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Premarital Rubella Screening Program: from Identification to Vaccination of Susceptible Women in the State of Hawaii

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Synopsis

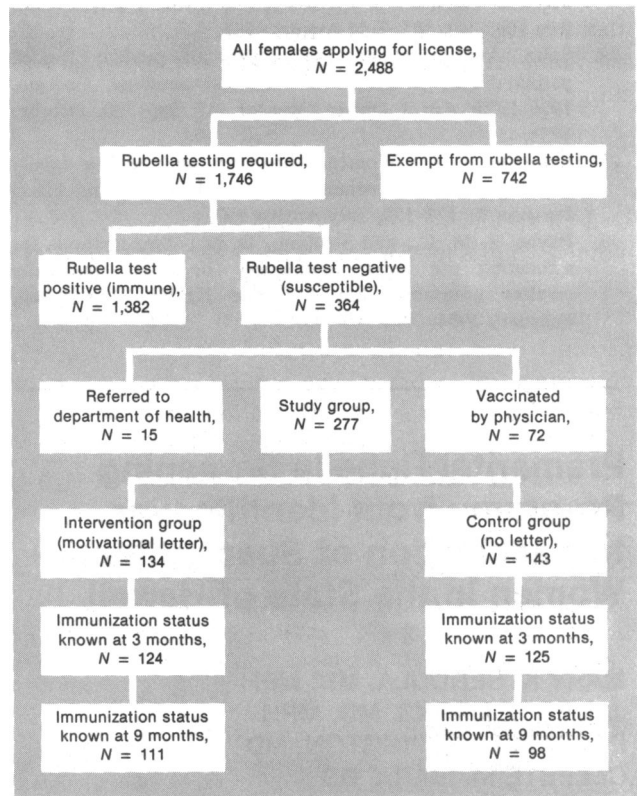
Premarital rubella screening programs are effective in identifying women of childbearing age who are susceptible to rubella. There is concern, however, that once identified, susceptible women may not be subsequently vaccinated. Therefore, a study was conducted to test the effectiveness of a motivational letter mailed at the time of serologic testing. Rubella-susceptible women identified by a premarital screening program were randomly divided into two groups: one group of 134 received a motivational letter and one group of 143 did not.

Three months later, 52 percent of the women in the motivational group had been vaccinated, compared with only 24 percent ($P < 0.05$) of the women in the control group. In this study, a motivational letter was found to lead to a significant increase in rubella vaccination rates among susceptible women. With the increasing emphasis on rubella vaccination programs for adult women, active approaches are necessary to identify and vaccinate susceptible women.

UNTIL RECENTLY, RUBELLA VACCINATION in the United States has been aimed primarily at children. Vaccination of the most critical target group—women of childbearing age—has had only secondary emphasis. This has been largely due to the

concern about inadvertent vaccination of pregnant women and possible untoward effects of the vaccine virus on the developing fetus. Although vaccination of children has resulted in reduced transmission among school children and has fore-

Flow diagram for premarital rubella screening and assignment to study groups, premarital rubella screening program, Hawaii, 1980



stalled major rubella epidemics, the impact of vaccination programs among women of childbearing age has been equivocal (1). Since women of childbearing age are a much more difficult target group than the "captive" school population, active approaches are necessary to identify and motivate this group to become vaccinated.

One approach has been to require a premarital rubella serology from all women applying for a marriage license. The State of Hawaii adopted such a law in 1979. The physician completing the premarital health certificate must submit a blood specimen for rubella antibody testing for every female applicant unless she has proof of rubella vaccination or is physically incapable of ever bearing children (post-menopausal or surgically sterilized). In addition, the physician is asked to provide information on whether or not he or she vaccinated the applicant. The Hawaii law, unlike laws in other States, stipulates that the Hawaii Department of Health provide counseling and rubella vaccination to women whose physicians express reluctance to vaccinate.

Because of concern that many susceptible women were not being vaccinated, the department of health conducted a survey in the spring of 1980 to test the effectiveness of a motivational letter for rubella-susceptible women identified through the premarital rubella program.

Methods

The motivational study involved 277 women who were susceptible to rubella at the time of application for a marriage license, during the 3-month period from March through May 1980 (see figure). Susceptibility was determined through premarital rubella laboratory testing done by both public and private laboratories. Susceptible women were excluded from the motivational study if the premarital health certificate indicated they had been immunized by their physicians (72 women) or referred to the department of health for immunization (15 women).

The study involved two groups: (a) the intervention groups, which was mailed a motivational letter immediately on notification by the department of health of laboratory results and (b) the control group, which did not receive such a motivational letter. Women were randomly assigned to one of these groups according to the week their premarital health certificate was received. Women whose certificates were received in the first week of the study were allocated to the

intervention group; the second week, to the control group; and so on in an alternating pattern. Information on age, birthplace, ethnic group, education, and occupation of the women was abstracted from the marriage license certificates. To optimize followup, addresses and telephone numbers of the women and their husbands were abstracted from the marriage license certificates of all susceptible women.

The initial motivational letter (see page 333) notified women in the intervention group of their susceptibility status and the importance and availability of rubella vaccine to prevent birth defects. Three months later, all women were contacted by mail and questioned about their immunization status. In this letter, similar to the initial motivational letter, there was another reminder of the woman's susceptibility status and the importance of rubella immunization. Women who did not return the letter were telephoned. At least two attempts (day and evening) were made for each of the telephone numbers available for each bride and groom. Those who were contacted were interviewed using a standard telephone questionnaire.

Women who deferred immunization at the time of the 3-month followup were contacted again 9-11 months after the original test (using the same methodology as at 3 months: letter followed by a telephone call) and questioned about their immunization status.

Results

Overall results—all groups combined. Of the 2,488 women applying for marriage license certificates from March through May 1980, rubella antibody testing was required for 1,746, of whom 364 (21 percent) were rubella-susceptible (see figure). The percentage of women vaccinated increased with time following the initial testing. Of the 364 women initially identified as susceptible, 23 percent (84 of 364) had already been vaccinated by the physician completing the premarital health certificate or following referral to the department of health. At the 3-month followup, the percentage of women vaccinated with known followup increased to 53 percent (178 of 333), and at the 9-month followup to 74 percent (218 of 293).

Motivational study group. Seventy-two women were excluded from the motivational study group because of exclusions for vaccination by a private physician, and 15 were excluded because of referral to the Hawaii Department of Health; thus, the number of women available for randomization was 277. There was no significant difference between the intervention and control groups with respect to age, education, occupation, ethnic group, and birthplace (table 1).

At the 3-month followup, 124 (93 percent) of the intervention group and 125 (87 percent) of the control group were contacted (see figure). At that time, 52 percent (64 of 124) of women in the intervention group said they had been vaccinated, compared with 24 percent (30 of 125) of the women in the control group (rate ratio, 2.2; 95 percent confidence interval, 1.5-3.0; table 2). The proportion of women who refused or deferred immunization because of pregnancy was similar in the two groups. However, a greater proportion of women in the control group (33 percent) deferred immunizations for reasons other than pregnancy (for example, too busy, no contracepting, afraid of shots), compared with the intervention group (15 percent) (table 2).

At 9-11 months after serologic testing, attempts were made to recontact women who had deferred immunization at 3 months (45 in the intervention

Table 1. Demographic and socioeconomic composition of study groups, premarital rubella screening program, Hawaii, 1980 (percentage)

Characteristic	Intervention (N = 134)	Control (N = 143)
Age:		
Less than 20 years	6	8
20-29	65	71
30-39	17	13
40 and older	3	4
Unknown	9	5
Education:		
Less than high school	8	8
High school graduate	27	34
1-3 years college	31	32
4 years college-graduate school	27	21
Unknown	8	5
Ethnic group:		
Caucasian	29	34
Japanese	30	20
Hawaiian-part Hawaiian	10	15
Filipino	8	8
Other-mixed	15	19
Unknown	8	4
Occupation:		
Professional-managerial	22	27
Clerical	24	25
Service	20	15
Unemployed-student	9	14
Miscellaneous	4	4
Unknown	21	16
Birthplace:		
Hawaii	52	50
U.S. mainland	24	30
Other	16	16
Unknown	8	4

group and 70 in the control group). Thirty-two women (71 percent) in the intervention group and 43 (61 percent) in the control group were actually contacted. At that time, 50 percent (16 of 32) of the women in the intervention group and 56 percent (24 of 43) of the control group had been vaccinated since the 3-month followup.

Combining the results from the 3- and 9-month followups, 72 percent (80 of 111) of women with known immunization status in the intervention group said they had been vaccinated, compared with 55 percent (54 of 98) in the control group (rate ratio, 1.3; 95 percent confidence interval, 1.1-1.6; table 2).

Discussion

In the present study, women who received a motivational letter were twice as likely to be vaccinated at a 3-month followup compared with women who did not receive a letter. The higher rate of vaccination among the intervention group

Table 2. Rubella vaccination status of susceptible women by study group and month of followup, premarital rubella screening program, Hawaii, 1980

Immunization status	3-month followup				9-month followup			
	Intervention		Control		Intervention		Control	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Immunized.....	64	52	30	1 24	80	72	54	² 55
Not immunized:								
Refused (sterile, avoids pregnancy).....	8	6	14	11	10	9	16	16
Refused (other reasons).....	7	6	11	9	8	7	11	11
Deferred (pregnant).....	26	21	29	23	3	3	3	3
Deferred (other reason).....	19	15	41	33	10	9	14	14
Total.....	124	100	125	100	111	100	98	99

¹ Rate ratio, 2.2; 95 percent confidence interval, 1.5-3.0.

² Rate ratio, 1.3; 95 percent confidence interval, 1.1-1.6.

appears to be due to the motivational letter mailed at the time of serologic testing. The difference in vaccination rates cannot be explained by initial differences in the composition of the study groups, since the intervention and control groups were similar with respect to age, education, ethnic group, occupation, and place of birth. It is also unlikely that the intervention group, to a greater extent than the control group, should have falsely reported a higher rate of vaccination in order to please the investigators, because the letter questionnaire mailed to both groups at 3 months contained the same reminder.

As would be expected at 3-month followup, the motivational letter appeared to have the greatest impact on women who deferred immunization for reasons other than pregnancy and had little effect on women who deferred because of pregnancy or who refused vaccination because of sterility, allergies, or other reasons.

The effect of the initial motivational letter was measured at 3 months; therefore, its effect on women deferring vaccination because of pregnancy could not be determined from this study. In addition, at the 9-month followup, when the vaccination coverage of women deferring because of pregnancy could be estimated, both the intervention and control groups had received a reminder letter.

Previous studies have shown a low rate of vaccination among women who are postpartum. In one survey of pregnant rubella-susceptible women identified through a prenatal screening program, only 5 percent (13 of 278) had been immunized (2). Compared with this previous study, the Hawaii women had a higher rate of vaccination. Of the 38 women with known followup who initially

deferred vaccination because of pregnancy, 66 percent were vaccinated at 9 months.

This study revealed that, for maximal effectiveness, motivational letters should be mailed as soon as possible after testing when the bride and groom can still be easily contacted. Even though both intervention and control groups had received a reminder letter at 3 months, the percentage immunized remained higher in the intervention group at the 9-month followup. The reminder letter received by the control group at 3 months was unable to make up the initial difference.

The percentage of women vaccinated in the present study—74 percent of 293 women with known followup—is higher than that found in previous investigations of premarital rubella screening programs. In Colorado, 41 percent of 230 susceptible women with known followup were vaccinated 4-5 months after testing; and in Rhode Island, 37 percent of 170 women, 5-8 months after testing (3,4). Reasons for the higher vaccination rates seen in the Hawaii study include the effectiveness of the motivational program, the referral mechanism for physicians reluctant to vaccinate, and the later time of followup (9-11 months). The effectiveness of the motivational program was likely the result of a combination of factors that include immediacy of contact, cumulative effect of multiple contacts, and nature of contact (letter and telephone call). The effect of each factor cannot be separated from the effect of the combination and may be a subject for further research.

Because vaccination of adult women has only recently been emphasized, little information is available on the effectiveness of motivational programs for this age group. Although no studies that investigated the effectiveness of intervention pro-

grams in adult women could be identified, several studies addressed the effectiveness of rubella screening programs and reasons why women were not vaccinated. Problems with notification and physician reluctance to vaccinate have been repeatedly identified (2-5). In the previously discussed study of premarital rubella screening in Rhode Island, only 76 percent of women who had been screened and found susceptible were aware of their susceptibility.

Problems with notification can be overcome through a motivational letter, but problems with physician reluctance to vaccinate are more difficult to address. Informing physicians that the most recent recommendation by the Immunization Practices Advisory Committee, Public Health Service, no longer requires rubella susceptibility testing prior to vaccination (thus eliminating the need for a return visit) may be helpful (6). In Hawaii, the system for referring women to the department of health was also useful in getting women vaccinated: 12 of the 15 women referred to the department of health were vaccinated.

In this study, a motivational letter sent to women identified as susceptible to rubella through a mandatory premarital screening program led to a significantly increased rate of rubella vaccine acceptance; similar letters should be part of public health programs elsewhere. Motivation programs such as this one could be conducted by organizations such as the department of health, marriage license bureau, or laboratory performing the test. Extrapolating the results of this investigation to the premarital program in Hawaii indicates that the program would result in the immunization of about 340 additional women each year (assuming motivational letters were mailed to an additional 1,200 women per year). Although the cost of administering such a program would be \$1,700-2,500 per year, it is minimal compared with the estimated lifetime cost for a child with congenital rubella syndrome, estimated to be \$221,660 (7).

With the increasing emphasis on rubella vaccination programs for the young adult woman, active approaches need to be developed to motivate this group to be vaccinated. In 1983, 11 States required premarital rubella testing (unpublished document, Centers for Disease Control, December 1983). The present survey illustrates the importance of an effective vaccination program for the childbearing age group, since 21 percent of all women tested were susceptible to rubella. Although this rate is lower than the 30-60 percent susceptibility rate

previously reported for Hawaii and may represent the entry of persons vaccinated as children into the childbearing-age population, effective programs are still needed for the group of women who have neither been vaccinated nor who acquired natural immunity as children (8,9).

Sample of Motivational Letter

Dear

Please allow me to offer my congratulations on your marriage. As you may remember, at the time you were married you were required to have a rubella blood test to complete your premarital health certificate.

According to our records, your rubella blood test shows that you are susceptible to rubella (German measles). This is important to you, because rubella during pregnancy can cause birth defects such as deafness, blindness, mental retardation, and heart disease. To protect against getting rubella during pregnancy, obtain a rubella shot now, before you become pregnant. If you are pregnant, ask your physician for a rubella shot after your baby is born. One shot will give you immunity that will probably last for the rest of your life.

If you have questions about rubella or the rubella vaccine (and where to get it), please call 548-5986 for information.

Sincerely,

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