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# The Effect of the Family Physician on Improving Follow-up After an Abnormal PAP Smear

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**Objective:** The aim of this study was to assess the effect of the family physician on improving compliance with follow-up of abnormal smears in cervical cancer screening.

**Design:** Observational study.

**Setting:** Two Regional Health Authority districts in the east of The Netherlands.

**Study participants:** Family practices with a national call system for cervical cancer screening and family practices with a family-practice-based call system. In a number of practices the family physicians had introduced a fail-safe system for follow-up.

**Main outcome measures:** Follow-up of women who participated in the first screening round and in whom a cytological abnormality had been diagnosed in the first smear. Criteria for adequate follow-up were defined with regard to the severity of the cytological abnormality.

**Results:** The overall compliance with follow-up in the study-group was 88%. The study showed a strong relationship between involvement of the family physician and compliance with follow-up. The compliance in practices that had a fail-safe system for follow-up was 93% compared to 82% in the practices without a fail-safe system. The highest follow-up was found in practices involved in the family-practice-based system. © 1997 Elsevier Science Ltd.

**Key words:** Screening, cervical cancer, call system, follow-up, family-practice-based call system, family physician, organization, computerization.

## INTRODUCTION

Mortality from cancer of the cervix can be reduced by cytological screening. The Nordic countries of Europe with carefully organized screening programmes, have shown a sharp reduction both in incidence of and mortality from cervical cancer since the mid-1960s, when mass screening started [1]. The crucial question for the success of cervical cancer screening is one of organization, to ensure high participation, an adequate

follow-up of cytological abnormalities and good smear taking.

In The Netherlands, a nationwide screening programme for cervical cancer was started in 1989. Every 3 years, all women aged between 35 and 54 years are invited for a cervical smear. In this nationwide programme the Regional Health Authority invites the women and the family physician takes the smears. Under these conditions, monitoring of and responsibility for participation is a major problem. Thus far, the attendance rate of this nationwide screening programme has been disappointing, ranging from 40 to 50%.

Another problem is the responsibility for the follow-up of women with pre-invasive cytological abnormalities. The laboratory will advise on follow-up actions, which have to be performed by the family physician. Again, the responsibility for supervision is not regulated. Compliance with follow-up of the women who participated in the nationwide programme has not yet been investigated.

The quality of cervical smears taken by family physicians in the national screening programme has been evaluated in the region of Nijmegen. The results of this study show that the quality of smears taken by family physicians has improved since the start of the national screening programme [2].

A system in which the family physician will be responsible for invitations to receive a PAP smear, is an option for improvement of the screening programme. Therefore, in 1989 an intervention study with a family-practice-based call system started in the Regional Health Authority district in the east of The Netherlands, to evaluate the effect of this call system on attendance rate and compliance with follow-up. The intervention group consisted of nine computerized family practices; women from these practices were invited for cervical cancer screening by a personal letter from their own family physician. The control group consisted of the other practices in the region without a family-practice-based call system. In these practices the women were invited by the Regional Health Authority (national call system).

The family-practice-based call system resulted in a higher attendance rate than the national call system. The attendance rate in the intervention group was 55% compared to 43% in the control group. A reminder in

the family-practice-based call system increased the attendance rate by an additional 9% [3].

This paper deals with the compliance with follow-up. First we assessed the extent of compliance with follow-up of cytological abnormalities among all women participating in screening in two Regional Health Authority districts in the east of The Netherlands. Secondly we evaluated the effect of the involvement of the family physician on compliance with follow-up. Our expectation was that involvement of the family physicians in a family-practice-based call system for invitations to receive a PAP smear, would increase their involvement in ensuring adequate follow-up.

## METHODS

### *Compliance with follow-up*

As data on the smear results were collected from the regional cytological laboratory, this study was confined to the family practices that sent their smears to the Nijmegen laboratory (86 family practices).

Included in the follow-up study were all women registered in these practices who participated in the first screening round (1989–1991) and in whom a cytological abnormality had been diagnosed in the first smear. This selection was made by the regional laboratory. At the laboratory, information was obtained about the age of the woman, her marital status, the family physician with whom a woman was registered, and about PAP smear results with recommendation for follow-up.

Criteria for adequate follow-up were defined with regard to the severity of the cytological abnormality. The national screening programme includes clear guidelines for the follow-up of abnormal smears [4]. In case of a positive smear, the laboratory gives recommendations to the family physician for follow-up. The interval at which a repeat smear was recommended depended on the classification of the smear. For mild and moderate dysplasia a first repeat smear was recommended after 3 months. For severe dysplasia a first repeat smear was recommended after 1 month or the women were referred to a gynaecologist. Women with a cytological diagnosis consistent with carcinoma *in situ* or invasive cancer had to be referred for histological analysis.

Women who completed the recommended follow-up

procedures within reasonable margins of the indicated interval were classified as "optimal follow-up". Women who completed the recommended follow-up but after the reasonable interval were classified as "sub-optimal follow-up". Women who failed to return, or only returned after a period of 12 months were defined as "lost to follow-up" (Table 1).

Data about compliance with follow-up were obtained from the national data bank of the pathology laboratories. All women were traced for a minimum of 12 months after the date of the abnormal PAP smear. Information was collected on all recommended follow-up procedures, whether they were performed, and, if so, on what date.

### *Involvement of the family physicians*

Women registered with nine family practices in these regions received an invitation for cervical cancer screening from their family physician (family-practice-based call system). Women registered with the other 77 family practices of the regions were invited by the Regional Health Authorities (national call system).

In all practices the family physician took the smears. In a number of practices the family physicians had introduced a system for monitoring and surveillance of follow-up of women with cytological abnormalities, a fail-safe system. Data about the presence of a fail-safe system in the nine family practices with the family-practice-based call system were known from the intervention study. In the 77 family practices with the national call system these data were known in 45 practices from a postal survey conducted in part of the study region [5]. No data regarding monitoring and surveillance were known for the remaining 35 practices. Therefore these practices were excluded from analyses concerning involvement of family physicians and compliance with follow-up.

## ANALYSIS

In a univariate analysis the relationship was assessed between known characteristics of the women (age, marital status and PAP smear results) and compliance with follow-up.

To evaluate the effect of the family physician's involvement, the follow-up of abnormal smears was

TABLE 1. Definition of follow-up

| Recommended interval                          | N   | %    | Optimal follow-up<br>(Interval to repeat examination in months) | Sub-optimal follow-up | Lost to follow-up |
|---|-----|------|---|-----------------------|-------------------|
| 1 month or after short period                 | 86  | 16.8 | < = 3   | 4–12                  | > 12              |
| After treatment of inflammatory changes       | 4   | 0.8  | < = 6   | 7–12                  | > 12              |
| 3 months                                      | 320 | 62.6 | < = 5   | 6–12                  | > 12              |
| 6 months                                      | 48  | 9.4  | < = 9   | 10–12                 | > 12              |
| Referral for histological analysis            | 35  | 6.9  | < = 3   | 4–12                  | > 12              |
| 1 month or referral for histological analysis | 18  | 3.5  | < = 3   | 4–12                  | > 12              |



compared between practices with and without a fail-safe system, and practices with and without the family-practice-based call system.

A logistic regression was performed to correct for potential confounders on the involvement effects. The involvement effects were defined as the effect of a fail-safe system (both in the practices with the family-practice-based call system and in those with the national call system) and the effect of involvement in a call system. For this analysis the outcome measure was dichotomized into women with optimal follow-up versus women with sub-optimal follow-up or without follow-up. The involvement effects and all significant characteristics of the women were included in a stepwise logistic regression model: a fail-safe system, a family-practice based system, age 43 years and younger, severe dysplasia or higher. Only variables that met the 0.15 significance level are included in the model.

## RESULTS

Initially 586 women were selected on the basis of a report of cellular abnormality. Seventy-five women were excluded because of a previous abnormal smear. The study therefore included 511 women. Smears were classified as mild dysplasia ( $n=335$ ; 66%), moderate dysplasia ( $n=77$ ; 15%), severe dysplasia ( $n=56$ ; 11%), carcinoma *in situ* ( $n=41$ ; 8%) and (micro) invasive cancer ( $n=2$ ).

Overall, 76% of the population were classified as optimal follow-up; 12% as sub-optimal follow-up and 12% as being lost to follow-up. Women who failed to comply with follow-up were more likely to be older and to have a less severe degree of cytological abnormality than women who returned for follow-up (Table 2). There was no relation between marital status and compliance with follow-up.

For further analysis 205 women registered in 35 practices with the national call system were excluded. No data regarding monitoring and surveillance of follow-up were known for these practices. The remaining 306

women consisted of 53 women registered with 9 practices with the family-practice-based call system and 253 women registered with 42 practices with the national call system.

All the practices with the family-practice-based call system had a fail-safe system for follow-up. They sent an invitation for follow-up or contacted women who did not respond to recommended repeat smears or histological analysis. In the intervention study the time spent on such a fail-safe system was only 2–3 hours a year [6].

Of the practices with the national call system 50% also had such a fail-safe system.

There was a relationship between involvement of the family physician and compliance with follow-up. Compliance in practices with a fail-safe system was 93% compared to 82% in the practices without a fail-safe system; optimal follow-up was 81% compared to 65%. The highest compliance was found among the women registered with the practices with the family-practice-based call system (Table 3).

Table 4 shows the odds ratios derived from the logistic regression model. The following factors had an independent association with follow-up: severity of initial cytological abnormality and the presence of a fail-safe system for follow-up in the practice. There is no independent effect of involvement in the family-practice-based call system.

The age of women did not independently contribute to the consistency of follow-up of abnormal smears.

Figure 1 shows the compliance related to the involvement of the family physician with whom a woman was registered as well as to the severity of the abnormality of the initial smear.

## DISCUSSION

This study shows that family physicians who are involved in inviting women to participate in a screening programme for cervical cancer, are more successful in obtaining follow-up of abnormal smears than family physicians not involved in the initial screening invitation.

TABLE 2. Follow-up according to age, marital status and PAP smear results

|                            | N   | Optimal follow-up |      | Sub-optimal follow-up |       | Lost to follow-up |       | $\chi^2$ | P value |
|----------------------------|-----|-------------------|------|-----------------------|-------|-------------------|-------|----------|---------|
|                            |     | N                 | %    | N                     | %     | N                 | %     |          |         |
| Age                        |     |                   |      |                       |       |                   |       |          |         |
| 43 and under               | 281 | 225               | 80.1 | 31                    | 11.0  | 25                | 8.9   | 6.96     | 0.031   |
| 44 and over                | 230 | 162               | 70.4 | 33                    | 14.4  | 35                | 15.2  |          |         |
| Marital status*            |     |                   |      |                       |       |                   |       | 0.14     | 0.935   |
| Married                    | 377 | 283               | 75.1 | 49                    | 13.0  | 45                | 11.9  |          |         |
| Unmarried                  | 44  | 32                | 72.7 | 6                     | 13.65 | 6                 | 13.65 |          |         |
| PAP smear results          |     |                   |      |                       |       |                   |       | 9.99     | 0.007   |
| Mild-moderate dysplasia    | 412 | 300               | 72.8 | 57                    | 13.8  | 55                | 13.4  |          |         |
| Severe dysplasia or higher | 99  | 87                | 87.9 | 7                     | 7.1   | 5                 | 5.0   |          |         |

\*90 women: marital status unknown.



TABLE 3. Follow-up and involvement of the family physician

|                                       | N   | Optimal follow-up |      | Sub-optimal follow-up |      | Lost to follow-up |      | $\chi^2$ | P value |
|---------------------------------------|-----|-------------------|------|-----------------------|------|-------------------|------|----------|---------|
|                                       |     | N                 | %    | N                     | %    | N                 | %    |          |         |
| Practices with a fail-safe system:    |     |                   |      |                       |      |                   |      |          |         |
| Family-practice-based call system     | 53  | 45                | 84.9 | 6                     | 11.3 | 2                 | 3.8  |          |         |
| National call system                  | 140 | 111               | 79.3 | 17                    | 12.1 | 12                | 8.6  |          |         |
| Practices without a fail-safe system: |     |                   |      |                       |      |                   |      |          |         |
| National call system                  | 113 | 74                | 65.5 | 19                    | 16.8 | 20                | 17.7 | 11.45    | 0.02    |
| Total                                 | 306 | 230               | 75.2 | 42                    | 13.7 | 34                | 11.1 |          |         |

TABLE 4. Logistic regression

|                               | Partial $R^2$ | Model $R^2$ | C (p) | F     | Prob > F |
|-------------------------------|---------------|-------------|-------|-------|----------|
| 1. Fail-safe system           | 0.029         | 0.029       | 8.317 | 9.038 | 0.0029   |
| 2. Severe dysplasia or higher | 0.024         | 0.053       | 2.805 | 7.518 | 0.0065   |

Stepwise logistic regression model with the following variables: a fail-safe system, a family-practice based system, age 43 years and younger, a severe dysplasia or higher. Only variables that met the 0.15 significance level are included in the model.

Successful follow-up was related to the severity of abnormality of the initial smear as well to the willingness of the family physician to monitor follow-up.

The family practices which had introduced a fail-safe system for follow-up were more successful in compliance with follow-up compared to practices without a fail-safe system. This is true for all women who had a cytological abnormality in the initial smear. However, the differences become even more clear when the women are categorized according to the severity of the abnormality. The fail-safe system had an effect for women with a severe dysplasia as well as for women with a mild/moderate dysplasia in the initial smear (Figure 1).

The highest proportion of compliance with follow-up was found in the practices that were also involved in the call system. To a large extent the effect of the involvement in the call system can be explained by the presence of a

fail-safe system in all these practices. We believe that the involvement of family physicians in a family-practice-based call system had a stimulating effect on the introduction of a fail-safe system within the practices as well as on the responsibility of the family physician for adequate follow-up.

The compliance with follow-up among the women registered with practices without a fail-safe system was consistent with results from other studies. Eighty-two per cent of the women returned for follow-up, 65.5% with optimal follow-up. These findings are comparable to, or better than, those from other studies in which, although the definitions of follow-up varied, compliance was not higher than 60–70%. Elwood *et al.* [7] found satisfactory follow-up for fewer than 60% of women diagnosed with cervical abnormalities on PAP smears. Satisfactory follow-up was defined as: gynaecological referral and further assessment or treatment, and, for mild or moderate cases, two consecutive normal smears.

In a study by Mitchell and Medley [8], 63% of the women with mild to severe dysplasia were rescreened. In a large randomized trial Marcus *et al.* [9] showed that nearly 30% of women who had abnormal PAP smears failed completely to return for follow-up.

In this study compliance with follow-up was strongly related to the severity of the initial PAP smear. Among women with severe dysplasia or higher only 5% did not return for follow-up. Among women with mild to moderate dysplasia the percentage lost to follow-up was much higher.

The influence of the severity of the initial abnormality on follow-up in this study was consistent with the results of other studies [9,10], but the influence of the woman's age and marital status that have been reported [8,9] could not be confirmed.

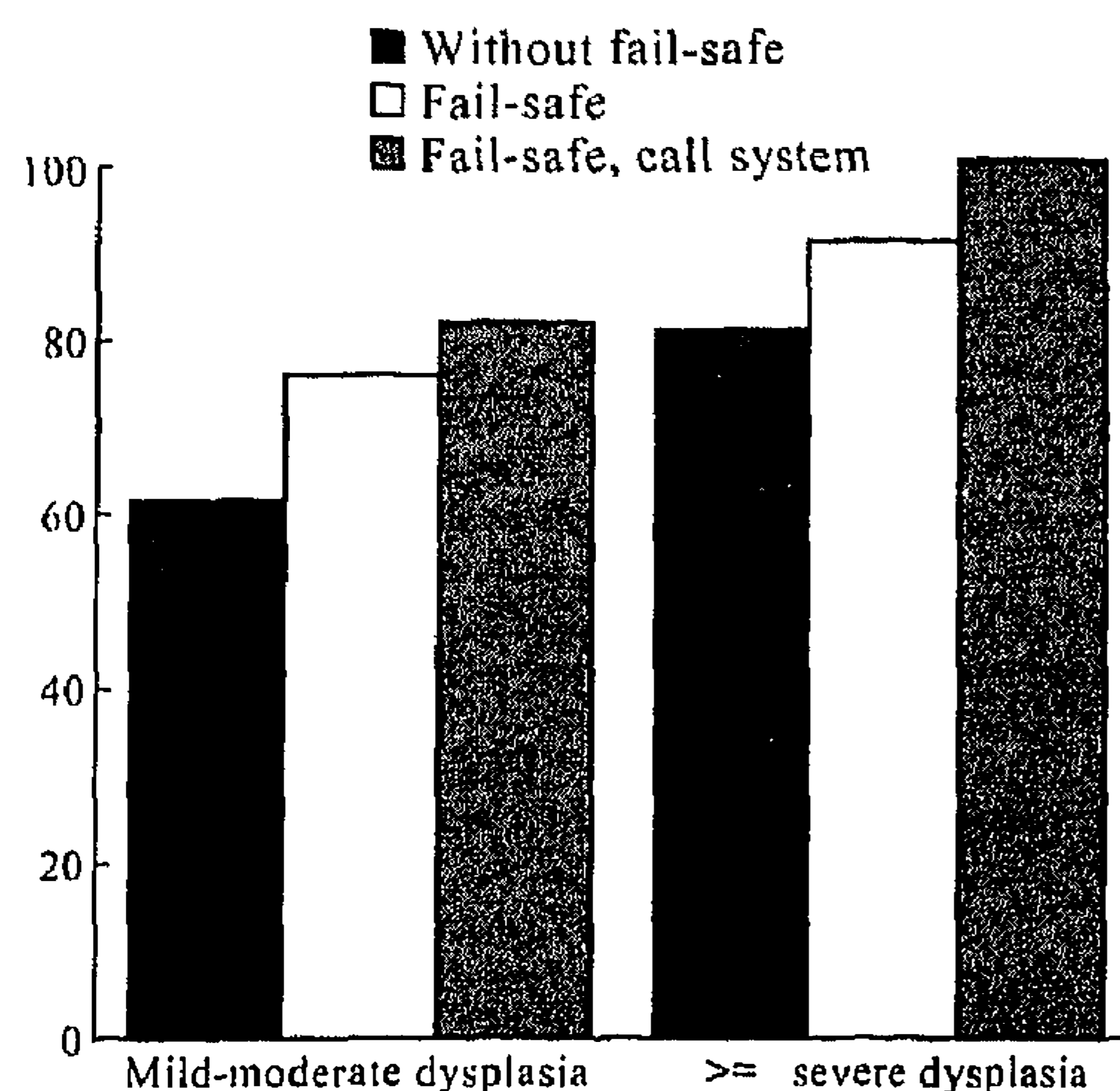


FIGURE 1. Compliance with follow-up by involvement of family physician and severity of smear.



Several factors influenced the results of this study. The introduction of a family-practice-based call system depended on the availability of a computerized system in the practice. Placing practices in a family-practice-based system was therefore not random. In these practices the family physicians and their staff were actively involved in the call system. Though there were no indications [3,5,11] that this group initially had a different attitude to cervical screening or towards an active role in prevention in general, such a selection bias cannot be ruled out. This may have resulted in the introduction of a "fail-safe" system, which all practices with the family-based-call system introduced on their own initiative. The principles of the family-practice-call system were known to the non-participating practices in the region, and this, again, may have influenced their attitudes. This may have resulted in the implementation of a self-initiated "fail-safe" system in some of the practices with the national call system.

Follow-up can be improved by sending reminders and by giving better information to the women. In a study by Michielutte *et al.* [10] in which non-compliant women were sent one or two reminders, the follow-up was 83%. A positive effect of reminders was also found in Mitchell and Medley's study; a reminder letter increased follow-up from 63 to 85% [8]. Another attempt to increase compliance was made in the intervention study of Marcus *et al.*, in which a personalized follow-up combined with targeted information had a positive impact on follow-up [9].

The laboratory can play an important role in monitoring follow-up. During the pilot programmes carried out in three regions in The Netherlands from 1976 to 1986 [12,13], the laboratory initiated a fail-safe procedure to ensure that family physicians did not forget to repeat smears after the recommended interval. Linking the computerized laboratory to the computerized general practice could further facilitate supervision of follow-up of abnormal smears.

In the period of this study the regional laboratory monitored the compliance of women with severe dysplasia. This surveillance undoubtedly contributed to the high compliance within this group. As a result, women with a more severe degree of cytological abnormality were more likely to return for follow-up. Even under these relatively good circumstances the extra value of a fail-safe system within the practice stands out clearly.

This study showed that introduction of a fail-safe system for follow-up in a family practice resulted in higher compliance with follow-up. The best results of follow-up were found in practices that were also involved in the call system. We believe that involvement in the family-practice-based system also increases responsibility for follow-up. All these practices had introduced a fail-safe system and were conscientious in the execution of this system.

In the nationwide screening programme follow-up can be improved by a higher level of involvement by family

physicians. One option is the introduction of a family-practice-based call system. This model appears feasible on a larger scale in The Netherlands and in other countries where data from practice lists are available [3]. But in all practices where family physicians take the smears for screening they are also responsible for adequate follow-up. Therefore the government has to stimulate the introduction of a fail-safe system for follow-up in all these practices. The introduction of such a system is simple and does not take much time.

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