

*VISITING THE DENTIST: A BEHAVIORAL COMMUNITY
ANALYSIS OF PARTICIPATION IN A DENTAL
HEALTH SCREENING AND REFERRAL PROGRAM*

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One-hundred and twenty-five families in the Medicaid Early Periodic Screening, Diagnosis and Treatment Program were assigned to one of five treatments to encourage parents to obtain health care service following the dental screening of their children: (a) a control procedure, in which parents were given a dentist's name; (b) a multiple contact procedure, in which parents received a postcard and two telephone call reminders; (c) a problem-solve procedure, in which a social worker aide conducted a brief session with the parent; (d) an incentive procedure, in which parents selected among four gifts that were contingent on seeking care; (e) an incentive + problem-solve procedure, in which the latter two treatments were combined. The multiple contact, incentive, and incentive + problem-solve techniques were significantly more effective in initiating dental visits than the control procedures. Families assigned to the intensive strategies were most likely to complete treatment. A cost-efficiency analysis showed the multiple contact technique to be a low-cost and highly effective procedure.

DESCRIPTORS: behavioral community psychology, dental visits, behavioral medicine, compliance, children

The chronic characteristics of dental disease are pervasive and cause an enormous social and economic burden (Young, 1974). Nearly 20 million persons between the ages of 18 and 79 are completely edentulous: adults with some remaining teeth averaged 18 decayed, missing, or filled teeth; at least 50% of the population suffer from some form of periodontal disease (Kegeles, 1974). It would require nearly \$15 billion to treat the backlog of dental needs (Mitchell, 1964).

For many health problems, including dental disease, mass screening programs have been a

popular, if not notably successful approach to increasing entry into the health care system (Epstein & Ossip, 1979). Compliance with screening referral recommendations requires the consumer to seek care or alter personal hygiene behaviors. The research literature has concentrated on factors that describe who is likely to use dental services, including sociodemographic characteristics (Gift, 1978; Nikias, 1968), practical constraints (Kronenfeld, 1979), previous dental experience (Metz & Richards, 1967) and health beliefs (Haefner & Kirscht, 1970; Kegeles, 1963, 1975). Unfortunately, little impact has been made on actual health-related behaviors, e.g., regular visits to the dentist remain an infrequent occurrence, particularly for the poor. Further, it is not uncommon for health screenings to result in less than 50% compliance with recommendations to seek care (Cauffman, Peterson, & Emrick, 1967; Reiss, Bailey, Hausfeld, & Dia, Note 1). Some health care system analysts have called for the use of incentives and other "external controls that can be a powerful force

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in initiating motivation, the missing ingredient in so much of health education" (Haggerty, 1977).

Several studies have examined system-related factors such as clinic initiated notification procedures on parent's compliance with follow-up recommendations (Cauffman et al., 1967; Cauffman, Warbuton, & Schultz, 1969; Fletcher, 1968; Gray, 1968; Stadt, Blum, Kent, Fletcher, Keyes, & Frost, 1963). In one study (Reiss, Piotrowski, & Bailey, 1976), 60% of the families sought care following repeated prompting which consisted of a note, followed by a phone call, followed by a home visit, compared to 23% of the families who received a single prompt or school note. The combination of a single prompt plus reinforcement (note and redeemable coupon worth \$5) was as effective and less costly than more intensive prompting.

Olson, Levy, Evans, and Olson (1981) assessed a more cost-effective multiple notification procedure (including three prompts, two written notes followed by a phone call or home visit). More than 53% of the children assigned to the multiple notification procedure obtained dental treatment as compared to 12% of the children assigned to a single written notice condition. Finally, Bunck and Iwata (1978) increased participation in a nutritious meal program for the elderly with recruitment techniques that involved intensive personal prompting (home visits) as compared to more impersonal approaches (public service announcements); a combination of minimal prompting plus reinforcement was effective and inexpensive.

The implications of community-based research of the health delivery system raise several considerations. The feasibility of implementing any approach will depend upon budgetary constraints and suggests the repeated application of inexpensive prompting procedures and incentives other than money. Noncash rewards may have the added benefit of being more acceptable to administrators of health services. Prompting and reinforcement strategies assume the target population has the skills to obtain the services

(Milio, 1967). Glogow (1970) evaluated several procedures including a problem-solving technique to increase participation in a follow-up retesting program for glaucoma. A 25-min discussion between the patient and nurse about arrangements for transportation, babysitting, and ways to be excused from work did not result in greater compliance as compared to other "educational techniques." However, substantial methodological problems reduce the interpretability of these findings.

The purpose of the present study was twofold. First, the study compared the effectiveness of five procedures to encourage parents of Medicaid eligible children to follow up on dental referrals. The procedures were designed to alleviate practical difficulties that may have discouraged implementation within the health care system. The incentive procedure in this study allowed participants to select among four rewards, most of which were compatible with goals of the health care system. The prompting procedure was designed to be economically feasible and relied upon repetitions to promote dental visits, and the problem-solving procedure was brief, simple, and easily replicated. Second, the study obtained detailed cost information for each procedure, to estimate cost-effectiveness.

METHOD

Participants and Setting

The 125 participants were selected from Medicaid families participating in the federal Early Periodic Screening, Diagnosis and Treatment (EPSDT) program administered by the Leon County Health Department (Dental Clinic). Families with positive dental screening results who met the following criteria were eligible: at least one child aged 5-15 yr; who did not require immediate emergency care, did not exhibit extreme dental fear (e.g., unwillingness to enter examination room or sit in dental chair, screaming or crying), and was accompanied by a parent or grandparent.

Screening and referral procedures were administered in the dental clinic. The follow-up dental care was provided by 5 of 13 local dentists who accepted Medicaid referrals during the study—January to September 1978. These dentists were selected on the basis of their location, their client-age requirements, and the willingness of the dentist to participate in the study. (Late in the study, one of the five dentists curtailed his participation in the Medicaid Screening Program because of objections to delayed payments by the state-appointed reimbursement agency. Consequently, the control and multiple contact groups have fewer participants: 24 and 23 families, respectively.)

Just prior to the child's screening, an oral description of the study's intent was given to all parents. None of the families declined to participate. During this brief period before screening, the researcher administered a dental and family history questionnaire to the parent.

Experimental Design and Conditions

A randomized group design was used to evaluate the effectiveness of the five treatment conditions: multiple contact, problem-solve, incentive, incentive + problem-solve, control. As with most medical research, a no-treatment control group was not feasible. The control group received the standard procedures of the dental clinic.

A single screening examination was administered to each client by the dental clinic. All children having some form of dental disease or inadequate oral cleanliness were referred for follow-up dental services. Prestablished treatment criteria were used for classification of the child's oral condition. The treatment condition implemented on any one screening day was selected on a random basis without replacement for every 5 days, i.e., all families attending the clinic on a certain day received the same predetermined treatment. After the experimental treatment was administered to the family, they were randomly assigned to one of the five den-

tists providing dental care. About 44 screening days (2 days per week for the first 4 mo followed by 1 day per week) were necessary to obtain the study participants. During this same period, 122 families were excluded from the project because they did not meet the eligibility criteria.

Multiple contacts. A series of three contacts was made to families in this condition. The first contact was made one to two days after the screening; the dental clinic sent a postcard to the family's home. Second, on the fourth or fifth working day after the screening, the family was contacted by phone by a dental clinic aide. The aide asked if the parent made a dental appointment, provided additional information, if requested, and encouraged the parent to set the appointment with the referral dentist. A third contact was made 1-2 days prior to the child's first appointment. The office receptionist phoned the family and reminded them of the appointment. Both phone contacts were made using a standardized message and checklist. The researcher directly monitored most of the phone calls originating from the Health Department and reviewed all completed checklists of phone conversations. Families without telephones (7) and families not reached after three attempts by the aide or receptionist (4) were mailed reminder postcards for the second and third contact. Seven of the families received one of their reminder contacts (contact 2 from the dental clinic) *after* they made an initial visit to the referral dentist.

Problem-solving. These families had a 15-min meeting with a social worker aide following the screening. The aide used a checklist to discuss appointment making skills: fitting appointments into a work or daily schedule; arranging to miss work; securing resources to solve problems with transportation, daycare; calling the dental office; and, cancelling and rescheduling appointments. The parent was then encouraged by the aide to call the referral dentist. The researcher directly monitored the aide's performance during more than half the sessions and reviewed checklists for all sessions.

Incentive. Immediately following the dental screening, parents received a coupon worth \$5 in cash or a selected gift item (trading stamps, dental supplies, or credit toward dental care for the parent) which was redeemable from the Health Department on the child's first visit to the dentist. A dental aide told the parents how to redeem the coupon: obtain the signature of the dentist after the first visit and mail the coupon in a stamped, addressed envelope. Families with more than one child received only one coupon. The coupon was signed by the dentist only after all children from a family completed their initial visit. Coupons expired 1 mo after the date of screening.

Problem-solving and incentive. Families received the same information, training, and coupon as that provided in the problem-solving only and incentive only conditions.

Control. Families received the standard clinic procedure. After the screening, the dental aide provided each parent with a sheet listing the name, address, and telephone number of the referred dentist.

Dependent Measures

Dental visit data. Each of the five referral dentists and the dental clinic maintained infor-

mation pertaining to the date of all kept, broken, and cancelled appointments on "visit data cards" designed for this study. The referral dentists returned the cards to the Health Department by mail: after 1 mo for those families who did not schedule a first appointment; after all care was completed; or, after the care was terminated for reasons other than complete care, e.g., broken appointments. All information was verified in weekly telephone calls to the participating dental office.

Cost analysis. All costs associated with the implementation of each of the treatment conditions were identified even though some part or all of these might be provided for within the ongoing program at a public health facility. This cost absorption procedure was identical to the cost analysis used in the Reiss et al. (1976) study.

RESULTS

Analyses of Variance indicated that the factors listed in Table 1 were evenly distributed across the five treatment groups. Table 1 presents the distribution of these variables for families who did and did not comply with screening recommendations. A chi-square analysis indi-

Table 1
Percentage of Families who made Initial Visits and Completed Care by Survey Variables

Variable	Initial Visit		Complete Care	
	No	Yes	No	Yes
<i>Age of Mother^a</i>				
21-25	12 (37.5)	20 (62.5)	22 (68.8)	10 (31.3)
26-30	12 (44.4)	15 (55.6)	19 (70.4)	8 (29.6)
31-40	10 (27.8)	26 (72.2)	13 (36.1)	23 (63.9)
>41	6 (23.1)	20 (76.9)	10 (38.5)	16 (61.5)
<i>Mother's Education</i>				
K-6	3 (37.5)	5 (62.5)	3 (37.5)	5 (62.5)
7-12	26 (33.3)	52 (66.7)	47 (60.3)	31 (39.7)
H.S.	7 (25.9)	20 (74.1)	10 (37.0)	17 (63.0)
College	4 (50.0)	4 (50.0)	4 (50.0)	4 (50.0)
<i>Mother's Working Status</i>				
Not Working	33 (33.7)	65 (66.3)	54 (55.1)	44 (44.9)
Part-time	5 (41.7)	7 (58.3)	7 (58.3)	5 (41.7)
Full-time	3 (25.0)	9 (75.0)	4 (25.0)	8 (75.0)

Table 1 continued

Variable	Initial Visit		Complete Care	
	No	Yes	No	Yes
<i>Personal D.D.S.</i>				
No	36 (3.56)	65 (64.4)	56 (55.4)	45 (55.6)
Yes	4 (20.0)	16 (80.0)	8 (40.0)	12 (60.0)
<i>Transportation to D.D.S.</i>				
Other	30 (40.0)	45 (60.0)	43 (51.3)	32 (42.7)
Own car	11 (23.4)	36 (76.6)	22 (46.8)	25 (53.2)
<i># Mother Visits D.D.S. in last 5 yr</i>				
0	14 (34.1)	27 (65.9)	21 (51.2)	20 (48.8)
1	15 (31.9)	32 (68.1)	25 (53.2)	22 (46.8)
72	11 (37.9)	18 (62.1)	17 (58.6)	12 (41.4)
<i># Yr since Mother's last visit to D.D.S.</i>				
Never	2 (33.3)	4 (66.7)	3 (50.0)	3 (50.0)
Longer than 5 yr	12 (35.3)	22 (64.7)	17 (50.0)	17 (50.0)
Within last 5 yr	26 (33.7)	51 (66.3)	43 (55.8)	34 (44.2)
<i>Mother's Reported Dental Status</i>				
Poor	19 (44.2)	24 (55.8)	28 (65.1)	15 (34.9)
Fair	8 (21.6)	29 (78.4)	14 (37.8)	23 (62.2)
Good	10 (30.3)	23 (69.7)	18 (54.5)	15 (45.5)
Excellent	2 (50.0)	2 (50.0)	2 (50.0)	2 (50.0)
<i>Reason for Mother's Visit</i>				
Symptomatic	31 (32.0)	66 (68.0)	52 (53.6)	45 (46.4)
Preventive	4 (44.4)	5 (55.6)	5 (55.6)	4 (44.4)
<i>Expected Extra Costs of going to D.D.S.</i>				
None	16 (27.6)	42 (72.4)	30 (51.7)	28 (48.3)
Some	20 (38.5)	32 (61.5)	28 (53.8)	24 (46.2)
<i>Mother's Fear of D.D.S.</i>				
Extreme	5 (18.5)	22 (81.5)	13 (48.1)	14 (51.9)
Some	4 (25.0)	12 (75.0)	7 (43.8)	9 (56.2)
None	27 (42.2)	37 (57.8)	38 (59.4)	26 (40.6)
<i># Children at a Screening^b</i>				
1 child	15 (26.3)	42 (73.3)	29 (50.9)	28 (49.1)
2 children	17 (51.5)	16 (48.5)	22 (66.7)	11 (33.3)
3 or more	8 (25.8)	23 (75.2)	13 (41.9)	18 (58.1)

^aInitial Visits only: $\chi^2(2) = 6.98, p < .03$.

^bInitial Visits only: $\chi^2(2) = 12.781, p < .005$.

cated the number of children brought to screening as the only variable related to a family making an initial visit, $\chi^2(2) = 6.98, p < .03$. Single child families or families with three or

more children were more likely to go to the dentist than families with two children. Additionally, older mothers were more likely to complete the dental treatment of their children than were

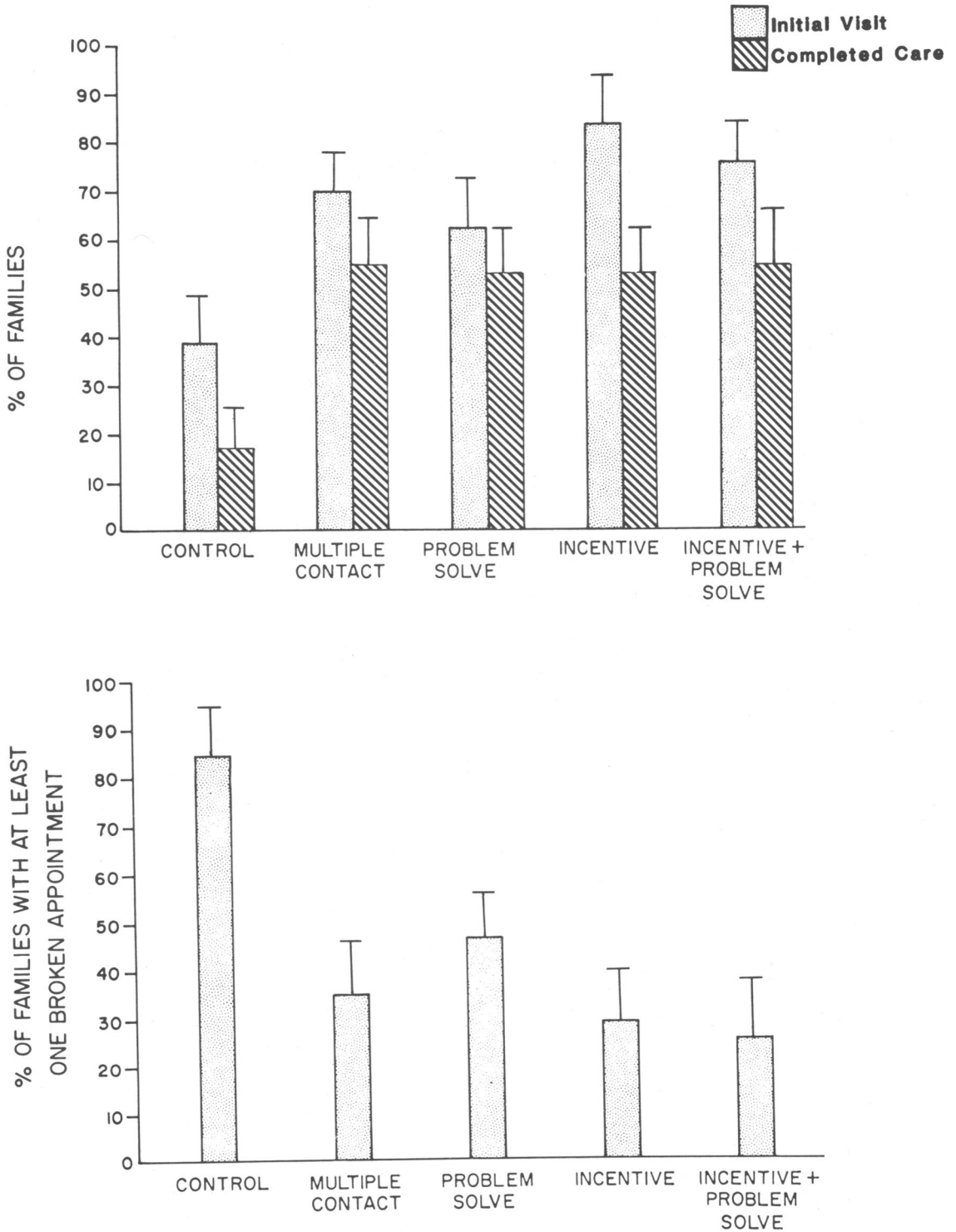


Fig. 1. (Top) Percentage (\pm S.E.M. for proportions) of families making at least one dental visit in each of the five treatment conditions (dots), and percentage of families completing dental care in each of the five treatment conditions (lines). (Bottom) Percentage of families who broke at least one dental appointment in each of the five treatment conditions.

younger mothers, $\chi^2(3) = 12.781, p < .005$. No other factors were related to initial visits or completed care.

Initial dental visits. A chi-square analysis was performed investigating the effects of dentist and type of treatment on obtaining an initial dental visit. All the children of a family must have visited the dentist in order to be classified as a family making an initial dental visit. Only the treatment effect was significant, $\chi^2(4) = 13.65, p < .008$. Figure 1 (top) displays the percentage of families for each treatment condition who made an initial visit to the dentist. The control group families were the least responsive to the screening recommendation; 37.5% of these families obtained care, compared to 69.6% for the multiple contact group (16 of 23), 64% for the problem-solve group (16 of 25), 84% for the incentive group (21 of 25), and 76% for the incentive + problem-solve group (19 of 25). More families in the multiple contact, incentive and incentive + problem-solve group made initial dental visits than the control group families, $\chi^2(1) = 7.4, p < .007$; $\chi^2(1) = 11.2, p < .001$; $\chi^2(1) = 4.9, p < .027$, respectively. The problem-solve group was an intermediate group not significantly different from the control group or the other treatment groups.

Completing dental care. The chi-square analysis of dental care completion data also yielded significant treatment differences, $\chi^2(4) = 11.02, p < .026$. Those families in the control group who received the standard clinic procedures were less likely to follow up on initial visits and complete dental treatment (16.7%) as compared to the more intensive procedures of multiple contact (56.5%), problem-solve (52%), incentive (52%), and incentive + problem-solve (56%) (Figure 1, top). These visual differences between the control group and each of the other treatment conditions were supported by follow-up analyses: multiple contact, $\chi^2(1) = 8.15, p < .01$; problem-solve, $\chi^2(1) = 6.67, p < .01$; incentive, $\chi^2(1) = 6.67, p < .01$; incentive + problem-solve, $\chi^2(1) = 8.10, p < .005$.

Broken appointments. In general, families

with more than one child were given appointments on the same day. With few exceptions (3 of 121 multiple appointments) parents either broke the appointments for all their children scheduled on a particular day or kept the appointments for all their children. Consequently, a chi-square analysis was performed on family data and indicated a significant treatment effect, $\chi^2(4) = 14.93, p < .005$, and significant dentist effect, $\chi^2(4) = 11.45, p < .02$. Over 84% of the control group families who made contact with the dentist missed at least one appointment whereas a much smaller percentage of families missed appointments in the multiple contact group, $\chi^2(1) = 5.47, p < .02$; problem-solve group, $\chi^2(1) = 5.85, p < .016$; incentive group, $\chi^2(1) = 10.09, p < .002$; and incentive + problem-solve group, $\chi^2(1) = 12.79, p < .001$ (see Figure 1, bottom).

Although the lack of independence of family member's broken appointment behavior requires the above data analysis, the impact of each broken appointment on a dental office was a practical consideration. There was a larger percentage of missed appointments by children in the control group and multiple contact group (38% and 32%, respectively) as compared to the problem-solve, incentive, and incentive + problem-solve group (17%, 8%, and 17%, respectively).

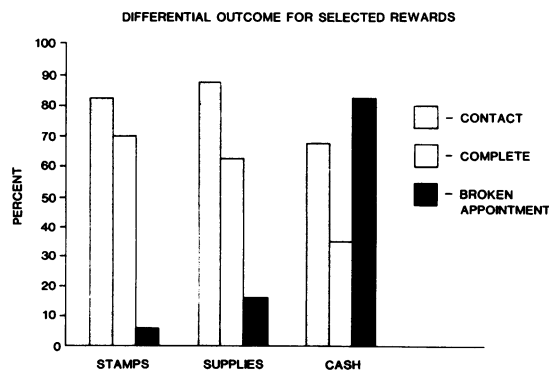


Fig. 2. Percentage of families making an initial dental visit, completing care, and broken appointments associated with type of reward selected.

Selection of Rewards

Families in the two treatment conditions (N = 50 families) involving incentives selected dental supplies and cash almost equivalently (34% and 38%, respectively) and, much more often than either the trading stamps (22%) or reimbursement for the mother's dental care (6%). Because so few families selected the reimbursement reward, it was not given further consideration.

The performance of these families in terms of making an initial dental visit, completing dental treatment, and appointment breaking is presented in Figure 2. Although it appears that families who chose the cash reward were less likely to comply with health recommendations, chi-square analyses did not indicate significant differences. Specifically, only 68% of the families who selected a cash reward initiated contact with the referral dentist as compared to more than 80% of the families who selected other rewards, $\chi^2(2) = 2.1915, p < .333$. Furthermore, only 35% of these cash-reward families completed their dental care as compared to 70% of the families who selected trading stamps and 62% of the families who selected dental supplies, $\chi^2(2) = 3.9133, p < .143$. Type of reward category was associated with broken appointments. More families (73%) who selected a cash rebate broke at least one appointment than the families who selected dental supplies (17%) or trading stamps (11%), $\chi^2(2) = 10.99, p < .005$. Of the 26 appointments broken by families in the incentive and incentive + problem-solve conditions, 81% were broken by families who selected the cash reward with the remainder broken by families in the dental supply group (15%) and trading stamp group (4%).

Cost Analysis

The cost for each approach was determined by considering expenses for materials (e.g., paper, postcards, postage), personnel time (e.g., social worker aide, dental assistant, secretary)

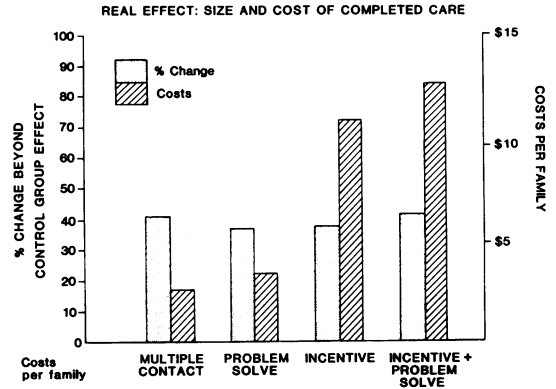


Fig. 3. Percent difference in completed care for each of the treatment conditions and the control group. Costs associated with this net effect are identified along the abscissa.

and rebate items. Costs have been calculated in three ways: cost per family in each group (total costs per procedure/number of families in the group), costs per families making an initial visit with the referral dentist (total costs per procedure/number of families making at least one visit), and costs per family completing care.

The costs associated with implementing treatment were \$.19 per control family, \$1.14 per multiple contact family, \$1.33 per problem-solve family, \$3.94 per incentive family and \$5.20 per incentive + problem-solve family. Analysis of the data in terms of the cost-efficiency of the treatments (i.e., total costs divided by the number of families making an initial dental visit) found the cost of obtaining a dental visit and completed care as follows: control, \$.50 per initial visit and \$1.12 per completed care; problem-solve, \$2.08 per initial visit and \$2.56 per completed care; incentive, \$4.69 per initial visit and \$7.57 per completed care; and incentive + problem-solve, \$6.84 per initial visit and \$9.29 per completed care.

Other important cost considerations are those attributable to the net effects of a treatment strategy (i.e., the percent change over baseline). For this study, baseline was defined as the percentage of families who completed care in the control group, about 17%. Stated in another way, Figure 3 costs out the effectiveness gained by implementing each strategy over a control

procedure. Viewed in this manner, the cost of a procedure is raised substantially, nearly \$2.91 for the multiple contact treatment and over \$13.00 for the incentive + problem-solve procedure.

DISCUSSION

The results of this study showed that prompting and incentive-based strategies, which are considerably more intensive than those commonly used in dental clinics, increased compliance with recommendations from a dental screening program. A total of 76% of the families exposed to these treatments made an initial visit with the referred dentist and 55% of the families completed treatment. The findings for the multiple contact procedure both replicate and extend results from previous research (Reiss et al., 1976; Bunck & Iwata, 1978). Replacing the very costly home health visit with a second telephone contact by a different caller significantly reduces cost without diminishing the response to a multiple reminder system. Unlike the multiple contact procedure used in the Reiss et al. (1976) study, the multiple prompt procedure used in the present study produced completion rates that were comparable to those achieved by the other treatment conditions.

Although problem-solving techniques are often described as an accepted approach to help people enter the health care system (Manela & Lauffer, 1979), few experimental analyses of this procedure have been conducted. Simply advising parents of the steps necessary to obtain dental care and identifying available "barrier-reducing" resources did increase the likelihood that parents would use free dental services for their children. The use of a short session (15 min) kept costs to less than \$1.40 per family.

The findings from this study contribute to the evidence that incentive-based strategies do not have an adverse effect upon future dental visits that are not subject to contingent material rewards. Families who received rewards after seeking dental care for their children were at least

as likely as families who received other types of intervention to complete their children's dental care treatment. In contrast to the Reiss et al. (1976) and Bunck and Iwata (1978) research, the cost-effectiveness of these reward contingent treatments did not compare favorably with a multiple prompting technique that resulted in about 10-14% fewer families initially contacting the dentist at about one-third the expense.

In addition, the results from the present study point to the consistent effects of the cash rewards and also suggest the viability of other noncash rewards. About the same percentage of families who selected trading stamps as those who selected dental supplies sought dental care for their children. More importantly, these families were much more likely to comply with the screening recommendations than families who selected a cash reward. However, the response of families who selected different rewards may only reflect a selection bias or some other methodological artifact.

Cost analyses are particularly important at a time when public health officers may call upon behavioral community psychologists to help them decide on policies affecting their recipients. A public health official or policy board should be able to use the data from Figure 4 to decide how much participation they desire on the part of their constituents and how costly it will be to produce this participation. In demonstrating how this data base can be established as part of an ongoing service delivery system and how such decisions can be made more objectively, this study has possibly set the precedent for a more thorough examination of current procedures and their actual effectiveness.

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