Analysis of research on the social and psychological factors which influence people to accept or reject poliomyelitis vaccination suggests that people who are currently incompletely vaccinated can best be reached through personal, face-to-face contacts.

Why People Fail to Seek Poliomyelitis Vaccination

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EPIDEMIOLOGICAL investigations of the 1958 outbreaks of poliomyelitis add to the growing body of evidence that Salk vaccine is safe and effective in preventing the disease. The major proportion of cases, particularly the paralytic, are occurring among incompletely vaccinated individuals. Thus the prevention of such epidemics as occurred in 1958 will not devolve primarily upon technical development of preventives. Rather, prevention will require increasing the number of people who protect themselves and their families through vaccination. Public health workers desiring to bring about such action can be more effective if they know why people fail to accept poliomyelitis vaccination, their motivations in rejecting or accepting it, the conditions under which they will respond to appeals for action, and the communication channels through which they get health information.

To provide such information quickly, the Public Health Service, through the regional office organization, recently asked States and universities to supply information obtained from systematic studies which would help to identify (in terms of age, education, income, and other factors) segments of the population that have been hard to reach for vaccination, and which would help to explain why people accept or fail to accept poliomyelitis vaccinations.

In addition to the formal inquiry, the literature on these topics was searched independently.

Although little time was available for gathering data in preparation for a national meeting to consider the problem, more than 40 research activities on poliomyelitis vaccination were identified. Seventeen of these were found to bear directly on the question of why people accept or fail to accept vaccination for themselves and their families. Of the 17 studies, 13 were reviewed; 4 were unavailable. Seven of the 13 were discarded because of methodological limitations in their design or because they could not be properly evaluated.

The six remaining studies (*1–6*) are methodologically sound and report findings which have implications for planning poliomyelitis vaccination programs. These studies contribute to our understanding of why people accept or reject vaccination. However, except for the Clausen (*2*) and Deasy (*3*) reports, which rep-

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resent different analyses of the same data, the studies were independently done, so that the relationships among the findings are not always clear. We shall attempt, therefore, to crystallize these relationships by analyzing the findings according to one set of explanatory concepts. The interpretations presented here, however, are not fully supported by adequate data in all cases. Additional studies of the explanatory concepts will be required to assess the validity of our interpretations.

From an analysis of the six studies, it would appear that two broad classes of factors determine the decision to participate in vaccination programs. These are personal readiness factors and social and situational factors.

Personal Readiness Factors

The factors of personal readiness include the motives, attitudes, and beliefs of individuals which affect their willingness to take voluntary action with regard to their health. Hochbaum (*7*) has described the importance of these factors in guiding the decision to obtain chest X-rays. In connection with poliomyelitis vaccination, three components of a person's readiness to seek vaccination can be identified: the extent to which he believes he may be susceptible to the disease, the seriousness with which he regards the consequences of getting the disease, and his conception of the safety and effectiveness of the vaccine.

Perceived Susceptibility

It would appear that a basic determinant of the decision to seek vaccination is the extent to which the individual believes that he is susceptible to poliomyelitis, or, for children, the extent to which the parent believes that his child is susceptible.

In Glasser's report of the study made for the National Foundation for Infantile Paralysis (*4*), the absence of perceived susceptibility is cited as 1 of the 2 principal barriers to the decision to obtain vaccination. Merrill and his associates (*5*) show that poliomyelitis tends to be regarded as a disease affecting only children, which may account for the failure of some adults to accept vaccination. The authors suggest that the establishment of vaccination priority groups tended to reinforce this perception among leading people that those included in the first priority group were the only ones who needed vaccination. The familiar picture of the child on crutches may also have reinforced the belief that poliomyelitis is a disease of children.

The failure to believe that one is susceptible to poliomyelitis may be a widespread problem. In the National Foundation for Infantile Paralysis study (*8*), 72 percent of the young adult sample believed that poliomyelitis had been nearly brought under control.

It must be stressed that this variable, perceived susceptibility, refers to the beliefs of people and not to objective facts about incidence. It is known that behavior is determined more by one's beliefs about reality than by reality itself, and that people vary markedly in their interpretations of reality.

Perceived Seriousness

Even when an individual feels he is susceptible to poliomyelitis (or believes that his child is), he will not act on his feeling unless he also believes that his becoming ill would have serious repercussions on his life. Here again it is the belief rather than the reality which is the important determinant of the decision.

While the data on seriousness are not as clear-cut as those on susceptibility, the studies by the National Foundation for Infantile Paralysis and Merrill and his co-workers suggest the importance of this factor in determining one's decision concerning vaccination. In the former study, it is shown that twice as many men as women in a nationwide sample believed that poliomyelitis in adults is milder than in children, and half as many men in the sample had been vaccinated. The latter study shows that the over-40 age group may not see poliomyelitis as constituting a serious problem for adults, and additional data suggest that poliomyelitis is considered to be milder in adults than in children.

Safety and Effectiveness

One's decision to accept vaccination for one's self and one's family is a function not only of the perceived likelihood of contracting the disease and the perceived seriousness of the disease

should it occur, but it is also a function of the kinds of beliefs one has about the safety and effectiveness of vaccination in reducing susceptibility and seriousness.

However concerned one is with poliomyelitis, if he thinks the vaccine is unsafe or ineffective, he will not accept vaccination. In the three studies reviewed which were conducted in connection with the field trials of 1954, questions of safety and effectiveness are frequently mentioned as a factor limiting decisions to participate (*2,3,6*). However, in Glasser's 1957 study (the most recent of the several reviewed), it is shown that such fears have largely been dispelled and no longer seem to be an important factor limiting acceptance of vaccination. It is certainly possible, however, that in specific groups this factor may still be important.

The three variables, perceived susceptibility, perceived seriousness, and beliefs about vaccination, define the kinds of personal factors that influence a decision relative to vaccination. But there is reason to believe (although the authors of the studies reviewed do not discuss this point) that the decision is determined not only by the kind of beliefs one has but by other factors as well.

Again and again the studies reviewed list procrastination, forgetfulness, neglect, apathy, carelessness, and laziness among the factors influencing the decision to vaccinate. These terms are not useful since they neither define a dynamic process nor suggest ways of overcoming the problem. We believe that these terms may be synonyms for one of two kinds of processes.

Clausen (*9*) reports data from California which suggest that there is a social class influence on behavior which is somewhat independent of the three beliefs described above. He shows that even among mothers who are generally favorable to vaccination those with much education and married to white collar workers were much more likely to have their children vaccinated than those with little education and married to blue collar workers. The extent to which such a social class influence operates independently of the kinds of beliefs described above must await detailed study of that question.

It is also possible that "procrastination," "apathy," "laziness," and the like reflect insufficient amounts of readiness to obtain poliomyelitis vaccinations.

It has been noticed that a great many people appear to have minimal motivation with regard to poliomyelitis. Glasser, for example, reports that by and large "people were failing to take advantage of the vaccine for themselves and their children, not because of specific resistance to it, but rather because of lack of definite, positive influences which might direct them to a clinic or doctor's office for inoculations" (*4*).

Limited data suggest that many people may already share the necessary beliefs, but not in sufficient degree. It is likely that those people with more than minimal motivation have already been vaccinated.

Social and Situational Factors

The personal readiness factors influence the voluntary decision to seek vaccination. However, the studies reviewed suggest as well that a variety of situational and social conditions may be effective in stimulating people to seek vaccination even in the absence of appropriate kinds and degrees of personal readiness.

Two components of the social and situational factors may be identified: social pressure and convenience.

Social Pressure

Clausen, Deasy, Glasser, and Merrill (*2–5*) all observe that vaccinated persons are more likely than unvaccinated persons to report discussion of vaccination with friends, in groups such as the PTA, or with physicians. Despite certain difficulties in interpreting this finding, it has at least been demonstrated that considerably more communication and interaction occurs among people who have taken action than among those who have not.

The individual's decision to seek vaccination may be determined by the social pressures applied by persons who are important to him. Belcher (*1*) shows that a greater proportion of Negroes than whites participated in a vaccination program in two Georgia communities. He suggests the importance of the fact that Negro school teachers urged the program among their pupils as enthusiastically as they could. There

is even a hint that the activities of some may have bordered on coercion. Negro ministers, both on and off the pulpit, urged vaccination. Public health physicians and nurses, presumed to be of fairly high status in the Negro community, also urged the people to seek vaccination.

Data presented by Glasser suggest that the physician will have a highly important role in stimulating people to be vaccinated. More than 90 percent of his adult sample looked to the physician as the principal source of information on poliomyelitis. Moreover, an overwhelming majority of unvaccinated persons reported that they would seek vaccination if their physician recommended it, and 80 to 90 percent of this group reported having a regular physician.

Convenience

Included within the notion of convenience is the distance one has to travel to obtain vaccination, the hours at which it is available, the cost of vaccination, and the acceptability of the facilities in which vaccination is performed. For any individual with a given degree of readiness to be vaccinated, the ultimate decision will be facilitated the more convenient, simple, and inexpensive the action is.

In explaining the higher participation rate of Negroes than of whites in the communities he studied, Belcher suggests the importance of the fact that vaccinations were administered at and by the local health department, a facility more widely known and accepted among Negroes than whites, that vaccination was free, and that more school buses were provided to take Negro children to the clinic for vaccination than to take white children.

Readiness and social factors may operate with a degree of independence of each other or they may interact. However, when the personal readiness to seek vaccination is weak, we would not expect the individual to act unless the social and situational forces impinging on him were strong. On the other hand, when relevant social factors are weak or absent, vaccinations would be sought only by persons with considerable personal readiness.

The evidence to date suggests that, among the currently unvaccinated, personal readiness to obtain poliomyelitis vaccination is so weak that rather strong social supports may be needed to modify their behavior in the short run. Educating for increased personal readiness can probably be effective only in the long run.

Obviously, the use of social forces in urging poliomyelitis vaccination entails working with local groups, often in face-to-face contacts. Deasy, Glasser, and Merrill have made this point explicitly, and Belcher has made it implicitly.

Each of the studies reviewed uncovered ignorance or misinformation among the people interviewed, and especially among those who have not been vaccinated. Clausen, Deasy, Glasser, Merrill, and Weiss show that acceptance of poliomyelitis vaccination is closely related to socioeconomic status, primarily education and occupation or income. The majority of the studies reviewed here offer evidence that the groups hardest to reach (the poorly educated and the nonwhite) will have to be approached personally rather than through mass means of communication. This conclusion is supported by research on communications performed on other subjects.

In the following paragraphs, only a few communication studies will be mentioned, although the bibliography is extensive. The role of television can only be referred to; standard books on communications research do not yet include much on the new medium.

Communications Research

It is known that different groups are differently exposed even to the most ubiquitous media. Lazarsfeld and Kendall (*10*) have shown that the lower educational groups do not read newspapers, magazines, and books to the same extent as do groups with more education; they differ little in exposure to movies and radio. However, even when groups are exposed to the same medium, they may attend to and learn different things from the same material.

Schramm and White (*11*) showed that with respect to newspaper reading, lower educational groups tended to read news of crime, corruption, disaster, and sports, whereas the more educated tended to read news of public affairs, economics, science, and social affairs.

Moreover, in a study performed for the National Association of Science Writers (*12*), it was clearly shown that the extent to which one could recall having learned any science or health information from newspapers, magazines, television, or radio was closely related to amount of education. Thus, of a group with less than high school education, more than one-third could recall no health or science information from these media, whereas of the group with high school education, only 11 percent were similarly unable to recall science or health information. At the higher educational levels, virtually everyone was able to recall science and health information from these sources.

Some of the data reported in the poliomyelitis studies support this trend. Belcher found that the nonwhites in his sample obtained their information on poliomyelitis and vaccination from personal sources (teachers, children, public health officials), while whites tended to get their information through impersonal sources. Similarly, Deasy showed that while all women in her sample had been exposed to an identical brochure, which had been brought home by their children, on the 1954 field trials, and while practically all women in the sample had been exposed to daily papers which were featuring intensive coverage of the field trials, the women differed in knowledge and acceptance of the program, acceptance being associated with amount of education.

Katz and Lazarsfeld (*13*) report that people who are reached by educational programs through the mass media are very largely those who do not need the education. Those who do need the education tend to stay away. In their words, "Those groups which are most hopefully regarded as the target of the communication are often least likely to be in the audience. Thus, educational programs . . . are very unlikely to reach the uneducated; and goodwill programs are least likely to reach those who are prejudiced against another group" (*13a*).

It is not to be denied that the mass media have, and always have had, an important role in communication. However, the poliomyelitis and communication studies reviewed here suggest that the assets and liabilities of the traditional approach should be considered in the light of the particular needs that face us in attempting to reach the lower income family, the family with little formal education, and the nonwhite family.

In this context, Merrill and his co-workers, in discussing people who have little money and little formal education, have said, "It appears that there is need for a change in target and methods if we are to reach this group effectively with health education" (*5*).

In a similar vein, Glasser states, "Informal communication—getting people to talk about vaccination—would appear to be the most direct method of accelerating the vaccination program" (*4*).

Summary

A person's beliefs about his susceptibility to poliomyelitis, about the severity of the disease, and about vaccination comprise the major components of his readiness to take action. On the other hand, social forces, including factors of pressure and convenience, are important in guiding the decision to be vaccinated or not.

The data reported tend to suggest that social class membership may affect decisions to be vaccinated and that personal readiness for poliomyelitis vaccination may be weak in those who are currently incompletely vaccinated. If this is so, the social factors would have to be stressed in order to insure more widespread acceptance of vaccination.

In considering the approaches that may be made to reach groups in an attempt to stimulate greater acceptance of vaccination, one is struck with certain serious limitations of the traditional approach of mass media of communication. It would appear that personal contacts with members of the so-called hard-to-reach groups may be required to stimulate increased acceptance of poliomyelitis vaccination.

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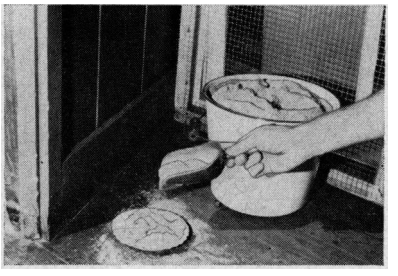
film

Use of Anticoagulants in Rodent Control

35-mm. filmstrip, color, sound, 9½ minutes, 76 frames. 1958.

Audience: Federal, State, local, and other health personnel engaged in rodent control.

Providing a comprehensive description of how anticoagulants are employed to kill rodents, this filmstrip shows the advantages of these poisons compared with other poisons. It lists the forms and types of anticoagulants available. It describes the various baits and tells how to prepare them, shows the



containers and how to place the poisons to get the most efficient kill. Precautionary measures to be used in handling these materials are emphasized.

This film may be obtained on LOAN from the Communicable Disease Center, Public Health Service, 50 7th Street NE., Atlanta 5, Ga., or by PURCHASE from United World Films, Inc., 1445 Park Avenue, New York 29, N. Y.

Legal note . . . Liability for Air Pollution

Res ipsa loquitur doctrine held applicable in suit for damages resulting from fluoride poisoning allegedly caused by defendant's aluminum reduction plant; defendant's evidence of reasonable care held insufficient to require finding as a matter of law that inference of negligence had been overcome. *Reynolds Metals Company* v. *Yturbide*, 258 F. 2d 321 (9th Cir., June 5, 1958).

The plaintiffs claimed they were poisoned by fluorides originating from the plant of the defendant, the Reynolds Metals Company. Their injuries were found by a jury to have been caused by excessive emission of fluorides by the defendant's plant. On appeal by the defendant the court of appeals, sustaining the verdict for plaintiffs, held that the defendant's evidence of reasonable care in operation of the plant was not sufficient to rebut the presumption that the excessive emission of fluorides was attributable to defendant's negligence.

The defendant operated an aluminum reduction plant in Troutdale, Oreg. In December 1946, shortly after operations began, the plaintiffs moved to a farm about 1 mile from the plant. For a period of about 4 years, a daily average of 2,800 pounds of fluoride was discharged into the atmosphere from the plant, running as high as 3,900 pounds daily in 1 month. In November 1950, when an improved system was installed, the fluoride discharge was reduced to a daily average of 643 pounds.

Although there was no proof of the quantities of fluorides which reached the plaintiffs' land, the court found that the fluorides emitted by defendant's plant were toxic, and it was conceded by the defendant that the fluorides escaping from its plant were poisonous in excessive amounts. The plaintiffs showed that the fluoride effluent reached their property and settled on it, that it was absorbed by vegetables, which were eaten by plaintiffs, that it etched the glass in their home, and that it was presumably inhaled by them. Evidence was also adduced that the plaintiffs' health improved when they moved away from the vicinity of the plant.

The defendant contended that (*a*) the proof was insufficient to demonstrate that the plaintiffs' injuries were caused by fluorides escaping from the plant and (*b*) there was no evidence of negligence or breach of duty by the defendant.

With respect to the first contention, the court held that on the basis of the evidence presented the jury was warranted in finding that the plaintiffs' injuries were caused by the fluorides emitted by the defendant's plant which found their way to the plaintiffs' property. Although evidence was presented by the defendant to show that only a small concentration of fluorides could have reached the plaintiffs, the court ruled that the fact that they suffered fluoride poisoning supported the finding that an "excessive amount" of fluoride, sufficient to cause such poisoning, was cast upon the plaintiffs' property from the defendant's plant.

The plaintiff was unable, however, to specify any particular acts of negligence by the defendant which brought about the injury and was compelled to rely on the legal doctrine of "res ipsa loquitur" (the thing speaks for itself) under which the facts of the occurrence warrant the inference of negligence.

Since the defendant's evidence was to the effect that, despite the large amounts of fluorides it admitted escaped into the air, no significant concentrations of fluorides were produced in localities near the plant, the trial court charged the jury that it was not to be expected that in the ordinary course of events the fluorides emitted by the plant would cause injury in the absence of negligence of the defendant. The court of appeals held that a finding that excessive amounts of fluorides were deposited on plaintiffs' property (a permissible inference from the facts) from the plant whose construction, operation, and maintenance was under the exclusive control of the defendant could reasonably be accepted as circumstantial evidence of negligence.

The court rejected the defendant's argument that this holding resulted in the application of a rule of absolute liability. Although the defendant's evidence tended to show that reasonable care had been exercised to control the amount of fluorides emitted by its plant, the court pointed out that such evidence did not preclude the jury from rejecting the defendant's version of the facts nor from finding that the defendant was in fact negligent.