

under 40-year group who have yet to start their polio immunization and 30 million who require one or more in-

jections to complete their vaccination. Until this entire group is reached, none of us can rest.

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This California study gives further evidence that an individual's attitude toward health is related to his socioeconomic status and to his perception of the peer group. Furthermore, attention is drawn to the effect of the quality of community programs on public attitudes and action.

II. ATTITUDES OF CALIFORNIANS TOWARD POLIOMYELITIS VACCINATION

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IN THE summer of 1956, the California State Department of Public Health, with the help of the U. S. Bureau of the Census, conducted a survey of California households to collect information concerning the status of poliomyelitis vaccination and about attitudes toward polio. Included were two other content areas of interest to our department. These concerned the opinions and attitudes of the public toward air pollution and toward child health practices.

The household interview technic seemed to be a suitable tool for such a study. Our department had accumulated substantial experience with the survey technic, having just completed the California Health Survey of 1954-1955,

a state-wide study of general morbidity.¹ The subject of polio was particularly germane because of the introduction of the Salk vaccine and the occurrence of the "Cutter incident."

Two factors in the California poliomyelitis situation were unique.

First: Since 1940, case rates in California have usually exceeded the national average and public attention has been directed to the problem by newspapers, radio and TV, probably more forcefully than in many other areas of the country.

Second: Almost half the persons who contracted polio following administration of the Cutter vaccine were residents of California. Consequently, the Cutter

incident probably had a greater impact in California than in the United States as a whole.

Aside from these two points, the polio vaccination situation in California was similar to that in the rest of the country. When our survey began, the vaccine had been available to children aged five to nine years for about one year, and to all children under 15 years for seven months. In most areas of the state, vaccination was available both from physicians in private practice and from school and health department clinics. Emphasis in public information had been put on the importance of the immediate vaccination of the five to nine age group with subsequent vaccination of others as soon as vaccine became available.

Method and Scope of the Survey

The sample, selected by the Bureau of the Census, was representative of the civilian, noninstitutional population of California, and it comprised 3,628 households, or about one out of every 1,200 households in the state. Specially trained Census Bureau enumerators interviewed the mother, or mother substitute, as well as a randomly selected adult member of each household between mid-May and mid-July of 1956. The sample included 1,719 mothers or mother substitutes and 3,544 randomly selected adults. The design and selection of the sample, and the conduct of the interviews, were in accordance with specifications established by the California State Department of Public Health. The data were collected in the name of the department.

The mother respondent furnished information about the immunization status of her children for polio, smallpox, diphtheria, pertussis and tetanus, the tonsillectomy history of all household members, and was questioned about her

attitude toward polio vaccination. The randomly selected adult respondent gave information on his or her attitude toward poliomyelitis, polio vaccination, and smallpox vaccination.

This report is limited to an analysis of attitudes and opinions toward polio vaccination. The information to be discussed emerged from person-to-person interviews conducted by trained Census Bureau interviewers using a standardized questionnaire. Attitude data were collected primarily by open-ended questions with built-in probes. The survey was not designed to probe deeply for underlying factors in motivation, but rather to provide a measure of public sentiment and action throughout the state for use at one stage in the polio vaccination program.

Favorability Index

A measure of general attitude to polio vaccination was desired in order to facilitate analysis of the subpopulation opposed to vaccination.

From the answers to questions asked of the mother respondent on the safety and effectiveness of the polio vaccine, from the reasons she gave for the vaccination or nonvaccination of her children, and from other responses, assessment was made of the attitude of each mother toward polio inoculation. These attitudes were categorized as either favorable, unfavorable, or neutral. (Vaccination status per se was not considered in determining whether a mother was favorable or not.)

On the basis of this index: 81 per cent of the mothers questioned were categorized as favorable to polio vaccination, 11 per cent as unfavorable and the remaining 8 per cent as neutral. The unfavorable mothers constituted one problem population. The second problem group comprised mothers whose attitudes were favorable, but who did

not have their children vaccinated. Four out of every ten favorable mothers were in this group.

Characteristics of Problem Groups of Mothers

How did the characteristics of mothers unfavorable to polio vaccination differ from those of favorable mothers? How were they similar?

1. Socioeconomic Variation, Education, and Family Size

Low socioeconomic status was one of the most important factors identifying the unfavorable mothers. On the whole, their families had a low income and were large. The head of the household was more likely to work in a "blue collar" * occupation and the educational level of the mothers was lower than for the favorable group.

2. Action of Friends

A characteristic of all mothers interviewed is that they tended to act in accordance with their perception of the way members of their peer groups acted. More than half of the unfavorable mothers believed that most of their friends had not had their children vaccinated. Conversely, the majority of favorable mothers believed that most of their friends' children had been vaccinated.

3. Cutter Incident

One thought-provoking result to emerge from the survey was that those mothers who explicitly mentioned the Cutter incident during the course of the interview tended to be more favorable than those who only referred to it indirectly and those who made no reference to it at all. Mothers who mentioned

* Classified as blue collar workers were craftsmen and foremen, operatives, private household and service workers, farm laborers and foremen, and laborers.

the Cutter incident may have been the best informed or the most interested group. We know that they listed more sources from which they had received information on polio vaccine than mothers who either referred to the incident indirectly or made no reference to it. A possible conclusion drawn from this is that persons who had more opportunity to become aware of the Cutter incident, in all likelihood also were better informed of the efforts made to set high safety standards for vaccine production, of the success of these efforts and of the strong scientific conviction of the safety of the vaccine.

4. Variation with State Geographic Area

Geographic area within the state was another variable related to attitude. At the time of the study San Diego County in Southern California was the most highly vaccinated area and also had the largest percentage of favorable mothers. The San Francisco Bay area in Northern California had the lowest vaccination levels, and the smallest proportion of favorable mothers.

5. Experience with Other Immunization Procedures

Families who had not had their children immunized against other communicable diseases tended not to have them vaccinated against polio. This of course is not surprising. It is understandable that a mother's reaction to any new immunization procedure will relate to her previous attitudes, actions, and experiences.

Attitudes and Vaccination Status of Children

The vaccination status of children one through 14 years of age was strongly correlated with the attitudes of their mothers. Only 3 per cent of children of unfavorable mothers had been

vaccinated as compared with 54 per cent of children of favorable mothers.

When a child had not been vaccinated the mother was asked, "Why hasn't . . . had the shots up to now?" The answers are summarized in Table 1 and discussed below.

1. Unfavorable Mothers

In the case of two-thirds of the unvaccinated children of unfavorable mothers, the answer was fear of the vaccine. Fear, plus opposition to all shots and the opposition of another person, were the reasons stated for the nonvaccination of 92 per cent of children of unfavorable mothers.

2. Favorable Mothers

While the action of almost all unfavorable mothers was consistent with their expressed attitude, favorable mothers were less consistent. Forty-six per cent of their children had not been vaccinated. The distribution of reasons given by this group for not having their children immunized was different from those given by unfavorable mothers and the reasons were more diverse.

The most popular response of favorable mothers, given by one-quarter of them, was "I just neglected it"—"I never got around to it." Fear of the vaccine was the next most common reason given. Although these mothers were generally

Table 1—Per cent Distribution of Nonvaccinated Children* by Mother's Stated Reason for Nonvaccination and Assessment of Mother's Attitude Toward Polio Vaccination

Stated Reason	Per cent of Children				
	All Non-vaccinated Children	Assessment of Mother's Attitude Toward Vaccination			
		Favorable	Neutral	Unfavorable	Undetermined
Total, All Reasons	100	100	100	100	100
Fear, uncertainty of vaccine	31	15	64	68	1
Opposition of husband or doctor to polio shots	7	7	2	10	...
General opposition to all shots	6	3	4	14	11
Wrong age group for polio shots	7	9	8	1	11
Child not in public priority program	9	13	2
Too expensive	7	9	5	1	...
Vaccine not available	5	7	...	2	...
No motivation—"Didn't get around to it"	18	24	10	2	31
Child was sick or other medical reasons	4	6	2	1	...
Child presently scheduled for shots	3	4
Other	2	2	2	2	43
Total Number of Nonvaccinated Children	1,734	1,148	172	379	35

* Since mothers may have given a different reason for not having each of their several children vaccinated, this table was necessarily based on children. There were 1,734 children aged 1-14 years in the sample who had not been vaccinated. These are the reasons given for each child by his mother.

NOTE: Per cents given as calculated, not adjusted to add to 100.

favorable, some of them still had doubts because of the newness of the vaccine or because they felt its safety or effectiveness was questionable.

However, the mothers of more than half of these children gave reasons other than "I just didn't get around to it" or fear. Some mothers thought their children were in the wrong age group. Others thought the vaccine was too expensive. Some of them said their child was sick or the vaccine was not available in their area.

In general, the favorable mothers gave a wide variety of reasons for not having their children vaccinated, while the unfavorable mothers were primarily deterred by fear.

This picture is somewhat oversimplified since it gives only the mother's stated reason for not having her children vaccinated, which may be only a rationalization masking real feelings. This is an example of the difficulty in determining motivation from a survey of this type, with its attendant interviewing and coding problems.

Attitudes of Randomly Selected Adults

In addition to securing information from mothers related to the vaccination of their children, we were interested in obtaining some indication of how adults would react upon becoming eligible to participate in the program.

A randomly selected sample of adults, drawn from the same households and including some of the mother respondents, was interviewed. Eighty-six per cent expressed a favorable attitude to polio vaccination, a finding slightly higher than that secured from mothers. As in the case of the mother respondents, a favorable attitude was closely related to social and economic factors. As annual income, occupational level, and especially as education increased, there was a correspondingly greater percentage of favorable respondents.

The question was asked: "If there are enough polio shots for everybody, do you think adults should be vaccinated, or do you think it doesn't matter very much?" Eight out of every ten adults under 40 years of age thought they should be vaccinated. Adults from the lower income and occupational groups were as emphatic about the desirability of adult vaccination as were those from the higher socioeconomic levels. The significance of this result must be interpreted with caution since the form of the question may have predisposed the respondent to answer favorably.

The interviewers asked, "When adults get polio, do you think they get a milder or more severe case than children do when they get it?" More than half of the adults in the sample were not aware that polio in adults is more severe.*

The question required an informed answer. One might have predicted that educated persons would be more likely to have had correct information than those with less education. We did not find this to be the case. In fact, the college graduates among the respondents had the smallest percentage answering correctly.

There were consistent differences in attitude between adults under 40 years of age and adults over 40. The older population tended to have greater percentages answering "no opinion." More of them felt that it did not matter whether adults were vaccinated against polio or not. The younger adults tended to be more aware of the severity of polio in adults. They were more positive in their belief in the safety of the vaccine, and were generally more favorable to polio vaccination.

* In 1954 a greater proportion of California adults with poliomyelitis suffered paralysis than did children; a greater proportion of adults with paralysis had bulbar polio than did children; and 57 per cent of all the deaths from polio occurred among adults, notwithstanding the fact that 64 per cent of the total polio cases occurred among 0-19-year-olds.

The respondents tended to be consistent in their answers. For example, when asked if they would get vaccinated if their doctor were to recommend it, those that responded "no" tended to feel that adults get polio less frequently and that the vaccine was not safe.

It is perhaps an illuminating sidelight that the lack of information of California adults concerning the nature and prevalence of polio and the value of immunization is not confined to one disease. For example, when asked whether or not it was important for adults, who had been vaccinated against smallpox as children to be vaccinated again, almost one-half responded "no." Their explanation ranged from statements that all adults are immune to smallpox to "a shot as a child is sufficient."

Interpretation of Findings

1. Early program priorities limiting vaccination to children aged five to nine caused some misunderstanding among mothers. Many did not realize that eligibility had been restricted because of the shortage of the vaccine and not because vaccination was unimportant for younger or older children.

Here are a few of the reasons mothers gave for not having their children vaccinated:

"There hasn't been any urging his age group. We're not concerned."

The mother of a three-year-old said, "I didn't know they started that young. It's only for school age, isn't it?"

Or, "The school hasn't demanded kids that old get them"—This response from the mother of a 12-year-old.

Their children were in the age group 0-14 and at the time of the survey had been eligible for vaccination for seven months, yet these mothers, and many others, did not know priorities had been expanded.

Some felt immunization was not important for preschoolers. One mother

said, "Being as she's not going to school I don't think there's the danger as with my other child."

2. The differences between first, intermediate, and ultimate program goals presented a difficult problem in health education. At any given time, emphasis necessarily was on the priority age group. Although we tried to keep ultimate goals before the people, the survey findings indicate that we were not successful. Seven months after priorities had been extended, many mothers did not know that children under five and over nine years of age were eligible and only a small proportion of adults were prepared for what was to be a next step in our program—the inclusion of all persons under 40.

3. There is evidence that public attitudes were favorably influenced by an aggressive, consistent program cooperatively planned and carried out by a local health department, medical society, and other community agencies.

San Diego County started its program on the first day vaccine became available. It was harder hit by the Cutter incident than any other California community. Throughout the period that vaccine was withdrawn, local public health and medical authorities presented to the public a consistent, reassuring story of support of the Salk vaccine and of local, state, and federal program policies. The local program was resumed as soon as vaccine again became available. In our survey the people of San Diego County were found to be more favorable to the vaccine than in any other geographic area of the state. A smaller percentage of mothers gave a fear response and a larger proportion of their children had been vaccinated.

On the other hand, in another area where some local programs started slowly without basic agreements having been sought between health departments, medical societies, and local agencies, and where public statements critical of

the program and the vaccine were made, we found a high proportion of respondents who doubted the safety and effectiveness of the vaccine. This area had the lowest percentage of vaccinated children.

4. It would appear that the lack of public understanding of the effect of poliomyelitis upon adults is a reflection both of the early vaccination program emphasis on children and of the words and symbols which have characterized this disease for many years. The words, "infantile paralysis," and the picture of a child on crutches help to create and reinforce the concept of a disease that affects children but not adults.

5. One of our most significant findings was that people, of whatever group, tend to think and act according to their perception of the way their friends think and act. The influence of the peer group is a factor too frequently overlooked in planning health education programs.

6. The correlation of unfavorable attitudes with low socioeconomic status and low educational level has been observed in other studies.²⁻⁵ Data avail-

able in any public health department, if analyzed, would reveal that people who have little money and little formal education tend to have more than their share of disease, lag behind others in adopting new public health measures and in availing themselves of community health services. It appears that there is a need for a change in target and methods if we are to reach this group effectively with health education. Possibly some action research is indicated.

7. One of the most valuable aspects of this survey was that it was conducted midway in the program. The results, only a few of which have been reported here, were utilized by the state and local health departments in program planning and in improving administrative practices and health education activities.

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Training In Veterinary Mycology

A course in "Laboratory Diagnostic Methods in Veterinary Mycology" is announced by the Communicable Disease Center for February 24-28, 1958. The course is designed to familiarize practicing veterinarians, laboratory workers, and others concerned with procedures for detecting, isolating, and identifying the fungi which cause mycotic infections in animals.

Additional information and application forms from Laboratory Training Services, Communicable Disease Center, P. O. Box 185, Chamblee, Ga.