Rubella screening: organization and incentive

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SUMMARY. Women aged 15–44 in a total population of 13,300 were screened for rubella immunity. Seventy-one per cent of the women at risk responded to a letter asking them to attend for a blood test, and of these nearly two thirds were screened. Practice expenditure on the programme was three times greater than income. We suggest a simpler, cheaper way of screening which involves minimal extra work and where an age–sex register is not required. We propose the introduction of a higher item-of-service payment for rubella vaccination.

Introduction

FORTY years ago, rubella infection during pregnancy was linked with congenital cataracts (Gregg, 1941). Prospective studies later established the risk of multiple handicap and abortion (Manson *et al.*, 1960; Siegel and Greenberg, 1960; Lundström, 1962).

Studies from British and North American general practice have described screening programmes to determine immunity to rubella (Goodman, 1976; Rose and Mole, 1976; Gringras *et al.*, 1977; Mountifield, 1978; Shlian, 1978; Gringras, 1980; Clubb *et al.*, 1981), but all reached only a small proportion of women at risk. Studies by Hansen (1980) and Mills and colleagues (1980) have attempted to screen all at risk, but the latter was confined almost entirely to teenagers and included males. The former, like us, identified the population from a register but waited for women to attend for any reason, rather than sending out letters giving a special appointment.

To date, no general practitioners have costed their screening programme. Skinner and colleagues (1972) found it cost-effective to vaccinate 13-year-old girls before the schoolgirl vaccination programme got under way. They identified girls born in a single year only, rather than 30 different years, and did not need to do blood tests, which made their task very much easier.

Aims

In addition to providing women of childbearing age in our practices with a screening service to determine immune status and vaccinating those susceptible, we set out to assess the following:

1. What is the response of a total population to a screening programme using a postal invitation to attend for a special appointment?
2. Is such a programme feasible as a routine procedure?
3. How does the general practitioner fare financially?

Method

The study took place in practices in Dorking (practice 1) and Englefield Green (practice 2). List sizes were 6,600 and 6,700 respectively. A pilot study was carried out in July 1979 in practice 1 to assess the response rate of a sample of 60 women. The pilot allowed us to plan a realistic spacing of appointments and gave us an opportunity to iron out procedural problems.

The study began in August 1979 and lasted six months in practice 1 and nine months in practice 2. Women aged 15–44 were identified from the age–sex registers and their addresses taken from the medical record envelopes.

Those women previously shown to be seropositive, those sterile following gynaecological surgery or on a waiting list for a sterilizing operation and those currently pregnant were excluded from the study. Those previously vaccinated, either as schoolgirls or in the puerperium, were included in order to confirm seroconversion. Vasectomy of the partner was not a reason for exclusion. A red 'rubella survey' label was attached to the medical record of all those included.

Special appointments were arranged for blood to be taken by a nurse. Initial letters giving specific appointments were sent out in weekly batches, a fortnight in advance, enclosing DHSS leaflet RV2 *(Catch German Measles Before it's Too Late)* and an addressed reply envelope. A detachable portion of the letter gave the

Table 1. Female population aged 15–44 of both practices by age-group.

Age group	Left district	Population at risk			
		Excluded	Non-attenders	Attenders	Total
15–19	23	8	158	272	461
20–24	41	42	145	161	389
25–29	35	90	132	129	386
30–34	50	157	199	127	533
35–39	31	92	204	113	440
40–44	19	74	202	84	379
All ages	199	463	1040	886	2588

Table 2. Marital status of attenders (both practices).

	Number	Per cent
Single	465	*52.5*
Married	377	*42.5*
Separated/widowed/divorced	44	*5.0*
Total	886	*100.0*

choice of acceptance or refusal. If the appointment given was inconvenient, women were asked to contact the surgery to alter it.

Two or three two-hour phlebotomy sessions took place a week; six to eight patients were booked every 15 minutes. All specimens were sent by hospital transport to the Public Health Laboratory at Epsom.

Letters were sent to women informing them of the result. A green 'rubella immune' label was superimposed for all found to be seropositive. Those found to be seronegative made an appointment with the doctor, when consent forms were signed (parents signed for the under-16s). An explanation of the vaccination and the need to avoid pregnancy following the injection was given. Only those who had used a reliable method of contraception for the previous month and who undertook to continue for another three months were vaccinated (Rowlands and Bethel, 1982).

Further clinical and virological details are contained in a separate paper (Rowlands and Bethel, 1981). Seronegatives who did not attend for vaccination were pursued energetically, mainly by telephone. Repeat blood samples were taken eight weeks after vaccination to prove seroconversion; women were again informed of the result. Those who failed to contact the surgery by the time of their appointment were reminded once by post or telephone. Reminders were also sent to those who accepted the first appointment but subsequently did not attend. Stamped addressed envelopes were included with postal reminders.

Records of all income and expenditure in connection with the study were kept, apart from the cost of telephone calls.

Results

Of the 2,588 women aged 15–44 years in both practices (Table 1), 199 (8 per cent) were found to have left the district. The remaining true population of 2,389 contained 463 women (19 per cent) who were excluded from the study for the reasons already given. The peak of 33 per cent excluded in the 30–34 age-group was largely made up of parous women known to be seropositive from antenatal screening. The majority of exclusions in the 35–44 age-group were because of sterility.

One thousand, three hundred and seventy-two (71 per cent) of the 1,926 women at risk responded to our letters. Nearly two thirds of responders (886) attended for a blood test, while the other third (486) refused. Of these refusals, 253 replied to the initial letter; a further 233 were prompted by a reminder. No response at all was received from 554 (53 per cent) of the 1,040 non-attenders. Practice 2 screened 50 per cent of its women at risk, practice 1, 42 per cent.

The marital status of attenders is shown in Table 2. Twelve per cent of those screened were seronegative. Ninety-seven of the 107 seronegatives (91 per cent) were vaccinated.

Table 3 shows the considerable financial loss incurred in implementing a programme of this kind. Claims for 99 immunization fees at £1.70 and 35 (extra) FP1001 contraceptive service fees at £4.65 were made.

Discussion

One hundred and ninety-nine letters were returned by the Post Office; it is likely that others did not reach patients because they had moved. Thus the size of our population was overestimated by at least 8 per cent (see Table 1). This degree of inaccuracy in age-sex registers is not unusual (Fraser and Clayton, 1981). However, we took addresses from the medical record envelope, which Fraser and Clayton have shown is more accurate than the age-sex register. These workers have also shown that inaccuracy caused by failure to make out cards for properly registered patients tends to be small. Thus we are confident that we identified all but a few of the population at risk.

We were pleased with the response to our programme; considerable interest and enthusiasm was shown by many women (and by certain other members of their families). Coincident national publicity may have had a beneficial effect, although many seemed unaware of the DHSS immunization campaign.

It was not possible to document reasons for refusal to attend for a blood test, as replies came either by letter or by telephone messages left with the receptionists. We formed the impression that some women may not have understood fully the importance of the procedure for them. Face-to-face interviews are more likely to persuade them than an approach by letter, even on headed notepaper from their own practice.

Table 3. Financial details (1979 values to the nearest £).

Item	Practice 1	Practice 2	Both practices
*Expenditure**			
Printing	175	175	350
Postage (2nd class)	156	176	332
Stationery	19	30	49
Net staff pay**	186	161	347
Total	536	542	1078
Income			
Immunization fees	76	92	168
Extra contraceptive fees	84	79	163
Total	160	171	331

*Expenditure on telephone calls not estimated.
**Seventy per cent of the staff pay was reimbursed by the FPC.

We did not reach the high proportion, 85 per cent, of women at risk achieved by Hansen (1980), but this took him 18 months. However, we think it likely that the larger proportion reached by practice 2 in our study reflects the longer time the survey continued in that practice. Women with red labels on their notes attending surgery for any reason were approached again and the importance of the blood test stressed. Thus a review of our results at 18 months might well show that the proportion approaches or surpasses that of Hansen.

We gained the impression that results of antenatal sero-testing and post-natal vaccination were not always conveyed to the general practitioner. We agree with Ellman (1979) and Vaile (1981) that all agencies which provide rubella vaccination or sero-testing should issue the women with a card bearing the date of vaccination (if applicable) and the date and result of blood tests.

Two procedural details concerned with taking blood and vaccinating were important to our screening programme. The blood test must be available on the premises. Sending patients to a laboratory (Rose and Mole, 1976) tends to reduce the numbers tested. Prescribing vaccine on an FP10 (Gringras *et al.*, 1977) means a trip to the chemist (plus a prescription charge); there is also the possibility that the vaccine will lose its potency by storage in unfavourable environments, such as handbags, for prolonged periods; and the vaccination rate is likely to suffer by default. We had plentiful supplies of vaccine obtained from the Area Health Authority stored in the fridge.

Conclusions

In conclusion, we make recommendations based on our experience of a programme using a postal invitation. Screening all women at risk in the country would be cost-effective, as has been shown in the USA (Schoenbaum *et al.*, 1976) and Finland (Elo, 1979), but the problem is to devise a way in which it can become a part of routine health care in general practice. At present there is a financial disincentive for individual general practitioners to undertake rubella screening. Although screening can and should continue to take place in family planning clinics and occupational health services, we suggest that general practice is the ideal setting.

The cost of postage in our programme was prohibitive. The idea of an annual freepost mailing for each household on a general practitioner's list (RCGP, 1981) would get round this problem, but we doubt that it will be introduced in the near future. Hansen's programme was successful without using letters, so we feel that a postal invitation has no special virtue. In the UK, one would expect to reach about 67 per cent of the population at risk during a year of consultations for any reason (Crombie *et al.*, 1975), provided no patients with red labels slipped through the net.

Eliminating the need for letters and envelopes means that printing costs are much reduced; they are confined to red and green labels and vaccination consent forms. However, staff costs remain considerable (despite 70 per cent reimbursement from the Family Practitioner Committee) if a total population is identified from an age-sex register.

For practices without age–sex registers (the majority), there are two alternatives. The first requires an intensive search for the notes of the population at risk, as carried out from an age–sex register. However, the time taken in this process would be enormous, as the names of the women would not be known in advance; it would be even lengthier in practices where notes of both sexes are filed together.

We advocate the following simpler system. Before every surgery, receptionists label or tag the notes of women in the appropriate age-range. This takes only a small amount of extra time each day, but is spread over a long period. The doctor enquires about rubella immunity at any consultation where the notes are labelled and, if appropriate, recommends a blood test. The disadvantage is that it takes a long time before a sizeable proportion of women at risk have labelled notes. In practices with age–sex registers, once notes are labelled, only at yearly intervals does a new cohort of teenagers reaching the agreed lower age for screening need to have its notes labelled. In both systems, the notes of all women of childbearing age joining the practice will be labelled as they arrive from the Family Practitioner Committee.

Even the simplest scheme costs extra money. There is a small income from additional FP1001 claims, but we have come to the same conclusion as the Royal College of General Practitioners (1981), that there is a need for a further incentive and that this should be in the form of an item-of-service payment.

We propose a payment for the vaccination of serologically-proven susceptible adults. As it is the vaccination of seronegatives which is to be encouraged, not merely determination of immune status, we feel that there should be no fee for a blood test. In addition, we recommend continuing the policy of vaccinating the 10–

14 year olds who have missed vaccination at school. We suggest a rate of payment for vaccination higher than its present category B level; this might be called category C and would reward the extra work involved in identifying the seronegative women. The exact amount of the payment would need to be negotiated, taking into account current financial considerations.

It would probably be necessary to review its value at intervals because the number of seronegatives identified in successive years will gradually diminish as the school vaccination programme proceeds. It will therefore become increasingly time-consuming and costly to identify any remaining seronegative women.

References

Clubb, R. A., Dove, G. A. W., MacInnes, L. E. *et al.* (1981). Factors influencing rubella immunity in women. *British Medical Journal,* **282,** 275-277.

Crombie, D. L., Pinsent, R. J. F. H., Lambert, P. H. *et al.* (1975). Comparison of the first and second national morbidity surveys. *Journal of the Royal College of General Practitioners,* **25,** 874-878.

Ellman, R. (1979). Rubella immunisation. Letter. *British Medical Journal,* **2,** 1440-1441.

Elo, O. (1979). Cost-benefit studies of vaccinations in Finland. *Developments in Biological Standardization,* **43,** 419-428.

Fraser, R. C. & Clayton, D. G. (1981). The accuracy of age–sex registers, practice medical records and family practitioner committee registers. *Journal of the Royal College of General Practitioners,* **31,** 410-419.

Goodman, M. (1976). Rubella in general practice. *Update,* **12,** 527-533.

Gregg, N.McA (1941). Congenital cataract following German measles in the mother. *Transactions of the Ophthalmological Society of Australia,* **3,** 35-46.

Gringras, M. (1980). Follow-up of rubella vaccination in general practice. *British Medical Journal,* **280,** 18-19.

Gringras, M., Reisler, R., Caisley, J. *et al.* (1977). Vaccination of rubella-susceptible women during oral contraceptive care in general practice. *British Medical Journal,* **2,** 245-246.

Hansen, N. H. (1980). Rubella prevention in family practice with RA27/3 vaccine. *Journal of Family Practice,* **11,** 537-542.

Lundström, R. (1962). Rubella during pregnancy. A follow-up study of children born after an epidemic of rubella in Sweden, 1951, with additional investigations on prophylaxis and treatment of maternal rubella. *Acta Paediatrica,* **51,** Supplement 133, 1-110.

Manson, M. M., Logan, W. P. D. & Loy, R. M. (1960). *Rubella and Other Virus Infections during Pregnancy.* Report on Public Health and Medical Subjects, No. 101. London: HMSO.

Mills, D. A., Parker, K. R. & Evans, C. E. (1980). Rubella antibody titres and immunization status in a family practice. *Canadian Medical Association Journal,* **122,** 549-552.

Mountifield, J. (1978). An evaluation of immunization against rubella. *Primary Care,* **5,** 717-723.

Rose, A. J. & Mole, K. F. (1976). Rubella immunization and contraception—a case for re-examining the policy of the Department of Health and Social Security. *Journal of the Royal College of General Practitioners,* **26,** 817-821.

Rowlands, S. & Bethel, R. G. H. (1981). Rubella vaccination: screening all women at risk. *British Medical Journal,* **283,** 829-831.

Rowlands, S. & Bethel, R. G. H. (1982). Contraceptive cover for rubella vaccination. *Practitioner,* **226,** 1155-1156.

Royal College of General Practitioners (1981). *Health and Prevention in Primary Care. Report from General Practice 18.* London: RCGP.

Schoenbaum, S. C., Hyde, J. N. Jnr, Bartoshesky, L. *et al.* (1976). Benefit-cost analysis of rubella vaccination policy. *New England Journal of Medicine,* **294,** 306-310.

Shlian, D. M. (1978). Screening and immunization of rubella-susceptible women. Experience in a large, prepaid medical group. *Journal of the American Medical Association,* **240,** 662-663.

Siegel, M. & Greenberg, M. (1960). Fetal death, malformation and prematurity after maternal rubella: results of a prospective study, 1949-1958. *New England Journal of Medicine,* **262,** 389-393.

Skinner, J. L., Skinner, E. M., Enoch, P. J. *et al.* (1972). Rubella immunization in a group practice. *Journal of the Royal College of General Practitioners,* **22,** 18-22.

Vaile, M. S. B. (1981). Factors influencing rubella immunity in women. Letter. *British Medical Journal,* **282,** 738.

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Influenza surveillance

The weekly indices used for monitoring influenza have been compared over a period of 13 winters, and a report, which is to be published, concludes that early indications of an influenza epidemic and its relative size are best reflected by rises in the RCGP epidemic influenza rate (Birmingham Research Unit) when laboratory reports confirm that influenza virus is being isolated from the population. Total deaths (all causes) and respiratory deaths (pneumonia, bronchitis and influenza) are also of value in monitoring because they usually increase at the same time as the RCGP rate or at most one week later, but changes are not specific to influenza and rises often take place in exceptionally cold weather. Deaths attributed to bronchitis or pneumonia are of less value because there is an underlying downward trend in the former and upward trend in the latter which make interpretation difficult. Deaths certified as influenza usually rise after the other indices, when an epidemic is well publicized. Finally, sickness benefit claims and emergency bed services indices have been more erratic in recent years and are thus found to be less valuable for weekly monitoring than in the past.

Source: *Communicable Disease Report,* 81/44.