.6

In Australia, as in the United Kingdom and the United States of America, the approach to cervical screening has, until recently, been largely opportunistic, in which women are invited for screening in the course of attendance at a health care facility for other reasons. There has been no organized system of inviting women. This has led to unnecessarily frequent screening of women at low risk and failure to reach women at higher risk.2 Nor has there been an organized approach to other components of screening, including quality control in smear taking and smear interpretation, follow-up of women with abnormalities or monitoring of the effects of screening.2

Of fundamental importance to the success of a cervical screening program is the ability of the program to identify and screen a high proportion of women at risk of cervical cancer. The effectiveness of cervical screening programs has been shown to be closely related to the proportion of eligible women who are actually screened, referred to as the 'coverage' of the target population.11, 13, 26, 28

Identification of the target population includes specifying which women are at risk, including the target age range, and the most appropriate screening interval. Considerable progress has been made in recent years in identification of risk factors for cervical cancer and its precursors. As with most cancers, age is an important risk factor, with both the incidence of and mortality from invasive cervical cancer increasing with age.2, 5, 9 The prevalence of precursor abnormalities is higher at younger ages however, indicating the potential for regression of minor abnormalities.29 The risk is increased among women who begin sexual intercourse at earlier ages, and who have had multiple sexual partners.30, 31 It is thought that the increased risk associated with certain sexual behaviour is related to infection with a sexually transmitted agent. There is now both experimental and epidemiological evidence that this agent is the human papillomavirus (HPV).30, 32, 33

While it is now widely accepted that human papillomavirus plays a important role in the causation of cervical cancer and the precursor abnormalities, 30, 32, 34 it should be noted that HPV is common among young women with normal cervical smears 35 and that a minority of cervical cancers are unrelated to HPV. Current research is aimed at the identification of other host factors or co-factors, as yet
undefined, that determine which women with HPV infection go on to develop cervical abnormalities.31

Although progress has been made in identifying risk factors for cervical cancer, this information is of limited value in formulating screening policies. Identification of risk factors related to sexual behaviour is difficult at a population level, and in any case experience with cervical screening programs has shown that undue emphasis on the sexually transmitted aspects has adverse consequences for recruitment of women for screening. Furthermore, it has been argued that selective screening on the basis of risk factors is inappropriate because the risk groups are difficult to identify and those identifiable are either too large or have too low a level of increased risk.9, 36, 37

The most important risk factor to be considered in formulating screening policies is age. The most recent recommendations of the International Union Against Cancer project on the evaluation of screening for cancer are for screening of women from 25 to 60 years,6 but others have argued for the inclusion of older women.38 Paul et al have argued for beginning screening at an age shortly before the age at which the first cases of invasive cancer occur, and an age for concluding screening based on the expected duration of protection afforded by a negative smear and the life expectancy of women.39 Thus, recent recommendations for screening in New Zealand and in Australia target women between the ages of 20 and 70 years, with the proviso that older women who have never had a smear should do so.3, 39 Recent research has suggested that it may be possible to cease screening as low as 50 years for women with previously normal smears, but the evidence is not conclusive.40

With respect to the screening interval, evidence from the International Agency for Research on Cancer, as stated above, indicates that screening every three years gives 91% reduction in the risk of invasive cancer, compared with 93% reduction for the far more costly annual screening.41 While some countries such as Finland and Sweden have had successful organized programs based on a five year screening interval, it should be noted that most smears in these countries (70-80%) are taken outside the organized program.11, 18, 26 In Australia, bearing in mind the limitations associated with not having an organized screening program, the current recommendation is for two yearly screening of all women aged 20 to 70 years of age with an intact uterus.3 Women who have undergone total hysterectomy for benign conditions do not need to be screened.39 Women who have never had sexual intercourse have a very low risk of cervical cancer, but it is not generally
possible to define this group on a population basis. There is no evidence that those with behavioural risk factors experience a more rapidly progressive pre-clinical phase of the disease, and so there is no justification for screening such women more frequently.39

Once screening policy with respect to women's eligibility is agreed upon, the next step in an organized approach to screening is the adoption of strategies to ensure that a high proportion of eligible women are screened.1

Before considering specific strategies to ensure the maximal uptake of cervical screening, this literature review examines some of the issues connected with the measurement of the screening coverage of the target population, and then reviews demographic, social, psychological and medical care factors which affect participation in screening.

Strategies for increasing the uptake of screening may be broadly classified into those concerned with individualized invitations to women in the target population and those concerned with improving opportunistic screening. The review considers each type of strategy, the methods of implementation for each and the evidence for their effectiveness. This is followed by an examination of the requirements for screening services acceptable to women, since these are related to the success of both types of strategies. Finally evidence about the effectiveness of community-based and media strategies for the promotion of cervical screening is reviewed.

MEASURING THE COVERAGE OF THE TARGET POPULATION

The term 'coverage' of the target population refers to the proportion of women in the population at risk of cervical cancer who have been screened within a particular time period, such as three years. Although often referred to as 'screening rates' or 'Pap smear rates', measures of coverage are usually proportions. For screening programs which include a population-based register linked to cytology results, the true rate of screening can be calculated. Otherwise, the extent of coverage can only be estimated by self-reported Pap smear history or by monitoring the number of smears done for a defined population over a certain period of time. Each of these methods has its limitations.
Estimating the target population

The target population for cervical screening in Australia is women aged 20 to 70 years with an intact uterus. Older women who have not been screened may be offered screening on an individual basis, but their uptake of screening is generally not included in overall measures of screening coverage.

The denominator for the target population of eligible women is usually based on census data. Apart from those who have undergone hysterectomy for cervical neoplasia, women who have had total hysterectomies do not need to be screened. Thus calculations of screening coverage need to take this into account by removing women who have undergone hysterectomy from the target population.

Studies involving self-report of screening history typically rely on self-report of hysterectomy to exclude ineligible women, although the reliability of this information has not been studied. For studies involving the review of cytology registry, laboratory or health insurance records, estimates of the proportion of women with an intact uterus have been made. Most of the Australian studies have used the estimates calculated by Holman and Armstrong. These authors calculated the proportion of women with an intact uterus by using age-specific hysterectomy rates in Western Australia from 1972-84, and by extrapolating the trend between 1972 and 1978 to previous years. Because of changing trends in hysterectomy, this method tends to underestimate the proportion of older women with an intact uterus. Dickinson and Hill used 1983 NSW hysterectomy rates as the basis for their calculations of the age specific prevalence of having an intact uterus. More recent data from the Australian Health Survey, based on self-report, puts the proportion of women aged 50-64 years with an intact uterus at approximately 90%, compared with the 80% estimated by Holman and Armstrong, and the 75% estimated by Dickinson and Hill.

Prevalence of adequate screening based on self-report

The adequacy of cervical screening in populations has frequently been estimated by means of surveys in which women are asked directly for the time since their last Pap smear. Problems with the reliability of self-report of smear history, as well as low response rates in many such surveys, limit the value of this approach. The issue of the accuracy of self-report is crucial to the assessment of the adequacy of screening coverage and will be discussed in some detail.

A number of studies have attempted to validate women's self-report of their Pap smear history by comparing women's responses with clinical medical records or
laboratory records. These studies have shown that there is a great discrepancy between the sensitivity of self-report, which is the proportion of women who have had a smear in the three year time period who correctly report that they have done so, and the specificity, which is the proportion of women who have not had a smear in the three year time period who correctly report that they have not done so. In the studies referred to above, the sensitivity of self-report was 95% or more. In other words, 95% of women who have been screened do report correctly that they have done so. On the other hand, the specificity was 55% or less, meaning that only 55% of those who have not had a smear correctly report that they have not.

An alternative way of looking at the accuracy of self-report is to calculate the positive predictive value of a report of a recent smear, i.e. the proportion of women who say that they have had a smear in whom there is confirmation in records. For those studies which provide this measure, or data from which it can be calculated, the range is from 75% to 85%.  

Women tend to underestimate the time since their last smear, a phenomenon referred to as 'telescoping'. The longer the time interval under consideration, the more likely women are to say that they have been screened when they have not. Apart from the phenomenon of telescoping, reasons for the inaccuracy of self-report may be the tendency to offer a socially desirable response, and genuine lack of knowledge on the part of the woman as to whether or not she has had a Pap smear.

The frequent underestimation of the time since the last smear has implications for monitoring of cervical screening in the population, as well as for making decisions in a clinical setting about taking a Pap smear. Estimates of the coverage of the target population based on self-report must be considered as overestimates by 10-20%, depending on the setting. For example, in the study by Bowman et al, the proportion of women screened in the previous three years was 75% based on self-report, but only 62% based on the review of pathology records. If only half of the women who have not had a smear in the previous three years correctly report that they have not done so (specificity of self-report of 50%), then reliance on self-report in clinical decision-making and in targeting women for recruitment strategies means that half of those who actually need a smear may not be offered one.

The results of studies based on self-reported screening history will now be reviewed. A number of community health surveys in Australia (both published
and unpublished) have included questions on cervical screening and have been reported in a Compendium of Behavioural Risk Factors for Australia. The figures for the prevalence of having been screened in the past three years ranged from 59% for one national household survey of women over 16 years, to 75% for a household survey of women aged 18 to 70 years in the greater Newcastle area. In one study of patients attending selected general practices in the Newcastle area, only 55% reported having been screened in the previous three years, but the sample is unlikely to have been representative of the general population.

In a telephone survey of women in Kalgoorlie and Boulder in Western Australia in 1990, 60% reported having had a Pap smear in the previous 12 months and a further 15% one to two years previously. Only 7% said they had never had a Pap smear. The women in this survey may not have been representative of the women in these townships, which include a large transient population, many living in caravan parks, and without telephone coverage.

The most recent Australian data comes from the 1989-90 Australian Health Survey, conducted by the Australian Bureau of Statistics, in which 86% of women aged 20-64 reported that they had ever had a Pap smear, 42% said that they had been screened in the past 12 months and 71% said that they had been screened in the past 3 years. It should be noted, however, that no adjustment was made for hysterectomy. For all of these studies the overall proportion screened masks great variations by age, and this is discussed in a later section.

A New Zealand household survey in 1990 showed a high proportion of women screened in the previous three years (77%), a figure which increased to 82% when adjustment was made for hysterectomy. This survey was subject to an unknown degree of selection bias, because the sampling method involved replacement and the true response rate could not be calculated.

Surveys from the United States have shown similar coverage, with over 90% of women reporting that they had ever been screened, and 65% screened in a three year period. All of these figures are likely to be over-estimates, due to the limitations of self-report referred to above.

While these overall figures for prevalence of adequate screening appear high, there are marked variations by age and ethnic group as well as other factors, as will be shown later.
Prevalence of adequate screening based on records

Studies determining the numbers of Pap smears actually being done, or preferably the number of women screened, over a particular period of time, can provide useful information about screening coverage if they can be related to a defined population. The information most often comes from pathology records or from health insurance claims. The usefulness of the figures obtained is limited by the fact that cervical screening is not evenly distributed among the population at risk; some women have smears more frequently than necessary, while others are not screened at all. There are also difficulties, as outlined earlier, in identifying the number of women who have undergone hysterectomy and therefore the size of the population at risk of cervical cancer over the period covered by the estimates.

McCormac et al reported on all smears processed at the Queen Elizabeth Hospital in Adelaide from 1959-82. They found only an average of 1.8 Pap smears per woman during the 23-year study period, compared with average of 4.1 smears over the period, which would have been expected if women had undergone three-yearly screening and if new patients had entered the programme at the same rate over the period of study. Unfortunately age-specific data were not available, and the study is limited by the fact that it was not population-based, since the laboratory processed only a third of all Pap smears in South Australia, and women could have had smears processed by other laboratories.

In 1983 Armstrong et al examined laboratory records for all Pap smears taken in Western Australia during an eight week period. The overall rate of screening was 210 per 1000 woman-years, equivalent to 21% of all women aged 15 years and over being screened in one year. These figures are clearly much lower than those generated by self-report, but the inclusion of women aged 15-19 and women over 70 years, who have low rates of screening, contributed to the low overall rate.

This study was repeated in 1992, examining records for all Pap smears taken in Western Australia during a one month period. The overall rate of screening was found to be 303 per 1000 woman-years for all women over 15 years estimated to have an intact uterus, an increase of 44% since the 1983 study. For women in the target age range of 20 to 69 years, and with an intact uterus, the estimated annual rate of screening was 372 per 1000 women, or 37% of all eligible women screened in one year. It was not possible, from these data, to calculate how many women had been screened at least once in a two or three year period.

Using data from the Australian Health Insurance Commission, and adjusting for the estimated fraction of women with an intact uterus, it has been calculated that
62% of Australian women were screened at least once in the three year interval 1987-89 and 50% in the two-year interval 1988-89.²

These figures are lower than those found in Manitoba, Canada, also using records from universal health insurance.⁶³ Over a 15 year period from 1970 to 1984, 91% of women who were aged 35 to 64 years in 1982 had been screened at least once, and 78% had had three or more Pap smears.⁶³

Scandinavian countries with population registers and organized screening programs can provide more accurate statistics for the uptake of screening. For example, over a 10 year period, over 90% of women aged 30 to 59 years in three Swedish counties were screened.⁶⁴ In Iceland in 1991, 94% of women at risk had been screened at least once since 1964, and 80% had been screened in the previous three years.¹¹

Results presented so far for the prevalence of adequate screening and for rates of screening are summary rates for the target population as a whole. In order to plan strategies for increasing the uptake of cervical screening among eligible women, we need to look at participation in screening among different groups of women with different characteristics, and to consider the many different factors which affect participation.

FACTORS AFFECTING PARTICIPATION IN CERVICAL CANCER SCREENING

The factors related to the uptake of cervical screening have been investigated in studies of a number of different groups of women. They include studies of women from the general population ⁶², ⁶⁵-⁶⁷ studies of general practice patients,⁵³, ⁶⁸ surveys of cases and controls in case control studies of cervical cancer, ⁶⁹ and surveys of attenders and non-attenders in response to invitations for screening.⁷⁰-⁷²

The factors under consideration in these studies may be classified as demographic characteristics, social and psychological factors, and medical care variables.

Demographic characteristics

From comparisons of screened women either with census data or with those not being screened, the demographic characteristics which have been shown to be related to cervical screening include age, marital status, education and socioeconomic status.
All studies, whether based on self-report, health insurance records or medical records, have shown considerable variation in the adequacy of screening by age, with the lowest prevalence being found among older women, particularly those over 50 years of age. In Western Australia in 1992, the highest proportion of women screened in one year was 45% for women aged 25 to 34 years old, and this compared with 14% for women aged 60-64 years, and 9% for women aged 65-69 years. These differences persisted even when adjustment was made for hysterectomy.

Similarly low rates for older women have been shown in Victoria and for Australia as a whole. Figures from the Victorian Cytology Registry for 1991, also adjusted for hysterectomy, show a peak at 30-39 years with 45% of women in this age group screened in a one year period, compared with only 18% of women aged 60-69. Information from the Australian Health Insurance Commission shows similar results. In the three year interval 1987-89, 62% of women aged 20-69 had been screened at least once, with the proportion varying from 74% in the 30-39 year age group to 25% in the 60-69 year age group. These are similar to figures for New South Wales also based on Health Insurance Commission data, i.e. 70% and 30% respectively for the same age groups.

Time trends in age-specific screening rates are also of interest. Comparison of the 1992 age-specific screening rates in Western Australia with those found in the earlier 1983 survey, showed increases in all age groups with the most dramatic increases being in women over 50 years, where percentage increases of 90% to 127% were recorded. The rates for older women were still very low, however, as shown earlier. These increases among older women, from 1983 to 1992, are in contrast to the marked decline in screening rates for older women over the period 1971-86, found in an earlier Victorian study of age trends in Pap smear coverage. The differences may be due to the different time period under consideration; it is possible that recent efforts to increase participation by older women are beginning to have an effect.

Similar variation by age has been found in the studies of self-reported Pap smear status referred to earlier. In the 1990-91 Australian Health Survey, 86% of women in the 25 to 34 age group said they had been screened in the past three years, compared with 46% of women aged 55 to 64 years. While all of the estimates based on self-report are likely to be overestimates, this would not explain the age differences, as there are unlikely to be major age differences in the accuracy of self-report.
Other demographic characteristics which have been shown to be related to the adequacy of cervical screening include marital status, education, socioeconomic status, race and geographical location, with underscreened women more likely to be single, less well-educated, of lower socioeconomic status, living in rural and remote areas, or non-white. In Western Australia in 1983, Armstrong et al. found deficiencies in coverage among rural women and women of lower socioeconomic status. This significantly lower rate for rural women was confirmed in the 1992 WA survey, although the differences by socioeconomic status in 1992 were not statistically significant. Low rates among women in rural and remote areas have also been found in Canada. In addition, various pilot projects in Australia found a low prevalence of screening among Aboriginal women.

Using information from the Australian Health Insurance Commission for NSW and the ACT, Shelley et al. found that women of lower socioeconomic status and women of non-English speaking background were less likely to be screened, but that the strongest predictor was the use of medical care. Similar relationships between adequacy of screening and age and social class have been found in Britain.

A number of the large American studies have used multivariate analysis to examine the effect of different social and demographic variables on compliance with screening recommendations. Howe and Bzduch found that important predictors of screening were age, education and marital status, with older women, less educated women and widows less likely to have been screened. The most important predictors of recency of having had a Pap smear were factors related to the use of medical services, but overall their model accounted for only 30% of the variance in compliance with screening.

Howe claims that demographic variables are often used as proxy measures for factors which are more difficult to conceptualize or measure, such as embarrassment, fear and lack of access to medical care, and this has been borne out by studies in which demographic characteristics such as income and education were found not to be independent predictors of screening after more specific factors were accounted for.

In summary, the lowest rates of attendance for screening have been found to be among older women, women not currently married, women with less education, of lower socio-economic status and, in the US studies, women of non-English speaking background. There is insufficient information about screening coverage.

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for women of non-English speaking background in Australia. These findings have
important implications for the conduct of screening programs.

Most of the studies reported in this section have been carried out in countries such
as the United Kingdom, Australia and the United States which, at the time when
these studies were conducted, made use of opportunistic screening rather than
individual invitations. There is some evidence that the social class effects can be
overcome by specifically inviting women to be screened.\textsuperscript{80} In the Nordic
countries which have organized call and recall systems, the results of studies of
the response of women to invitations conducted are difficult to interpret because
of the relative infrequency of the reminders (every four or five years), and the fact
that many of those not participating in the organized program are screened
regularly outside of the program.\textsuperscript{10, 18, 81} In Sweden, younger and better-educated
women were less likely to attend in response to an invitation, but two thirds of
non-participants gave reasons indicating that they had attended elsewhere.\textsuperscript{81} The
response to individual invitations will be discussed in detail in a later section.

Social and psychological factors
Examination of demographic characteristics, while defining which groups of
women are not being reached, and indicating target groups for educational and
other programs, does not explain why some women choose to have cervical
smears taken and some do not. Apart from the (presumably few) occasions where
a woman has a Pap smear taken without her knowledge, the process of having a
smear requires a conscious decision on the part of the woman, either to request a
smear or to respond to a mailed invitation or a recommendation from her doctor.
The beliefs and attitudes which may affect decision-making about health
behaviour, including cervical screening, have been studied in some detail, and
various models have been proposed. These models are outlined below.

Models of health behaviour
The model most often used to account for health behaviour is the Health Belief
Model developed by Rosenstock and others in the 1960's.\textsuperscript{82-84} In terms of the
Health Belief Model, the likelihood of a woman taking the action of having a
cervical smear is a function of the perceived threat to her of developing cervical
cancer (composed of her perception of her susceptibility to the disease and of the
seriousness of the disease), and the balance between the perceived benefits to her
of having a smear and the barriers (psychological, practical and financial) to her
obtaining one.\textsuperscript{83} Other factors which have been included in the model are the
'modifying' variables of demographic and social factors and various 'cues to action' which may trigger action in a person who is ready. Another variable, 'motivation for health' or the salience of health for that person was added to the model later by Kirscht. In terms of preventive health behaviour, the variables of 'perceived barriers' and 'perceived susceptibility' are said to be the most important predictors.

The Health Belief Model has been criticized on a number of grounds. It has been shown that the variables in the model account for only a small proportion of the variance in actual behaviour. Recent US studies have shown that components of the Health Belief Model, such as perceived benefits and susceptibility to cervical cancer, did not predict participation in screening for older minority women.

In addition, in most instances the 'predictors' of the health behaviour of interest have been measured at the same time as the behaviour, and so it is not clear whether the so-called beliefs pre-dated the behaviour. Gillam has suggested that the Health Belief Model has isolated the woman's decision to consult from her ongoing relationship with her doctor.

In spite of these drawbacks, however, the model provides a useful framework for considering the social and psychological factors affecting the uptake of cervical screening.

The Theory of Reasoned Action, postulated by Fishbein and Ajzen, is another model which has been used in an attempt to explain and predict preventive health behaviour. This model states that behaviour is predicted by a person's intention to perform the behaviour. Intention is itself determined by attitude to the behaviour and subjective norms about the behaviour. Attitude is a function of the expected outcomes of a behaviour weighted by the importance of those outcomes to the person. Subjective norms are a function of the person's perceptions of the expectations of significant others weighted by the person's motivation to conform to those expectations. Intention also is seen to take into account barriers to the behaviour, to the extent that the person is aware of them.

Hill et al, in a study of women in Victoria, investigated the relevance of the Health Belief Model and the Theory of Reasoned Action in predicting women's intention to undergo regular Pap smears. They found that the Theory of Reasoned Action predicted 26% of Pap smear intention and the Health Belief Model 30%, and that the components of the Health Belief Model which were significant were 'perceived
susceptibility' and 'perceived barriers'. They suggested a composite model which
takes into account a person's perceived barriers as well as their attitude and
subjective norms. However, they noted that none of the models accounted for a
large proportion of the variance in subjects' intentions to have a Pap smear.67
Support for the Theory of Reasoned Action comes from a recent US study of
elderly women in which stated intent was the only variable which predicted
compliance with cervical screening.89

Bowling has argued that the difficulty of predicting response from the various
models of health behaviour indicates that a personal approach is needed, tailored
to the needs of the individual.88

The pre-requisites for regular cervical screening behaviour outlined by Eardley,
which contain components of the Health Belief Model, provide a useful starting
point for considering the social and psychological factors affecting uptake of
cervical screening.80

Not only must a woman know of the test's existence, she must also
have some positive concept of its function and a belief both in its
efficacy and its relevance to her. She must find the prospect of the
test itself and its implications acceptable. Finally she must know
where to obtain a test, and the venue and its system of operation
must be acceptable to her.80 p.958

The relevant areas to be considered are therefore a woman's knowledge of the test
and its function; her belief in the efficacy of screening; and the various barriers to
screening which are concerned with the logistics or practical difficulties of
obtaining a test, with the examination itself, and with the implications of the
result.

Knowledge
In order to appreciate the benefits of cervical screening, women need to know of
the existence of the Pap smear and its purpose. To understand their own
susceptibility, they need to know which women need a Pap smear and how often.
Practical knowledge related to access to screening services, such as where to go to
be screened, will be discussed under logistic barriers in a later section.

Awareness of the Pap smear and its function
Recent Australian and New Zealand surveys have shown that over 90% of women
in both general practice and community settings are aware of the Pap smear.54, 66,
68, 94, 95 For more specific knowledge, the findings of these surveys depend partly
on whether the women are asked open questions without any prompting, or
whether they are required to choose from alternatives. For example, in response to an open question, 91% of women in a general practice survey in Perth knew that the Pap smear was some kind of gynaecological examination, but only 36% knew that it was taken from the cervix. In a community survey of older women in rural Victoria, 90% knew that the test was related to cancer and in response to an unprompted question two thirds mentioned the cervix. In a NSW community survey, 96% had heard of a Pap smear, 60% knew that it was related to cervical cancer and 30% to cancer of the uterus or unspecified reproductive organs. In the study of women in Kalgoorlie in Western Australia, 85% knew that the Pap smear was related to cancer of the cervix. In a New Zealand general practice study 19% of Maori women and 3% of European women did not know what a cervical smear test was. In all of these studies women may have over-reported their knowledge, so as not to appear ignorant.

Thus most recent research has shown a relatively high level of knowledge among women of the existence of cervical screening. There is, however, less understanding of the role of the cervical smear in detecting pre-cancerous lesions and thus in preventing invasive cervical cancer. When asked about the purpose of the Pap smear, less than 15% of women in Perth said that the Pap smear could detect pre-cancerous changes, while 80% said that it could detect cancer. In Victoria, comparing women who had not been screened for more than two years ('overdue') with those who were up-to-date with screening, 5% of those overdue for screening said that the test could detect a 'change in cells' (implying prevention of cancer), compared with 15% of those who were up-to-date with screening. Only 11% of women in a survey in a deprived part of London said that the cervical smear could prevent cancer. By contrast, in a community survey in New South Wales, when women were asked whether the Pap smear could detect changes before they became early cancer, 81% agreed, indicating the difference between prompted and unprompted responses. In the study by Peters in the United States, knowing the purpose of the Pap smear was significantly associated with compliance with screening. For example only 44% of those never screened knew the purpose of the Pap smear, compared with 91% of those who had had two or more verified smears in a five year period.

Apart from the findings of these latter two studies, women's knowledge of the preventive function of the Pap smear in detecting pre-cancerous changes has been shown to be quite low. It is arguable whether the subtle distinction between prevention and early detection is really meaningful for women. Certainly women with abnormal smears interviewed by Posner in 1988 thought they had had a
'brush with cancer'. A recent British study found that 61% of women who received a computerized letter saying that they had abnormal smears believed that they had cancer, 44% of a group of women in a community survey in the North of England, all of whom had been screened, thought that a positive Pap smear meant cancer. Although the test operates mainly by detecting pre-cancerous changes, the health education message that Pap smears prevent cervical cancer is clearly not true for those women whose Pap smear detects more advanced disease. Shelley has questioned the wisdom of trying to change public perception on this point. The results of a cancer education program in Oxford illustrate the difficulty of trying to get the 'prevention' message across. Before the educational program, 50% of women thought that cancer of the cervix was preventable; this proportion increased to 86% after the program, but declined to 39% one year later. At one year there was no significant difference between the group receiving the educational program and a control group in the proportion who thought that cervical cancer was preventable.

Knowledge of who needs a Pap smear and how often
In order to appreciate the relevance of cervical screening to her personally, a woman also needs to know which women need screening and the appropriate screening interval. If there is an efficient reminder system, knowledge of the appropriate screening interval is not so crucial. Gordon and Fatovich found that while 80% of women knew that women should be screened at least every three years, 10% did not know who should have Pap smears and 15% thought that only women who were currently sexually active should have smears. Most of the Victorian women surveyed by Cockburn et al thought that women should be screened annually or two-yearly. Factors which discriminated between those who were overdue and those who were up-to-date with screening were not knowing when to start screening, believing that the screening interval was three years or more, and believing that 'it doesn't matter if you go an extra year or two between tests'. In addition, compared with women adequately screened, significantly fewer women who were overdue thought that the tests were important for women over 40, and fewer thought that women should not stop having the test. Clearly, in this group of older rural women, lack of the relevant knowledge was associated with being inadequately screened.

In the NSW survey, 82% of women nominated a screening interval of one to three years, but only 38% knew when women should start having smears and 60% when they should stop. Almost a fifth of the women thought that women could stop having smears after the menopause, and a quarter agreed with the statement that
'an extra year or two doesn't matter'. In a study in rural Western Australia, 12% of women overdue for a smear thought that the test was 'unnecessary'.

Belief in the efficacy of screening
Beliefs about the efficacy of cervical cancer screening are related to the 'perceived benefits' of screening referred to in the Health Belief Model.

In the NSW survey referred to earlier, 96% of women agreed that it was very important to have Pap smears regularly. In Victoria, 98% of those up-to-date with screening thought that regular tests were important, compared with only 79% of those overdue. For both groups of women, over 80% had confidence in the accuracy of the test. While the question did not relate directly to the issue of early detection, half of the women surveyed in Kalgoorlie, WA, thought that cancer of the cervix was possibly curable, and another one third thought that it was definitely curable.

In one early American study, Kegeles et al found, for all education and income groups, that beliefs which differentiated those who did and did not have cervical screening were a belief in value of early detection and a belief in the efficacy of professional detection rather than waiting for symptoms. In the recent US National Health Interview Study women who agreed with the statement that they could do very little to reduce their chances of cancer were less likely to have been screened within the previous three years than those who disagreed.

In the study by Hill et al, the belief that 'having a Pap smear means that any cancer found is likely to be curable' was not strongly correlated with intention to have a Pap smear (r=0.18) although the correlation was significantly different from zero(p<0.05). There was a stronger correlation for belief in the ability of the test to detect cancer in the early stages (r=0.29, p<0.01).

Barriers to screening
In considering the barriers to cervical screening it is important to bear in mind the limitations of surveys which simply ask women for reasons why they have not been screened. As Hunt and McLeod have commented, people tend to give the 'culturally normative or socially acceptable version of events or answer to a question'. In the US National Health Interview Study, almost half of the women gave as a reason for not being screened, the fact that they had been 'putting it off'. This and similar responses such as 'didn't get around to it' or 'didn't have time' may mask more deep-seated underlying reasons. Support for this view is
given in studies in which women have been asked why others don't attend for tests.\textsuperscript{104-106} In an early study in Manchester 70\% of women said that others did not have the test because of fear and modesty, while only 6\% gave this as a reason for themselves.\textsuperscript{105} Lack of time was the most common reason given by women as to why they themselves did not attend. As Shelley has pointed out, the constraint of 'lack of time' is itself likely to be a measure of the priority a woman gives to the test, in the face of other demands on her time.\textsuperscript{100}

As part of a case control study in Los Angeles, Peters et al attempted a more in-depth exploration of the barriers to screening by obtaining the information through semi-structured interviews.\textsuperscript{69} Women were assured that other women found difficulty in having regular Pap smears and then were asked why they had found it difficult over the previous five years. The answers were recorded verbatim and coded into five groups of barriers: \textit{cognitive} barriers related to lack of knowledge about the test and its purpose; \textit{emotional} barriers related both to embarrassment and dislike of vaginal examinations and fear of finding something wrong; \textit{economic} barriers related to shortage of time and/or money; \textit{logistic} barriers concerned with difficulties with the process of arranging screening and difficulty remembering to attend for screening; and \textit{social} barriers related to the views of other people, including the woman's doctor and significant others. Except for the cognitive barriers which have already been considered, this classification will be used as a framework for reviewing the relevant literature. In the study by Peters et al, the effect of the different types of barriers on compliance with screening was examined using ordinal logistic regression.\textsuperscript{69} Subjects were divided into five categories depending on their cervical screening history over the past five years and whether the Pap smears they reported were able to be verified from records. The categories ranged from 'never previously screened' to 'two or more verified smears in the 5 year time period'.\textsuperscript{69}

\textbf{Emotional barriers}

Peters et al described two groups of emotional barriers, which they refer to as 'fear' (fear of embarrassment, fear of the result) and 'hate' (dislike of pelvic examination).\textsuperscript{69} This appears to be an arbitrary distinction, and for the purpose of this review the emotional barriers will be divided into those associated with the examination itself and those related to the implications of the test and its association with cancer.
Dislike of vaginal examination
Given the intimate nature of the examination, it is not surprising that embarrassment at having a vaginal examination has been shown to be an important barrier discouraging women from having a Pap smear.\textsuperscript{66, 67, 69, 105, 1971, 106} The gynaecological examination has been referred to as an 'extreme invasion of personal space.'\textsuperscript{107}

"The pelvic exam is one of the most common anxiety producing medical procedures: it is certainly physically uncomfortable, embarrassing for some, and the nature of the . . . position strikes directly against traditional values such as modesty and respectability."\textsuperscript{108} p.75

In Peters' study, 'fear', which included both fear of embarrassment and fear of finding something wrong, was significantly negatively associated with compliance with screening. The largest component of this variable was fear of embarrassment (64%).\textsuperscript{69} Hill \textit{et al} found that the barriers of embarrassment, the indignity of the examination and the discomfort of the examination were significantly related to past screening behaviour and intention to have regular Pap smears in the future.\textsuperscript{67} In the study of older women in Victoria by Cockburn \textit{et al}, women overdue for screening were significantly more likely to be embarrassed about having a Pap smear than those who were up-to-date. More than one third of those who were overdue said embarrassment actually stopped them from having a Pap smear.\textsuperscript{66} In Shelley's NSW study, a quarter of women said that Pap smears were too uncomfortable and embarrassing to have regularly, but that study was not able to evaluate the relationship between responses to the questions and screening status.\textsuperscript{94}

British studies of non-attenders in response to invitations for screening have found embarrassment about having the test and the unacceptability of a male doctor to be important reasons for refusal of invitations.\textsuperscript{71, 106, Nathoo, 1988 #1438} Preferences for female smear-takers will be discussed later under the heading of 'acceptable services'.

Fear of cancer
Fear that the result of the Pap smear might show cancer has been described as a barrier to screening. Interestingly, it appears to be a reason which women are willing to attribute to other women, but are less willing to admit to themselves. For example in one English study, one third of women suggested that fear of cancer was the primary reason that other women did not have a Pap smear, but for themselves cited such reasons as being too busy.\textsuperscript{109} Fear and modesty have
frequently been attributed as barriers for other women, while women have given more 'socially acceptable' reasons, such as lack of time, for their own failure to be screened.\textsuperscript{104, 105}

In the study of Cockburn \textit{et al}, over 80\% of women said that fear of finding something wrong was not a problem at all, but 9\% of those overdue for screening said that this fear stopped them from having a test, compared with 2\% of those who were up-to-date. This variable was not significant in predicting screening status, however.\textsuperscript{66} In the Los Angeles study by Peters \textit{et al}, fear was a significant predictor of compliance with screening but, as indicated earlier, fear of embarrassment was combined in this study with fear of finding something wrong.\textsuperscript{69} Only 18\% of responses in this category related to fear of the result. Hill \textit{et al} found that fear of the result of the test was significantly negatively correlated both with past screening behaviour and with future intention to have regular Pap smears.\textsuperscript{67}

The issues of fear and fatalism as a barrier to cervical screening have been said to be more important in women of lower socioeconomic status, although there is little direct evidence on this point. It has been argued that communities experiencing poverty develop a sense of powerlessness and fatalism, incompatible with taking preventive measures, which imply orientation towards the future.\textsuperscript{88, 110} Blaxter noted that women living in poverty were in circumstances which made care of one's own health impossible.\textsuperscript{111} Amongst these women cancer was dreaded, and there was a feeling that merely to talk about it (and presumably to attend for screening) would invoke it. Hulka noted that the 'hard to reach' group of women includes those 'for whom the immediate problems of living are so overwhelming that the subtleties of disease prevention are insignificant.'\textsuperscript{112} p. 1012

Interestingly, while fear and fatalism were the main reactions to the idea of cancer found among black women in North Carolina, there was at the same time a motivation for women to take care of their own health, not for their own sake, but for the sake of being able to fulfil their family roles as mothers or grandmothers.\textsuperscript{113}

**Social barriers**

The social barriers referred to by Peters \textit{et al} include the objections of significant others in a woman's life, as well as the failure of her doctor to recommend screening.\textsuperscript{69} These social barriers were significant predictors of compliance with screening, although it was not possible to determine the relative contribution of the doctor and other people to this variable. In line with the Theory of Reasoned
Action, Hill et al found that the views of others who were important to the woman (subjective norms) were important in predicting Pap smear intention. Anecdotal evidence of the importance of daughters and daughters-in-law in persuading older women has been provided by Brett.

The importance of the doctor's suggestion has been shown in other studies. In New Zealand, 17% of women gave as a reason for not being screened the fact that the doctor did not suggest it. Women overdue for screening were more likely to rely on their doctor to suggest the test, than those who were up-to-date. In a London survey, 8% of unscreened women had not had Pap smears because nobody had advised them to do so, and 15% of women overall said that more encouragement from health professionals would make women more likely to be screened. In the most recent study from North-East Scotland, a region where fewer than 10% of women aged 21-60 are unscreened, the main reason given by women with invasive cancer as to why they had never been screened was that they had never specifically been invited.

Nicoll found in Scotland that 84% of women overdue for repeat screening and 64% of women who had never been screened, gave one or more of the following reasons 'didn't know I needed it', 'not got around to it' and 'nobody asked me' as reasons for not being screened. The major reasons for non-use of both Pap smears and mammography given by elderly black women in the United States were that the physician had not recommended them or that the woman did not know she needed them.

Economic and logistic barriers

The economic barriers referred to by Peters included lack of time as well as lack of money. These did not, however, predict compliance with screening once other factors were taken into account. However, two other United States studies suggest that economic barriers do play a role in that country, since those with private health insurance and those in pre-paid health plans were more likely to be up-to-date with screening. In a study of black women in North Carolina, competing financial obligations and difficulties with transportation were the most common reasons given for not obtaining routine health care such as Pap smears, but these findings were not related to women's screening status.

There has been little research in Australia on cost barriers to screening, although Hill et al found that the 'doctor's fee' was a significant barrier related both to intention and past behaviour. Cockburn found that women not in paid work
were more likely to be overdue for screening, but this did not affect screening status when other factors were taken into account.66

The emphasis in research on cervical screening is shifting from descriptions of the characteristics of unscreened women, to an examination of logistic or organizational barriers which prevent women being screened, with more emphasis being placed on the initiation of the service by the provider and ways of making it easier for women to have access to smear-taking services.80

The logistic difficulties in obtaining a Pap smear should not be underestimated. As Kegeles has pointed out:

when the woman obtains a Pap test on her own initiative, fairly elaborate chains of subsidiary actions are involved. For example, she must be aware of and recall the need for such screening, locate the appropriate health service, make an appointment, perhaps engage a baby-sitter or request time off from work, arrange transportation, remember the appointment, go and obtain the test, pay for the service, and repeat the entire chain at appropriate self-monitored intervals.116 p.1050

The logistic barriers described by Peters et al (problems with transport, child care, having nowhere to go for a Pap smear, the difficulty of getting an appointment, or difficulty remembering) did not independently predict compliance with screening.69 Some of these barriers are economic, and have been used to explain social class differences in the use of health services, including cervical screening. For example, it has been argued that people on low incomes may incur greater costs, as they may be dependent on public transport, have further to go to health facilities and may be in employment in which they lose pay when they have to take time off work.88 In Victoria, women who were overdue for screening were more likely to state that they were too busy, although as the authors have pointed out, this may be a rationalization.66

In NSW, Shelley et al found that 98% of women in their community sample were certain of at least one place to go for a Pap smear, but only 30% knew that women could have Pap smears at alternative services such as the Family Planning Association or women's health centres.94 Since these services are usually staffed by women, such knowledge would be important to those women for whom embarrassment is a major barrier. In Cockburn's study in rural Victoria there was little difference between women overdue and women up-to-date with screening in knowledge of where to go for the test, and most women knew that they could go to the local doctor.66

23
Medical care variables

Source of medical care
Some of the barriers described above may be overcome by access to a regular source of medical care. A number of studies have shown the importance of variables concerned with medical care in predicting the use of cervical screening. Having a regular source of medical care has been shown to be an important predictor of the adequacy of screening in the United States.58, 69, 78

Shelley found in NSW that the strongest predictor of whether a woman had been screened over a three year period was the frequency with which she consulted a general practitioner.65 Those with the lowest screening rates were those who consulted a general practitioner less than once a year on average.

The way in which having a regular source of medical care operates to increase participation in screening has not been elucidated, but presumably there are several factors involved. As Howe and Bzduch have indicated, attendance at a doctor for examinations increases the opportunity for educating women about cervical smears and for smear taking.78 Presumably women with a regular doctor are more likely to know that they can be screened by that doctor, and are more likely to be invited to be screened by that doctor, thus overcoming some of the barriers outlined above.

Sex of medical practitioner
Another key medical care variable is the sex of the general practitioner or primary care physician. In the 1992 Western Australian survey, women general practitioners were over-represented among the general practitioners taking smears.62 Although 21% of the general practitioners working in Western Australia were women, women doctors took half of the Pap smears taken by general practitioners. The increase in the rate of screening of 210 to 303 per 1000 woman-years between 1983 and 1992 could be almost entirely attributed to an increase in the rate of smears taken by female general practitioners.

Lewis and Mitchell in Victoria also found that female doctors took more Pap smears than male doctors.117 In their sample, which consisted of 30% female general practitioners, 53% of the smears were taken by female doctors. The female doctors took an average of 6.8 smears per month (range 0-97), compared with an average of 2.5 smears per month (range 0-28) for male doctors.
A number of studies have shown that women whose general practitioner is female are more likely to be adequately screened than those whose regular general practitioner is male. In a study of female hospital in-patients in Fremantle, Western Australia, 118 53% of those with a female general practitioner were adequately screened, compared with 28% of those whose general practitioner was male. In one New Zealand general practice women whose regular general practitioner was female were significantly more likely to be up-to-date with screening than those who had a male general practitioner (73% vs 56%).95 A recent British study of the uptake of cervical screening in 128 general practices found that the proportion of women adequately screened in a practice was positively related to the presence of a female partner.119

These findings are consistent with recent North American research which has shown that women who are patients of female doctors are more likely to be screened for both breast and cervical cancer.120-122 These differences are likely to be due to women being less embarrassed about asking their female doctor for a smear, and to female doctors being more comfortable about offering Pap smears to women. It has been argued that female doctors tend to see a higher proportion of female patients than male doctors, and therefore organize their practices for the taking of Pap smears.121 It has also been suggested that female doctors may be more interested in preventive care for women because of their own perceived susceptibility to cancer, or that female doctors may be more comfortable with the more collaborative style of doctor-patient relationship implied by screening.120

**Behaviour of doctors**

Recently the attention in research on the uptake of cervical screening has shifted from a focus on the social and psychological factors affecting women's behaviour in this area to a focus on the behaviour of doctors in offering preventive services such as Pap smears. Jaen et al, in a useful review of this field, have developed a model for physician delivery of preventive services, based on the notion of competing demands for the doctor's time during the doctor-patient encounter.123 These competing demands include not only a competition with acute and continuing care, but also the competition between multiple possible preventive services. The authors argue that what is labelled as 'poor physician compliance' with recommendations for preventive services may be a rational setting of priorities in the face of competing demands. The components of the model include variables related to the doctor, the patient and the practice environment. With respect to the doctor, factors include doctors' attitudes about preventive services, such as their expectations about the efficacy of the preventive service;
doctors' skills both in communication and in the technical procedures such as taking Pap smears; and the perceived 'performance gap' or the doctor's perception of how his or her behaviour compares with that of other doctors in the community. Patient factors influencing doctors' behaviour include patient expectations about what the doctor will provide during the consultation, which frequently include concerns other than prevention. The practice organization, payment structure and the involvement of allied health professionals are aspects of the practice environment which influence the doctor's use of preventive services. Other environmental factors are the characteristics of the community in which the doctor practises and alternative demands on the doctor's time.\textsuperscript{123} The impact of interventions which address some of these factors will be considered later in this review, under strategies for improving opportunistic screening in general practice.

The issue of payment structures is worth commenting on here, since it underpins a variety of different recruitment strategies. In Australia, with a fee-for-service system, the lack of a specific fee for taking a Pap smear has been a matter of concern to general practitioners, and the lack of financial incentive to carry out preventive services has been cited as a barrier to the practice of preventive medicine in general practice.\textsuperscript{124}

In the United Kingdom, with the basic payment to general practitioners being linked to the number of patients on their practice lists in a capitation system, there have for some time been specific payments for preventive procedures such as immunization and Pap smears. Since 1990 these payments for cervical screening have been linked to the achievement of various levels of coverage of the target population of eligible women in the practice, with one level of payment to the doctor for achieving 50% coverage and a higher payment for achieving 80% coverage.\textsuperscript{125, 126} Failure to reach 50% coverage attracts no remuneration. This approach appears to have been very effective in increasing the uptake of cervical screening in Britain.\textsuperscript{126, 127} Over the three years following the introduction of the new contract with general practitioner targets in 1990, the percentage of eligible women in England who had been screened in the past five and a half years increased from 61% to 83%.\textsuperscript{126} The percentage of general practitioners achieving 80% coverage increased from 53% to 83%, while the percentage with less than 50% coverage declined from 15% to 3%. These figures are confounded to some extent by the introduction of district-based call and recall schemes based on district registers, although many of these were in operation before 1990. There is concern about the lack of incentive for screening in those practices where
screening is well below the target levels, but this is clearly a declining group.\textsuperscript{125, 128}

**Conclusion**

In summary, for the woman, the principal barriers to cervical screening appear to be emotional barriers, including embarrassment associated with having a vaginal examination and fear of the implications of a positive test result. Economic and logistic barriers also play a part, especially in countries such as the United States where the cost of health care to the patient may be high.

It is not clear what contribution each of the various barriers described above makes towards non-participation in screening. For example, while many women are embarrassed or fearful, it does not prevent them from being screened. Presumably for them the benefits outweigh the disadvantages. Shelley \textit{et al} tried to examine this by asking women whether they thought that having a Pap smear test was more trouble than it was worth, and 96% disagreed.\textsuperscript{94} Cockburn \textit{et al} also asked women whether the specific barriers such as embarrassment actually stopped them from having a Pap smear.\textsuperscript{66} Subsequent sections of this review will consider to what extent these barriers can be overcome by simply offering the test to women in circumstances acceptable to them.

In considering the doctor and his or her behaviour in influencing participation in cervical screening, factors considered to be important are the sex of the doctor and the doctor's knowledge, attitudes and skills, as well as the patient's expectations of the consultation and various aspects of the practice and community environments.

Eardley \textit{et al} have suggested that the population of women eligible for cervical screening can be viewed as a continuum.\textsuperscript{80} At one extreme are women who will refuse to be screened whatever the circumstances; at the other extreme are women who will have a Pap smear no matter how difficult it is. These authors suggest that the majority of women are somewhere between these two extremes, and that women's participation in screening will depend on how easy it is made for them to do so. For example, if a woman is specifically invited for screening, the barrier of not knowing where to go for a test is automatically removed, provided she is given a specific venue or choice of venues. Eardley \textit{et al} argue for a consumer-oriented, provider-initiated system which takes the initiative in offering screening to women and is organized in a way to suit the convenience of the user.\textsuperscript{80} The evidence for the effectiveness of such initiatives will be examined in the next section.
STRATEGIES FOR PROMOTING PARTICIPATION IN CERVICAL CANCER SCREENING

Strategies for promoting participation in screening can be classified into four categories. They are clearly not mutually exclusive, and can be employed separately or in combination.

1. Individual invitations ('call' and 'recall')
2. Improvement of opportunistic screening
3. Provision of special screening services
4. Community and media-based health education programs

The use of individual invitations, in which women are sought out and actively invited, is described as 'call and recall' in the British and Australian literature, and as 'outreach' in the North American literature. On the other hand, the process of inviting women to be screened in the course of their attendance at a health facility for some other reason is referred to in Britain and Australia as opportunistic screening, and in North American as 'in-reach'. The two strategies have also been referred to as an 'active' approach and a 'passive' approach respectively.

I INDIVIDUAL INVITATIONS TO WOMEN IN THE TARGET POPULATION (CALL AND RECALL)

This section will review the literature on the operation of the strategy of individual invitations for screening or 'call and recall'. The terminology 'call and recall' refers to identifying individual women and inviting them to attend their own doctor or an alternative service for a Pap smear. 'Call' refers to individual invitations to women who have never had a Pap smear, while 'recall' generally refers to the issuing of notifications to women whose previous smears have been negative, to inform them when their next Pap smear is due. The term 'reminder' is sometimes used to cover both call and recall. 'Follow-up' refers to notifications sent to women with non-negative smears to inform them of the need for further investigation or a repeat smear.
There are many aspects of the operation of call and recall systems which will influence the effectiveness and the efficiency of the process. These are shown in Tables 1 and 2. They include the source and accuracy of the database; the definition of eligibility for invitations; the characteristics of the women approached, particularly in relation to age and screening history; how the initial invitation is made; whether or not a specific appointment time is offered; the intensity of efforts to contact the woman; the nature of the service offered, whether it is provided by the general practitioner or by a practice nurse, and whether it is in the routine surgery or a special screening clinic. The question of overall responsibility for the call and recall system will also have an impact on its success, whether it is the local health authority, the general practitioner or a practice nurse with special responsibility for the program. It may be difficult to tease out the effect of each of these different components, as a number of factors may be operating simultaneously, and in few studies has any attempt been made to examine the separate effects.

**Source and accuracy of the database**

Individualised invitations to women may be generated at different levels, depending on the arrangements possible in different countries. All rely on some updatable listing of the target population. The alternatives which have been used are national population registers, such as electoral rolls; district registers based on patients enrolled with all general practitioners in a district; individual general practice age-sex registers; and registers of cytology results based on individual laboratories or established on a regional or statewide basis.

The accuracy of information on the woman's eligibility for a Pap smear and the accuracy of the woman's address are two aspects of the accuracy of these databases which need to be considered.

**Eligibility for invitations**

An important distinction can be made between different types of programs depending on whether or not the person or the authority issuing the invitations has prior knowledge of the woman's need for a Pap smear. This has implications for the acceptability of the program to women, especially if the invitation comes from some source other than the general practitioner.
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<td>Comprehensive laboratory register including unscreened women</td>
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<td>Initial Invitation</td>
<td>Mail</td>
<td>Mail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Appointment</td>
<td>Randomly allocated to appointment or no appointment</td>
<td>Yes</td>
<td>No</td>
<td></td>
<td>Yes (Recommended)</td>
</tr>
<tr>
<td>Follow-up</td>
<td>Two mailed reminders for each group</td>
<td>Not known</td>
<td>Personal visit</td>
<td>Second letter after 16 weeks Notification of GP after 32 weeks</td>
<td>First reminder to GP after 3 months Second reminder direct to woman after 7 months</td>
</tr>
<tr>
<td>Smear taking Service</td>
<td>G.P. or Local authority clinic</td>
<td>G.P.</td>
<td>Health Centre</td>
<td>Choice of G.P. or Well woman clinic</td>
<td>G.P. or Well woman clinic</td>
</tr>
<tr>
<td>Results</td>
<td>Letter Appt only Initial 21% 36% 1st Rem. 28% 44% 2nd Rem. 32% 47% (Cumulative percentages)</td>
<td>25% of unscreened women screened in response to invitation</td>
<td>14% of eligible women attended Only 24% of non-responders located - 6/17 screened</td>
<td>13% uptake (90/687) 47% incorrect addresses 23% ineligible 43% of those eligible and accessible responded</td>
<td>Uptake 41% (822/1978) Increased proportion adequately screened from 587 to 693 84% of women accounted for (adjusting for hysterectomy)</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------</td>
<td>----------------------</td>
<td>---------------------</td>
<td>------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td><strong>Source of names</strong></td>
<td>Age-Sex Register</td>
<td>Age-Sex Register</td>
<td>Age-Sex Register</td>
<td>Age-Sex Register</td>
<td>Age-Sex Register</td>
</tr>
<tr>
<td><strong>Age Range</strong></td>
<td>16 - 65</td>
<td>35 - 59</td>
<td>20 - 64</td>
<td>35 - 59</td>
<td>32 - 60</td>
</tr>
<tr>
<td><strong>History of women invited</strong></td>
<td>No smear in past 5 years</td>
<td>No smear in past 5 years</td>
<td>No record of smear</td>
<td>No smear in past 5 years</td>
<td>No smear in past 5 years</td>
</tr>
<tr>
<td><strong>Number of invitations</strong></td>
<td>459</td>
<td>1691</td>
<td>750</td>
<td>810</td>
<td>192</td>
</tr>
<tr>
<td><strong>Sender of invitations</strong></td>
<td>G.P.</td>
<td>G.P.</td>
<td>G.P.</td>
<td>G.P.</td>
<td>Practice Nurse</td>
</tr>
<tr>
<td><strong>Initial invitation</strong></td>
<td>Mail</td>
<td>Mail</td>
<td>Mail</td>
<td>Mail</td>
<td>Mail</td>
</tr>
<tr>
<td><strong>Appointment</strong></td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td><strong>Follow-up</strong></td>
<td>(Letters, phone calls, home visits (Number not given))</td>
<td>Repeated reminders</td>
<td>First reminder 2 months later</td>
<td>One reminder</td>
<td>NO</td>
</tr>
<tr>
<td><strong>Smear-taking Service</strong></td>
<td>Practice nurse</td>
<td>G.P. or Practice nurse</td>
<td>Well woman clinic in practice (practice nurse)</td>
<td>Well woman clinic in practice (Practice nurse)</td>
<td>G.P. or Practice nurse</td>
</tr>
<tr>
<td><strong>Additional Strategies</strong></td>
<td>-</td>
<td>Leaflet with letter tagging notes</td>
<td>-</td>
<td>-</td>
<td>Waiting room poster</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>96% uptake (440/459)</td>
<td>87% of eligible women in practice screened</td>
<td>32% of letters un delivered 44% screened</td>
<td>29% of letters un delivered 26% screened 22% initial letter 4% after reminder</td>
<td>57% screened</td>
</tr>
</tbody>
</table>
Programs in which an attempt is made to identify women who do need screening, because they have not had a recent smear and have not had a hysterectomy will be referred to as 'selective'. For recall of women who have ever been screened, this may involve identifying women from a database which includes information on screening history such as a general practice age-sex register or a cervical cytology register, and inviting them when their next smear is due. Call of women who have never been screened requires linkage of the information on screening history, for example from laboratory reports, to some listing of the population. This 'selective' approach is one which has been taken in the United Kingdom, using district registers. Invitation strategies based on general practice age-sex registers also involve a 'selective' approach, since information about the woman's eligibility is available in the practice. Linkage of cervical cytology information to more 'remote' databases such as the electoral roll is more controversial, at least in Australia. Extensive community consultations in Victoria showed no support for an approach which involved linking of information on cervical screening status to the electoral roll. A less intrusive alternative is the use of 'non-selective' or comprehensive invitations, sometimes referred to as 'direct-mailing'. Letters of invitation are sent to all women in the relevant age group on a regular basis, without reference to the relevant health status of the woman. The accompanying letter indicates which women do not need to have a Pap smear, such as those who have had a recent Pap smear (within a specified interval) or those who have had a hysterectomy. This is the approach which has been taken in countries such as Finland and the Netherlands which have used national population registers.

Whether the invitations are selective or non-selective is important in the calculation of response rates to invitations, as adjustments need to be made for women who do not need a smear. A major difficulty with comparing the effectiveness of different call and recall systems is that not all are starting with a comparable population of women. For example, one would expect invitations to women who have been screened previously to lead to a higher response rate than those to women never previously screened. Some studies have included only women who have never been screened, others women who have not been screened for more than five years, others women not screened for more than three years. Many studies include a mix of these women and the authors have not stratified by smear history when comparing response rates.
**National population registers**

The basis for the listing of the target population may be a national register such as the electoral roll. The successful programs in the Nordic countries,10-12, 26, 138 and in some regions of the Netherlands,137 have been based on population registers, which are updatable computerized listings of the whole population. The population register is held at a national or county level and has long been a feature of life in these countries, with general public acceptance. The invitations are generally administered at the county level.10, 12, 81, 139 Inaccuracy of the registers has not been reported as a problem in the published literature from these countries, but there has been little specific comment on this aspect.

In Australia and New Zealand, the closest approximation to a population register currently available for the purpose of issuing individualized invitations is the electoral register or electoral roll. In Australia it comprises a list of all Australian citizens over the age of 18 who are entitled to vote. Comparison by age group of the numbers of women on the electoral roll in Western Australia in 1992 with the 1992 population based on census data revealed that among women over 50 years of age, the electoral roll numbers constituted over 90% of the numbers recorded in the census.140 The proportions were slightly lower for younger age groups, with 79% of women in their twenties, 82% of women in their thirties and 89% of women in their forties being on the roll.

The electoral roll includes name, address, date of birth, sex, and occupation data, although normally only the name and address are readily available. Enrolment for eligible adults is compulsory in Australia, and it is a legal requirement to notify one's change of address to the Electoral Commission within one month. The accuracy of the roll is also checked by door-to-door visiting at least every two years. It is also updated with reference to death registrations.135, 141

There have been four reported Australian studies of the use of the electoral roll as a basis for inviting women to undergo cervical screening, two in rural New South Wales, 136 one in rural Victoria, 132 and one in metropolitan Perth, Western Australia.142 This section will focus on the accuracy of the database used for these studies. The effect of the invitations will be considered later.

In one New South Wales study, letters of invitation were sent to all women aged 18 to 70 years on the electoral roll in two rural communities; a third community acted as a control.136 Letters were sent to over 2000 women, and the receipt of the letter and the acceptability of the letter were examined by a survey of a random sample of 1300 women. Only 65 letters were returned address unknown, and
another 14 women were found on telephone follow-up to have moved. These figures of less than 1% are likely to underestimate considerably the proportion of undeliverable letters. The response rate to the questionnaire was only 31% (384/1221), suggesting that a proportion of non-respondents never received the questionnaire or, presumably, the original letter of invitation.

More encouraging figures about the accuracy of the electoral roll as a database come from another NSW study by the same research group, in which one intervention was the mailing of personalised letters combined with a media campaign. The post-intervention survey achieved a response rate of 86%, and 66% of respondents reported that they had received the letter.

In Western Australia, invitation letters were sent to 1651 women aged 20 to 69 years randomly selected from the electoral roll in a disadvantaged area of Perth. The response to the invitation was assessed by mailed questionnaire, for which the overall response rate was 57%. For 8% of the women the initial invitation letter or the questionnaire was returned undelivered, and 10 women (0.6%) had died. Seventy-five percent of a random sample of non-respondents were able to be contacted at the address on the electoral roll.

The Victorian study examined the effect of individualized invitations, either alone or in combination with a community based campaign, in increasing the uptake of Pap smears in women in rural Victoria. The extent of the inaccuracy of the database could not be determined, but fewer than 5% of the 4000 invitation letters mailed were returned address unknown.

In a parallel study investigating the capacity of electoral roll invitations to reach women at risk of cervical cancer, the authors checked the Victorian Cancer Registry records against electoral listings, and found that 70% of women registered as having cervical cancer in 1985 were able to be identified as being at the same address as the one on the electoral roll, 13% were identified at a different address and 18% were not on the Victorian electoral roll. They suggest that it would be desirable to use a more up-to-date population register such as the database of the Health Insurance Commission.

A South Australian study also investigated the potential value of the electoral rolls for personalised invitations, and found that while, 93% of all South Australian women over 18 years were on the electoral rolls, only 77% of overseas-born women and 40% of Aboriginal women were on the roll at their current address.
Eighty-nine percent of women with cervical cancer were recorded on the electoral roll, 86% at their current address.  

In connection with the NSW research referred to earlier, the addresses of a random sample of 100 women from a household survey, who reported that they had not had a Pap smear in the previous year, were checked with the electoral roll. It was possible to locate 82% of these women on the electoral roll at their correct address.  

In New Zealand, the electoral roll was used to select women to be invited to register with the Otago Cervical Screening Program, and to have a Pap smear if they had not had one in the previous year. Being registered with the program would help to ensure follow-up if the woman had an abnormal smear, and would ensure that she would be reminded about future smears when they became due. Only 2% of the invitations were returned address unknown, but the number which did not reach their destination is not known.  

District registers  

In England and Wales, where all women are registered with a general practitioner, the databases for call and recall systems are based on the age-sex registers held by the relevant Health Authority through the Family Health Services Agency. There have been major problems with the inaccuracy of these databases, both in terms of the addresses of women and their need for a Pap smear. In order to overcome the problem of sending letters inappropriately, a list of eligible women in each practice (prior notification list) is first sent to the general practitioner for review, before the invitations are sent. Despite this, the problem of inaccuracy has been particularly serious with the mobile populations of the inner city areas where at least 30% of letters were sent to incorrect addresses. In one study in inner-city London, 47% of the invitation letters were sent to inaccurate addresses and another 23% were inappropriate as the women did not need a smear.  

Haran et al have commented on the difficulties in maintaining the accuracy and ensuring the efficient running of this system, which involves several different agencies (the health authority, the laboratory, the general practitioner, the health authority's clinics, and the eligible women themselves) and have suggested strategies for overcoming some of the problems in communication.  

In Scotland the equivalent registers are the databases of the Community Health Index, maintained by each Area Health Board. Inaccuracy was reported in one
Scottish study to be less of a problem because of the use of a unique identifying number for patients for both hospital and community services and the updating of the index for each contact with these services.\textsuperscript{150} The database was linked by a computer system to the laboratory information on cervical smears.\textsuperscript{150, 151} However, in contrast to the inner city practices referred to earlier, the population was largely rural and relatively stable.\textsuperscript{152}

The linking of general practitioner payments in the United Kingdom to the achievement of targets in cervical screening, for which the Family Health Services Agency database provides the denominator,\textsuperscript{125} has caused increased concern about inaccuracies in these databases,\textsuperscript{153} and will presumably lead to more concerted efforts to bring them up to date.

No equivalent databases exist in the United States, but in one early study in Pennsylvania, the mailing list of the County Department of Public Assistance was used to send with 'welfare checks' to indigent women information about Pap smears and invitations to attend a screening clinic.\textsuperscript{112}

In Australia, Mak and Straton have described the operation of the Fitzroy Valley Pap Smear Register, a low-technology register in a remote Aboriginal community in Western Australia.\textsuperscript{154} The register was developed initially by identifying women of the appropriate age range from hospital and community health records. The information required to maintain the accuracy of the Register was obtained by community health staff largely by word of mouth, and the operation of the recall system was based on a simple index card system.

**General practice age-sex registers**

The age-sex registers held by individual general practices are potentially valuable tools for identifying women eligible to be invited for screening. Age-sex registers are an integral part of general practice in Britain, with its clearly defined practice populations. With the advent of computerization, more general practices in countries with a less structured system of general practice, such as Australia and New Zealand, are developing age-sex registers, and realising their potential for call and recall for a variety of preventive measures including cervical screening.\textsuperscript{155-158}

In 1987, 20% of a sample of NSW general practitioners had implemented some kind of recall system within their practice, while 60% said that they were prepared to do so.\textsuperscript{159}
In Western Australia in 1992, 66% of general practitioners surveyed reported operating a Pap smear reminder system in their practices, 20% using a manual system such as a card index, 15% using a computer system, 21% making use of laboratory initiated reminders, and 10% other systems including the marking of patients' notes. The factor most frequently identified as a barrier to operating a reminder system was the lack of time to organize a system. There were no significant differences in doctor or practice characteristics between those who did and those who did not operate reminder systems.

In Victoria in 1992, 43% of general practitioners surveyed said that they had a specific recall method in their practices; of these 40% had a computerised recall system, 49% kept a logbook, and 11% tagged the patient's notes. Comparison of doctors' responses with the records of the Victorian Cervical Cytology Registry showed that doctors with a systematic recall system were more likely to screen older women.

These figures are in marked contrast to the responses of 82 NSW general practitioners surveyed in 1991, amongst whom only 6% had an 'in-house' reminder system, 5% used pathology laboratory reminders, and 9% used the NSW State Cancer Council's reminder system. The major barriers were the time required to review the practice records to develop a list of eligible patients, and the cost. Data from a Western Australian study showed that a nurse took four minutes per record to identify eligible women. In none of these studies was it clear whether general practitioners operated a system which allowed identification of women who had never been screened, or whether their systems only covered women who had had at least one smear.

Havelock et al surveyed a random sample of 540 general practitioners in the United Kingdom, and achieved a 77% response rate. Overall 43% had a systematic method of identifying women who needed Pap smears, including previously untested women, either through the practice's age-sex register or the records of the family practitioner committee, or by systematically reviewing the notes of women in the practice. The approach to women could be either by written invitation or through the 'tagging' of the notes to prompt the doctor to invite the woman to have a Pap smear when she attended the surgery for some other reason. The tagging of notes will be considered later under opportunistic screening. Those general practitioners who had a systematic approach were found to be significantly younger, to be in larger practices, to be in rural practice, to employ a practice nurse and to have positive beliefs about the value of cervical
screening and the time spent on it. The fact that predominantly rural practices were more likely to have an organized approach may reflect the difficulties already described in the inner city with maintaining accurate lists of patients.

Surveys of general practitioners in New Zealand have revealed a relatively high level of computerization of practices and a widespread use of recall systems, according to self-report. In Auckland in 1989, 33% of a random sample of 96 general practitioners had age-sex registers, two-thirds of which were computerized. Eighty-eight percent said that they used a recall system for cervical screening, but many of these used a recall system only for women with abnormal smears, while only 43% used a recall system to reach all women in their practices. Doctor characteristics which predicted the use of recall systems for all patients were being younger, being female and being in group practice.

Of 210 general practitioners in Canterbury, New Zealand, surveyed in 1990, 55% had age-sex registers in their practices, and 47% said that they used an age-sex register to identify women who needed screening. It is not clear whether the latter group of doctors actually sent out reminder letters or whether they used the age-sex register as an aid to tagging the notes.

It should be noted, however, that while many general practitioners do report that they have reminder systems in their practices, the picture is not quite so favourable when these systems are evaluated. A more detailed examination of general practice reminder systems based on individual practice age-sex registers in Auckland revealed major deficits in their accuracy and efficiency.

In the Netherland, where 75% of general practitioners either had computerized age-sex registers or expected to computerize within two years, work is being done on linking general practice age-sex registers to regional population registers.

There is no doubt that efficient recall systems operated through general practice have many advantages over those operated from a more remote location. The general practitioner is more likely to know the health status of the woman and her current address, and is able to provide a more personal approach. There is also the capacity, presently unavailable to cervical cytology registries, to identify and invite women who have not previously been screened. In recognition of the important role of general practice recall systems, the New Zealand National Cervical Screening Programme has provided staff in various regions to assist general practitioners in developing their own age-sex registers, in auditing medical records to identify eligible women and in establishing practice-based recall
systems.\textsuperscript{163, 165} It must be recognized, however, that not all general practitioners have efficient recall systems, that women change general practitioners, that a number of women do not have a regular general practitioner and that many women have cervical smears in settings other than general practice.

A study in Victoria of 2000 women who had two smears three years apart showed that 48\% had the second smear taken by a different practitioner,\textsuperscript{135} which suggests a potential difficulty in using general practice age-sex registers for recall. Use of the practice register for recall may increase the proportion staying with the same general practitioner.

\textit{Cervical cytology registers and laboratory registers}
Once women have been screened at least once, information in laboratory records can be used to remind them when their next smear is due. The information may come from individual laboratories or from a cervical cytology registry. A cervical cytology registry is not confined to a single laboratory, but is a computerized database for all laboratories in an area, which contains the results of all Pap smears and basic identifying information about the woman, her referring doctor and the laboratory where the smear was examined.\textsuperscript{2}

The use of laboratory records as a basis for recalling women when their next Pap smear is due (or overdue) has been a relatively common practice in Australia, and a number of laboratories have provided a reminder service in which they notify the general practitioner when his/her patient is due for another smear. For example, 21\% of a sample of Western Australian general practitioners made use of a reminder system provided by the pathology laboratory.\textsuperscript{157}

In Australia cervical cytology registries are being established at a State level, and those in Victoria and Western Australia have already been established, recalling women with normal smears after three years.\textsuperscript{2, 75} In Victoria the recall process has begun, and preliminary figures show that 10\% of letters are returned unable to be delivered (V Higgins, personal communication) but there are as yet no published data on the effectiveness of the recall.

The effectiveness of cervical cytology registers is dependent on the enrolment of a large proportion of the eligible women as they are screened. In both Victoria and Western Australia, women are enrolled on the register unless they choose not to do so, in which case their Pap smear request form is appropriately annotated to alert the laboratory. Fewer than 10\% of women screened in Victoria are declining to be on the register.\textsuperscript{166}
In New Zealand, a National Cervical Screening Register is being established, with women being enrolled when they have a Pap smear taken, unless they choose to 'opt-off'. Like the Victorian and Western Australian cervical cytology registers it is designed to act as a back-up to any recall systems operated by general practitioner, by recalling women with normal smears after three years. While the register does have considerable support, there is a certain amount of resistance on the part of general practitioners to the paperwork involved in enrolling patients on the register.

Other registers
Since 1982, the New South Wales State Cancer Council has operated a voluntary Pap Test Reminder Service. A woman can enrol on the Reminder Service by completing a registration form indicating contact details, date of last Pap smear and the screening interval recommended by her doctor. Women are sent a reminder letter in the month before their next Pap smear is due. In 1993, there were 39,000 women on the register, representing approximately 2% of women in NSW in the age group 20 to 69 years. In a research study evaluating by questionnaire the effectiveness of the reminder service, 3% of the questionnaires were returned undelivered and a further 48% were not returned at all, indicating that the true level of inaccuracy of the database lay somewhere between 3% and 51%. At the time of this study the reminders were sent out annually, and the authors argue that the level of inaccuracy of the database is likely to increase for longer reminder intervals.

Initial invitation
In almost all of the studies reviewed, the initial invitation was sent by mail. For countries using national registers, information about the woman's general practitioner is not usually on the database and letters are sent to women directly, inviting them to attend their own general practitioner or a special screening clinic.

In the Netherlands letters are currently sent to women directly from the local health authority using the national population register. The initial pilot projects involved invitations with appointments to special screening clinics staffed by female smear-takers. With the establishment of the nationwide system, the special clinics were not implemented. Although the invitations were still sent from the local health authority, the letter invited women to make an appointment with their own doctor. This process is under review, as will be discussed later.
In the studies in Victoria and NSW described earlier, invitations were sent in the name of the State Cancer Councils, well respected in the community for work in cancer prevention.\textsuperscript{132, 136}

In the case of district registers in the United Kingdom, after the prior screening of the list by the general practitioner, the letters could be sent directly from the general practitioner, (in which case the general practitioner could offer a specific appointment), or from the health authority as if from the general practitioner, or from the health authority directly.\textsuperscript{171} In the system in Scotland described by Robertson, once general practitioners were sent the prior notification list they could sign the standard letter provided, send their own letter or contact the woman by telephone.\textsuperscript{150} There is no research evidence on the relative effectiveness of these different approaches.

General practices dealing directly with their own patients can undertake more personalized approaches, including the offering of a specific appointment and approaching women by telephone. Almost all the studies reviewed have involved mailed invitations, sent by the general practitioner, \textsuperscript{71, 147, 148, 172-174} or the practice nurse.\textsuperscript{175, 176} Robson referred to the practice nurse ‘contacting’ women; this may have included telephone contact.\textsuperscript{176} In one New Zealand practice, women were telephoned initially by the practice nurse; invitations were mailed only if the phone contact was unsuccessful.\textsuperscript{134, 177} At the same time as the recall letter was generated, the notes were tagged with a computer generated reminder indicating the date of the last smear and the date of recall.

Few of the published reports give details about the content of the invitation letter or whether any accompanying health education material was provided. Some studies have reported the sending of an accompanying health education leaflet along with the invitation, providing information about cervical screening and outlining alternative venues to the general practitioner for having a smear taken, but once again the effect of this has not been tested.\textsuperscript{146, 171}

In 1989 the Health Education Authority for England and Wales published guidelines as to what should be covered in an letter inviting women for cervical screening.\textsuperscript{178} The HEA recommended that any invitation should include reference to the recommended screening interval, the rationale for a Pap smear, an explanation as to why the woman had been selected for an invitation, an indication of the choice of venue for smear-taking and the availability of a female smear-taker, and how the woman could obtain the result. They also suggested that the letter should indicate the test was confidential and free of charge, and include a
contact telephone number for further enquiries and reference to an interpreter service for women of non-English speaking background. In addition the guidelines indicate that women should notify their general practitioner if they have had a Pap smear in the last five years, and notify him or her of any change of address. These latter guidelines are specific to the United Kingdom context in which a woman is on the list of a particular general practitioner. Finally, it was recommended that an appropriately worded health education leaflet about cervical screening be included. Austoker has also recommended that such letters be signed by a doctor known to the woman, that appointments be included wherever possible, and that a reply slip be included for ease of response by the woman.126

Eardley et al surveyed 190 District Health Authorities in England about the content of their invitation letters, and evaluated them according to the criteria of the HEA guidelines.178 The study was carried out shortly before the publication of the guidelines, and found a number of deficiencies in the letters, the most common of which were failure to indicate the availability of a female smear-taker and failure to explain why women were being invited. In 15% of cases the test was described as a 'cancer test', perpetuating the misconception that the Pap smear functions to detect early cervical cancer. Only 5% offered women a specific appointment, and only 8% provided a specific contact phone number for further enquiries. Two-thirds of the district health authorities studied included a health education leaflet with the letter. The authors point out the tension between providing all the recommended items of information and the need to maintain the readability of the letter.178 While there is theoretical justification for the inclusion of the various items of information, the effect of different combinations on the uptake of screening has not been empirically tested.

The effect of two different styles of invitation was tested in a trial in rural New South Wales.136 Each of three regions was randomly allocated to one of two intervention conditions or a control. In one intervention region women received an invitation letter providing basic information about Pap smears and a list of possible services for smear-taking. In the other intervention region women received, as well as a letter, an elaborate information package including prompt cards designed to help overcome some of the known barriers to screening. The uptake of screening was higher in each of the intervention regions than the control region, but the more elaborate information package was no more effective than the basic information strategy.136 This study also reported on the readability of the invitation letter, an assessment which has not been reported in other studies.
Use of appointments

An aspect of the initial invitation which has been tested is the effect of offering a specific appointment for a Pap smear. In the survey carried out by Cox et al in conjunction with an invitation to women taken from the electoral roll, 90% of women thought that receiving an appointment time to have a smear would make them more likely to have one.143

Clearly it is more feasible to offer appointments when the agency or doctor sending the invitation is also responsible for providing the service. Wilson and Leeming, in a study of women for whom there was no record of previous screening, randomly allocated 50 women aged 45-64 in each of five general practices to receive either an invitation letter with a specific appointment time or one without appointment.179 After the initial letter, 36% in the appointment group and 21% in the letter only group had attended for a smear. This difference was maintained after two reminder letters (47% vs 32%). The difference was more marked in women aged 54-65.

A Western Australian study comparing the effect of letters with and without appointments to a special Pap smear clinic within a general practice found no significant difference between the uptake of screening in the letters with appointments, compared with those without, although each type of letter increased the uptake of screening compared with a control group.158 Of those who were sent an appointment, 67% said that having a specific appointment was 'very important' and 24% said it was 'fairly important' in their decision to attend for a Pap smear. This study will be described in more detail later.

The only other evidence about the effectiveness of appointment letters comes from mammography screening, which is not strictly comparable since mammography is a specific service which cannot be combined with a consultation on other matters. Williams and Vessey found that invitations with appointments for mammography screening improved compliance.180 Hurley et al found that the most effective strategy was a letter with a specific appointment time, followed by a second letter to non-attenders, but letters without appointment times were actually more cost effective.181

Others inviting women to cervical screening have offered appointments in conjunction with other strategies but have not attempted to evaluate separately the effect of offering an appointment.147 Rang and Tod, although not offering a specific appointment time, offered several alternative dates for an afternoon or evening clinic.148 Norman and Fitter compared patients' views on appointments
for a general health check sent in an invitation letter, with appointments given at
the time of another consultation. Not surprisingly, those who had been sent an
appointment by letter found it more difficult to keep, but no evidence is presented
on the effect on the overall response.

Intensity of follow-up

The cost of individual invitations depends on the extent to which women who do
not respond to the initial invitation are pursued. Programs based on a national
population register and which have involved mailing to all women in an age range,
without reference to their eligibility for screening, have generally sent one letter
only. The pilot studies in Victoria and NSW have also involved a single
mailing. While several of the programs of call and recall described in the
literature have involved further letters to non-attenders, few have examined the
effectiveness of these, and even fewer have examined the cost-effectiveness.

Additional letters were used in the national program in the Netherlands, and the
second letter was reported to have increased the percentage of participants from
65% to 70%. In one region in the Netherlands there was an overall response
rate of 48% in a program which included sending a second letter. The proportion
of all women who responded to the second reminder was low (15%). Presumably
the second letter was sent to all women, as it was calculated that over half of the
funds used in the recruitment were needed to induce 15% of the women to
participate.

A more recent trial in the Netherlands of call systems in general practice found
that contact with non-attenders by a reminder letter or telephone call after four
weeks increased the proportion attending from 58% to 70%.

More intensive follow-up has been used in Britain. For example, call and recall
from the district registers involved sending a second letter four months after the
first, followed by notification of the general practitioner about non-
respondents. In Tayside in Scotland two additional reminders were
sent, one three months after the original and another four months later, only the
last letter giving information about well woman clinics staffed by women.

In one of the earlier British studies, women were sent up to three letters, together
with reply-paid envelopes, from the county health department. This was
followed by visits from the health visitor, both to those who had not responded
and to those who had refused. By these strategies another 12.5% was added to the
response rate making a total of 72.5%. The cost of this intensive follow-up was not described and one must question where legitimate follow-up ends and harassment begins.

In those studies which have described separately the effect of subsequent letters after the first, the proportion responding has been less than 10% of the target population. For example, in the study by Wilson and Leeming, 10% of those sent a second letter (7% of the target population) had a Pap smear, and 6% of those sent a third letter (4% of the target population) responded.

Meadows compared the effect of personal and postal contact in 183 women overdue for a Pap smear, who were randomly allocated to receive a mailed questionnaire or to be interviewed by a medical student. Only 8% of women in the postal group had a Pap smear in the four weeks after the contact, compared with 15% of those interviewed by the student either face to face or on the telephone. These results should be interpreted with caution, as the contact involved the completion of a questionnaire about reasons for not having a Pap smear, hardly a routine contact.

As can be seen above, only a few studies have reported the marginal effect of additional mailings and even fewer have attempted to estimate the costs and benefits. Those studies which have done so have shown little marginal gain from extra mailings beyond the first, but it could be argued that the women who respond to subsequent mailings are in a higher risk group, and thus it is worth making the extra effort to reach them. To determine whether this is the case, one would need to examine rates of abnormalities in large samples of women responding at different points in the invitation process, and this has not been done.

**Smear-taking service provided for respondents**

In most of the reported studies, the invitation letters have suggested that the woman attend her own general practitioner, although in some cases the letter has included information about alternative services. There are also options within general practice, such as having the Pap smear taken by the practice nurse, although the effect of offering these has not been specifically evaluated. In some practices, the practice nurse runs a special screening clinic within the practice. For example, Shroff described a once weekly cervical screening clinic within a general practice, with smears taken by a female general practitioner or practice nurse, but gave no figures on the number of women who chose to go to the clinic rather than to their own general practitioner.
Invitations from sources other than general practice, such as health authorities or Anti-Cancer Councils, are more likely to offer women the choice of alternative services. In a Victorian study which compared the effect of an invitation letter with or without a community based campaign, the community based campaign included the provision of special screening clinics staffed by women, even though the letter recommended the woman's general practitioner as the first choice of venue for having a smear taken. Although the community-based campaign combined with the letter was more effective than the letter alone, this could not be attributed solely to the provision of special clinics, as there were other components of the campaign. The proportion of those screened in the community campaign areas who actually attended the special clinics was not reported.

Responsibility for the program

It has been argued that it is important to have one committed person responsible for the call and recall program. This may be a single person responsible in the health authority, or in the case of general practice based systems, one general practitioner or the practice nurse. Several practice-based programs have used the practice nurse to audit the practice records and identify women at risk, and have given the nurse responsibility for the on-going running of the call and recall system, including the taking of the smears. Havelock et al found that 74% of those who took a systematic approach to screening (through call and recall systems or tagging notes) employed a practice nurse, compared with 49% of those who used unsystematic opportunistic screening and 33% of non-screeners.

In a randomized controlled trial Robson examined the effect in an inner London general practice of giving a health promotion nurse alone responsibility for health checks in the practice, compared with giving the main responsibility to the general practitioner. Patients were randomly allocated to one of two groups, one of which had their risk factors including cervical smear history, monitored and followed up by the health promotion nurse, while the second group were managed by the general practitioner with assistance from the nurse as requested. Both the doctor and the nurse had access to a computer with the relevant medical information on each patient and were encouraged to use it for follow-up. The nurse ran monthly computer searches to identify people who needed recall and contacted them either by mail or phone. After two years of the study, 76% of the eligible women in the group for whom the nurse was responsible were up-to-date with cervical screening compared with only 49% of the group for whom the general practitioner was responsible.
Effectiveness of call and recall systems

Measuring effectiveness
While the ultimate effectiveness of cervical screening programs must be measured in terms of morbidity and mortality from invasive cervical cancer, this is not feasible in the short term and measures of the effect of various strategies on the uptake of screening are required.

It has also been argued that the rate of abnormalities detected should be included as an measure of effectiveness, giving an indication of whether high risk women are being reached. This has rarely been done.

Comparison of the effect of different call and recall programs is quite difficult because of differences in methods of calculation of the response. Many studies have calculated the effect in terms of the proportion of eligible women who respond to the invitation to be screened, excluding from the denominator those who have undergone hysterectomy, those who have never had sexual intercourse (if known), and those who have had a recent smear (if known). Some have also excluded from the denominator those who are known not to have been reached by the invitation, such as those who have changed address, although the validity of this is dubious, unless the women are known to have been screened elsewhere. A slightly different but comparable approach is to include women in the denominator who do not need a smear because of hysterectomy, and also to include them in the numerator as women 'accounted for'. Others have presented results in terms of a 'practice audit', indicating what proportion of eligible women in their practice are 'up-to-date' with screening, having been screened in the previous two years, three years, or five years, depending on the guidelines in operation at the time.

Studies of invitation letters and media campaigns in New South Wales and Victoria have measured the outcome by examining rates of attendance for Pap smears based on Health Insurance Commission figures and/or pathology laboratory records for a three month post-intervention period, and compared them with what would be expected based on attendance rates during a three-month pre-intervention period. They have also compared attendance rates in intervention regions with those in control regions with no intervention. Regions have been geographically separate to avoid contamination. In Victoria it has been possible, using the database of the Victorian Cytology Service, to examine the uptake of smears by individual women who received invitation letters.
Response to the invitation

The responses to call and recall will be grouped according to the database used to generate the invitations, whether it is a national population register, district or general practice based register, or a laboratory-based or cervical cytology register.

National population registers

While the Scandinavian studies have demonstrated the impact of recruitment programs on the incidence and mortality from invasive cancer of the cervix, there have been few reports of the actual response rate to the invitation. It was reported from Uppsala in Sweden in 1975 that 65% of the women invited participated in the organized screening program, but that most of the women who did not participate had obtained Pap smears from gynaecologists outside the program.81 Other data from Sweden indicates that only a quarter of the Pap smears taken in Sweden were taken as part of the organized program, which involved invitations to all women aged 30 to 49 every 4 years.138 In Finland the participation rate in response to 5-yearly invitations is reported to have been 70 to 80% since the program became nationwide in the early 1970's.10 However, as in Sweden, 75-80% of all Pap smears in Finland are taken outside the program.

In the Dutch pilot projects which involved appointments to special mobile screening clinics a 70% response was reported, with greater participation overall among urban women, younger women and those currently married.139 Surveys revealed that, taking into account women who had undergone hysterectomy and women who were being screened by their own doctor, 80% of the female population in the target age groups of 35-54 years were covered by screening or 'otherwise protected'.139

Although the Dutch pilot program was effective in reaching a high proportion of eligible women, there were many smears taken by general practitioners and gynaecologists outside the systematic program, with many women being screened in both settings.169, 187 The resulting high costs led to the change referred to earlier, in which the invitations recommended that women make an appointment with their own doctor.169 This resulted in overall attendance rates of about 40%. This drop in attendance rates was attributed in part to the inability to monitor the response and to send reminders when the organization responsible for the invitations was not linked to the person taking the smears. As a result of this, a consideration is being given to using general practice as a basis for call and recall. A pilot study of this approach will be discussed later.169
An interesting comparison of the effectiveness of systematic call and recall with that of opportunistic screening is provided by the experience of two Danish counties. After 12 years of systematic call and recall of women aged 23-45, 85% of eligible women were reported to be screened regularly. The program was then dropped in favour of opportunistic screening, and after 3 years, the coverage had fallen to 61%, with the lowest uptake of 51% among the oldest age group. There was marked variation in uptake by district, apparently depending on the enthusiasm of individual general practitioners.

The studies in Victoria and New South Wales which have used the electoral roll as a source of names for invitation letters have shown an increase in the uptake of screening in response to the letter. In the Victorian study referred to earlier, rural regions were randomly allocated to receive no intervention, a personal letter of invitation, a community based campaign lasting four weeks, or a combination of letter and campaign. The uptake, as shown by examination of laboratory records, was significantly greater in the region receiving the invitation letter than in the control region (Odds Ratio 1.61; 95% CI 1.49-2.33). The combination of campaign and invitation letter was even more effective (Odds Ratio 3.0; 95% CI 2.38-3.77), but this increase in screening included an increase among women who had already been screened in the previous two years. Only the strategy of the letter alone showed a more specific effect on those who needed screening, accompanied by a decrease in screening among women who did not. At the population level, the letter alone was associated with a 3% increase in the quarterly screening rate for the region concerned.

In the studies by Byles et al in rural New South Wales, a letter-based campaign was compared with intensive general practitioner-based recruitment; both were accompanied by a media campaign. In two out of three regions, the combined invitation letter and media campaign was associated with an increase in Pap smears, attendances for Pap smears being 53% and 43% higher than expected, and the increases were significantly greater than in a control region. However, the combined letter and media campaign was less effective than the combined general practitioner based recruitment and media campaign.

In the Western Australian study of invitations sent to women in a disadvantaged urban area randomly selected from the electoral roll, the response to the invitation letter was monitored by questionnaire sent to women three months after the initial letter. Of the 1651 women aged 20-69 years who were randomly selected, 845 responded to the questionnaire and 30% of those with an intact uterus reported
having attended for a Pap smear. Factors which were significantly associated with a positive response to the invitation were being currently married or living as married, having more years of education, having access to a female general practitioner, knowing the screening interval and being more recently screened. Only 16% of those never previously screened had a Pap smear in response to the invitation, compared with 35% of those who had been screened 1-3 years previously. Age was not significantly associated with the response, nor was ethnic background as determined by country of birth and language spoken at home.

Because only just over half of the women responded to the questionnaire, the response to the invitation was also calculated based on the assumption that none of the non-respondents to the questionnaire estimated to have an intact uterus had a Pap smear. On this basis, the proportion screened in response to the letter estimated to be 18%. Under this pessimistic scenario, comparison of the estimated age-specific proportions of women responding to the invitation, with the proportion of women expected to have a smear in a six-month period based on data from the 1992 Western Australian cytology survey described above, showed increases of 2-5% for women aged 30-49 years. The effect was greater in women over 50; women aged 50-59 were almost one and half times as likely to have a Pap smear in the six months after the letter, and women aged 60-69 years were four times as likely to be screened in response to the letter as would be expected from population screening rates for 1992. The most common reasons given for not being screened included 'had not got around to it' or 'had not had a chance' (65%).

**District and general practice registers**

Studies describing the results of call and recall schemes using district registers include a number of general practices, which are likely to vary in their degree of commitment to the program. These studies are summarized in Table 2.2. Excluding women ineligible because of hysterectomy or recent smear, the responses to the invitation ranged from 14% in a disadvantaged area of Manchester to 41% in a largely rural area of Scotland. Excluding women for whom the addresses were incorrect naturally raises the response rate. For example, in the study by Beardow in inner city London, there was a 13% uptake (90/687) in response to the first letter, which rose to 17% (90/530) when women found to be ineligible were excluded, and 43% (90/210) when women with incorrect addresses were excluded.
As would be expected, studies based on individual general practices (Table 2.1) have generally shown a higher rate of response to invitation letters, ranging from 26% in a program involving a second letter to non-respondents 148 to 96%. The latter result has not been achieved in any other studies, and involved intensive follow-up using an unknown number of letters, phone calls and home visits to reach non-responders. 174

In response to the disappointing attendance rates in the Dutch national call system, a pilot study of a call system in nine general practices was undertaken in Nijmegen, and attendance rates compared with those for women in other practices in the same area who were called by the local health authority under the national system. 169 All women were initially identified from the population register held by the local health authority. For women in the group invited by their general practitioner the overall attendance rate was 57%, compared with 44% of those invited by the health authority. Although the invitations from the general practitioners were only sent to eligible women (those with an intact uterus, those with no smear in the past year, and those not undergoing follow-up for cytological abnormalities), the attendance rates were calculated using as the denominator all women originally identified from the register, in order to allow proper comparison with the control group, in whom eligibility could not be defined in advance. As noted earlier, contact by reminder letter or telephone call increased the response substantially for the general practice group; for these practices the final response, after ineligible women were excluded, was 84%. The usual decline in screening rates among older age groups was not seen in those invited through general practice.

The results of several call and recall schemes have been expressed in terms of the proportion of eligible women in the target population who are adequately screened, and most have achieved over 80% coverage of eligible women. 71, 150, 172, 175 Not all have indicated the extent of coverage before beginning the program. In Scotland, Reid et al showed that the proportion of adequately screened women in the target area increased from 71% to 78% with the operation of an organized call and recall system, and increased further to 85% following the introduction of general practitioner contracts involving targets. 127

Majeed et al in a study of 128 practices in England, using data from the health authority and census data, found considerable variation among practices in the proportion of women screened. 119 The proportion of women who had been screened in the previous five and a half years (the recommended screening interval
being five years) ranged from 17% to 94%. Factors which were associated with significantly higher screening coverage were the presence of a female partner in the practice and the number of children under five years in the practice. Practices in more disadvantaged areas, as measured by overcrowding, had significantly lower coverage, as did those with a high proportion of women from ethnic minority groups, and those with a high proportion of patients who had changed their address in the past year. It was noted, however, many practices in deprived areas were able to achieve high uptake rates. Although those with computerized practices had higher coverage in the univariate analysis, this effect was not significant in the multivariate analysis as it was related to the level of affluence of the practice population.  

In the American study of disadvantaged women, in which women were sent information and invitations with their welfare payments, 31% returned the card requesting an appointment, but only half of those who were sent appointments ultimately attended. This was considered to be at least partly due to delays in setting up sufficient clinics to meet the demand.

Recall using laboratories and cervical cytology registers
One would expect higher response rates for recall programs which send reminders only women who have previously been screened. In an early study in Manchester, recall letters were generated from a laboratory to remind women to return for another Pap smear three years after a normal smear. The apparent response rate was 48%. However, excluding women who died, those who had already been screened in the intervening period, those who had undergone hysterectomy, and those who had moved away, the effective response rate was 72%. Response was not related to social class, unlike the response to the initial invitation. Women who been screened originally at a mobile facility such as an industrial clinic were less likely to respond. Other factors adversely affecting the response were finding the first test unpleasant and working outside the home.

In the English study based on the National Health Service Central Register, 42% of all women in the study and 64% of those eligible for screening had another smear in response to a recall letter five years after their original smear. The main reason for non-response was that women had been screened elsewhere during the intervening period. Unlike the previous study, the response was lower in women of lower socioeconomic status. Women who had had their smear in a hospital setting were less likely to respond.
As noted above, the Victorian Cytology Registry has begun its recall program, but no results are yet available.

Other registers
The effectiveness of the Pap Test Reminder Service operated by the NSW State Cancer Council was evaluated by sending questionnaires to women 10 weeks after their reminder letter. The validity of the results was limited by the response to the questionnaire of only 49%. Of those who did respond to the questionnaire, 56% had a Pap smear in response to the reminder letter. This represented a 9% increase over the number of Pap smears expected in the time period, using Medicare data. Under the most pessimistic assumption that none of those who failed to respond to the questionnaire were screened, only 23% would have been screened in response to the reminder letter. Of the respondents to the questionnaire who were not screened, 11% indicated that they were not actually due for a Pap smear. This problem would not arise if the reminder system were linked to Pap smear results as in a cervical cytology registry. Other reasons for not responding included the logistic barriers referred to earlier, such as family and work commitments, as well as the usual 'not getting around to it'. When these women who had not been screened were asked what would make having a Pap smear easier, the most common response was 'having the Pap test done by a woman' (25%).

Factors affecting response to invitation
In an early review Kegeles and Grady summarized the effectiveness of individual contacts in recruiting women for screening. They noted that the use of individualized invitations brings in low users of health services and women at high risk of cancer, and that the success of such reminder systems seems to be largely independent of demographic and attitudinal factors. They also noted that women who can return to the place where they had their original test are more likely to have repeat tests. The more recent research reported here confirms these findings, showing that uniformly high coverage can be achieved. Studies have shown some variation in response by age and screening history, with older women and those not previously screened being less likely to take up the offer of a smear.

THIS IS A BIT THIN HERE. PERHAPS PUT RESPONSE IN RELATION TO AGE ETC, OR THE FACT THAT A REMINDER SYSTEM CAN OVERCOME OTHER BARRIERS OR LEAVE OUT ALTOGETHER.
Acceptability to women

The overseas studies reported here have not specifically evaluated the acceptability to women of individualized invitations. It has been assumed that, at the very least, those who have responded have found the invitation acceptable. In the Victorian study in which women identified from the electoral roll were sent invitations, a toll-free number at the Anti-Cancer Council was provided for women to call with any concerns. Although letters were sent to over 10,000 women, only 12 rang on the toll-free number, none were angry or anxious and none were concerned that the letter implied that they had cancer; only two queried the source of their name. The acceptability of mailed invitations in the Western Australian study was not directly evaluated. The original invitations had been sent to all women over 18 as information about age was not available from the electoral roll at the time. There was a small number of phone calls (fewer than 5% of the invitations sent out), but these were mainly relatives of women in their eighties who felt that their relative was too infirm to be screened.

Byles investigated the acceptability of individual letters in rural New South Wales, by means of a post-campaign survey which achieved a response rate of 86%. Two-thirds said that they had received the letter, and of these 78% were pleased that the letter was personally addressed to them, 94% agreed that such letters should be sent to all women, and 83% said they would like to be reminded regularly by letter.

In another study by Byles, which involved comparison of two direct-mail strategies, acceptability of the interventions was again high, with 78% of women receiving the simple basic letter and 68% of women receiving the letter and information package being pleased that they received the letter addressed to them personally. More than 95% thought such letter should be sent to all women. This evidence is slightly less convincing as the overall response rate to the post-campaign survey was only 31%.

It is clear that, in rural Australia at least, there is little objection to invitation letters. In each study the letter was sent from the State Anti-Cancer Council or Cancer Foundation. It must be noted that in each of these programs, there was no suggestion that the sender had knowledge of a woman's eligibility for screening.

There are unlikely to be problems with the acceptability of invitation letters sent from the general practitioner to his or her own patients, although there is little direct evidence on this point. Ward et al asked women patients of general practitioners what might help them to have their next Pap smear. The only
strategy nominated as being likely to help 'a lot' by at least 50% of respondents was 'if I was reminded to have one by getting a letter from my GP'. The strategies of being reminded by a letter from the Cancer Council or from the Department of Health were nominated as being likely to help 'a lot' or 'a little' by over 50% of respondents.

STRATEGIES FOR PROMOTING PARTICIPATION IN CERVICAL CANCER SCREENING

II IMPROVING OPPORTUNISTIC SCREENING

Another approach to increasing the uptake of screening is to make use of the opportunity of women's contact with the health system for other reasons, and to offer them a Pap smear. This is referred to as opportunistic screening, and will be used here with reference to contacts with the health system in general practice and in hospital.

Studies of women with invasive cancer have shown that there have been missed opportunities for screening them in the years before their diagnosis. Macgregor found in Scotland that 75% of women with invasive cancer had a record of a hospital admission for some other condition, but had never been screened. More recently a study of women with invasive cervical cancer in a deprived area of New York City found that two thirds had not been screened within the previous five years, although 73% of the unscreened women had received ambulatory medical care over that time period, and 18% had been hospitalized. There were similar findings in another American study, where 65% of women aged 65-79 with invasive cancer had never been screened, although 88% had seen a doctor in the previous three years.

In a recent case-control study in Manitoba, Canada, Cohen found that while women with cervical cancer were less likely to have visited doctors than had controls, the number of non-users of medical services was much smaller than the number of untested women, indicating once again missed opportunities for cervical screening. Cohen suggests that 'health care policy directives should be aimed at physicians rather than at women in the population (p 97)'.

A recent survey of women in a disadvantaged area of London revealed that 20 to 30% of women in outpatient departments and general practitioners' surgeries and 35% of non-gynaecological in-patients needed screening, illustrating the potential for reaching unscreened women through opportunistic screening of women in these health care settings.
General practice

In Australia, the general practice setting provides an important opportunity for reaching women who would otherwise not be screened. According to the 1989-90 Australian Health Survey, over 80% of women had visited their general practitioner in the previous twelve months. Studies of women's attitudes described earlier indicate that failure of the doctor to suggest a Pap smear may be a barrier to screening. Cockburn et al have suggested that many of the barriers to screening such as embarrassment, being too busy and lack of knowledge of the recommended screening interval, could be overcome by the clinician in routine practice.66 Patients do not seem to be opposed to the idea of being offered a Pap smear by their doctor, and for the majority of women, the general practitioner is the preferred person to take their smear. Almost all (99%) women in one Australian study said that they would like their general practitioner to tell them if they needed a Pap smear.

Several studies have shown the effectiveness of opportunistic screening as carried out by individual general practitioners. By determining the Pap smear status of each woman at each consultation, Ross achieved a situation in her Glasgow general practice in which 84% of eligible women had been screened within five years, and 76% within 3 years. A male general practitioner in rural New South Wales achieved 86% coverage overall, and 74% coverage among women aged 55-69 years, and another male general practitioner in Western Australia, by having surgery staff review the notes of women to assess the need for screening before each consultation, achieved 73% coverage of women in his practice, with 64% of previously unscreened patients agreeing to be screened.

While these reports show what can be done by enthusiastic and motivated general practitioners, there is some uncertainty as to how many general practitioners are willing to make this kind of effort over an extended period of time. There may also be publication bias here, as individuals with poor records of screening in their practice are less likely to publish their results. One which did so was a model teaching family practice in the United States, with no time or financial pressures on the doctors, where only 30% of eligible women were screened at their first visit to the clinic, 19% at the second and 8% at the third.

Even amongst general practitioners who were motivated enough to participate in a trial of different approaches to opportunistic screening in Sydney, there was considerable variation in the effectiveness of different general practitioners in encouraging women to be screened. The least effective managed to persuade
women to have a smear in only 11% of cases, while the most effective succeeded in 94% of cases. Among doctors participating in a Victorian study which required them to offer Pap smears to all eligible women, 11% of women aged 40 to 65 years and 32% of women over 65 were not offered a smear, even though the effort was required for only 10 days.201

Although general practitioners tend to overestimate their use of preventive measures 202 some general practitioners are aware of their deficiencies in this area. In a study of NSW general practitioners, although over 90% of respondents thought that having doctors take responsibility for initiating Pap smears would increase the uptake of screening, 43% said that 'forgetting to take smear tests' was a factor which tended to discourage them, and 48% cited lack of time.159 Sixty percent thought that 'having a method for reminding myself to raise the issue' would encourage them to take more smears.159 Others have confirmed that the main barriers to opportunistic screening among general practitioners were forgetfulness, difficulty in identifying dates when Pap tests were due, and time constraints.203

While there has been little research in Australia on the relative effectiveness of opportunistic screening, the outcome of 25 years of largely opportunistic screening is that rates of screening rates are relatively low, especially among older women who are not having vaginal examinations for other reasons 61

In Britain, a survey in 1982 of over 6500 records from 29 practices showed that general practitioners who had only an opportunistic policy for cervical screening achieved on average 47% coverage of their eligible patients, compared with over 65% for those with a 'screening program'.204 A screening program was defined as one in which patients were recruited by direct contact, rather than consultations for other reasons. The differences found may reflect differences in the enthusiasm for cervical screening among different practices, rather than the effect of the different methods of approaching women.

Havelock has made a useful distinction between unsystematic and systematic opportunistic screening in general practice.162 The former consists of arranging a Pap smear (either immediately or at some time in the future) during the course of a routine consultation, without any particular prompt to the doctor; the identification of eligible women may be somewhat haphazard.162 A systematic approach involves identifying (usually from practice records) women in the practice who need screening, including previously untested women, and having some system of prompting the doctor to offer them a smear at the time of the consultation.162
Havelock has categorised this type of opportunistic screening with the sending of call and recall letters, but it is useful to consider it separately.

If the potential for increasing coverage of eligible women is to be realised through opportunistic screening, a more systematic approach is needed. There are three components to effective opportunistic screening:

- there should be a system for identifying eligible women and indicating to the doctor at the time of consultation which women are eligible
- the doctor should be able to persuade women to be screened
- the practice organization should support the program

Much of the research in this area comes from the United States where, unlike the United Kingdom, practices do not have lists of the target population which would facilitate organized call and recall, and so more attention has been paid to ways of enhancing opportunistic screening.

**Identifying eligible women and prompting the doctor**

Identification of women eligible for screening can be done by computer or manual methods, or a combination of the two. For example the practice age-sex register may be used to identify women of the appropriate age group, after which manual audit of records is carried out in order to identify eligible women. While use of a computer does simplify the process of identifying eligible women, a systematic approach to opportunistic screening can be taken using manual methods.\(^205\),\(^206\)

With respect to prompting the doctor, in fully computerised practices the relevant information can be seen on the screen or printed out before the consultation.\(^203\),\(^207\)-\(^210\) In a manual system, once eligible women have been identified, the woman's records are marked in some way obvious to the doctor, to indicate that the patient needs a smear. This has been done in the form of coloured stickers, stamps, or even completed cytology request forms.\(^173\) In the British literature, these methods have been referred to as 'tagging the notes', while in the United States they are referred to as 'physician reminders'.\(^130\)

**Manual methods**

Women's eligibility for screening can be determined by systematic examination or audit of practice records, a task often undertaken by a practice nurse.\(^161\),\(^163\) This can be a very time-consuming task in a manual system. For example, it was
estimated in one study that four minutes on average were needed to review each medical record for eligibility for screening, even after women of the appropriate age group had been identified from the practice age-sex register. In one Australian study, general practitioners reported that the most influential barrier to preventive care in general practice was their lack of time to audit medical records to identify those in need of preventive care.

Identifying women's eligibility as they come to the practice for other consultations does not require commitment of a large block of time, and can be the basis of a systematic opportunistic approach, provided that it is done consistently. This can be achieved through examination of the medical records when the patient arrives, or through having patients complete a screening questionnaire while in the waiting room, bearing in mind the limitations of self-report in underestimating the time since the last smear. Such a system also allows identification of other preventive measures needed and appropriate health checks can be offered. In one New Zealand practice the cervical screening coverage of eligible women was increased from 45% to 87% by this means.

In a study in Melbourne, all women over 40 who presented to 19 general practices were given an educational leaflet about Pap smears and a questionnaire about their Pap smear history to complete in the waiting room. While the use of the self-administered questionnaire may have oriented the women to the idea of screening and contributed to the proportion agreeing to a smear at the initial consultation, it was not a particularly strong prompt to women, as only 18% took the initiative to ask the doctor for a Pap smear. For those who did not ask for a Pap smear, the doctor was asked to determine the woman's need for screening and offer one. Three quarters of those at risk initially accepted the offer of a Pap smear, and about half of those at risk actually had a Pap smear, 26% at the same consultation and 23% at a later date.

A number of North American studies have described the practice of systematic review of patients' eligibility for various screening tests as they attend for other reasons. The effectiveness of these interventions has usually been assessed by a succession of cross-sectional surveys, and the studies have provided no indication of overall coverage of women in the practice by cervical screening.

In one University-based general internal medicine practice in the United States, a 'health maintenance flow sheet' was placed in the patient's medical record. A specially trained nurse examined the patient's record, and noted on the flow sheet the date of the last performance of the recommended procedure such as a Pap
smear. The flow sheet was reviewed by the nurse before each visit and a reminder slip was clipped to the front of the record when an item was due. There was no significant increase in the performance of Pap smears, with the proportion of women with an intact uterus who were screened in the two time periods being only 13% and 14% respectively.

A similar approach was used in a randomised trial in 98 general practices in the United States which compared the use of the flow sheets ('office systems approach') with an educational intervention. Practices were assigned to one of four groups, receiving the educational intervention, the 'office system' intervention, both of these, or no intervention. The educational intervention consisted of a one-day meeting for doctors directed at improving knowledge, attitudes and skills relevant to prevention and early detection of cancer. Only the practices with the 'office systems approach' showed an increase in the proportion of eligible women having a Pap smear (from 58% to 71%) but the difference was not statistically significant. The papers did not report the cost of the work by the nurse in reading the chart and informing the doctor and patient of what was required.

Another method of identifying eligible women is to put the onus on the woman, by providing her with a small card indicating when her next smear is due. This approach has been used for many years with children's immunization record cards. The effectiveness of such a patient-held 'mini-record' or 'health diary' was tested in the United States, where patients in two group practices in the one family practice teaching clinic were given a 'health diary' and patients in another group practice in the same clinic were used as a control group. The 'health diary' was a passport-sized card which was distributed by nursing staff and completed by the doctor, and which covered a number of preventive manoeuvres, including blood pressure checks, vaccinations, faecal occult blood, breast examinations and Pap smears. Compliance was calculated as the percentage of 'indicated' manoeuvres performed within the time period. In the case of Pap smears, this was defined as annual Pap smears for at least three years, after which, if all were normal, annual smears were classed as 'not indicated'. Compliance with Pap smear recommendations in the intervention group increased significantly from 63% at baseline to 78% at 6 months, but declined at 18 months to below baseline levels. For the control group practice there was a decline over both time periods. The authors concluded that the decline was due to the lack of on-going involvement of nursing staff in prompting the use of the diary. It does raise questions of the sustainability of such
an intervention, which clearly required much effort on the part of nursing and office staff, and to a lesser extent the medical staff.

Although the Australian Cervical Screening Programme has produced credit-card-sized cards for women to mark when their next Pap smear is due, the use of these cards has not been formally evaluated here. In the study by Ward et al of general practice patients in Sydney, more than half of them said that 'having my own card with the date for my Pap smear written on it' would encourage them to have their next Pap smear.191

Computer methods
The use of computers should provide an efficient approach to identifying eligible women and prompting the doctor to offer a Pap smear. For practices with computers these are relatively easy tasks, provided that the screening history is on the database and there are provisions for updating the information.207,210 The use of a computer-generated reminder to the doctor has been described in a number of studies,203,207,209,210 and may be in the form of a printout or a message on the computer screen. Ravet, in a suburban general practice in Perth, used the computer to generate a list of outstanding procedures for each patient at the time of consultation, and increased the percentage of eligible women in his practice who were up-to-date with screening from 33% to 89%.207,213 He reported that the weekly computer processing of over 13,500 records to identify eligible women took only four minutes of operator time. In a similar process in an American practice, the computer printed out at each visit a form telling the doctor which health maintenance procedure was appropriate, and the date that each intervention was completed or refused by the patient.210 The use of this system was reported to increase cervical screening coverage of eligible women from 42% to 71%.

As with the manual methods of identification described above, American studies of computer-generated reminders have relied on examination of the proportion of women screened in cross-sectional studies of different samples of records before and after the intervention. In one study of internal medicine residents, McPhee et al compared the effectiveness of computer generated reminders to the doctor, in the form of a list of overdue tests for each patient at the time of the visit, with the strategy of monthly feedback to the residents about their performance rates.203 These were compared with a control group which received no intervention. Although the cancer screening reminders had a significant impact on other cancer screening tests, there was no significant effect of either of the interventions on cervical screening in comparison with the control group. The authors attributed
this to the already high level of compliance with cervical screening in the pre-
intervention phase.203

A similar study was carried out with primary care physicians examining the effect
of computer generated lists of overdue tests for each patient as before, supplemented with patient education materials, compared with a control group.209 Using three yearly screening as a standard, and there was a statistically significant increase in the proportion of women in the intervention group who were adequately screened from 121% to 155%, indicating that even before the intervention the screening was being done more often than the recommended three yearly interval and that it increased even more. Clearly the measurement of outcome in this study took little account of over-screening.

McDonald et al took a similar approach in a study of doctors in a general medical
clinic, except that the computer generated reminders and prompts to the doctor encompassed a much broader range of issues.208 They included a total of 1490 rules generating a total of 751 different reminder messages. The computer printouts included references to relevant medical literature about physician behaviour in relation to treatment as well as preventive measures. For Pap smears, 38% of eligible women in the intervention group had been screened compared with 22% in the control group. Unfortunately the authors did not state whether annual or three yearly screening was taken as the standard.

It must be said that while these United States trials provide some evidence for the effectiveness of computer generated reminders, the evidence in relation to Pap smears is inconclusive, mainly because of problems with the measurement of the outcome. All have used either independent samples, pre and post intervention, or in some cases a small historical cohort; there are no prospective studies of the direct effect on a cohort of eligible women, and measures of the proportion of women adequately screened are rarely included. Haynes has commented on the weaknesses of studies of this type.214 In the United States an important problem specific to cervical screening is the choice of a three year screening interval as the criterion in a situation where annual screening has been the normal practice.

Comparison of 'patient reminders' and 'physician reminders'
There have been three different studies comparing the effect of reminder letters or telephone calls to individual patients, referred to in the North American literature as 'patient reminders', with the effect of providing a prompt to the doctor to remind him/her to offer a Pap smear when the patient attends the surgery for some reason.
The latter approach is referred to in North America as 'physician reminders', while in Australia and Britain it is called 'tagging the notes'.

In an inner-city London practice, Pierce et al showed that 'tagging' the notes of eligible women to remind the doctor to offer a smear was as effective as mailed letters of invitation in encouraging eligible women to be screened. Eligible women were randomly allocated to one of three groups, one in which women were sent invitation letters, one in which the notes were tagged with a prompt to the doctor in the form of a partially completed Pap smear request form, and one group which acted as a control group. Thirty-two percent of women who were sent the invitation letter, and 27% of those whose notes were tagged were screened in a twelve month period, compared with 15% of those in the control group. Each of the systematic approaches, i.e. the note-tagging and the invitation letters, was significantly more effective than unsystematic opportunistic screening, but there was no significant difference between the two systematic intervention groups. It was noted that 27% of the women in the group with tagged notes did not attend during the 12 months of the study. In each group, women who had been screened previously were twice as likely to have a smear during the intervention period as those who had not previously had a Pap smear. The effectiveness of the systematic approaches is even more striking when one considers that the women in the study were only those who were not already on the practice's recall system, and thus presumably more resistant to screening. Of 1232 women aged over 35 years in the practice, 53% were already on the practice's recall register, and thus ineligible to participate. Although women of the relevant age group were identified from the practice age-sex register, it is not clear whether the woman's screening history was determined from manual examination of records or by using the computer. In any case, tagging the notes is a manual operation.

In Canada, McDowell et al compared the effectiveness of what they called 'active reminders' or 'patient reminders' in the form of letters or telephone calls to women, with 'passive reminders' or 'physician reminders' which involved a computer-generated prompt to the doctor to remind him/her to offer a Pap smear. The study design was similar to that of Pierce et al referred to above. Eligible women were identified by computer and randomly allocated to one of four groups, with the outcome being the number of women screened in the 12 months after the intervention. In the control group which received no intervention 14% of women were screened; 16% were screened in the 'passive reminder' group. There were two 'active reminder' groups in which attempts were made to contact eligible women. One group were sent a computer-generated reminder letter inviting them...
to attend for a smear, with a further letter after 21 days to non-attenders (26% screened), and in the other group women were contacted by telephone by the practice nurse (20% screened). Considering all women allocated to the different interventions, only the reminder letter was associated with a significantly higher uptake of screening than in the control group. Considering only those women who attended the practice during the year of the study, 36% in the control group and 44% of those in the group with physician reminders (prompts to the doctor) were screened, and there were no significant difference between those receiving the letter or telephone reminders and the control group. These authors examined the cost-effectiveness of the various approaches and found that, for those who did attend, the prompt to the doctor (physician reminder) was the most cost effective.

The difference in the outcome for these two studies is likely to be related to the proportion of eligible women attending the practice over the period of the study. In the study of Pierce et al, in London, where 63% of eligible women attended in one year, the tagging of the notes was as effective as the reminder letter. In the Canadian study, where only 37% of eligible women in the physician reminder group attended, the reminder letter was significantly more effective.

A study in a University general practice in a disadvantaged area of Perth, Western Australia, examined the effect of reminder letters to women, with and without appointments to a special screening clinic in the practice, and compared them with the effect of 'tagging the notes' and with the uptake of screening in a control group with no intervention. There were 757 eligible women aged 36-59 identified from the practice's computerized age-sex register who were randomly allocated to one of the four intervention groups. Women in the two invitation letter groups were sent a letter on practice letterhead, signed by the nurse, inviting them to attend the practice for a smear. Both the letters with and without appointments indicated the availability of the special screening clinic, staffed by women. If a patient failed to attend within four weeks, a reminder telephone call was made by the nurse; a reminder letter was sent if telephone contact could not be made. The tagging of the notes consisted of a form attached to the patient's record indicating that she needed a smear. The form had a place for the date of the initial offer of a smear and two reminders, as well as the reason for refusal, and included information about the special screening clinic. The appointment letter (30% uptake) and 'letter only' (26% uptake) strategies were significantly more effective at recruiting women from the randomly allocated practice population, than were the opportunistic methods (tagged notes 21% and control 17%). Only 47% of the women in the control group and 39% of the women in the tagged notes group.
attended the practice over the 12 months of the study. Considering only those who attended the practice, 65% of the tagged notes group and 36% of the control group had a smear, a statistically significant difference. There was considerable variation in the cost of the different approaches. The average cost per Pap smear achieved for the appointment letter group was $48, and for the letter only group $45. The costs were largely attributable to the high labour costs associated with the special Pap smear clinic, for which attendances were very low. In contrast, the cost per Pap smear in the tagged notes group was $15, similar to that for the control group. This confirms the findings of McDowell et al that tagging the notes or providing 'physician reminders' is the most cost-effective approach for those who do attend the surgery.\textsuperscript{131}

McDowell et al recommend a combined approach, in which 'physician reminders' are used for women who attend the practice, backed up by an active reminder by telephone or letter for all women who do not attend within a certain time period.\textsuperscript{131} In their study the telephone call from the nurse was found to be the more cost-effective of the active reminder strategies.

\textit{Persuading the woman to be screened}

In Bowman's study of NSW general practitioners, the inability to convince women who refuse to be screened was the factor most often cited as discouraging the provision of Pap smears, cited by 59% of general practitioners.\textsuperscript{159} However, the evidence indicates that this is not as great a problem as doctors perceive it to be, and the simple advice to have a smear is often sufficient.\textsuperscript{114, 196, 213} Brett noted the 'unexpected willingness' to accept straightforward advice on the need for a Pap smear.\textsuperscript{114}

Ward et al examined the effect of two different interventions to increase the uptake of screening when offered by a male general practitioner.\textsuperscript{196} While in the waiting room, women completed a screening questionnaire on women's health, including questions which defined their eligibility for a Pap smear. Eligible women were randomly allocated to a minimal or maximal intervention, the minimal one consisting of a simple recommendation from the general practitioner that the woman have a Pap smear, either then or at the next visit. For the maximal intervention, the general practitioner was instructed to explore the barriers to the woman's participation in screening and make appropriate responses in an attempt to persuade her of the need for a Pap smear. Sixty-one percent of women had a smear, 45% on the day it was offered and a further 16% within one month. There was no significant difference between the two intervention groups in the uptake of
screening. Past screening history did not affect the uptake. It was encouraging that 64% of women who had not previously been screened responded to the offer of a Pap smear. The uptake of screening in this study (61%), covering an age range 20-69 years, was higher than that achieved in a Victorian study which was directed at women over 40 years. In the latter study, 50% of women offered screening took up the offer, 37% at the same visit. Interestingly, in Ward's study, the uptake was higher among older women. Both studies used a waiting room questionnaire to define women's eligibility, and the authors have argued that such a strategy helps to prepare the women as well as acting as a prompt to the doctor. This may account for the relatively high proportion willing to have a smear taken immediately.

A small minority of women may need to be approached more than once. Ravet estimated that about three visits per patient were needed to produce the desired effect, but presented no data on this point. Repeated attempts to persuade women to be screened may be more acceptable (and less costly) in the context of a surgery consultation than the sending of repeated reminder letters.

Supportive practice organization - the role of facilitators

Important barriers to the practice of preventive medicine in general practice are the lack of time to audit records and lack of medical record systems which facilitate preventive care. Havelock noted that general practitioners were willing to make organizational changes in their practices, but needed considerable support to do so. Davidson has referred to the importance of having on-going arrangements for systematic screening which fit into a practice and incorporate existing practice staff and systems.

Recognition of the need for organizational support for establishing systems within the practice for promoting preventive care has led to the use of facilitators in the United Kingdom. The facilitator is a person, usually a trained nurse, who goes into a practice on a short-term basis and helps the practice staff to implement systems for inviting patients, usually on an opportunistic basis, for health checks. This concept was originally developed in Britain in the context of assessing and attempting to modify risk factors for cardiovascular disease, and reports of the effectiveness have related to the effects in this area. However, although the health checks for women have included cervical screening of eligible women, usually by the practice nurse, the British reports have not included the effect on cervical screening. A parallel development in the United States has been referred to as the 'office systems approach', in the United States. McPhee et
al have written a useful review of the studies using this approach for a variety of preventive manoeuvres. The Office of Disease Prevention in the US Public Health Service has developed a number of resources for primary care physicians, to assist them to develop office systems facilitating preventive services, in the 'Put Prevention into Practice' program. These have been based largely on the work of Dietrich, and there are currently a number of pilot studies underway in the United States, evaluating the effect of using these 'PPIP' materials. A feature of this program is the extent of collaboration with doctors' organizations.

In New Zealand, White et al studied the use of practice nurse consultants in general practice to support practice staff in auditing records and setting up sustainable recall systems, so that eligible women over 45 could be invited for screening. By the end of six months, 77% of 26 practices had established recall systems, and the number of smears taken in the practices had increased by 18% compared with the previous year. Difficulties with monitoring the outcome precluded accurate assessment of the effect on screening coverage in the various practices. Another group of nine practices was supplied with clerical assistance to set up recall systems, and all did so, with an increase of 21% in the number of smears, and an increase of 154% in the number of smears taken in women over 45 years.

The use of facilitators or practice consultants is quite labour-intensive and presumably quite costly, but no studies have reported the cost of this approach.

Improving services within general practice

One way of enhancing opportunistic screening is to ensure that the services provided in general practice are acceptable to women. The preference of many women for a female smear taker has already been referred to, and many practices have attempted to provide this choice, either through female general practitioners or through practice nurses. Almost two thirds of the New Zealand practices surveyed by Harper could provide a female smear-taker, and 39% of practices had a practice nurse taking smears. A number of practices have set up well-woman clinics within the practice, often staffed by the practice nurse but no formal evaluation of the acceptability of these to women has been reported. Ross has argued that many women prefer to have their Pap smear taken during ordinary surgery sessions as this provides a certain 'anonymity of purpose', but no formal data has been presented on this point. In the study of Pritchard et al in Perth, where invitations were sent to women in a general practice inviting them to attend a special screening clinic in the practice, staffed by women, 73% of those who had
a smear in response to a letter with a specific appointment to the clinic actually attended the clinic, compared with 49% of those who had a smear in response to a letter without appointment. Attendance at the clinic from the other groups in the study was very low. Only one patient in the control group and three in the 'tagged notes' group attended the clinic. The combination of the relatively low response to invitations and the very low attendance from the practice patients in general meant that the labour costs for the clinic were very high, and it was not considered to be viable in the long term.

Requiring women to return to a special well woman's clinic in the practice or, indeed, to another appointment with the general practitioner may lead to attrition and reduce the impact of opportunistic screening. In the study of Cockburn et al 26% of those at risk (36% of those who accepted the offer of a smear) had their Pap smear at the initial consultation. Information was not obtained about whether the decision to defer was due to the doctor's lack of time or the patient's choice. Only half of those who said that they would return for a test at a later date did so, although it was noted that they were not invited to make specific appointments before leaving. In the study by Ward et al, only 29% of those who deferred their Pap smear returned within one month. Presumably the women who defer are those who are most reluctant to be screened; it may be that they do not wish to refuse outright but have no intention of having a Pap smear, in which case pressing them to be screened during the consultation would not necessarily lead them to have a smear. On the other hand it has been suggested that once away from the surgery the salience of a Pap smear and the perceived benefits become less important to the woman in relation to the perceived barriers. More research is needed on women's preferences in this matter.

Lewis and Mitchell found, in their study of Victorian general practitioners, that 56% took a smear as part of a general consultation if it was due, 26% asked the woman to return for another consultation, unless the current consultation was for a gynaecological reason, and 17% said that their approach depended on the circumstances. The design of this study precluded any examination of the effect of deferring the Pap smear to a later consultation.

In the context of cardiovascular disease, Waller et al have sounded a note of caution about the practice of inviting patients to return for health checks. In reviewing the results in an enthusiastic practice after five years they identified a strong association between social class and non-attendance, and suggest that for
high risk patients it is better to set aside medical and nursing time when they do visit rather than asking them to come back for a health check.

Other methods of increasing the uptake of screening in general practice

Financial incentives
Strategies to improve cervical screening in general practice need to address the more general structural barriers to the practice of preventive medicine in general practice. Support for office practices, such as reminders to the doctor, which are conducive to the practice of preventive medicine, have already been discussed in some detail. Other issues in Australia include the time available in the consultation, which is related to the question of specific remuneration for preventive procedures. Reference has been made earlier in this review to the effectiveness in the United Kingdom of financial incentives in the form of target payments, payable on achievement of two different levels of coverage by cervical screening (50% and 80%). Such an approach would be difficult to implement in the current Australian context, since there are no defined practice populations, but specific fee-for service payment for preventive measures such as Pap smears has been advocated.

Professional education
Professional education about cervical screening, in terms of both the communication skills needed to encourage women to be screened, as well as the practical skills needed to take smears, should improve the uptake of screening, since general practitioners who are more confident about taking Pap smears would be more likely to offer them. In the study of Dietrich et al in the United States, a one day educational workshop, directed at knowledge, attitudes and skills in prevention of various kinds of cancer, did not significantly increase the number of Pap smears taken by primary care physicians. Since a number of cancers were covered in the one-day workshop, it is likely that the amount of specific instruction on Pap smears was insufficient to make a difference.

There have been few attempts to examine the skills of general practitioners in taking Pap smears, and most have relied on self-report. Lewis and Mitchell in Victoria asked detailed questions about smear-taking technique, including the positioning of the woman, the type of speculum and the instrument used to sample the cervix, but were not able to observe the actual technique. They found that 79% used a bi-valve speculum and 63% examined the woman in a supine position. Most did not use different sampling instruments for pre- and post-menopausal
women. Only 69% said that they always visualised the cervix. Using the presence of endocervical cells as a measure of a well-collected smear, they compared the doctors' responses with relevant data from the Victorian Cytology Registry. Factors which increased the likelihood of having endocervical cells present included having relevant postgraduate qualifications or training, such as training in the Family Medicine Programme or the Family Planning Certificate. The lowest proportions of endocervical cells were in smears taken by doctors who were most recent graduates and those who had graduated more than twenty-five years previously. All smears in Victoria are registered with the Victorian Cervical Cytology Registry unless the woman objects, and a rather disturbing finding of this survey was that 41% of the general practitioners surveyed had no smears registered with the Victorian Cervical Cytology Registry over the two month survey period, and a further 8% had no record of a Pap smear ever being registered. This suggests that half of the general practitioners surveyed were taking very few smears indeed. The authors found that many general practitioners had received inadequate training in smear-taking, and that a number were confused about the recommended age range for screening and the screening interval.

Another aspect of professional education is the provision of feedback to doctors about their performance. Mugford et al have reviewed the evidence of the effectiveness of feedback to doctors, and found that it was most likely to influence clinical practice if it was part of an overall strategy in which doctors had already agreed to review their practice and where doctors had been involved in developing the strategy. Possible strategies for feedback to doctors on cervical screening are informing doctors about the coverage of eligible women in their practices, which is not easy in the Australian context, and informing them about smear quality, using the proportion of smears with endocervical cells as a measure of a well-collected smear. Ideally this feedback should be provided in the context of the performance of others. Jaen has suggested that a factor in doctors' performance of preventive manoeuvres is the perceived 'performance gap', or the doctor's perception of how his or her behaviour compares with that of other doctors in the community.

The literature in relation to feedback on cervical screening in particular is not conclusive. The one study in the United States, involving hospital residents, did not show an increase in the uptake of Pap smears in response to feedback to doctors, but the screening coverage was already very high, and the effects were assessed through cross-sectional studies of different groups of women. In
Britain, on the other hand, feedback to doctors about the coverage of their target populations, in conjunction with incentive payments, has been very effective.\textsuperscript{126} It is likely that the incentive payments played a major role there. In New Zealand, auditing of practice records to determine the coverage of women in the target population was part of a program of assistance to practices, but this was done in conjunction with the establishment of recall systems.\textsuperscript{163} There is no evidence about the effect of feedback on screening coverage in conjunction with purely opportunistic screening. It is possible that simply assisting doctors to audit their records and determine screening coverage may be sufficient motivation to improve opportunistic screening.

With respect to smear quality, while feedback about proportions of smears with endocervical cells has become the practice of many laboratories in Australia, there is little formal evidence about the effect.

**Conclusion**

It is clear from the above studies, that opportunistic screening in general practice, appropriately supported, has the potential to reach a number of unscreened women, provided that it is carried out systematically and consistently. In Australia, it seems that potential is not being reached at present.

There are limitations to what can be achieved by opportunistic screening, however. As Norman and Fitter have pointed out, the potential of opportunistic screening methods is limited by a number of steps involved in the process.\textsuperscript{223} In the first place, the patient has to attend the surgery. It has been shown that patients who are less likely to respond to recall letters are those who are also less likely to attend the surgery.\textsuperscript{148} More than a quarter of the women whose notes had been tagged in the study by Pierce et al did not attend the surgery over a 12 month period.\textsuperscript{173} Shelley has also noted that those least likely to attend their general practitioner are those least likely to be screened.\textsuperscript{65} Reliance on opportunistic screening means missing a crucial group of low attenders.

Secondly the general practitioner has to invite the patient to attend for screening. This may not happen if the patient is too ill, or the general practitioner is too busy. Finally the patient has to accept the offer of screening either on that occasion or make an appointment for a subsequent visit.\textsuperscript{223} Using a computer simulation model, Norman and Fitter have calculated that if one out of every four patients were invited it would take 12 years to achieve 90% coverage of the target population, compared with less than four years if three out of four patients were...
invited. They have shown that it is difficult to ensure a steady flow of patients into the screening program using opportunistic methods only. They argue that opportunistic screening methods will need to be combined with more formal methods of invitation, especially when the point is reached that most of the frequent consulters have been invited and screened.

Hospital services

The screening of female in-patients in public hospitals provides a good opportunity to reach groups of women who tend to be relatively older and of lower socio-economic status, groups which are relatively under-screened. This was confirmed by a survey of female in-patients aged 40-75 years at Fremantle Hospital in 1990 which revealed that 66% had not been screened in the past three years, including 26% who had never been screened. In 1972 Greenwald estimated that 53% of the deaths from cervical cancer in New York State from 1967-69 might have been prevented if there had been routine screening of all women admitted to hospital. State law in several States in the United States requires that a Pap smear be taken from a woman within a certain time period of her admission to hospital, unless there is an adequate reason for not taking a smear. Recent research suggests that this approach is not particularly effective, if there is reliance on medical staff to carry out the procedure, although there was more success with the use of nurse practitioners. In Maryland, older and low-income women who had been in hospital were no more likely to be adequately screened than those who had not been in hospital.

There have been reports of the provision of routine cervical cancer screening for in-patients in the United Kingdom, United States, South Africa, New Zealand, Canada and Italy. Most reports are confined to a description of the service provided, and the proportion of women taking up the offer. Details of the organization of the hospital based screening services and the uptake of screening are given in Table 3. In most situations, a trained nurse was responsible for the service. Recruitment was not always described, but in those studies in which it was reported, it was done either through a systematic approach by means of a daily list of admissions or through approaches directly to ward staff to find eligible women. All had the limitation that they relied on women's self-report of their screening status to define eligibility for a smear. The proportion of women taking up the offer of a smear ranged from 44% to 66%, most of those not screened being women who had a history of a recent smear. Refusals varied from less than 1% to 10%, and in those studies reporting the proportion with medical or
<table>
<thead>
<tr>
<th>AUTHOR</th>
<th>SITE</th>
<th>ADVERTISING OF SERVICES</th>
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<th>CHARACTERISTICS OF PATIENTS SCREENED</th>
<th>PREVALENCE OF ABNORMAL SMEARS</th>
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<tr>
<td>Sergeant et al, 1977</td>
<td>General Hospital Canada</td>
<td>Not described</td>
<td>Nurse obtained daily admission list</td>
<td>Nurse Practitioner</td>
<td>&quot;Extremely ill&quot; Smear &lt; 1 year</td>
<td>53% screened</td>
<td>33% never screened</td>
<td>15 per 1000 &quot;positive&quot; smears</td>
<td>Physician responsible for follow-up</td>
<td>Hospital ward</td>
<td>Nurse provided breast and pelvic examination and counselling in women's health</td>
</tr>
<tr>
<td>Dutoit &amp; Van Niekerk, 1978</td>
<td>General Hospital South Africa</td>
<td>Not described</td>
<td>Not described</td>
<td>Trained nurses from Gynecology Oncology Unit</td>
<td>Psychiatric wards, Intensive Unit, Recent smear</td>
<td>66% screened, 6% refusal</td>
<td>Not described</td>
<td>9.3 per 1000 &quot;neoplastic cells&quot;</td>
<td>Referral to gynaecologist</td>
<td>Hospital ward</td>
<td>Age limit &lt; 70 reduced to &lt; 65 due to high rate of refusal or hysterectomy</td>
</tr>
<tr>
<td>Boyce et al, 1981</td>
<td>General Hospital (Public) USA</td>
<td>Not described</td>
<td>Patients recruited by ward nurses</td>
<td>Trained registered nurse</td>
<td>Medical or psychiatric contra-indications</td>
<td>Aged &gt; 60 Recent smear &quot;Too III&quot;</td>
<td>&quot;All races, levels of income, education and occupation.&quot;</td>
<td>Public 13.7 per 1000 &quot;abnormal smears&quot;</td>
<td>Follow up by gynaecologist in charge of project</td>
<td>Not described</td>
<td>CINI 2 per 1000</td>
</tr>
<tr>
<td>Duncan and Parker, 1981</td>
<td>General Hospital New Zealand</td>
<td>Not described</td>
<td>Attempted to interview all women admitted to wards</td>
<td>Clinical Nurse Specialist in Women's Health</td>
<td>Aged &gt; 60 Recent smear &quot;Too III&quot;</td>
<td>&quot;All races, levels of income, education and occupation.&quot;</td>
<td>Private: 13.1 per 1000 &quot;abnormal smears&quot;</td>
<td>Not described</td>
<td>Not described</td>
<td>21.9 per 1000 &quot;suggestive of CIN&quot;</td>
<td></td>
</tr>
<tr>
<td>Foley, 1987</td>
<td>General Hospital USA</td>
<td>Written information to patients admission and via hospital TV.</td>
<td>Consultations initiated by patient, staff nurse or doctor</td>
<td>Trained nurse</td>
<td>Psychiatric, geriatric and infectious patients /too ill&quot; age &lt; 70, recent smear; no intercourse</td>
<td>Not described</td>
<td>54% never screened</td>
<td>5.4 per 1000 women screened</td>
<td>Patients notified of normal and abnormal results. Those with abnormal results referred to gynaecologist</td>
<td>Patient's room</td>
<td>Patients with abnormal results followed up by gynaecologist providing the service</td>
</tr>
<tr>
<td>Hudson et al, 1987</td>
<td>General District UK</td>
<td>Pamphlet to women awaiting admissions reminders to staff</td>
<td>Ward Sister nominated eligible patients</td>
<td>Gynaecologist</td>
<td>No intercourse, hysterectomy. Admission for gynae condition Aged &lt; 25 or &gt; 70</td>
<td>Not described</td>
<td>62% aged &gt; 55</td>
<td>Private: 6% refusals, 4% hyster. 3.7% &quot;organizational problems.&quot;</td>
<td>Medical or psychiatric contra-indications</td>
<td>Not described</td>
<td>Based on Sutherland, 1992</td>
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<tr>
<td>Franchesci et al, 1989</td>
<td>General Hospital Italy</td>
<td>Not described</td>
<td>Patients interviewed by nurse on admission</td>
<td>No intercourse, hysterectomy. Admission for gynae condition Aged &lt; 25 or &gt; 70</td>
<td>&quot;All races, levels of income, education and occupation.&quot;</td>
<td>6.2% refusals</td>
<td>4% hyster. 3.7% &quot;organizational problems.&quot;</td>
<td>Psychiatric, geriatric and infectious patients /too ill&quot; age &lt; 70, recent smear; no intercourse</td>
<td>Medical or psychiatric contra-indications</td>
<td>Not described</td>
<td>Based on Sutherland, 1992</td>
</tr>
</tbody>
</table>

Table 3: CERVICAL SCREENING FOR HOSPITAL PATIENTS

*Based on Sutherland, 1992*
psychiatric contra-indications it ranged from 10% to 17%. The proportion of women with abnormal smears was generally significantly higher than the corresponding general population, suggesting that the hospital in-patients were a relatively high risk group. None of the studies have compared the offering of a smear with any other kind of intervention, and none have addressed cost-effectiveness issues, although the study by Du Toit and van Nierkerk showed that 16% of women with abnormal smears died of their underlying illness before the smear could be investigated further. This suggests undue delay in follow-up, or screening of women who were too ill.

A recent Western Australian study has demonstrated the feasibility and effectiveness of a cervical screening program for hospital in-patients. This study examined the need for and the effectiveness of a Pap smear service, staffed by a Women's Health Nurse, for women in-patients aged 20-69 years, which was provided at a major teaching hospital in Perth, Western Australia. The effect of providing the Pap Smear Service (Service group) was compared with the effect of giving a pamphlet on Pap smears to eligible women (Education group) and with no intervention (Control group). Women were identified systematically through a daily list of admissions of women in the relevant age group. While 72% of eligible women in the Service Group accepted screening, only 24% of eligible women in the Education Group and 20% in the Control Group had a Pap smear in the four months after discharge from hospital, as determined by means of a mailed questionnaire. The differences between the Service group and each of the other two groups were statistically significant. There was a significant interaction between the uptake of screening and age, with the differences between the Service Group and the other two groups being much greater in women over 50. For example, examination of the data for women over 50 years of age showed that women in the Service group were over 50 times more likely to be screened than women of the same age range in the Control group (Odds Ratio 51.5, 95% CI 19.0 - 139.6) while the corresponding figure for women under 50 years was 6.3 (95% CI 2.5-10.4).

The service was effective in reaching older and under-screened women. The need for screening was demonstrated by the fact that 36% of those in the Service group who were still in hospital when reviewed needed a Pap smear (by their own self-report) and were well enough to be offered screening. The women screened by this service were significantly older than those screened in Western Australia as a whole in 1992 (65% were over 50 years of age, compared with 14% for the State as a whole), and 30% had never previously had a Pap smear.
Evaluation of this hospital Pap Smear Service showed a very high level of approval of the service on the part of administrators, nursing staff and medical staff (resident staff and consultants). All categories of staff considered the Women's Health Nurse to be the most appropriate provider of the service, except for the consultants, the majority of whom thought that the Pap smears should be taken by interns.

Screening of women attending hospital outpatient clinics has also been tried in the United States. Mandelblatt et al have described a screening clinic, run by nurse practitioners, established in a public hospital in association with a primary care outpatient clinic. Women were recruited by referral from doctors or nurses in the clinic, and through direct approach by the nurse practitioner to patients in the waiting area. This project was aimed particularly at women over 65 years and was well accepted, with 71% accepting a screening interview and 92% of these agreeing to have a Pap smear. One unexpected finding was that 22% of those who reported having had a hysterectomy had an intact cervix, and the authors recommend an initial speculum examination if there is any doubt, since many subtotal hysterectomies were carried out in the 1960's. The prevalence of abnormalities in this group of elderly black women was high, but a disturbing finding was the fact that 30% of these women refused further investigation, illustrating one of the difficulties of targeting older women.

STRATEGIES FOR PROMOTING PARTICIPATION IN CERVICAL CANCER SCREENING

III PROVIDING SERVICES ACCEPTABLE TO WOMEN

Providing smear-taking services which are accessible and acceptable is an important component of successful cervical screening, and one which will affect recruitment for screening, both through the effect on the women themselves and their willingness to return for further smears, and through the impact on their encouragement of other women.

Smear-taking services may be provided in general practice (either as part of the routine surgery or as a special screening clinic), as part of special women's health clinics (either specifically for cervical screening or covering other women's health issues) or in special situations such as workplace screening. The special case of screening of hospital in-patients has already been referred to and will not be discussed in detail here.
The acceptability of these various services has been studied through surveys of women asking them what they would like in a smear-taking service, usually confined to their choice of general practice or a special clinic, their preference for the sex of the smear-taker and in some instances the professional role of the smear-taker (doctor or nurse). Results of these studies vary from country to country depending on how well established a part of the health system a particular service is. For example women with no experience either directly or indirectly of women's health clinics or of trained nurses as smear takers are less likely to express a preference for them.

As Shelley and Turnbull have pointed out, it should also be noted that the expression of preference for a particular type of smear-taker does not necessarily mean that a woman would not use another smear-taker if her first preference were not available. Few of these studies have analysed preferences by age and screening history of the woman. While the majority of women may be happy with a particular type of service, it is by the impact of the services in reaching women who are difficult to reach that their ultimate success will be judged. Thus another approach to the study of acceptability has been the examination of the characteristics (especially age, ethnic background and screening history) of women attending special services in particular, to examine the success of these services in reaching groups who tend to be underscreened. Study of the barriers to cervical screening, as outlined in an earlier section, also provide clues to the optimal organization of cervical screening services to meet women's needs.

**Sex of smear taker**

A number of surveys have examined women's preferences with respect to the sex of the smear taker. In England a postal survey of women taken from the electoral roll found that 41% preferred a female general practitioner to take their smear, 12% a female family planning doctor, 4% a female nurse, and 38% had no preference. Only 5% preferred a male general practitioner to take their smear. The proportion preferring a female smear taker was higher for older women and women of lower socioeconomic status.

In a telephone survey in Melbourne women were asked about their choice of a new general practitioner if they needed a Pap smear. Half (52%) expressed no preference, 39% preferred female and 8% male. Similar figures were obtained by Grace in New Zealand in a sample recruited through community networks; 52% had no preference and 41% preferred female. A New Zealand community survey, based on the electoral roll, showed similar findings, with 35% saying that
they would prefer the doctor taking the smear to be a woman. A relatively high proportion of women (45%) said that they would prefer a special women's health clinic.

Roworth and Carter in Scotland, in another community survey based on the electoral roll, found that 31% preferred a female doctor and 65% had no preference. In a study of patients in a general practice where all partners were male, 54% preferred their usual doctor to take the smear, while 34% preferred the practice midwife. Older women and women not previously screened were more likely to prefer the practice midwife. A Scottish study in a group general practice found that 44% gave their own general practitioner (male) as the preferred smear taker. A female smear taker (female partner or practice nurse) was preferred by 37% of those who were adequately screened, 46% of those who had been previously screened but not in the past five years, and 51% of those who had never been screened. However, 95% of those who had ever been screened and 85% of those who had never been screened said that they would be willing to have the test from their own general practitioner if nobody else was available.

In a study of patients in three general practices in New Zealand, in which all except one of the doctors were male, 60% preferred their own doctor to take the smear, 15% preferred a visiting female doctor and 6% the practice nurse. Those with an out-of-date smear history were more likely to prefer a female alternative such as a female general practitioner, practice nurse, or well woman clinic.

Alexander and McCullough tried to separate out the preferences in terms of the sex of the examiner (male or female) and the professional role of the examiner (nurse or doctor), by surveying attenders at a screening program and a sample of non-attenders who had not been screened for more than three years. Amongst those attending, 30% preferred a female doctor, and a further 16% preferred a female regardless of whether the examiner was a doctor or nurse. Women were surveyed just after being examined; more than half of those who had been examined by a female expressed a preference for a female (mainly a female doctor), compared with only 12% of those who had been examined by a male. Low income women and Mexican-American women were more likely to prefer a female, and almost a quarter of the latter group said that they had come to the clinic because a female examiner was available. For those who had not been screened for more than 3 years, 57% expressed a preference for female (14% for female doctor), and only 39% had no preference.
Evidence of preference for a female smear taker also comes from comparing the screening histories of women whose regular general practitioner is female compared with those who have a male general practitioner. As noted earlier, women with a female general practitioner are more likely to be adequately screened.

In summary, surveys of women have shown consistently that for cervical screening, 30-40% prefer a female smear-taker, fewer than 10% prefer male, and about half have no preference. It is clear that at least one third of women overall express a preference for a female smear-taker, with higher proportions of underscreened women expressing such a preference. Women who are under-screened are more likely to state a preference for a female smear-taker. This should be taken into account in the planning of cervical screening services.

Role of the nurse

In making the choice of a female smear-taker available to women, the employment of a trained nurse in this role is an option which has been used for some years in many countries around the world. Practice nurses are responsible for cervical screening in many general practices in the United Kingdom and New Zealand. The employment of trained nurses as smear-takers has only recently become accepted in Australia through the training initially of Family Planning Association Nurse Practitioners, and later of Women's Health Nurses in the NSW Health Department. The evaluation of the latter program indicates a high level of satisfaction with the nurse on the part of those using the service.

More recently, in Victoria, a group of nurses working at community health centres was trained to take Pap smears and then employed to run screening sessions at the community health centres and to educate women in the community and recruit them for screening. The demographic characteristics of the women screened were compared with those screened by doctors in community health centres and a random sample of general practitioners. The women screened by the nurse practitioners were significantly more likely to be of non-English speaking background, to be older and to be underscreened. Thirty-five percent of women screened by nurses were of non-English speaking background compared with 19% of those screened by general practitioners. Thirty-nine percent were over 50 years of age compared with 16% of women screened by general practitioners. The results for the doctors at the community health centres lay between these two extremes. The screening history was determined objectively by searching the database of the Victorian Cytology Service (VCS), which includes all Pap smears
taken in the state of Victoria. Of the women screened by the nurses, 84% had not had a Pap smear recorded by the VCS in the past 2 years, compared with about 60% for the other groups. More than half of them had not had a smear recorded by the VCS in the past 10 years, compared with fewer than a third of the women screened by the doctors. Using the presence of endocervical cells as a measure of the adequacy of the smears, the smears taken by the nurses (74% with an endocervical component) did not differ significantly from those taken by the doctors. This was a particularly good result considering that more of the women screened by the nurses were of post-menopausal age, in whom it is more difficult to sample the transformation zone. A surprising result of this pilot study was that the women screened by the nurses, although expected to be of higher risk, did not yield a higher rate of abnormalities. The prevalence of CIN or worse was only 0.8% (14/1831); the age standardized prevalence ratio comparing those screened by the nurses with those screened by the other groups was 0.57 (95% CI 0.33-0.81).

Women's health clinics

A number of projects supported by the Australian government's 'New Initiatives for Women' funding have involved the provision of alternative services for women, frequently staffed by nurses. These include the Women's Health Nurse Practitioner program in NSW, services for rural women in Victoria, Queensland, South Australia, and Western Australia, and special initiatives to reach Aboriginal women in Queensland and the Northern Territory. The services were evaluated by examining the age distribution and screening history of women screened, and comparing where possible with data from the Health Insurance Commission or from Statewide surveys. Women screened by these services were more likely to be older and underscreened, in that they had either never been screened or not screened for some years. In the short-term, all of these services succeeded in producing increases in the numbers of smears being done, especially among older women. Some of this increase may have been due to women who would have otherwise been screened attending earlier than they otherwise would have done, a phenomenon referred to as 'borrowing from the future'.

The cost of providing the NSW Women's Health Nurse Practitioner service has been evaluated in some detail and has been estimated to be somewhat higher than the cost of providing similar services in general practice. The provision of Pap smear services by nurses working within general practice has not been examined in Australia.
In rural Victoria, special free screening clinics, staffed wherever possible by women, were used as one component of a campaign which also included community-based activities and educational activities with general practitioners. Continuity was provided by having results sent to a doctor nominated by the woman. The clinics were successful in reaching older women (70% were over 40, compared with 36% of women being screened through the usual medical services), and women who were underscreened. Over half had not been screened in the previous seven years. Factors related to the service provider, such as preference for a female practitioner or one not known to them, were cited by 42% of women as their main reason for attendance. Almost three quarters of the women said they would prefer to have their next Pap smear at a similar clinic. There was a 50% increase in the number of Pap smears from the region during the campaign, of which half could be attributed to the special clinics.

Women attending a pilot cervical screening service in Perth also gave embarrassment and the desire to see a female doctor as their reasons for coming to the clinic. However, this clinic, located in a professional office area, was less successful in reaching women at risk, as most women were Australian born and of comparatively high socioeconomic status.

A similar clinic was established in a disadvantaged area of Perth in conjunction with a study of the effect of invitation letters to women selected from the electoral roll, previously described. Over 18 months of operation only 876 women attended, but only limited publicity was allowed, because of objections made by local general practitioners to the Medical Board of WA. The clinic was relatively successful in reaching older women and under-screened women; the clients of the clinic were significantly older than those screened in Western Australia as a whole, and half of the women had not been screened for more than three years. Only 8% had never been screened. The main reason given by women for attending the clinic was the availability of a female doctor. Women from non-English speaking backgrounds, particularly those from Southern Europe, were over-represented in the clinic population compared with the census data for the area surrounding the clinic. This could be attributed to specific outreach activities with these ethnic groups on the part of the nurse educator responsible for the clinic.

Special Pap smear clinics staffed by local general practitioners have been set up on an occasional basis in rural areas in Western Australia and South Australia. In the Riverland region of South Australia, in conjunction with a local television
and radio campaign, general practitioners organised a free Pap smear clinic on each of four consecutive Saturday mornings, which were attended by a total of 277 women. Smears were taken by the male and female general practitioners in the practice. Reasons for attendance at the clinic were not explored, but the good attendance indicates the effectiveness of the media campaign, combined with the attraction of a free service and the opportunity to have a Pap smear in a different context from the usual surgery consultation. The clinics were moderately successful in attracting underscreened women, in that 40% of the women attending had not been screened in the past three years. Only 5% of women attending had never been screened, however, and half of these were under 20 years of age. The age distribution of women attending was quite different from the usual pattern of cervical screening, with almost half of the women attending (46%) being over 50 years old.

Special women's health clinics, including local authority well woman's clinics and family planning clinics, have been available in Britain for many years, but there has been no formal evaluation of their role in cervical screening. In addition, the mobile vans of the Women's National Cancer Control Campaign (WNCCC) have been set up in shopping centres and housing estates and at workplaces. They were shown to have attracted a higher proportion of women over 35 years, women of lower socioeconomic status and women having their first cervical smear than did the local authority clinics in the same area, but no comparison with general practice was given.

In one region in Scotland a decline in use of alternative services has occurred since the introduction of the general practitioner contract with targets for cervical screening. Concern has been expressed about whether women are being unduly pressured to choose their general practitioner for screening, or whether previous use of alternative clinics was merely a reflection of the lack of interest of general practitioners in cervical screening. While women screened elsewhere are excluded from the denominator for the calculation of general practitioner targets, payment is only made for those women who are actually screened in the general practice.

In one project in Detroit in the United States, mobile outreach clinics were shown to be more effective than standing clinics or workplace clinics in reaching high risk black women. However, as noted earlier, mobile clinics have limitations in facilitating regular screening, as women attending mobile clinics are less likely to return for subsequent smears.
Cost of services

As pointed out earlier, there has been very little research in Australia examining the effect of the cost of a Pap smear on women's acceptance of screening. Many of the alternative services, staffed by women, do provide free Pap smears to their clients, but it is not clear how important to women is the fact that the service is free. The main reason given for attendance at such services is the availability of a female provider. In any case, with the widespread prevalence of bulk-billing in general practice, Pap smears in general practice are free for many women; it is also possible for women to be bulk-billed for the laboratory charges. There is considerable variation in the extent to which women are out-of-pocket after having a Pap smear and this is an area which needs more research.

In New Zealand, where there is a charge of up to $30 for a Pap smear, White et al monitored the effect of subsidizing screening in general practice for women over 60, so that there was no cost to the patient.163 Thirty-five per cent of eligible women were screened, 13% of whom had never previously been screened. Interestingly, of those who were screened, 65% said that they would have had the smear even if it had cost $15 or more, because they had been invited to do so by their doctor or nurse.

Workplace services

In an attempt to overcome some of the practical difficulties of time and location which may prevent women from being screened, a number of screening services have been provided at women's place of work, usually including breast checks and the teaching of breast self-examination as well as cervical screening.252-255 Apart from the aspect of convenience for women, it has been suggested that peer pressure from workmates might encourage reluctant women to be screened.253 Criticisms of workplace screening include difficulties with follow-up and concern with privacy, in that women's attendance or otherwise at the screening clinic is too obvious to others in the workplace.104, 250, 255 While a number of examples of workplace screening have been described, few have noted the proportion of eligible women attending and none have provided formal evaluation of the service or cost-benefit analysis. Sansom found that women who had been screened in an industrial clinic were less likely to return for a repeat smear, which may be due to turnover of employees or the intermittent nature of the service.104

The program of the Women's National Cancer Control Campaign in providing mobile units to worksites has been referred to above.250 Figures for the visit of the WNCCC to one industrial site in the north of Scotland have been reported.256
Here 36% of the female workforce attended a screening clinic run by a female doctor. The attendance rate was higher among older women, and one quarter of those attending had never been screened, but disturbingly almost half of those attending had been screened in the past three years, indicating the potential for overscreening in such situations.

Another Scottish study used the existing district cervical cytology register to identify women from one local employer who did need screening, and offered them the opportunity to have smears taken by a female doctor at their workplace. Only 22% responded to the offer at the workplace, with an additional 7% being screened elsewhere within two months. Response rates were higher among manual workers, but slightly lower among older age groups.

In one English health district a well woman's screening service, staffed by women and including cervical screening and breast examination, was offered to 82 different companies, of which 48% accepted. Once again the mobile unit was provided by the Women's National Cancer Control Campaign. Preparatory work included liaison with personnel officers and occupational health nurses, provision of posters and leaflets promoting the clinic and, in some cases, an informal talk to female employees explaining the service. For those companies where the size of the female workforce was known, the response rate among those at work on the day was 91%, although only 58% of these actually needed cervical screening. Thirty-six per cent of those screened had not been reached by more conventional sources, comprising 10% never previously screened and 26% who had been screened more than three years previously. The authors commented that the response depended on the enthusiasm and commitment of both those providing the services and the relevant liaison person in each workplace, and noted that response rates were higher in the early stages of the program where there was continuity of staff, than later when different staff were employed on a sessional basis.

In Sydney, Raphael reported on visits by a female doctor to factories, retail stores and other workplaces over a 12 year period to provide for 'cancer checks' on women including breast examination and cervical screening. The response rate from eligible women ranged from 15% to 40% at the first visit to any one workplace, but increased on subsequent visits as women who had been screened returned for a repeat smear and also persuaded their workmates. The characteristics of the attenders were not described, except that 62% had not previously been screened. Problems were noted with follow-up of women with atypical smears, particularly in the case of young women who were more likely to
change jobs. There was no formal evaluation of women's attitudes to the screening, but reasons described for using the service included the chance to have a woman doctor, not having a family doctor, or being too embarrassed to go to their own doctor. It was also noted that women took the opportunity to seek advice on other women's health issues.253

The issue of privacy for women was addressed in a well woman's service provided by a private occupational health firm, using separate premises on an industrial estate.254 Fees were charged to the women directly or to their employer, and the employers gave women time to attend. Continuity of care was maintained by close liaison with general practitioners and the sending of smear results to women and their general practitioners. Any necessary referrals were organized by the general practitioner in most instances. Almost a quarter of women with abnormal smears (9/39) were described as being 'lost to follow-up'. Women attending the service were said to be older than attenders at well woman clinics, with 45% of women attending being over 45 years of age. There was an under-representation of Asian immigrant women. The high prevalence of abnormalities (115 per 1000) indicated the success of the program in reaching women at risk.254

Another example of workplace screening is the comprehensive service provided for its employees by Marks and Spencer in Britain, through its own Industrial Medical Officers, with the firm also providing support for laboratory services, but no figures are available for this service.250

Other services

It has been suggested that an appropriate way to reach women for cervical screening would be to offer women the opportunity to have a Pap smear when they attend for mammography screening. Women in a disadvantaged area of Manchester were randomly allocated either to receive an invitation for cervical screening at the same time as their invitation for mammography screening, or to be offered cervical screening opportunistically when they came to the mammography centre.258 Approximately half of the invited women attended for breast screening, of whom 72% had had a Pap smear in the past five years. Twenty percent of those with an intact uterus had a Pap smear taken at the adjacent cervical screening clinic, with smears taken by a trained nurse, including 25% of those who had no record of a previous Pap smear. Of those who did have a Pap smear, 45% had not been screened for five years or more. Those who had received in advance the invitation for a Pap smear were more likely to have a Pap smear taken (28% vs 13%). The study showed that, in the British context, it was feasible to organise
breast and cervical cancer screening services together without disrupting the mammography service, although concerns were expressed about undermining the role of general practitioners in cervical screening. However, it is a strategy which may serve to reach at-risk women who are not currently being screened in general practice.

The possibility of using mammography screening services in Western Australia as an opportunity to promote cervical screening among older women was investigated in a recent survey of 100 consecutive women attending a mammography service in suburban Perth. Over 90% had a favourable attitude towards receiving information about Pap smears from the radiographer. A surprisingly high 32% of women had undergone hysterectomy. Of those with an intact uterus, 83% said they would use a Pap smear service if it were available. However only a small proportion of women actually needed screening according to their own self-report; 90% said that they had had a Pap smear in the past two years. This is a small sample, and the results may vary in different geographic areas, but these findings suggest that women attending for mammography screening may be a group already well screened for cervical cancer; providing a Pap smear service for this group may not be cost-effective.

**Limitations of alternative services.**

It is clear that alternative services, usually staffed by women practitioners, have an important role to play in encouraging women to have cervical screening. The evidence suggests that while outreach activities such as mobile clinics and workplace services may successfully recruit women for screening, they do not necessarily promote long-term use of regular screening.

Howard has referred to the problem with the 'lack of continuity which occurs when outreach programs touch people's lives in episodic waves without becoming integral parts of their medical experience.' She proposes more emphasis on opportunistic screening which she refers to as 'inreach'.

The importance of having screening as part of usual medical services has been argued. Sansom has commented that 'to bring women back for periodic tests they should be captured in a context in which their membership is constant over the desired period'.

85
Detailed analysis of health education strategies aimed at increasing the uptake of cervical screening is beyond the scope of this review, but the effects of various community campaigns will be reviewed. Most suffer from a lack of detail about what was done, and from designs which make it difficult to evaluate the effect of different components.

Kegeles commented some years ago that few of the educational efforts to increase the uptake of cervical screening had been adequately evaluated, and his criticisms apply to many recent studies. He noted that many of the programs do not answer the following questions:

- to whom the programs were directed and who carried them out;
- what was done and why; in what order things were done; which efforts worked and which did not; on whom these efforts worked and on whom they did not'.

Community-based strategies

Community-based strategies include a wide variety of activities, frequently with established community groups. In one early study in the United States a variety of community-based strategies were used. These included the showing of a film to community groups, the training of volunteer workers in housing estates, the distribution of postage-paid appointment request cards for free screening clinics in welfare offices, vaccination centres, 'health fairs' and the handing out of such cards at clinics, for women to encourage their friends and relatives to attend. Cards were also made available to private doctors. The response rate for these various strategies could not be calculated, but in terms of the numbers of women attending, referrals from other women constituted an important source of new patients. It was noted that personal contacts with women resulted in a higher proportion of appointments made, but a lower proportion of appointments kept.

A more recent study of black women and Mexican-American women in Texas involved trained volunteers from the target communities talking with their friends and neighbours about cervical and breast cancer screening. This was carried out in conjunction with a local media campaign involving role models from the target communities. While there was no demonstrable change in knowledge or attitudes, there was a significant increase in the uptake of mammography, and a small, non-significant increase in the proportion of women having had a Pap smear in the previous two years.
In connection with a special Pap smear clinic in Perth, outreach was undertaken with ethnic women's groups, which included the organization of 'morning teas' for women of a particular ethnic background.\textsuperscript{142} The nurse educator responsible for the clinic gave talks at these events, and was able to make appointments on the spot for women who wished to attend the clinic. There was no formal evaluation of the effectiveness of the strategy, although women from this ethnic group were over-represented among clinic attenders.

Recent Australian studies, in New South Wales and Victoria, have taken a systematic approach to the evaluation of community based strategies.\textsuperscript{132, 136, 243, 246} All of these studies have been carried out in rural areas. The strategies used included making contact with local women's groups and providing education sessions, distribution of information in the form of cards or brochures in shopping centres and workplaces, and the use of posters. Most have combined these strategies with the provision of special screening clinics as described earlier. Local print media and radio have also been used, and sometimes the local campaign has been added to a more widespread television campaign.\textsuperscript{243}

The effectiveness of the different components has not been tested separately, but in Victoria community health workers surveyed indicated that the electronic media were more important in larger communities, and personal contact more important in the smaller communities.\textsuperscript{246}

One Victorian study involved community-based activities, screening clinics and educational activities for general practitioners. General practitioners were also asked to display waiting room posters and have receptionists hand out brochures to women.\textsuperscript{246} The educational meetings for general practitioners were poorly attended. The overall effect of the campaign was a 50 percent increase in the rate of Pap smears examined by the Victorian Cytology Service for women aged 40-59 years in the relevant regions, with an even greater increase for women over 60.\textsuperscript{246}

A later Victorian study compared the effect of a community-based campaign, with and without an individual letter, and the effect of no intervention.\textsuperscript{132} The community-based campaign included local media coverage, information sessions for women, and educational meetings for general practitioners. The campaign and the letter combined were more effective than either alone. The odds ratio for being screened in response to the campaign alone was 1.86, to the letter alone 1.61 and to the campaign plus letter 3.00. All of these were statistically significant (p<0.001).\textsuperscript{132} However, as noted earlier, the campaign plus letter also produced
an increase in the screening of ineligible women, which was not the case with the letter alone.

Media campaigns
Shelley et al have reported on an intensive campaign in NSW which included a television commercial, radio commercials, advertisements in women's magazines, as well as posters and a pamphlet distributed to general practitioners and other health services.94 The authors refer also to 'community level promotional activities' but these are not described. The campaign produced a 30% increase in Pap smear rates during the four months following the campaign, and a 50% increase among women who were overdue for screening. The television commercial was aimed at older women and the greatest increase in screening was among women over 50 who had not been screened for two years or more. When expressed at a population level, it was estimated that the campaign resulted in 2.6% of women in the target group having smears. As noted earlier women had displayed a high level of knowledge and favourable attitudes towards Pap smears before the campaign and there was little change in response to the campaign. After the campaign, more women were likely to mention that Pap smears could be taken at women's health services (38% vs 30%). There were also increases in the number of women who knew the age at which women should start and stop having Pap smears, although more than half of the women still did not know when to start and one third did not know when to stop. Given the favourable attitudes and the relatively high levels of knowledge before the campaign, and the lack of demonstrable changes in knowledge, the authors have argued that the media campaign acted primarily as a 'cue to action' to prompt women to have a smear.94

Byles examined in New South Wales the effect of a television campaign in conjunction with the other strategies of an individual letter and general practice based initiatives described elsewhere in this review.136 It was noted that the media campaign alone did not have a significant effect in increasing the uptake of Pap smears, but the authors argue that the media had an 'agenda setting' function, reinforcing the work of general practitioners.136

The brief television and radio campaign organised by the general practitioners in the Riverland region of South Australia, referred to earlier, was successful in attracting women to free Pap smear clinics staffed by the local general practitioners.249 At the same time there was an increase in the number of Pap smears taken in normal consultations. Compared with a baseline level of approximately 300 Pap smears per month from the region, there was a 33%
increase (100 extra smears) in the first month of the campaign and a 66% increase (200 extra smears) in the second month. These were in addition to the 277 smears taken in the special Pap smear clinics.

**Interventions with general practitioners**

The importance of the general practitioner in recruitment of women for cervical screening has been referred to elsewhere in this review, particularly in the section on enhancement of opportunistic screening. While education of general practitioners in cervical screening has been frequently advocated, and several of the campaigns referred to above have included a component of education or 'updating' of general practitioners, few studies have examined separately the effect of such initiatives.

Byles has studied the effect of initiatives directed at general practitioners in New South Wales. The researchers worked with general practitioners in small groups and on a one-to-one basis, attempting to convince them of the importance of general practice-based recruitment and to involve them in the development of strategies for increasing the uptake of screening in their practices. They provided information, resources, feedback about the general practitioners' rates of screening, and peer support. The study was carried out in three different situations, a rural locality, a country town and a large rural centre. In each of these there were three different interventions, television alone, television plus an individual letter to women and television plus the general practitioner-based strategies described above. Overall the combined media and general practitioner-based recruitment was most effective in increasing the rates of screening above what would have been expected, but the results varied in the different localities. In all regions there was a significant increase in attendances for screening over the three months after the media campaign. Over the six-month period of the general practitioner based intervention, attendances were about 80% higher in the rural locality and in the country town but not significantly increased in the large rural centre. The effect on general practitioners' behaviour was not particularly dramatic. For example, in one post-intervention survey, 79% of women had seen a general practitioner, and only 13% said that the doctor had mentioned Pap smears in routine consultations.

**Other strategies**

Two early American studies have used home visiting by trained lay people to encourage women to be screened. The study by Kegeles in an urban ghetto
involved home visits by a trained community resident. Women were randomly allocated to receive information either on cervical screening or on iron deficiency (control group). In an attempt to overcome barriers to screening, the women were also given information about the time and place of the screening clinic, offer of an appointment, childcare, and a taxi fare to the clinic. In the experimental group 45% took up the offer compared with 22% in the control group, but no changes were shown in attitudes or beliefs about cervical cancer. The author postulated that the information provided to the experimental group acted as a 'cue to action'.

In a short-term intensive project in a deprived neighbourhood in Los Angeles, local lay women were trained to recruit women to attend a special screening clinic. After an intensive recruitment drive, involving door to door visits, 35% of eligible women attended. The success of the project was limited by the fact that the clinic itself only operated for a total of two weeks. The strategy of home visiting is extremely labour intensive and neither of these studies has reported on the cost effectiveness of such recruitment.

Referral of 'medically indigent' women to special screening clinics by public health nurses and social workers has also been used in the United States, but there is no information about the proportion of the target population responding. Two thirds of the women approached in this way agreed to an appointment but fewer than one third of these actually kept their appointment. This suggests that women felt pressure to make an appointment when offered by a person in authority, but the barriers to screening were not really addressed.

McAvoy and Raza in Leicester studied the effect of three different methods of providing educational material about Pap smears to Asian (Indian and Pakistani) women of non-English speaking background, 98% of whom had never previously been screened. Women were randomly allocated to one of three intervention groups and a control group, the outcome being the recording of a cervical smear on the health authority computer within four months of the intervention. The ability to monitor objectively the effect of the intervention was an important feature of this study. Only 5% of women in the control group had a smear, compared with 11% of those who were sent a leaflet and fact sheet in the mail, 26% of those visited and given a leaflet (37% of those who actually read the leaflet), and 30% of those visited and given a video about cervical smears (47% of those who actually viewed the video). Interestingly, the women who viewed the video in their own time were more likely to be screened (64%) than those who viewed it in the presence of the research assistant (41%). The written materials
were translated into five Asian languages, and the soundtrack for the video was available in each of these languages. The results indicate that, in this population, a mailed leaflet was no more effective than no intervention at all. The use of appropriate video material was an effective approach in a population such as this in which there was a high level of video ownership, and in which almost half of the women could not read in their own language. Although the cost of the various approaches was not formally evaluated, the authors comment on the high cost of the personal approach, and suggest that it should be reserved for women who have failed to respond to mailed invitations. Showing of videos on a one to one basis is clearly the most expensive option; showing videos to small groups of women would be less expensive, but may not always be culturally appropriate. Video is obviously a medium which warrants further investigation. In Australia, videos have been found to be acceptable to Aboriginal women in North Queensland, although there has been no formal evaluation of their effectiveness.

None of the studies described in this section have really addressed the issue of the extent to which the increase in smears taken in response to a community-based or media campaign is merely due to women who would have otherwise been screened coming slightly earlier for their Pap smear. This phenomenon is referred to as 'borrowing from the future', and long term examination of trends in the rate of Pap smears is needed to determine the extent to which this has occurred.

STRATEGIES FOR PROMOTING PARTICIPATION IN CERVICAL CANCER SCREENING

V GROUPS WITH SPECIAL NEEDS

As outlined earlier in this review, many studies, particularly in the United States, have shown low rates of cervical screening among minority groups, such as black women, and women of non-English speaking background such as Hispanic women. In Australia the main disadvantaged groups are Aboriginal women and women of non-English speaking background. While there have been a number of interventions aimed at increasing the uptake of screening among these groups, few reports have been published.

Aboriginal women

Aboriginal women have much higher incidence and mortality rates from cervical cancer than non-Aboriginal women. Mortality figures for the Northern Territory
have shown that the incidence rates for cancer of the cervix were more than five times higher than for non-Aboriginal women in 1981-85 and mortality rates were almost six times higher in 1979-83.265, 266 These differences are presumably related to the low prevalence of screening among Aboriginal women, although there is little published information about screening rates. One pilot survey of 388 Aboriginal women in the Northern Territory found that 64% had not had a Pap smear in the last three years and 47% had never been screened.2 The findings on the prevalence of cervical cytological abnormalities among women who are screened do not show a consistent pattern.154, 266-269

Barriers to cervical screening among Aboriginal women include lack of knowledge, feelings of shyness, embarrassment and shame, as well as fear of the results of the test.2, 270 There are privacy issues concerned with discussion of 'women's business'. There is also concern about the linking of cervical cancer to sexual activity and to sexually transmitted diseases 271

A variety of recruitment strategies have been used in an attempt to provide cervical screening for Aboriginal women, mainly in Queensland and the Northern Territory. These have included examples of the various strategies referred to earlier in this review, such as the development of a recall system, community education strategies and provision of culturally appropriate and acceptable alternative services, with smears being taken by community health nurses, Aboriginal health workers, and female doctors. A number of pilot projects have been described in the report of the AHMAC Cervical Cancer Screening Evaluation Steering Committee.2 These have indicated that the process of gaining the confidence and trust of Aboriginal women is a long-term proposition, requiring stability of staff with sensitivity to the relevant cultural issues. Involvement of Aboriginal women, especially Aboriginal health workers, in the implementation of projects is essential and there must also be sensitivity to the health priorities of these women.270

Two projects have shown that enthusiastic female staff, working closely with Aboriginal women, can achieve high rates of screening. Mak and Straton have shown in the Fitzroy Valley in the Kimberley region of Western Australia that a combination of opportunistic screening and a simple recall system implemented by community health staff was able to achieve 87% coverage of Aboriginal women aged 15 to 69 years.154 Gilles et al through a culturally appropriate community-based women's health service in a remote Aboriginal community in the Northern Territory, increased coverage from 40% to 80% of Aboriginal women.271 Only
3% of the women approached, mostly older women, refused screening. An interesting strategy was the use of a simple pictorial representation in the clinic of women who had had smears, which was said to be very effective in recruiting other women.

An important problem in relation to cervical screening for Aboriginal women is the issue of follow-up for women with screen-detected abnormalities. For women from remote communities to be required to go to the city for colposcopy requires a major upheaval and, not surprisingly, there is a low rate of compliance with follow-up recommendations.

**Women of non-English speaking background**

There has been very little published research in Australia on the participation of women of non-English speaking background in cervical screening. Gifford reported on in-depth interviews with Italian and Macedonian women in Melbourne, carried out in their own languages, which explored the meaning of cervical cancer and cervical screening for them in relation to their cultural and religious beliefs. In 1992 Shelley reviewed a small number of unpublished research reports, which referred mainly to small 'convenience' samples drawn from factories, women's groups, community organizations, or interceptions in shopping centres. She noted that the women were mainly young and that they were not necessarily representative of their own ethnic groups, let alone women of non-English speaking background in general. As Shelley has pointed out, Australian women of non-English speaking background 'are not a single group, but represent a diverse array of language, cultural and religious backgrounds' (p 2). It has not been possible to locate any further material published in relation to NESB women since Shelley's review; clearly this is an area in which more research is needed.

**SUMMARY**

This review has examined the literature on the factors affecting the uptake of cervical screening among eligible women, and the various practical, emotional and social barriers to screening. The most important demographic characteristic affecting uptake of screening is age, with older women consistently less likely to attend for screening. Women not currently married, women with less education, women of low socioeconomic status and women of non-English speaking
background are also less likely to be adequately screened. The most important barriers to screening are the emotional barrier of embarrassment associated with the vaginal examination itself, as well as fear of a positive result. Cognitive and practical barriers such as not knowing one's need for screening and not knowing where to find an acceptable smear-taker are also important factors.

A number of strategies have been tried in various countries in an attempt to overcome these barriers. The strategies used have reflected the social and medico-political context of health services in the country concerned, but some common themes have emerged. Strategies which have involved individual invitations to women at risk, whether they be based on national, district, general practice or laboratory registers, have generally been successful in increasing the uptake of screening and in overcoming the differences in uptake by age and socioeconomic status seen in unorganized screening. There is evidence that the success of such invitation strategies depends on the screening history of the women invited, with women never previously screened being least likely to respond.

A more personalized approach to recruitment has been provided by making use of women's contacts with the health system for other reasons, either in general practice or in the hospital setting, and offering them the opportunity to be screened. In the United States, where the organization of health care for the most part precludes individual invitations, a number of quite creative methods have been used to prompt the doctor to remember to offer a Pap smear during a woman's attendance for another reason. A number of studies have shown the success of this approach, but it obviously requires the attendance of women at the health facility and is thus limited by the fact that those most at risk, the less well educated and less well off, are less likely to seek medical attention.

An important strategy for increasing the uptake of screening is the provision of services acceptable to women, whether it be in general practice or through the provision of special alternative services. The preferences of women for a female smear-taker have been well documented, and the profile of patients attracted to those services which have provided a female smear-taker, whether doctor or nurse, has shown consistently that they are more likely to be older and to be underscreened compared with women screened through more traditional services. A particular problem with alternative services is the fact that they are frequently short-term, often because of funding limitations, and they are therefore unable to act as a consistent venue to which women can return for regular screening.
Community-based and media campaigns have been shown to be effective in increasing the uptake of screening, but it is often difficult to separate out their effect from the effect of other strategies used in association such as the provision of alternative services. They also have the added problem that they are relatively non-specific and may attract women who do not really need to be screened at that particular time.

CONCLUSIONS

Several key issues emerge from this literature review. These issues may be classified into measurement, recruitment, smear-taking, and consideration of the role of the general practitioner.

Measurement issues

Many of the studies reviewed here have relied on women's self-report of their Pap smear status, in determining their eligibility for screening and/or in assessing the outcome of interventions aimed at increasing the uptake of screening. Given the limitations of self-report described in the literature, reliance on self-report in determining eligibility means that women who actually need a Pap smear miss out, and that women who do not need screening are screened unnecessarily.

Inaccuracies in self-report have important implications both in clinical decision making and in the monitoring of the response to interventions. The establishment of cervical cytology registries, as has already been achieved in Victoria and Western Australia, will provide more accurate information about women's screening history, allowing health professionals to determine the screening status of women and women to be reminded when their next smear is due. They will also provide the capacity to monitor the effect of intervention strategies such as those described in this review.

Recruitment issues

Over-screening

Many of the strategies referred to in this review run the risk of over-screening, or screening women unnecessarily frequently, with women more recently screened being most likely to respond. The sending of comprehensive or non-selective invitations, without reference to the screening history of the women, while meeting women's desire for privacy, does risk bringing in women who do not really need a Pap smear at that time. This was the case with the invitation letters
described in this thesis, with two-thirds of the women responding not needing to be screened according to the three-year interval recommended at the time. Similarly, with the establishment of special clinics, there is a risk that women who do not really need screening will come simply because the clinic is there; once they have come it is difficult to turn them away.

The question of 'over-screening' has been difficult to address in Australia, because of the considerable confusion the optimal screening interval, and the consequent variation in health education messages. Epidemiological evidence from around the world indicates that screening every three years gives 91% reduction in the risk of invasive cancer, compared with 93% reduction for the far more costly annual screening. Although the NH&MRC in 1984 recommended a three-year screening interval, this was not widely accepted by clinicians, who were continued to advocate annual screening. The development of consensus on a two-year interval should provide consistency and reduce the extent of annual screening, although the recommended interval is shorter than the three-year interval advocated by international authorities. Education of both women and health professionals about the appropriate screening interval is needed. Too frequent screening means that lesions which might otherwise have regressed spontaneously will be discovered and women will be subjected to unnecessary investigation. The costs of unnecessary screening are thus two-fold, the costs associated with the taking and the examination of the extra Pap smears, and the costs, both financial and emotional, of extra unnecessary investigations. At the same time there is little benefit to the population in terms of cancer prevention.

The risk of screening women more frequently than necessary is also a problem with reliance on opportunistic screening. As Paul et al have noted, in the absence of an organized system of recall as a back-up, clinicians and women tend to use every opportunity to have a smear taken. A systematic approach which integrates opportunistic screening with a formal recall system based on a cervical cytology register, combined with appropriate professional and public education, would help to overcome this problem.

Reaching older women
The results of the Australian studies reviewed here confirm the findings of other studies around the world that, with unorganized screening, the rates of screening among women over 50 years of age are very low. However, a number of studies reported in this review have demonstrated that active recruitment strategies such as invitation letters, or a systematic approach to opportunistic screening can
overcome the barriers to screening among this group, as can the provision of special services staffed by women.

Underlying the low uptake of screening among many older women is the idea that they are 'too old' to be screened. Several studies have shown that women who are not married are less likely to respond to invitations, and a number have shown that women mistakenly believe that they are not susceptible to cervical cancer if they are no longer sexually active. This misinformation can be overcome on a one-to-one basis, as indicated by the success of recruitment strategies involving a personal approach by a doctor or nurse, such as can be provided in general practice, or in a hospital setting.

Those producing health education materials and those, such as general practitioners, who provide information directly to women, must emphasise the need for regular cervical screening among women who have ever had sexual intercourse, regardless of their current sexual activity.

**The role of invitation letters**

Australian studies of invitation letters based on the electoral roll have shown an increase in the uptake of screening, especially among older women. This evidence, combined with the evidence from studies of invitation letters in Britain, suggests that there is a place for mailed invitations. Invitation letters seem to be more effective in reminding women who had been screened previously than in persuading women never previously screened to have their first smear. This suggests that the most useful role for invitations is in reminding women who have been screened when their next smear is due, a role which can easily be fulfilled by a cervical cytology registry. The use of reminders from a cervical cytology registry, either directly to women or through general practitioners, allows targeting of women who actually are overdue for a smear, and reduces the likelihood of overscreening. It may be that women who have never been screened will respond better to more personalized approaches on a one-to-one basis in the general practitioner's surgery or in a hospital-based service such as the ones described in this review. Once these women have had a Pap smear and are on the cervical cytology register, they can then be reminded by mail as needed.

While the electoral roll is available as a database for invitations in Australia, it has limitations in that it does not include recent immigrants, and addresses are not always accurate. In the studies described in this thesis, although only a small percentage of letters have been returned address unknown, the number with
incorrect addresses is likely to be higher. The database of the Health Insurance Commission used for national health insurance purposes is likely to be more accurate, and could be used for the sending of 'non-selective' invitation letters. However, in the current climate of opinion in Australia, linkage of a population database such as the electoral roll or the Health Insurance Commission database to a cervical cytology register, so that women not on the cytology register could be specifically invited, is unlikely to be acceptable. Assuming that women are properly informed by the person taking the smear that their results will be sent to the cervical cytology registry unless they object, reminder letters from the registry should be acceptable.

The acceptability to women in the United Kingdom of more targeted invitations, based on the linkage of cytology results with a population database, probably relates to the fact that the basic responsibility for the list lies 'close to home' with the local general practitioner, so it is less likely to be perceived as intrusion on the part of 'big brother'. With the present arrangements for general practice in Australia, the option of invitations based on general practitioners' lists of patients is not generally available, although an increasing number of general practitioners do have age-sex registers, many based on computers. Increasingly, general practitioners in this country are using their computer systems for recalling patients for preventive manoeuvres, including Pap smears. This trend should be encouraged, as call and recall systems based on general practice have a number of advantages over those operated from a more remote location. There is still a need for a back-up recall system from the cervical cytology registry, however, as not all general practitioners have efficient recall systems, women do change general practitioners, a number of women do not have a regular general practitioner and many women have Pap smears in settings other than general practice.

**Smear-taking issues**

*Female smear-takers*

Another important issue to emerge from this review is women's desire for a female smear taker, which has been described in many surveys asking women about their preferences. This desire for a female smear-taker has been demonstrated in practice in studies which have shown that females general practitioners take a disproportionate number of the smears taken by general practitioners, and in studies of attenders at special clinics at which the availability of a female smear-taker has been an important reason for attending. Importantly, women who tend to
be underscreened, such as older women and women of non-English speaking background, are more likely to express a preference for a female smear-taker.

While the studies reviewed have shown that a number of women do prefer a female smear-taker, one important issue is whether the desire for a female smear-taker is such that women will not have a smear at all unless there is a female available. The fact that so many older women are inadequately screened suggests that this may be the case for many women. On the other hand, studies have shown that active recruitment for screening on the part of male general practitioners can achieve high levels of screening coverage.

In any case, it is clear that for a screening program to be effective in reaching underscreened women, a choice of female smear-taker should be available. In the Australian context, this is usually a female general practitioner, although nurses have been occasionally been used in this role, mainly in country areas. In Britain, New Zealand and the Nordic countries, by contrast, a high proportion of Pap smears are taken by trained nurses. The practice nurse in Britain and in New Zealand is a vital part of the cervical screening program, both in the taking of smears and in the running of practice-based call and recall programs. Consideration should be given in Australia to adopting the infrastructure and funding mechanisms which would allow the development of this expanded role for nurses in general practice.

The role of alternative smear-taking services

Alternative smear-taking services, staffed by women, provide the option of a female smear-taker. The recent cytology survey in Western Australia showed that more than three quarters of the Pap smears taken in the State were taken in general practice. However, the same survey showed that the rates of screening, especially among older women, were well below the equivalent even of three-yearly screening, indicating that there are many women currently not being reached by general practitioners. A number of Australian studies have shown that some of these women can be reached by appropriate alternative services. As Byles has pointed out, the true measure of the effectiveness of a strategy for cervical screening lies in its ability to reach women who have never been screened or who are overdue for screening.186

The question arises, in countries where most smears are taken in general practice, as to whether the perceived need for alternative services is due primarily to a lack of interest in cervical screening among some general practitioners. In Britain, the
use of alternative services has decreased with the introduction of financial incentives in the form of target payments for general practitioners. It not clear whether this reflects a true change in women’s preferences, an increase in the availability of cervical screening in general practice, or undue pressure for women to attend their general practitioner for a smear.128

While alternative services do have an important role in encouraging women who may not otherwise be screened to attend for a Pap smear, they also have their limitations. For effective prevention of invasive cervical cancer, women need to be screened on a regular basis. Studies have shown that women screened in an alternative screening service provided intermittently, such as a workplace service, are less likely to return for subsequent smears than those screened in a more traditional medical setting.104 The same problem would apply to a hospital-based service, since hospital admission is not a regular feature of life for most women.

The realities of funding are such that alternative services may be provided for a relatively short time and then closed as funding priorities change. On the other hand, alternative services provided by an organization such as the Family Planning Association, which has regular clinics established on a long-term basis, do provide a venue for regular screening. Family planning services, however, tend to attract women over a limited range of their life span and, in Western Australia at least, account a very small proportion of all smears taken.

In the Australian context, the role of alternative screening services, either in hospital or in the community, must be seen as that of attracting women who would not otherwise be reached, by providing a sympathetic and non-threatening environment where women can be assured that their smear will be taken by an experienced female smear-taker. Staff providing such services can educate women about the need for screening and demonstrate to them that the procedure is not as unpleasant for them as they had expected. Women may then be encouraged to return to their own doctor or to attend a service in which Pap smears can be readily provided on a regular basis in the long-term.

Since an important function of alternative services is to provide access to a female smear-taker, the increased availability of women general practitioners, as well as the training of practice nurses, would reduce the need for such services. In any case, where such alternative services are provided, it is important that there be close liaison with general practitioners to ensure continuity of care.
The role of the general practitioner

A discussion of recruitment for cervical screening would not be complete without a consideration of the role of the general practitioner. It is important to recognize the crucial role played by general practitioners in cervical screening in Australia. More than three-quarters of Pap smears are currently taken in general practice, and over 80% of women in the underscreened older age groups visit their general practitioner at least once a year. The general practitioner, knowing the circumstances of each woman, is in a unique position to educate the patient on an individual basis about her need for a Pap smear. In addition, it is possible for general practitioners to run very efficient call and recall systems of their own.

The next challenge in cervical screening in this country is how to take advantage of this potential, and ensure that all general practitioners do offer eligible women the opportunity to have a Pap smear, and that they are able to provide a high quality smear-taking service which is acceptable to women. It has been shown that a high proportion of women will accept the offer of a Pap smear when suggested by their general practitioner, but although there is considerable variation in the success rates of different practitioners. The challenge lies in motivating general practitioners and in facilitating both the process of recruitment for cervical screening in general practice and the acquisition of smear-taking skills among general practitioners. The recently created Divisions of General Practice would be an appropriate focus for such activities. A number of creative approaches to recruitment have been tried in the United States, using various types of prompts to the doctor, as well assistance to office staff in organizing the practice to facilitate the practice of preventive medicine. Many of these could be trialled in the Australian context, bearing in mind the limitation, common to most of these approaches, that they rely on the attendance of the woman at the surgery. Unfortunately those most likely to be overdue for screening are those least likely to attend the surgery.

A more comprehensive approach involves identifying women who have attended the practice and determining their screening history. Although general practice in Australia is not organized on the basis of capitation lists, increasing numbers of general practitioners now have age-sex registers, many based on computers, which could be used as a basis for identifying women who need cervical screening, and inviting them to be screened, either by means of mailed invitations from the practice or by prompting the doctor to offer a Pap smear when they attend. Resources are needed to help general practitioners to develop efficient systems. In New Zealand, such resources have been provided by the National Cervical
Screening Programme in the form of staff to go into practices and assist general practitioners in developing their own age-sex registers, in auditing medical records to identify eligible women and in establishing practice-based reminder systems. This has been particularly useful in identifying systematically women who have either never been screened or not screened for some years.

In the United Kingdom, the use of financial targets for general practitioners has produced a dramatic increase in the proportion of women adequately screened, and in the proportion of general practitioners who are achieving the target of 80% coverage of eligible women. Currently in Australia, the fee for taking a Pap smear is included in the usual consultation fee, and there is no particular financial incentive to general practitioners to take Pap smears. Serious consideration must be given to structural issues related to the funding of smear-taking in general practice, by providing separate payments to general practitioners for taking Pap smears, by introduction of some kind of target payment or, as indicated above, by providing financial arrangements which would allow an expanded role for practice nurses in cervical screening.

**Implementing effective cervical screening**

It has been proposed by Eardley *et al* in Britain, that women eligible for cervical screening lie along a continuum. They argue that, while some women will not agree to have a Pap smear regardless of any recruitment efforts and others will take the initiative and attend for screening regardless of the barriers, the majority of women lie somewhere in between. Their participation in screening depends on having the process initiated by the provider and the service oriented to the needs of the consumer.

The most effective intervention strategies appear to be those characterized by active initiation of the recruitment process, either by a mailed invitation or by the specific offering of a Pap smear by the woman's general practitioner or by a nurse in an appropriate setting such as a hospital or community health centre, and by the provision of a service acceptable to women, with the opportunity to have the smear taken by a female smear-taker. It has been shown that many of the barriers to cervical screening can be overcome, simply by taking the initiative and inviting women to have a Pap smear and offering them the opportunity to be screened in circumstances acceptable to them. While many of the strategies described in this review have involved alternative services, the conditions of provider initiation and consumer orientation can readily be provided in the more traditional setting of general practice. In developing strategies for increasing participation in cervical
screening, effort and resources must be concentrated on initiating services and providing favourable circumstances for those who would not otherwise be screened, so that no women are deterred from screening because they were unable to take the initiative or the services were unacceptable. Only then will we know the size of the group of women who will not be screened whatever the circumstances; it will probably turn out to be much smaller than previously suspected. Only then will the ultimate goal of major reductions in morbidity and mortality from invasive cervical cancer be achieved in Australia.
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