This study was made to identify factors which influence the results of referrals from a school health program in the Los Angeles City School System. The result is a detailed analysis of socioeconomic, attitudinal, and notification factors influencing the outcome of referrals. The Interview Schedule was based upon that used in the preceding paper by Gabrielson and his colleagues, and the two studies should be compared.

MEDICAL CARE OF SCHOOL CHILDREN: FACTORS INFLUENCING OUTCOME OF REFERRAL FROM A SCHOOL HEALTH PROGRAM

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Introduction

DURING the twentieth century, research in the area of school health services has been focused upon the efforts of school personnel to identify, through various case-finding procedures, children who are in need of medical and dental care. These case-finding studies dominate research efforts and tend to mask equally important referral activities of school personnel. Annual reports of school health service programs provide ample descriptive evidence of referral activities. However, the important question of *why* some children receive attention and others do not can be answered only by investigation with primary emphasis upon explanation rather than description.

The major purpose of this study was to identify factors which influence the outcome of referrals from a school health service program. Factors investigated included family background characteristics, relevant parental attitudes, and notification procedures used by school personnel.

The Los Angeles City School System was selected for this study because it serves the population of a large, complex urban community and because it provides uniform health service administrative procedures. Community size facilitated the selection of a sufficiently large sample and uniform procedures restricted variation in the mode of entry into the sample.

Method

The procedures used in this project included: adapting instruments, choosing Study Areas, selecting the sample, and conducting interviews.

Adapting Instruments

Two sources of data (school health records and parents' responses to an interviewer) were utilized. Instruments for data collection were adapted from a special Form and an Interview Schedule developed and tested in 1964 by Ira Gabrielson and Lowell Levin of the Department of Epidemiology and Public Health at Yale University.

The Yale Form was modified to accommodate relevant information available on pupil Health Record Cards in the Los Angeles City Schools. The Form (consisting of 14 items) identifies the child and his parents and focuses upon the child's specific health defect. Six new items were added to the Form, hereafter referred to as the "Report of a Single Health Defect." One such item is the physician's urgency rating of the defect.

For the purpose of replication, the majority of the 87 items on the Yale Interview Schedule were used in interviews with parents. These items relate to family background characteristics, general health information, and attitudes and behavior of parents toward their child's health. Twenty-nine new items, which were of concern to the investigators, were added to the Interview Schedule. These included questions such as: Where were the parents born? How urgent did parents consider their child's specific health defect?

Choosing Study Areas

The investigators and an advisory committee based their choice of areas to be included in this study upon "Background for Planning,"[1] a recently published source of demographic information. The author, Marchia Meeker, utilized 1960 Census data to classify the population of Los Angeles County into six socioeconomic strata.

One hundred and thirty-four Study Areas were identified by Meeker in the county. Each area consists of a group of Census Tracts and conforms as closely as possible to established municipal boundaries and geographical units. With respect to population characteristics, each area shows a considerable degree of homogeneity. Meeker developed an index to permit a socioeconomic ranking of all Study Areas by using three indicators—occupation, income, and education. Occupation was based upon the percentage of employed males in white collar jobs; income was derived from median family income; and education was determined by the percentage of the population age 25 and over who had completed one or more years of college. On a six-point scale, an index score of six designates the lowest stratum or Social Rank VI, whereas an index score of one designates the highest stratum or Social Rank I.

Eight Study Areas in the Los Angeles City School Districts, representing Social Ranks II, IV, and V, were selected for this research project. The Social Rank II communities of West Los Angeles, Palms, West Wilshire, Wilshire-Pico, and West Hollywood—with a total population of 195,900—were chosen to represent the upper socioeconomic group. The Social Rank IV communities of West Adams and Leimert and the Social Rank V community of Venice—with a total population of 178,600—were chosen to represent the lower socioeconomic group. It was necessary to include communities from both Social Ranks IV and V for the lower stratum in order to secure a population group which approximated in size that of the upper stratum. These study areas satisfied the following requirements of the research design:

1. Homogeneity of Socioeconomic Groups—Within-group homogeneity should be maintained by selecting for each socioeconomic stratum Study Areas which are contiguous to one another.*

2. Desired Sample Size—A sufficient number of Study Areas should be included to yield a sample of approximately 500 fourth-grade public school children† with defects identified by

* An exception is Venice, which is geographically the nearest Social Rank V community to the Study Areas selected to represent Social Rank IV.

† The fourth grade was selected in preference to any other elementary grade because it is the only grade at which all children receive a periodic health examination. Children are also given an examination when they enter school, but the examination may occur in *either* kindergarten *or* first grade.

school health service personnel during the 1963-1964 school year.

Selecting Sample

Forty-eight elementary schools in the Los Angeles City School System are located in the Study Area communities: 24 in Social Rank II and 24 in Social Ranks IV and V. At these schools, four teams of two school nurses surveyed the individual Health Record Cards of all fourth-grade children who were enrolled in 4B in September, 1963, and who were enrolled in 4A in February, 1964. The purposes of this survey of records were to identify children with health defects eligible for inclusion in the Study Area population and to secure information about their specific health defects. During July, 1964, the nurses transferred pertinent data from pupil Health Record Cards to the "Report of a Single Health Defect."

A one-half-day training session was held for the nurses before they began the survey. A nursing supervisor and the principal investigator shared training leadership. Although all of the nurses were affiliated with the Los Angeles City Schools, a possible bias was controlled by involving only nurses who were not serving in the Study Area schools at the time data were collected.

Children from Study Area schools entered the population through one or more of the following administrative channels[2]:

1. Physical Examination—All children at the fourth-grade level are required to have a physical examination by a school physician who is assisted by a school nurse.*

2. Otological Examination—At the fourth-grade level the audiometrist tests children who (a) are new to the school and have not been tested previously; (b) are referred by teachers, nurses, or physicians because of suspected hearing loss; or (c) have a history of earache or ear infection since they were last tested. Children with more than 10 per cent loss of hearing are referred to a school otologist for an examination.

3. Dental Examination—The school dentist does not visit every elementary school each year. However, during the 1963-1964 school year, children received a dental examination by a school dentist in 32 of the 48 elementary schools included in the study.

* Less than 1 per cent of the children enrolled in the Study Area schools are exempt from physical examinations for religious or other personal reasons.

According to a recent annual report,[3] many children with health defects are identified during physical examinations in Los Angeles City Schools. However, parents do not receive written notices about all of these defects. For example, a child may have a congenital or acquired defect for which no medical or surgical treatment is indicated. In some cases school adjustment may be necessary, but no notice is sent to the parent. An illustration of this might be the assignment of a child to a corrective class for an orthopedic or postural defect. In other cases the child already may be under the care of a private physician, or dentist, or a clinic, so no recommendation needs to be made at the time. The physician or dentist also may discover defects which, in his professional judgment, should be noted, but do not seem serious enough to report to parents at the time.

It should be stressed that only those children whose parents received a definite notification about a specific defect needing attention were eligible for inclusion in the population. The entry criteria were met by 788 children with 935 defects. These children represented approximately 16 per cent of the estimated fourth-grade enrollment in the Study Area schools. Four hundred and twenty-two children with medical or a combination of medical and dental defects were included in the sample. In addition, 20 per cent or 73 of the remaining children who had only dental defects became a part of the sample. These cases were selected by means of a systematic sampling technic.[4] Thus, the total sample consisted of 495 children with 641 defects.

It also should be stressed that the investigators were concerned with the child, rather than with the defect as the unit of analysis in this study. Therefore, only the most salient defect was included when a child had more than one defect. The criterion used to determine saliency was the physician's (dentist's) urgency rating. Each defect is given a rating on a scale ranging from one to four, with highest urgency designated as four and lowest urgency designated as one.

Parents or guardians of all children who were included in the sample received notification from school personnel during the 1963-1964 school year recommending that they "seek professional care" for their child's health defect. No parents were *required* to secure care for their children, nor were any children in the sample excluded from school because they had not received attention. The term "received attention" is used on the Health Record Card to denote that following the notification: (a) the child's defect has been corrected; (b) the child has been taken for care, but care was deemed unnecessary or the condition was uncorrectable; or (c) the child is under private or clinic care. If action taken by the parents is listed as "received attention," then such action is defined as success of referral. The "received attention" notation recorded on the individual Health Record Card was used as the objective measure of care in this study.

Notations regarding outcome of referral are verified by school personnel in two ways. (1) Physicians, dentists, and parents complete special forms* stating that the child has received attention. These forms are sent to school nurses who promptly record this information on the child's Health Record Card. (2) Nurses examine the child to confirm outcome of referral and record findings on the child's Health Record Card. For example, nurses may observe a child's teeth for recommended fillings or they may recheck his vision after new glasses have been obtained.

Another measure of *receiving attention* was available from parent interviews. However, as would be expected, there were discrepancies between school records and parent reports. These discrepancies were re-examined in each case by the investigators. It was concluded that three major sources of contamination interfered with the reliability of parent reports. The first source was linked with a time lag and possible errors in recall. During the interview parents were asked to recall whether or not they had secured attention for their child. In some cases, a period of 11 months had elapsed since care was sought. The second source of contamination was related to the wording of the interview question (i.e., Was professional help sought for Johnny's health problem?). For example, a mother who was a nurse had removed wax from her son's ear. She stated that professional help had not been sought, but the school nurse recorded that the child's condition had been corrected. A third source of contamination was associated with the desire of some parents to give what they considered to be the socially approved answer, "Yes, professional help was sought." Probably, these parents were eager to please the interviewer. These three contaminants made parent reports a less accurate measure of *receiving attention* than school records. The decision to base analyses upon the school records is corroborated in the work of Bronson Price. He concluded from a critique of several school health service studies that when school records and parent reports do not yield consistent results, preference should be given to school records.[5]

* These forms include: *Permit to Release Medical Information, Report to Schools of Clinic Visit, Dental Health Report of Family Dentist,* and *Follow-up Home Notice.*

Conducting Interviews

After the sample of children had been selected, interviews with adults responsible for the children were conducted by a team of 14 field investigators. The minimum qualifications for interviewers consisted of at least two years of college and at least one year of experience in public contact work. In fact, 12 of the 14 interviewers qualified well beyond these minimums—seven having bachelor's degrees and five having master's degrees. All field investigators were women and possessed ethnic characteristics similar to those of parents in areas where interviews were conducted.

The Interview Schedule was pretested in Westchester, a Social Rank II community with a population of approximately 52,800. Before the pretest, the investigators received two full-day sessions of rigorous training that incorporated role playing of hypothetical interview situations. During the pretest, the investigators received two half-day sessions of additional training that again employed role playing technics. This time, interviewing experiences that had been encountered in Westchester were re-enacted. This preliminary study not only prepared the investigators for the larger study, but also provided information which was utilized in revising the Interview Schedule.

During August, 1964, 79.6 per cent of the parents of children in the sample were interviewed and 12.9 per cent were interviewed the following month.* It was necessary for field investigators to make repeated visits—as many as nine in some instances—in order to find the adult responsible for the child. Seven families refused to cooperate and 30 families had moved from the area. In all, 92.5 per cent of the total sample or parents of 458 children participated in this study.† This percentage is impressive in view of the high residential mobility in Los Angeles County where less than 40 per cent of the population lived in the same house from 1955 to 1960.[6]

* In order to insure that the interviews had actually been conducted, verification was performed by re-contacting the parents of every fifth child. A clerk called parents who had a telephone and a school nurse visited parents who did not have a telephone.

Results

The results of the analyses are presented in the following sequence: First, the index of social rank is validated. Second, relationships are displayed between relevant socioeconomic factors and outcome of referral. Third, attitudinal factors are related to outcome of referral. Fourth, the effectiveness of multiple notifications is demonstrated. Finally, a multivariate analysis is performed on factors relating to outcome of referral.

Validation of the Index of Social Rank

Relevant demographic information obtained from the Interview Schedule was analyzed in an attempt to establish the validity of Meeker's Index of Social Rank. The analysis involved the use of multiple regression technics.[7] Estimates of social rank were obtained by combining information on traditional measures of socioeconomic status. These were education, occupation, and age of parents, as well as size of family. The results suggest that a highly reliable prediction of social rank can be made with knowledge of these variables.‡

† Two hundred and eleven children were from Social Rank II and 247 children were from Social Ranks IV and V.

‡ The actual computed equations are as follows:

$\hat{Y}$ (social rank) =
0.212 (family size) − 0.193 (father's age) − 0.172 (father's education) + 0.091 (father's occupation) + 3.70.
$R = 0.49$ $F = 35.91$ $P < 0.001$

$\hat{Y}$ (social rank) =
0.236 (family size) − 0.163 (mother's education) − 0.132 (mother's age) + 0.097 (mother's occupation) + 3.56.
$R = 0.44$ $F = 25.82$ $P < 0.001$

The findings show that the index of social rank was best predicted by family size, followed in rank order by age, education, and occupation of parents. In particular, the smaller families (one or two children) consistently appeared in the upper social rank (II) and larger families appeared in the lower social ranks (IV and V). Older parents (fathers over 40 years of age and mothers over 35 years of age) were associated with Social Rank II, whereas younger parents were associated with Social Ranks IV and V. Parents educated beyond the high school level generally appeared in Social Rank II, whereas parents with less than high school educations appeared in Social Ranks IV and V. Parents in white collar occupations (based on 1960 Census classifications) were associated with Social Rank II, whereas those in blue collar occupations were associated with Social Ranks IV and V. Since these combined relationships are significant ($P<0.001$) and meaningful, the investigators concluded that Meeker's Index of Social Rank was valid and appropriate for use in this study.

Socioeconomic Factors Related to Outcome

One objective of this study was to relate family background characteristics to whether or not children receive attention following referral from a school health program. Relevant characteristics obtained from the Interview Schedule were cross-classified with outcome of referral. The chi-square analysis was used to assess the significance of all observed relationships. The results of this analysis, summarized in Table 1, are as follows:

1. Children of parents in Social Rank II were *much* more likely to receive attention than were children of parents in Social Ranks IV and V ($P<0.001$). Only 37.4 per cent of the children in Social Ranks IV and V received attention, whereas 63.6 per cent of the children in Social Rank II received attention—indeed, an impressive difference.

2. Children of parents educated beyond the high school level were more likely to receive attention than were children of parents having an education less than or equal to the high school level. For fathers, this finding was significant beyond the 0.001 level, and beyond the 0.01 level for mothers.

3. Children of fathers employed in white collar occupations were more likely to receive attention than were children of fathers employed in blue collar occupations ($P<0.001$). However, the relationship between outcome of referral and mother's occupation was somewhat different. Less than one-half of the children having mothers in white collar occupations received attention (47.7 per cent). An even smaller proportion (less than one-third or 31.2 per cent) of children having mothers in blue collar occupations received attention. Although the direction of this relationship can be considered essentially the same as that for the father's occupation the fact still remains that only 40.8 per cent of all children having working mothers received attention. One possible explanation might be that working mothers have less free time in which to secure medical care for their children. Another plausible explanation might be that a higher proportion of working mothers are found in the lower social ranks, regardless of occupation. When investigating this possibility, the data revealed that approximately 60 per cent or 109 working mothers were associated with Social Ranks IV and V, whereas approximately 40 per cent or 75 were associated with Social Rank II. Since social rank was previously demonstrated as a potent determinant of outcome of referral, it may be that social rank is masking the relationship between mother's occupation and outcome.

4. Children of older parents (fathers over 40 years of age and mothers over

Table 1—Socioeconomic factors related to outcome of referral*

Variables	Per cent and number of cases receiving attention				Level of significance
	%	No.	%	No.	
Social rank	II		IV and V		
	63.6	(131)	37.4	(92)	P<0.001
Education	Beyond high school		High school or less		
Father	59.3	(105)	42.6	(107)	P<0.001
Mother	59.0	(85)	45.1	(133)	P<0.01
Occupation†	White collar		Blue collar		
Father	59.2	(119)	42.1	(88)	P<0.001
Mother	47.7	(51)	31.2	(24)	P<0.05
Age‡	Older		Younger		
Father	51.4	(109)	46.7	(105)	
Mother	54.7	(141)	41.7	(78)	P<0.01
Family size	Two children or less		More than two children		
	55.0	(88)	46.0	(131)	P<0.05
Racial-ethnic characteristic	Caucasian and Oriental		Negro and Spanish-surname		
Father	58.8	(153)	35.4	(64)	P<0.001
Mother	57.6	(155)	35.5	(61)	P<0.001
Religious preference	Jewish		Other		
Father	70.5	(67)	44.5	(145)	P<0.001
Mother	69.0	(69)	44.3	(153)	P<0.001
Attendance at religious services	Once a month or less		More than once a month		
Father	55.2	(133)	46.3	(63)	P<0.05
Mother	53.5	(136)	44.6	(79)	P<0.05
Parents' birthplace	United States		Other (foreign)		
Father	49.3	(181)	50.7	(39)	
Mother	49.2	(184)	51.5	(37)	

* All relationships are tested by means of the chi-square analysis on one degree of freedom.
† Occupational groupings are based on 1960 Census classifications.
‡ Age groupings are based on 40 years of age as a breaking point for fathers and 35 years of age as a breaking point for mothers.

35 years of age) were more likely to receive attention than were children of younger parents. This finding is significant (P<0.01) for mothers and appears as a trend (P<0.15) for fathers. Looking again at social rank for a possible explanation, it becomes immediately apparent that younger parents are consistently associated with Social Ranks IV and V and older parents with Social Rank II (P<0.01).

5. Children of smaller families (i.e., one or two children in the family) were more likely to receive attention than were children of larger families (P<0.05). However, since family size was demonstrated to be the best single determinant of social rank, this finding should be interpreted with caution.

6. Children of white and Oriental parents were *much* more likely to receive attention than were children of Negro or Spanish-surname parents (P<0.001). This finding also is prob-

ably confounded with social rank, since only 14 per cent of the parents in Social Rank II were Negro and Spanish-surname contrasted with 62 per cent in Social Ranks IV and V.

7. Gerhard Lenski[8] theorizes that religious affiliation has as much influence as class position upon the behavior of urbanized Americans. He further supplies evidence that Jews display a marked tendency to be scientifically oriented. In accordance with Edward A. Suchman's[9] theory that securing medical care is related to a *scientific* rather than a *nonscientific* orientation, it was hypothesized that children of Jewish parents would be more likely to receive attention than children of parents of other religions. The results clearly indicate this to be the case, where the relationships are significant beyond the 0.001 level for both the mother's and father's religious preference. That is, children of parents having a Jewish religious preference were *much* more likely to receive attention than were children of parents having other religious preferences.

8. It also follows from Suchman's theory that the more scientifically oriented individual would be less apt to frequently attend religious services. Thus it should follow that children of parents who attend religious services (regardless of religious preference) once a month or less are more likely to receive attention than are children of parents who attend religious services more than once a month. When this hypothesis was tested, the results were significant beyond the 0.05 level.

9. Finally, children of foreign-born parents (either mothers or fathers) were only *slightly* more likely to receive attention than were children of parents born in the United States. Although these findings were not significant, the relationships were in the opposite direction of those predicted. This is probably due to the fact that approximately 70 per cent of the foreign-born parents were associated with Social Rank II.

Attitudinal Factors Related to Outcome

A second objective of this study was to relate attitudinal responses to outcome of referral. Ten parental attitude items included in the Interview Schedule were used for this purpose. Factor analysis of these items,* all of which pertain to the child's health, revealed two distinct attitudinal (or response) dimensions. Inspection of the items suggests that the first dimension can be considered as parent's appraisal of the child's general health and the second as parent's concern about the specific defect. However, the first dimension, or factor, was composed of only two items and as such may be considered as a possible artifact.

The second dimension, or factor, was composed of eight items dealing with the parent's expressed concern with (a) the urgency of the defect, (b) the interference the defect would have upon the child's school work, friendships, or ability to get a job as an adult, and (c) the effect the defect would have upon the child's health as an adult, appearance or attractiveness, personality, or happiness of the whole family. Of these eight items comprising this factor, the parent's expressed concern with the urgency of the defect (parent's urgency

* The actual factor loadings (Varimax Rotations) are as follows:

Item	Loading
Factor I	
comparison with other children his (her) age	−0.770
comparison with other children in the family	−0.736
Factor II	
parent's urgency rating	0.669
interference with child's school work	0.741
interference with child's friendships	0.711
affect child's appearance or attractiveness	0.595
affect child's personality	0.788
affect child's health as an adult	0.752
affect happiness of whole family	0.798
interference with child's ability to get a job as an adult	0.810

Table 2—Attitudinal factors related to outcome of referral*

Variables	Per cent and number of cases receiving attention				Level of significance
	%	No.	%	No.	
Parent's *urgency* rating	High		Low		
	56.8	(109)	44.4	(110)	$P<0.01$
Physician's *urgency* rating	High		Low		
	48.9	(86)	49.6	(137)	

* All relationships are tested by means of the chi-square analysis on one degree of freedom.

rating) was considered as a good single estimator of parental attitudes concerning a specific health defect. A regression equation predicting the parent's urgency rating response from the remaining seven responses supports this assumption.* That is, a parent's response as to the urgency of the child's defect can quite reliably be predicted with knowledge of the responses on the other attitude items. In addition, the urgency rating item was assumed to provide a more meaningful measure of attitude concerning the defect because it appeared first in the sequence of these attitude items on the Interview Schedule and therefore would be less sensitive to the effects of response set. These assumptions enabled the investigators to establish the relationship between parental attitudes concerning a specific health defect and outcome of referral by testing one hypothesis. Specifically, as presented in Table 2, a significant relationship was established between parent's urgency rating and outcome of referral ($P<0.01$). That is, children whose defects were given a high urgency rating by their parents were more likely to receive attention than were children whose defects were given a low urgency rating by their parents.

It was further hypothesized that there would be a correspondence of physician's urgency rating* to parent's urgency rating and that both in turn would be related to outcome of referral. However, it was found that the physician's rating was almost totally unrelated to the parent's rating ($r=-0.06$). In fact, the physician's urgency rating as shown in Table 2 was virtually unrelated to outcome of referral. These findings suggest that it might be helpful to communicate the physician's urgency rating of the defect to *some* parents. For example, a physician's high urgency rating of the defect could favorably change a parent's low urgency rating of the defect which in turn could lead to successful outcome of referral.

Finally, all previously discussed parental attitude items were examined by social rank. It was found through chi-square analysis that attitudes expressed by parents in Social Ranks IV and V were uniformly consistent with their behavior (i.e., securing care). On the other hand, there were virtually no relationships between attitudes and be-

* The actual regression equation is as follows:

$\hat{Y}$ (parent's urgency rating) =
0.268 (interfere with child's school work)
+0.110 (affect happiness of the whole family)
+0.086 (interfere with child's ability to get a job as an adult)
+0.051 (affect child's personality)
+0.046 (affect child's health as an adult)
+0.045 (affect child's appearance) +1.01
$R=0.599$ $F=42.05$ $P<0.001$

The only attitude item which did *not* appear to add to the prediction of parent's urgency rating was the parent's belief that the defect would cause interference with the child's friendships.

* The physician's urgency rating represents a professional opinion obtained from the "Report of a Single Health Defect."

havior of parents in Social Rank II. That is, attitudinal measures did not discriminate in terms of behavior for Social Rank II parents. This could be due to the tendency for these parents to give socially acceptable responses. Although there is a correspondence between expressed parental attitudes and behavior in lower social ranks, a significantly smaller proportion of these children receive attention than do children in the upper social ranks. Thus, in addition to attitudes, one must look for other factors as possible explanations for success of referral.

Notification Factors Related to Outcome

A third objective of this study was to examine the effect of notifications on outcome of referral. Parents of all children included in this study received at least one notification from school personnel. In addition, approximately one-third of the parents received more than one notification. These subsequent notifications could have been made by either the same or different individuals (e.g., physician, dentist, nurse, counselor, or teacher) and through either the same or different contact technics (i.e., written notice, telephone call, home, or school visit).

When notifications were related to outcome of referral, several striking relationships appeared. Of all parents responding to notifications (i.e., securing attention for their children), approximately one-half responded when only one notification was sent, and one-half responded when two or more notifications were sent. This finding implies that the effectiveness of the referral program can be doubled when school personnel follow through with more than one notification.

In particular, as represented in Table 3, parents who are notified about defects by more than one contact technic are *much* more likely to secure attention for their children than are parents who are notified by only one contact technic. Also, parents who receive more than one notification (irrespective of persons or technics involved) are *much* more likely to secure attention for their children than are parents who receive only one notification. Finally, parents who are notified by more than one person are *much* more likely to secure attention for their children than are parents who are notified by only one person. These relationships are all significant well beyond the 0.001 level. As opposed to many of the previous findings, the influence of social rank appears negligible in the above relationships. For example, in Social Rank II, approximately 52 per cent of parents receiving notifications secured attention for their children when only one con-

Table 3—Notification factors related to outcome of referral*

Variables	Per cent and number of cases receiving attention				Level of significance
	%	No.	%	No.	
Contact technic	One		Two or more		
	36.3	(118)	82.7	(105)	P<0.001
Notification (irrespective of person or technic)	One		Two or more		
	34.7	(103)	77.4	(120)	P<0.001
Person	One		Two or more		
	36.9	(114)	76.2	(109)	P<0.001

* All relationships are tested by means of the chi-square analysis on one degree of freedom.

tact technic was employed, whereas 88 per cent responded when two or more contact technics were employed. In Social Ranks IV and V, approximately 25 per cent of parents receiving notification when only one contact technic was employed secured attention for their children, whereas 77 per cent responded when two or more contact technics were employed. Although the proportionate increase in securing attention when two or more technics were employed was greater for lower social ranks, both relationships were significant ($P<0.001$) and in the predicted directions.

These findings suggest the desirability of school health service personnel adopting the policy of sending more than one notification to parents who fail to take action following a single notification. If resources are limited, multiple notification efforts could be concentrated in lower socioeconomic areas. Furthermore, the "team approach," as well as the use of more than one contact technic, could be employed by school personnel in an effort to enhance outcome of referral.

Multifactor Determinants of Outcome of Referral

The preceding results suggested that many of the obtained relationships might themselves be interrelated, or that certain variables might combine to afford more reliable predictions of the criterion variable; outcome of referral. Therefore, those measures which could be considered scalar and parametric were subjected to more complex statistical treatment in an effort to uncover subtle interrelationships among various predictors of outcome.

Relevant independent estimators of outcome were identified by intercorrelating all scalar and parametric variables with the dependent variable (i.e., outcome of referral). Many variables, although highly correlated with the dependent variable, were excluded due to a concomitant correlation with other related variables. For example, parent's age was related to social rank as well as to outcome of referral and thus would not be an *independent* estimator. Other variables were excluded due to poor or nonexistent relationships to outcome. This procedure reduced the intercorrelation matrix of 29 variables to what appeared to be the three best *independent* estimators of outcome:

(1) Index of social rank
(2) Parent's urgency rating
(3) Notifications (represented by the number of contact technics).

Partial correlation and multiple regression technics were used to analyze these variables as estimators of outcome. The results, as presented in Table 4, suggest several interesting relationships. First, the predictive ability afforded by the index of social rank increases when *either* urgency rating or notifications are held constant, but decreases when *both* are held constant. Second, the predictive value of notifications appears relatively unchanged when *either* or *both* social rank and urgency rating are held constant. Finally, urgency rating correlates best with outcome when social rank is held constant, but appears to be a poor estimator when *both* social rank and notifications are held constant. This suggests that parent's urgency rating is, in part, a function of notifications.

Nevertheless, parent's urgency rating was found to be of significant value when estimating outcome of referral. Two regression equations predicting outcome were computed, the first ignoring and the second including parent's urgency rating as an estimator.* Comparison

* The actual computed equations are as follows:

$\hat{Y}$ (outcome) =
-0.433 (notifications) $+0.245$ (social rank) $+1.75$.
$R=0.474$ $F=68.15$ $P<0.001$

$\hat{Y}$ (outcome) =
-0.408 (notifications) $+0.250$ (social rank) $+0.123$ (parent's urgency rating) $+0.343$.
$R=0.492$ $F=48.26$ $P<0.001$
F for increase in $R=8.98$ $P<0.01$

of these two equations clearly indicated that predictions of outcome become more reliable when urgency rating is included. Specifically, the inclusion of parent's urgency rating with notifications and social rank significantly increased the accuracy of prediction of outcome ($P<0.01$). When the approximate relative weightings* of these predictors are computed, notifications appear three times as important as social rank and eight times as important as urgency rating in predicting outcome of referral. Thus, notifications are indeed most potently related to the success of school health service programs.

* Weightings are obtained by squaring regression coefficients and observing their relative magnitudes.[11]

Summary

This report presents a detailed analysis of various socioeconomic, attitudinal, and notification factors influencing the outcome of referrals from a school health service program. Four hundred and fifty-eight fourth-grade children within the Los Angeles City School Districts who had been identified by school personnel as needing medical or dental care were selected for this study: 211 having parents in an upper social rank, 247 having parents in lower social ranks. In all cases, parents of these children had received at least one notification from school personnel describing the child's defect and advising that professional care be

Table 4—Relationship of social rank, parent's urgency rating, and notifications to outcome of referral*

A. Zero-order correlation matrix

	Outcome	Social rank	Urgency rating	Notifications
Outcome	1.00	+0.23‡	+0.14‡	−0.41‡
Social rank		1.00	−0.06	+0.03
Urgency rating			1.00	−0.08
Notifications				1.00

B. First-order partial correlations		
1. Outcome with social rank		
(a) holding urgency rating constant	r = +0.245	t = 5.39†‡
(b) holding notifications constant	r = +0.267	t = 5.92‡
2. Outcome with urgency rating		
(a) holding social rank constant	r = +0.158	t = 3.42‡
(b) holding notifications constant	r = +0.108	t = 2.31§
3. Outcome with notifications		
(a) holding social rank constant	r = −0.433	t = −10.24‡
(b) holding urgency rating constant	r = −0.394	t = − 9.14‡
C. Second-order partial correlations		
1 Outcome with social rank holding urgency rating and notifications constant	r = 0.222	t = 4.86‡
2. Outcome with urgency rating holding social rank and notifications constant	r = 0.071	t = 1.55
3. Outcome with notifications holding social rank and urgency ratings constant	r = −0.409	t = −9.78‡

* Notifications are represented by the number of contact technics that school personnel employed.
† The level of significance for partial correlation coefficients was obtained by use of the t technic.[10]
‡ $P<0.001$; § $P<0.05$.

sought. Parents were interviewed and relevant information obtained. The school's report of outcome of referral (i.e., whether or not the child received attention) was employed as the dependent variable.

Subsequent data analysis revealed several interesting results: Meeker's recently developed index of socioeconomic status was established as reliable and valid. Factors influencing outcome of referral were identified as social rank; family size; parents' national background, education, occupation, religious preference, religious service attendance, and urgency ratings; mother's age and employment; and number of notifications, number of persons making notifications, and number of contact technics employed. In terms of the specific data, the following relationships were found to be significant at or beyond the 0.05 level of confidence. That is, children were *more* likely to receive attention if

they were from Social Rank II,
they were members of small families,
their parents were Caucasian or Oriental,
their parents had an education beyond high school,
their parents were employed in white collar occupations,
they were members of families with non-working mothers,
their mothers were over 35 years of age,
their parents had a Jewish religious preference,
their parents attended religious service once a month or less,
their parents perceived the defect to be of high urgency,
their parents received more than one notification,
their parents were notified by more than one person,
their parents were notified by more than one contact technic.

On the other hand, children were *less* likely to receive attention if

they were from Social Rank IV and V,
they were members of large families,
their parents were Negro or had a Spanish surname,
their parents had a high school education or less,
their parents were employed in blue collar occupations,
they were members of families with working mothers,
their mothers were 35 years of age or under,
their parents attended religious services more than once a month,
their parents perceived the defect to be of low urgency,
their parents received only one notification,
their parents were notified by only one person,
their parents were notified by only one contact technic.

Other factors not influencing outcome of referral were father's age, parents' country of origin, and urgency ratings of physicians and dentists. Tests involving these factors failed to meet the significance level of 0.05 or better.

Finally, the three *best* independent estimators of outcome of referral appeared to be notifications, social rank, and parent's urgency rating with approximate relative weightings of eight, three, and one, respectively. Judging from these weightings, notifications can be considered three times as potent as social rank and eight times as potent as parent's urgency rating as a determinant of outcome of referral.

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Biomedical Engineering Conference

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