

IMMUNIZATION IN GENERAL PRACTICE

(An analysis of some of the factors involved)

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IN JULY 1965, I undertook a survey of the state of immunization of all the children aged between one and two years in the general practice in which I was working as a trainee assistant. Certain factors were investigated to see if they had any bearing on the standard of immunization, namely the sex of the child, the birth order of the child, the father's occupational category, and the distance from home to place of immunization.

Practice situation and procedures

The surgery is situated near the city centre within 50 yards of three main arterial roads, which serve the housing schemes in which the majority of the patients live.

The practice which employs both a receptionist and a nurse, holds a 'baby clinic' on two afternoons a week at which the child is weighed and immunized where necessary. The child is also examined.

All immunizations carried out in the practice are recorded in the patient's medical notes. Information as to the children immunized outside the practice in health clinics and nurseries is obtained at a monthly meeting with the health visitors who work in the surrounding district.

All the children in the survey were vaccinated by the multiple pressure technique. The child was not recorded as having been vaccinated unless the vaccination was seen to have taken. Triple antigen and oral Sabin polio vaccine were each given three times at monthly intervals according to the Q regimen (see table I).

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TABLE I
IMMUNIZATION PROGRAMME

| <i>Age of child</i> | <i>Type of immunization</i> |
|---------------------|-----------------------------|
| 3 months | 1st triple |
| 4 months | 2nd triple |
| 5 months | 3rd triple |
| 6 months | 1st polio |
| 7 months | 2nd polio |
| 8 months | 3rd polio |
| 1 year | Smallpox vaccination |

Data

The names of the children born between 1 May 1963 and 30 April 1964 were obtained from the age/sex register of the practice. The state of immunization of these children was extracted from the case records. It was assumed that if no record was present as to an item of immunization, the child had not received this specific item. Confirmation that the child had not been immunized elsewhere was obtained from the records in the public health department. Confirmation as to the immunization state of all children who were known to have been immunized outside the practice was also obtained from this source.

The distance from the child's home to the place of immunization was estimated 'as the crow flies'. No allowance was made for difficulties in travelling, e.g. bus routes.

The birth order of the child and the occupation of the father were all obtained from family record cards maintained by the practice.

Although the 75 children under survey were born at different times throughout a calendar year, the data were confined to the state of immunization of these children on 31 July 1965. Their ages at this date, therefore, ranged from 1 year 3 months to 2 years 3 months.

Definitions

For the purpose of this study a 'fully immunized' child is a child who was immunized according to the programme (*vide supra*).

A child defined as 'irregularly immunized' is a child who had a time lag of more than six weeks between any two of the three inoculations.

An 'incompletely immunized' child is a child who has received one inoculation but has missed either one or both of the other inoculations in this series.

A 'partially immunized' child is a child who has received some

form of inoculation without completing the whole programme.

Place and pattern of immunization (table II)

On 30 June when the survey was undertaken the age/sex register showed that there were 75 children born between the specified dates. Fifty (67 per cent) had been immunized by the general practitioner, 12 (16 per cent) by the local health authority child welfare clinics, and four (five per cent) by both general practitioner and local health authority. Full immunization was achieved in respect of 46 (61 per cent) of the children and 20 (27 per cent) were partially immunized. Nine (12 per cent) had received no form of immunization.

Thirty-eight (76 per cent) of the 50 children immunized by the

TABLE II
STATE OF IMMUNIZATION AND BY WHOM IMMUNIZED

| <i>Immunization</i> | <i>By G.P. only</i> | <i>By L.H.A. only</i> | <i>By both G.P. and L.H.A.</i> | <i>Not immunized</i> | <i>Totals</i> |
|--|---------------------|-----------------------|--------------------------------|----------------------|---------------|
| <i>Fully immunized ..</i> | 38* | 6 | 2 | — | 46 (61) |
| <i>Partially immunized</i> | | | | | |
| Complete polio only | — | 1 | — | — | 1 |
| Complete triple only | 1 | 2 | — | — | 3 |
| Complete triple and polio only .. | 6 | 2 | 1 | — | 9 |
| Smallpox and complete polio only .. | — | — | 1 | — | 1 |
| Smallpox and complete polio and incomplete triple .. | 2 | — | — | — | 2 |
| Complete polio and irregular triple only | 1 | — | — | — | 1 |
| Complete triple and incomplete polio only | 1 | — | — | — | 1 |
| Irregular triple only | 1 | 1 | — | — | 2 |
| <i>Not immunized ..</i> | — | — | — | 9 | 9 |
| TOTAL | 50 (67) | 12 (16) | 4 (5) | 9 (12) | 75 (100) |

* These 38 children include two, one of whom had an irregular polio inoculation and the other an irregular triple injection,

general practitioner were fully immunized, half of the 12 children immunized by the local health authority were fully immunized. Two of the four children who were immunized at both types of clinic were fully immunized.

Twenty children were partially immunized and of these 17 (85 per cent) were not vaccinated. Ten of the 17 attended the general practitioner, six the local health authority and one attended both types of clinic.

Two of these 20 children received no form of triple antigen and five received no form of polio inoculation.

The annual report by the medical officer of health of the City of Edinburgh in 1964 indicates that general practitioners in the city as a whole performed 60 per cent of the smallpox vaccinations, 45 per cent of the triple antigen inoculations and 47 per cent of the polio inoculations to all children under five years.

Results

To compare the relationship between the factors under review and the standard of immunization, children were grouped into those who were fully immunized and those who were partially or not immunized. The standard of immunization was studied in relation to the following factors:

1. *Sex of the child (table III)*

Forty-seven of the 75 children were boys and 31 (66 per cent) of them were fully immunized. Fifteen (54 per cent) of the 28 girls were fully immunized. The difference is not statistically significant.

TABLE III
SEX OF CHILD RELATED TO STANDARD OF IMMUNIZATION

| <i>Sex</i> | <i>Fully immunized</i> | <i>Partially/not immunized</i> | <i>Totals</i> |
|----------------|------------------------|--------------------------------|---------------|
| Male | 31 (66) | 16 (34) | 47 (=100) |
| Female | 15 (54) | 13 (46) | 28 (=100) |

2. *Birth rank of the child (table IV)*

The first, second and third children were compared with fourth and subsequent children. Forty (71 per cent) of the 56 children in the first group were fully immunized compared with six (32 per cent) of the 19 children in the second group. This difference is statistically significant ($p = < 0.01$). (One-third of the 75 children in the study were the first child in their family.)

3. *Social group of the family (table V)*

The father's occupation was coded according to the Registrar General's classifications:

Group A. R.G. Categories I, II and III.

Group B. R.G. Categories IV and V.

A third group (C) consisted of the families of 12 children whose father's occupations were unclassified either because there was no father in the household, because his occupation was unknown, or because the father was serving with H.M. Forces.

Twenty-seven (75 per cent) of the 36 children in Group A were fully immunized compared with 14 (52 per cent) of the 27 children in Group B. This difference is statistically significant ($p = < 0.05$).

4. Distance from the home to the place of immunization (table VI)

All the children in the study lived within one mile of their nearest local health authority child welfare clinic. Distance as such cannot therefore be considered to have inhibited attendance at the clinic for immunization. Thus to show the effect of distance from home to surgery and the state of immunization of the child, the 16 children who were immunized by the local health authority have not been considered. Of the remaining 59 children, 45 lived within two miles of the doctor's surgery and 34 (76 per cent) of those children were fully immunized. Fourteen children lived more than two miles from the doctor's surgery and only four (29 per cent) were fully immunized. This difference is statistically significant ($p = < 0.01$).

Twenty of the total children lived more than two miles from their doctor's

TABLE IV
BIRTH RATE OF CHILD RELATED TO STANDARD OF IMMUNIZATION

| <i>Birth rank</i> | <i>Fully immunized</i> | <i>Partially/not immunized</i> | <i>Totals</i> |
|---------------------------|------------------------|--------------------------------|---------------|
| 1st, 2nd, 3rd child | 40 (71) | 16 (29) | 56 (=100) |
| 4th or later child | 6 (32) | 13 (68) | 19 (=100) |

$p = < 0.01$

TABLE V
FATHER'S OCCUPATION RELATED TO STANDARD OF IMMUNIZATION OF CHILD

| <i>Father's occupation (family group)</i> | <i>Fully immunized</i> | <i>Partially/not immunized</i> | <i>Totals</i> |
|--|------------------------|--------------------------------|---------------|
| <i>Group A</i> R.G. I, II, or III | 27 (75) | 9 (25) | 36 (=100) |
| <i>Group B</i> R.G. IV or V | 14 (52) | 13 (48) | 27 (=100) |
| <i>Group C*</i> Unclassified | 5 (42) | 7 (58) | 12 (=100) |

$p = < 0.05$

* The unclassified Group (C) was not included in the significance test.

surgery and of these, five (25 per cent) were fully immunized, four by the general practitioner and one by the child welfare clinic. Of the other 15, five were partially immunized by the general practitioner, four were partially immunized at the child welfare clinic and one child who attended both clinic and surgery was only partially immunized. Five of the 20 children were not immunized at all.

Two points are worth noting; first, of the nine children not immunized, five lived more than two miles from the surgery, secondly, of the 12 children immunized at the child welfare clinic, five lived more than two miles from the surgery.

TABLE VI
DISTANCE FROM HOME TO SURGERY RELATED TO STANDARD OF IMMUNIZATION OF CHILD

| <i>Distance from surgery</i> | <i>Fully immunized by G.P.</i> | <i>Partially/not immunized by G.P.</i> | <i>Totals</i> |
|------------------------------|--------------------------------|--|---------------|
| Less than two miles .. | 34 (76) | 11 (24) | 45 (= 100) |
| Two miles or more | 4 (29) | 10 (71) | 14 (= 100) |

$$p = <0.01$$

Note:—This table omits those children (12) immunized by the C.W.C. and those immunized by both C.W.C. and G.P. (4).

Discussion

The number of children in the survey is small and therefore any conclusion must be considered cautiously. Nevertheless, most of the results follow the expected pattern.

The most striking feature of the study was the number of children who were not vaccinated against smallpox. This amounted to 26 (35 per cent) of the 75 children. In fact, of the children who were only partially immunized 85 per cent received no smallpox vaccination. Various reasons have been put forward for the fall in recent years in the number of children being vaccinated. It is widely believed that smallpox is no longer a danger and is a disease of the past. Postponement of vaccination until the child is one year old may also be a factor.

In this practice 88 per cent of the children in the age group had received some form of immunization but more than a quarter of these immunized had not been vaccinated.

More boys were immunized than girls but the difference in this series is not statistically significant.

Three factors were proved to make a statistically significant difference to the standard of immunization. There is less likelihood of a child being fully immunized if it comes from a larger family, from a family in the lower social groups, or from a home which is far from the doctor's surgery. Children in these homes, therefore,

form a vulnerable group and in any immunization scheme a concentrated effort should be made to reach them. Threshold levels in families of more than three children and in homes more than two miles from the surgery are clearly shown in the results.

It is interesting that of the nine children who received no form of immunization, five lived more than two miles from the surgery; four were born into families of three or more children; all of them came from homes where the father's occupation was in Registrar General categories IV or V.

The significance of these findings is a matter for conjecture. Why should a birth rank of fourth or later make such a difference to the immunization of a child? Is the mother meeting her older children from school when she should be taking the new baby to be immunized? Is she less able to cope with the demands of the home? Do mothers of four or more children have a different attitude to immunization? Then again, why should there be such a difference between the children who live more than two miles from the surgery and those who live nearer? Is the problem of buses and prams more difficult? Is there less inclination to attend the surgery when one lives farther away?

Many of the larger families in the lower social groups in this practice are the families which have been moved from condemned tenements near the city centre and rehoused in outlying housing schemes some distance from the surgery. These would seem to be the families in which the child is most in need of immunization and least likely to get it.

A further factor which was also considered was the effect of the mother working outside the home on the standard of immunization of the child. In this particular study, however, information as to the mother's working habits was not sufficiently reliable. The family cards, reviewed annually, indicated that 13 (17 per cent) of the mothers worked either part time or full time outside the home. Douglas and Broomfield, in a review of children under five, found that only four (two per cent) of mothers took employment with a child of under one year in the house. The standard of immunization

TABLE VII

EMPLOYMENT OF MOTHER RELATED TO STANDARD OF IMMUNIZATION OF CHILD

| <i>Employment of mother</i> | <i>Fully immunized</i> | <i>Partially/not immunized</i> | <i>Totals</i> |
|-----------------------------|------------------------|--------------------------------|---------------|
| Not working | 40 (65) | 22 (35) | 62 (=100) |
| Working | 6 (46) | 7 (54) | 13 (=100) |

of the children of the 13 mothers was not found to be significantly different from that of the children of the other mothers in the survey.

Summary

A survey was conducted in a general practice on the immunization state of 75 children aged between one and two years. The effect of certain factors on the standard of immunization was also investigated.

I. (a) Nine (12 per cent) of the children had received no form of immunization.

(b) More than four times as many children in this practice were immunized by the general practitioner as by the local health authority's child welfare clinics.

(c) Seventy-six per cent of the children who attended their general practitioner were fully immunized as compared with 50 per cent of those attending the child welfare clinics.

(d) Smallpox vaccination was the most commonly omitted form of immunization.

II. In this practice information on the immunization state was obtained from the case notes for 88 per cent of the children.

III. Statistically significant differences were found between children who were fully immunized and those who were partially or not immunized in respect of the family's social group, the birth rank of the child and the distance from home to the surgery.

More boys than girls were fully immunized but this difference was not statistically significant.

In this practice at least, the fully immunized child is most likely to come from a home where the father's occupation is in Registrar General's categories I, II or III; he is likely to be the first, second or third child in the family and the home is likely to be less than two miles from the general practitioner's surgery.

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MEDICAL PHOTOGRAPHY

The annual exhibition of medical photography by the Medical Group of The Royal Photographic Society of Great Britain will be held from 3 March to 27 April in the Claire Wand Gallery at B.M.A. House, Tavistock Square, London, W.C.1.