

Adherence to guidelines on cervical cancer screening in general practice: programme elements of successful implementation

Rosella P M G Hermens, Eelko Hak, Marlies E J L Hulscher, Jozé C C Braspenning and Richard PTM Grol

SUMMARY

Background: There is still only limited understanding of whether and why interventions to facilitate the implementation of guidelines for improving primary care are successful. It is therefore important to look inside the 'black box' of the intervention, to ascertain which elements work well or less well.

Aim: To assess the associations of key elements of a nationwide multifaceted prevention programme with the successful implementation of cervical screening guidelines in general practice.

Design of study: A nationwide prospective cohort study.

Setting: A random sample of one-third of all 4758 general practices in The Netherlands ($n = 1586$).

Method: General practitioners (GPs) in The Netherlands were exposed to a two-and-a-half-year nationwide multifaceted prevention programme to improve the adherence to national guidelines for cervical cancer screening. Adherence to guidelines at baseline and after the intervention and actual exposure to programme elements were assessed in the sample using self-administered questionnaires.

Results: Both baseline and post-measurement questionnaires were returned by 988 practices (response rate = 62%). No major differences in baseline practice characteristics between study population, non-responders, and all Netherlands practices were observed. After the intervention all practices improved markedly ($P < 0.001$) in their incorporation of nine out of 10 guideline indicators for effective cervical screening into practice. The most important elements for successful implementation were: specific software modules (odds ratios and 95% confidence intervals for all nine indicators ranged from OR = 1.85 [95% CI = 1.24–2.77] to OR = 10.2 [95% CI = 7.58–14.1]); two or more 'practice visits' by outreach visitors (ORs and 95% CIs for six indicators ranged from OR = 1.46 [95% CI = 1.01–2.12] to OR = 2.35 [95% CI = 1.63–3.38]); and an educational programme for practice assistants (ORs and 95% CIs for four indicators ranged from OR = 1.37 [95% CI = 1.00–1.92] to OR = 1.90 [95% CI = 1.25–2.88]).

Conclusion: A multifaceted programme targeting GPs, including facilitating software modules, outreach visits, and educational sessions for PAs, contributes to the successful implementation of national guidelines for cervical screening.

Keywords: guideline adherence; preventive health services; cervical cancer; screening.

R P M G Hermens, MSc, epidemiologist; M E J L Hulscher, PhD, health scientist; J C C Braspenning, PhD, psychologist; and R P T M Grol, professor in quality of care, Centre for Quality of Care Research (WOK), Universities of Nijmegen and Maastricht, The Netherlands. E Hak, PhD, epidemiologist, Julius Center for General Practice and Patient Oriented Research, University Medical Centre, Utrecht, The Netherlands.

Address for correspondence

R P M G Hermens, Centre for Quality of Care Research (WOK), University Medical Centre, Nijmegen, PO Box 9101, 6500 HB Nijmegen, The Netherlands. E-mail: R.Hermens@hsv.kun.nl

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Introduction

MANY potentially effective strategies for implementing physician guidelines are available, but none of these strategies is superior in all aspects.¹ The understanding of whether and why an intervention is successful is still limited, since interventions are invariably found to be effective in some settings but not in others.^{2–9} Multifaceted interventions (combining various strategies) are generally more effective in facilitating the implementation of guidelines and improvement of primary care, but even these interventions do not always enhance performance.^{3,9} It is therefore important to look inside the 'black box' of the intervention, to ascertain which elements work well or less well.¹⁰

In many Western Countries, general practitioners (GPs) are in a favourable position to provide population-based preventive care. Most patients who are registered with the practice have an ongoing relationship with their GP over the years and about 90% of the patients consult their GP at least once every three years. To ensure an efficient prevention strategy, the involvement of GPs and the implementation of GP guidelines is essential.

Therefore, in 1995 a nationwide prevention programme directed at GPs was initiated by the Netherlands Ministry of Health, the Netherlands College of General Practitioners, and the National Association of General Practitioners (NCGP and NAGP). They aimed at a more systematic approach towards preventive services in general practice, with influenza vaccination and cervical screening as starting activities. One important objective was to enhance population-based prevention of cervical cancer by improving the adherence to guidelines for cervical cancer screening in general practice.^{11–13} Cervical screening began in The Netherlands around 1970, being mainly opportunistic. A nationwide screening programme started in 1989 with a primarily community-based organisation (a local authority invited the eligible women; the GP took the smears). A main shortcoming of this community-based approach was the disappointing attendance rate of 40% to 50%.¹⁴ Because different authorities were responsible for invitation and taking the smears, stimulating and monitoring of participation was a problem. Pilot projects showed that by improving the organisation of the general practices, GPs could contribute considerably to the effectiveness of cervical screening.^{14,15}

In the nationwide prevention programme of 1995, a combination of various methods for quality improvement, performed at national, district, and practice levels, was used. In all 23 health districts in The Netherlands, outreach visitors were used as a key strategy to support individual practices in optimising the organisation of the cervical screening.^{16–20}

HOW THIS FITS IN*What do we know?*

The understanding of whether and why interventions to facilitate the implementation of guidelines for improving primary care are successful is still limited, since most interventions are found to be effective in some settings. Multifaceted interventions (combining various strategies) are generally more effective, but even these interventions do not always enhance performance. It is therefore important to look inside the 'black box' of the intervention, to ascertain which elements work well or less well.

*What does this paper add?*

In a prospective cohort study of general practices exposed to a national multifaceted prevention programme to implement cervical screening guidelines for two-and-a-half years, we were able to assess in some detail which elements of the intervention were particularly associated with successful implementation of the guidelines in general practice. Multivariate analysis showed that, in particular facilitating software modules, two or more practice visits by outreach visitors and education for practice assistants, contributes more than practice characteristics to a successful implementation of national guidelines for cervical screening in general practice.

The aim of this paper is to ascertain which elements of the nationwide multifaceted prevention programme can be particularly associated with successful implementation of cervical screening guidelines in general practice independent of other prognostic variables, such as practice characteristics.

Method*Setting and study population*

In a nationwide prospective cohort study, the effectiveness of the prevention programme and its key elements was assessed using questionnaires. At baseline, a random one-in-three sample of all 4758 general practices in The Netherlands was invited to participate. The 1586 practices were sampled from the Netherlands Institute of Primary Health Care (NIVEL) database containing data on the address and practice setting of all general practices. In the summer of 1995, a questionnaire was sent to one GP per practice to assess the organisation of cervical screening at the start of the national programme. After two-and-a-half years of follow-up, the same questionnaire was sent to all first-round responders. All practices that were enabled at baseline and completed the follow-up measurement were included.

The national prevention programme

The national prevention programme included various activities to implement the guidelines at national, district, and practice levels (Box 1).

National level

- Development of guidelines
- Development of educational materials
- Coordination by professional organisation
- Structural and financial arrangements
- Development of facilitating software modules

District level

- Continuing medical education (CME)
- Small group education
- Arrangements between stakeholders

Practice level

- Individual instruction and practice support by outreach visitors

Box 1. Activities to implement cervical cancer screening guidelines in general practice at different levels.

At the national level, guidelines concerning population-based cervical cancer screening were developed and their use advocated.¹³ In addition, specific educational materials for GPs and practice assistants and facilitating software modules (to support the selection, invitation, and monitoring of the eligible women) were developed and introduced. Structural and financial arrangements concerning reimbursement for the taking of cervical smears were also made. The GPs' professional organisations supported the activities at district and practice levels. In all, continuing medical education (CME) meetings in 23 health districts (with autonomous management organisation) and small group educational meetings for GPs and practice assistants were organised. The use of computer software and smear taking by practice assistants were introduced in these meetings. Regional arrangements were made between all stakeholders (for instance, with community services). District GP coordinators (approximately 0.2 full-time equivalent [FTE] per 200 GPs) organised the implementation of the project in every district. They facilitated the management of preventive activities, including those by outreach visitors and by other primary health care organisations.

At practice level, support of individual practices was provided by outreach visitors employed in each of the 23 health districts (approximately 200 GPs per full-time outreach visitor). Their tasks included supporting the improvement of practice organisation, assistance in using the computerised invitation and monitoring system, and assistance in the task division between practice personnel and local health authorities. All outreach visitors — mainly experienced practice assistants — received training focusing on this multifaceted outreach visit intervention.

Data collection

Three sets of information were collected from each practice:

1. Baseline characteristics: type of practice (solo versus group, team); number and working hours of GPs and practice assistants; practice location (rural or urban); percentage of patients insured through the National Health Service; presence of a computerised patient information recording system, including an age-sex register; and presence of a pharmacy combined with the general practice. The working hours of GPs were

standardised to a FTE to calculate the mean number of patients per full-time GP. The extent to which GPs delegated clinical tasks to practice assistants was also determined (expressed as a validated 'delegation index', including five clinical tasks: venepuncture, removing stitches, removing earwax, checking patients with hypertension, and freezing warts²¹).

2. Actual exposure of the practices to programme elements of the national prevention programme: (a) whether they were informed about the programme (yes/no); (b) type of contact with project staff (outreach visitor or district GP co-ordinator): contact through CME or small group education for GPs (yes/no), contact through CME or small group education for practice assistants (yes/no), contact through one or more practice visits (yes/no), and number of practice visits; and (c) use of the specific software (yes/no).
3. Outcome measurements: adherence to ten specific indicators (yes/no) for the organisation of effective cervical cancer screening were used to measure adherence to four guidelines (inviting women patients, monitoring attendance and sending reminders, organising the taking of smears, and follow-up monitoring [Table 2]).

Statistical analysis

The unit of analysis was the practice. Frequencies were used to compare the practice characteristics of the study sample at baseline with data from non-responders and with national data. To assess the overall effectiveness of the national programme regarding adherence to the guidelines, the proportion of adhering practices was calculated for each indicator. Changes in adherence to the guidelines between 1995 and 1997 were tested with the formula for the difference of proportions for paired measurements.²² A *P*-value of 0.05 or less was considered to indicate the statistical significance of the difference between measurements before and after the intervention period of two-and-a-half years. Frequencies were used to assess the actual exposure of the practices to the programme elements. A stepwise multivariate logistic regression analysis was applied to assess the determinants for effective implementation of the guidelines. In this procedure, adherence to guideline indicators in 1997 were used as a dichotomised dependent variable. The determinants included adherence to guideline indicators in 1995, the actual exposure to programme elements, and practice characteristics. The programme element 'practice visits' was dichotomised with one or zero for equal and more or fewer visits than the median number per practice respectively. Correlations between determinants were tested with a Spearman correlation analysis. As an estimation for the explained variance of the model, an adjusted R^2 (= max-rescaled R^2) was determined.^{23,24}

Results

Study population

Of the total 1586 general practices, 988 (62%) were included in the study population. Of these, 68% were solo practices, 78% had a computerised patient information recording system, and 40% delegated three or more clinical tasks to

practice assistants. No major differences in baseline practice characteristics between the study population, the non-responders, and general practices in The Netherlands as a whole were observed (Table 1).

Improvement in guideline adherence and exposure to elements of the national prevention programme

After two-and-a-half years of follow-up, major changes were found in incorporating guidelines for effective cervical screening into practice: a statistically significant ($P < 0.001$) increase in adherence to nine out of 10 indicators for the guidelines was observed (Table 2).

Almost all practices in the study population (94%) had been informed about the national prevention programme (via a letter from the district association of GPs, a professional journal, or through the outreach visitor or district GP co-ordinator). For practices that had had contact with an outreach visitor through a practice visit (40%), the median number of practice visits was two, varying from one to 13. The facilitating software modules were used by 474 practices (48%), either in full or in part.

Key elements for successful implementation of the cervical screening guidelines

Multivariate logistic regression analysis revealed that, for all indicators except 'invitation by the GP', adherence to the indicator in 1997 was independently and positively associated with adherence in 1995. The adjusted R^2 for these baseline models varied from 0.02 to 0.37, suggesting that 2% to 37% of the variation in adherence in 1997 could be explained by adherence in 1995. Maximum correlations between determinants was 0.31, so all determinants were tested in the multivariate analysis. Controlling for adherence in 1995, the following key elements of the programme appeared to be independently associated with improvement in adherence: use of the software modules, practice visits, and continuing medical education (CME) or small group education (SGE) for practice assistants. The strongest association was found for the 'use of the software modules'. This increased the chance of adherence to all nine indicators in 1997 by a factor of 1.85 ('separate session for cervical smears') to 10.2 ('to identify the taking of the smears'). Two or more practice visits (= median number) by outreach visitors were found to be important for adherence to six indicators out of the four guidelines. The visits increased the chance of adherence by a factor of 1.52 ('separate session for cervical smears') to 2.35 ('invitation by GP'). Also, participation in CME or SGE by practice assistants was a significant determinant for effective implementation. It was important for the adherence to four indicators and increased the chance by a factor of 1.37 to 1.90. The only practice characteristic that was related to adherence to the indicators was 'a high delegation index'; this increased the chance of adherence to the guideline 'efficient organisation of taking smears' by a factor of 2.26 to 2.72. The adjusted R^2 for the full models varied from 0.18 to 0.42. In particular, for the indicators 'invitation by GP', 'to identify women who can be medically excluded from screening', 'to identify the taking of the smears', and 'to send a reminder', the programme ele-

Table 1. Characteristics of the practices in the study population (percentages).

Practice characteristics	Study population (n = 988)	All practices in The Netherlands ^a (n = 4758)
Solo practice	68	70
Urban area (>50 000 inhabitants)	38	40
Practice with pharmacy	12	13
Percentage of NHS patients ^b	61	60
Percentage of practices with more than 2350 patients per full-time GP	63	NA
Presence of a computerised patient information recording system	78	80
High delegation index (3–5)	40	NA

NA = statistics not available. ^aStatistics from the NIVEL Institute, 1995. ^bCompulsory insurance by the National Health Service (NHS) for patients earning less than £21 500 per year.²⁷

Table 2. Changes in adherence of organisational guidelines for cervical screening (percentage change, Δ) of practices in the whole study population from 1995 to 1997.

Guidelines	All practices (n = 988)			
	1995 (%)	1997 (%)	Δ^a (%)	P-value Δ^b
Systematic invitation system				
Invitation by GP	5	30	25	<0.001
Presence of an age–sex register	86	95	9	<0.001
Monitoring attendance and reminding				
To identify women who can be medically excluded from screening	40	74	34	<0.001
To document the taking of the smears	36	61	25	<0.001
To send a reminder	7	44	37	<0.001
Efficient organisation of taking smears				
Separate workroom for practice assistants	66	62	-4	0.025
Practice assistant takes smears	8	20	12	<0.001
Separate session for cervical smears	9	21	12	<0.001
Systematic follow-up monitoring				
To record the results of the smears	72	83	11	<0.001
To monitor follow-up	35	51	16	<0.001

^a Δ = differences between percentages before (1995) and after (1997) the intervention. ^bP-value for the difference between percentages before and after intervention.

Table 3. Exposure of the general practices to the programme elements.

Exposure to programme elements	All practices (%) (n = 988)
Informed about the national prevention programme	94
Contact with the outreach visitor or district GP co-ordinator	70
CME or small group education for GPs	30
CME or small group education for practice assistants	30
Practice visits	40
Median number of practice visits (minimum–maximum)	2 (1–13)
Use of specific software	48

ments contributed substantially to the explanation of the adherence in 1997.

Discussion

A two-and-a-half-year multifaceted national prevention programme targeting GPs and including facilitating software modules, contact with outreach visitors, and educational sessions for practice assistants seems to contribute to successful implementation of cervical screening guidelines in general practice. In addition, the practice characteristic ‘del-

egation of many clinical tasks to the practice assistant’ is found to be associated with adherence to the guideline concerning the efficient organisation of taking smears.

These findings are consistent with those of other studies, showing that well designed plans with combinations of different interventions can be effective in facilitating the implementation of guidelines.^{3–6,9} This study is unique in that we have been able to ascertain in some detail which elements of the intervention are particularly related to the successful implementation of the cervical screening guidelines. The multivariate analysis showed that programme elements contributed more than practice characteristics to adherence to guidelines in 1997. The use of specific software modules (facilitating selection and invitation of women for a smear, monitoring attendance, sending reminders, and monitoring follow-up) seemed to be a major determinant in achieving improvement. A study concerning influenza vaccination — another preventive activity of the GP — showed also that the use of computerised prevention modules by GPs greatly facilitated population-based prevention of influenza.²⁵ In countries such as The Netherlands and the UK where there is extensive use of computerised medical records, implementation of these software modules in general practice should be encouraged.

Because ‘practice visits’ by outreach visitors influenced

Table 4. Multivariate logistic regression analysis of exposure to programme elements, practice characteristics, and adherence to the concerned guideline in 1995 related to the adherence to guidelines in 1997: odds ratios (ORs) and 95% confidence intervals (CIs) are given.

Guidelines	Guideline adherence 1995 (baseline)		Contact by CME or SGE for GPs (1 contacts versus 0)		Contact by CME or SGE for practice assistants (1 contacts versus 0)		Contact by practice visits (2 visits versus 0 or 1)		Use of specific software		High delegation index (3–5 tasks)		Fit baseline model ^b	Fit full model ^b
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI	R ²	R ²
Systematic inviting system														
Invitation by GP ^a	NS		NS		1.37	1.00–1.92	2.35	1.63–3.38	8.71	6.11–12.4	NS		0.00	0.33
Presence of an age–sex register	26.1	12.5–54.3	NS		NS		NS		8.25	2.46–27.7	NS		0.37	0.42
Monitoring attendance and reminding														
To identify women who can be medically excluded from screening	3.93	2.65–5.82	1.75	1.15–2.65	1.80	1.16–2.79	2.04	1.20–3.49	7.34	4.88–11.0	NS		0.07	0.35
To document the taking of the smears	1.87	1.35–2.58	NS		NS		NS		10.2	7.38–14.1	NS		0.02	0.33
To send a reminder	1.61	1.30–2.01	NS		1.58	1.12–2.22	1.80	1.23–2.63	7.49	5.43–10.3	NS		0.03	0.33
Efficient smear-taking organisation														
Practice assistant takes smears	52.6	21.7–125.0	NS		1.90	1.25–2.88	NS		2.05	1.34–3.12	2.72	1.81–4.11	0.29	0.37
Separate session for cervical smears	15.6	8.70–27.7	NS		NS		1.52	1.00–2.33	1.85	1.24–2.77	2.26	1.54–3.32	0.20	0.27
Systematic follow-up monitoring														
To record the results of the smears	1.86	1.56–2.23	NS		NS		1.93	1.12–3.35	4.01	2.65–6.06	NS		0.07	0.18
Some kind of follow-up monitoring	5.26	3.82–7.25	NS		NS		1.46	1.01–2.12	4.48	3.42–6.25	NS		0.13	0.30

NS = not significant in multivariate logistic regression analysis. ^aIn the multivariate analysis, the practice characteristic 'practices with more than 2350 patients per full-time GP' was also independently associated with an increase in adherence to this guideline (OR = 1.50; 95% CI = 1.07–2.11). ^bBaseline model: guideline adherence in 1997 = guideline adherence in 1995; full model: guideline adherence in 1997 = guideline adherence in 1995 + significant exposure variables + significant practice characteristics.

the adherence to six indicators of four guidelines and 'more' visits gave 'more' adherence, we consider the conclusion that the input of such outreach visitors can make a real difference to be justified. This finding is in line with other studies on improving prevention.¹⁶⁻²⁰

Because we made use of self-registration of the practices, the question can be raised whether real changes took place or whether the doctors became more adept at providing the desired information. We think that it is very likely that real changes took place as the outcome measurements (adherence to guidelines) concerned actual organisational facts: invitation by the GP, presence of an age-sex register, sending a reminder, presence of a separate workroom for practice assistants, the taking of smears by practice assistants, and presence of a separate session for cervical smears. These questions also proved to be valid in previous studies. The questions about the actual exposure of the practices to programme elements of the national prevention programme, such as number of practice visits by outreach visitors, are relatively new. However, during the first one-and-a-half years of the project, both outreach visitors and practices registered these numbers, which were comparable.

The evaluation of a multifaceted prevention programme requires a specific study design, including a randomly allocated control group without intervention. Conversely, in a nationwide programme it is impossible to withhold support of preventive activities in a group of general practices. However, in our prospective cohort study we have been able to assess the natural course of exposure to the programme in a totally non-selected group of general practices and to look inside the 'black box' of the intervention to assess which elements work well and which work less well. The design used currently may not exclude the possibility that the improvement in adherence to guidelines may have resulted from factors other than the intervention. However, we are of the opinion that the observed improvements largely resulted from the intervention. Key elements of the prevention programme (use of the specific software, practice visits, education of practice assistants) positively influenced the adherence to guidelines for the organisation of an effective cervical cancer screening in general practice. The largest increases in adherence were found for the guidelines 'systematic inviting system' and 'monitoring attendance and reminding'. These guidelines received special attention in the intervention because the first aim of the programme was to reach a high level of participation in cervical screening through the involvement of the GPs in the invitation system. Moreover, when we consider this study in conjunction with previous studies, we can observe a trend indicating that the longer the exposure to the prevention programme the greater the adherence to the guidelines. A questionnaire survey among a random cohort of general practices showed that adherence to cervical screening guidelines was minimal in 1995.¹¹ We followed this cohort during the first one-and-a-half years of the nationwide implementation of the prevention programme and observed a short-term change in some guideline indicators in 1996.²⁶ After two-and-a-half years of follow-up, major changes were found in incorporating guidelines for effective cervical screening in general practice: a statistically significant ($P < 0.001$) increase in adherence to

nine out of 10 guideline indicators.

Furthermore, in this study we measured improvements in adherence to guidelines which are drawn up in terms of process measurements. In an additional study we could confirm our hypotheses that an increase in adherence to guidelines is related to an increase in attendance of the eligible women.²⁸ The results showed indeed that in a general practice-based approach at which the guidelines aim ('GP invites and reminds eligible women'), the attendance rate was on average 13% higher than in the community-based approach ('local authority invites and reminds eligible women') (63% versus 50%).

In conclusion, with this study we are able to look inside the 'black box' of a multifaceted intervention programme, to generate insights into which of the programme elements are effective. Facilitating software modules, contact with outreach visitors, and educational sessions for practice assistants contributes to a successful implementation of national guidelines for cervical screening in general practice.

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