
Participant Evaluation and Cost of a Community-Based Health Promotion Program for Elders

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Synopsis.....

There is little information on how best to provide health promotion and disease prevention services to elderly persons. This paper reports participants' perceptions of the effectiveness of a health promotion program consisting of health education classes and case management services. A single-

group, posttest only design was used for the county-wide program, which operated independent of participants' primary care physicians. Each person received a thorough screening evaluation, was invited to health education classes, and was assigned a case manager for a 2-year health promotion period. Community residents 64-71 years of age were recruited; 475 entered the study, and 378 (79.6 percent) completed the followup evaluation interview. Only one-third of the participants attended at least one class, but a majority of those attending each class rated it very or extremely effective in increasing knowledge.

To determine the effectiveness of the case managers, each participant identified the three health problems that were of greatest concern to him or her and indicated which of these priority problems were discussed with the case manager. Discussion with the case manager was significantly associated with continuing to see a personal physician for the problem, following the physician's recommendations, the problem's being under control, and the problem's improving over the 2-year followup. The classes and case management services benefited the participants who used them. How to best deliver these services to the target group needs further study.

INTEREST IN SCREENING and health promotion for the elderly has been growing for some time (1-3). The question of what procedures should be included in screening packages for seniors has been addressed by several groups (1-7). A health promotion model combining "health education with organizational and environmental services and resources in support of health behavior" has been outlined but not empirically tested as a unified program (8). One component of health education (self-care education) has been evaluated singly (9), and one organizational service (health visitor attached to general practitioners' offices) has been described (10-15), but a program for this age group including both types of interventions has not been evaluated. In this paper we report the results of an integrated demonstration project.

Two features have distinguished the methods used to date of delivering services: the site of the program and the role of the patient's primary physician. Screening and health promotion programs for the elderly have been conducted in patients' homes (11,12,14-17), private physicians' offices (12,14,15), specific geriatric screening or wellness clinics (10,13,15,18-20), community centers (21-25), and inpatient settings (15). The role of the patients' primary care physicians has varied from direct involvement in the process of conducting the screening or reviewing the results (11,12,14), to referral to the assessment team either personally or through review of practice records (10,13,15,19), to community recruitment of participants with support of the general practitioner prior to the assessment (16), to community recruitment

of participants with only post-assessment referral to private physicians (18), to no involvement (17,20-26). Several programs have been conducted in the United States (9,17,18,20-27), but few reports provide information on the impact of the program (9,18,21,23,25).

Despite considerable experience, the literature provides no guidance on how best to provide health promotion services to ambulatory elders. All reports describe the types of services provided to participants (9-29), several indicate the types of problems detected in participants (10-16,19), three note whether participants followed specific recommendations such as seeing a physician or completing treatment (13,16,18), and five present data on the program's impact on health knowledge (9,18,25), health-related skills (9,25), and health status (9,13,23,25). Health knowledge and skills increased in the programs with little or no physician involvement (9,18,25), health status improved in the program with modest physician involvement (13), and the two programs with no physician involvement produced conflicting results—improvement (23) and no change in health status (9,25). These results show no clear trend as to the apparent effectiveness of these services, where best to provide them, or how best to involve patients' physicians in the programs.

This demonstration project was based on a community outreach model. The rationale was that a community-based approach could be replicated elsewhere without the success being dependent upon the active participation and support of the local medical care system. This strategy is consistent with the experience and recommendations of others (20-30) and avoids the barriers to primary physicians' provision of health promotion services to elderly patients (31,32). Community recruitment of participants with only post-assessment referral to participants' private physicians was chosen for the primary care physicians' role, since this is a model that could be used by community centers or other community organizations. This report concerns the effectiveness of the program's health promotion components and the appropriateness of this delivery system for this particular target group.

This study involved an ambulatory, low-risk group of 64- to 71-year-old persons, a comprehensive screening assessment, a health promotion component, and a delivery system independent of the participants' usual sources of medical care. The purpose of this project was to determine the feasibility of the service package and how it influenced participants' self-reported behaviors. A rela-

tively "young elderly" target group was selected to distinguish screening and health promotion activities from the geriatric assessment activities designed for frail, vulnerable elderly (33). The focus of this project is on primary and secondary prevention as compared with the tertiary prevention focus of geriatric assessment activities.

A comprehensive screening assessment was offered to determine empirically whether the selective packages recommended for this target age group miss significant health problems and should be revised. The project's implications for the content of screening packages have been reported elsewhere (34). The results validated the focused, selective approach for this specific target group, since an unfocused comprehensive assessment was found to be neither necessary nor feasible (34,35).

The health promotion component of the program included classes to transmit general knowledge and case managers to provide specific knowledge needed by persons, to counsel participants about their particular prevention and health promotion needs, and to facilitate participants' use of the health care system, especially their personal physicians, to meet their individual needs. The primary purpose of this evaluation was to determine the health promotion component's impact on immediate outcomes, that is, participants' self-reported knowledge and behaviors. Intermediate outcomes, such as status of health problems, were of secondary interest, and ultimate outcomes, such as functional health status, were not considered appropriate for a feasibility demonstration project.

Methods

Sample. The program was conducted in a mixed urban-suburban county in central New Jersey in 1980-83. The goal was to recruit 500 voluntary participants or approximately 5 percent of the county's population of persons 64 to 71 years of age. Invitational letters were sent to subscribers of Blue Cross Medicare Complementary Insurance (Medigap), and other potential participants were contacted through community outreach efforts, for example, senior citizen resource centers.

Program description. The participants received comprehensive screening assessments that included a thorough medical and psychosocial history, a complete physical examination, and a battery of laboratory tests (complete blood count with differential, electrolytes, Standard Multi-channel Analysis-12, serum lipids, urinalysis, stool occult

blood, electrocardiogram, thyroid functions tests, and optional Papanicolau smear). These assessments were conducted at three ambulatory care centers located in different parts of the county. Each assessment was followed within 1 to 2 weeks by a case conference when the physician, nurse, and social worker reviewed the results of the participant's evaluation, developed a problem list, and made specific recommendations for each problem, for example, referral to a patient's primary care physician. The nurse or social worker discussed the results of the assessment with the participant at a followup visit and reviewed the health plan that was formulated at the case conference.

Prior to the screening assessment, each participant completed a health history, family history, and organ systems review form. The project nurse reviewed this form for any clarification, completed a structured nutritional questionnaire, and determined the participant's ability to perform activities of daily living if the participant reported at least one musculoskeletal or cardiovascular symptom. A family physician then conducted a detailed comprehensive physical examination. The social worker conducted a structured interview that obtained information about employment, housing, education, finances, and transportation. Information regarding family, social, and community activities and informal support network was also ascertained.

The nurse or social worker who reviewed the assessment results with a participant at the follow-up visit was designated as that participant's case manager for the remainder of the 2-year project. The participants were encouraged to call their case manager any time that they had a health problem or concern. The participants also were requested to complete periodically a self-report form that included information on illness days, medical care visits, other health professional visits, use of community services, volunteer work, and personal assistance from friends or family.

Case managers were expected to call their assigned participants every 3 to 4 months and make additional calls if the self-report forms submitted by participants indicated a specific need. The case managers served primarily as facilitators, counselors, and educators. They were a source of information on community services, and they taught participants how to use these services and how to develop greater personal responsibility for their health. Education about developing healthy lifestyles (for example, exercise, socialization, proper nutrition, moderation in alcohol consumption, and elimination of smoking) was a major

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responsibility of the case managers. Referral to appropriate medical and health-related services was offered when the participants became ill. The case managers fulfilled what would be called a traditional professional casework model in the schema described by Capitman and coworkers (36). Two nurses and two social workers worked full-time while the screening assessments and case conferences were conducted and then worked part-time as case managers for the remainder of the project. The county Visiting Nurse Association provided the nurses and social workers under a subcontract.

In addition to the one-to-one education by the case managers, health education classes on specific diseases and on general issues such as retirement planning, drug use and abuse, physical fitness, nutrition, community resources, personal and environmental safety, common health problems in the elderly, and sexuality in aging were offered. Classes on each topic were offered twice during the 2-year project. Part-time health education curriculum specialists and consultants from the Robert Wood Johnson Medical School's Office of Consumer Health Education developed and conducted the classes under a subcontract.

Evaluation

To evaluate the 2-year program, a followup interview and analysis of the data were conducted by a team of investigators and trained interviewers who had not been involved with the initial planning of the project or the day-to-day implementation and delivery of services. This strategy minimized response bias by participants who would not want to displease their case managers with negative feedback. Personal interviews were arranged in the home of each consenting program participant. The structured interview addressed three areas of program evaluation: (a) apparent impact of the case management services on the health problems of

Table 1. Percentage distribution of initial and followup groups, by demographic characteristics

Characteristic	Initial (N = 475)	Followup (N = 378)
Male	55.8	43.6
Married.....	65.6	65.4
Widowed	25.0	26.1
Separated, divorced	5.2	4.8
Single.....	4.0	3.7
Living with:		
Spouse only	50.6	52.5
Spouse and children.....	11.1	9.6
Living alone	21.8	25.3

¹ $\chi^2 = 12.58, df = 1, P < .001.$

greatest concern to the participants, (b) perceived influence of the education classes, and (c) overall satisfaction with the services provided.

To determine the program's impact related to specific health problems, each participant was first asked to identify which of 25 common conditions they currently had, regardless of whether the condition was being treated or not. This list included the problems that were observed in 5 percent or more of the participants at the initial screening with the addition of cancer and grief due to death or illness of a loved one. Each participant could specify other current problems as well. Next, the participants were asked to identify the three conditions or problems that were of greatest concern to them. For each priority problem, inquiries then were made regarding how the person became aware of the problem, whether the problem was discussed with the case manager, whether the participant sought treatment, the role of the project in the person's seeking treatment or following the physician's advice, the current status of the problem, and any change in status of the problem during the project.

Project costs were determined to assess the feasibility of the program. The costs of the case management and health education subcontracts (during the 2 years after the screening assessments had been completed) were considered together as an integrated package. These service costs are reported separately from the program costs (subcontracts, part-time project director and secretary, and supplies) for comparison with other costs reported in the literature (36). Costs of evaluating the program were not included in the service or program cost estimates.

Average monthly costs per participant or per priority problem were calculated by dividing the project's 2-year costs by the number of participants

or the number of problems in the relevant category. The absolute numbers of health problems reported by the participants were used in the calculations of cost per problem with no adjustment for nonresponders; all 475 participants were included when calculating average monthly cost per participant. The casefinding cost of the screening assessment and followup case conference has been reported previously (35).

Results

Sample. Four hundred and seventy-five persons participated in the initial screening assessment and health promotion program. The mean age of the entire group was 67.9 years; 65.6 percent were married, 25 percent widowed, 5.2 percent separated or divorced, and 4.0 percent single. Half had graduated from high school and nearly 25 percent had either attended or graduated from college. Two-thirds of the participants had an annual household income of \$10,000 or more, whereas only one-third of their peers nationally report this level of income (37). More than 80 percent of the participants had Medigap insurance. Finally, the target group tended to be healthier than their peers nationally with regard to serious chronic illness (34).

Of this study group, 378 (79.6 percent) completed the followup evaluation interview 2 years later. The reasons that 97 participants were not included in the followup are no time or interest, 36; unable to contact, 26; unknown, 11; too disabled, 8; moved, 7; dropped out of program, 3; bad experience with program, 3; language, 2; and died, 1. The total group of participants was more likely to be male than the followup group, 56 percent versus 44 percent; however, the two groups were similar in all other demographic variables (table 1). Nearly 9 of 10 (87.5 percent) of the original participants had a primary care physician at the time of the initial assessment.

Screening assessment. The initial screening assessment detected a mean of 4.1 problems per patient and at least one previously unknown medical condition in approximately 75 percent of the participants (further details on the yield of the screening assessment in terms of detected medical conditions, laboratory abnormalities, and psychosocial problems have been reported elsewhere (34)). At the program evaluation interview, the participants reported that only 32 (3.6 percent) of their priority problems were first noted at the screening assess-

Table 2. Conditions identified as current, priority, and discussed with case manager by 378 persons in the study's followup

Problem	Respondents reporting problem as current		Current problems identified as priority		Priority problems discussed with case manager	
	Number	Percent	Number	Percent	Number	Percent
Arthritis	178	47.1	122	68.5	59	48.4
Hypertension	160	42.3	111	69.4	67	60.4
Hearing loss	109	28.8	66	60.6	22	33.3
Pain in arm or legs	99	26.2	23	23.2	12	36.4
Obesity	98	25.9	46	46.9	12	26.1
Reduced function in limbs	57	15.1	24	42.1	9	37.5
Varicose veins	54	14.3	20	37.0	7	35.0
Skin rash	49	13.0	19	38.8	8	42.1
Hemorrhoids	49	13.0	20	40.8	6	30.0
Dental problems	47	12.4	14	29.8	1	7.1
Cataracts	45	11.9	29	64.4	14	48.3
Sexual problems	44	11.6	15	34.1	5	35.7
Depression	43	11.4	17	39.5	8	47.0
Enlarged prostate	39	10.3	21	53.8	10	47.6
Angina	35	9.2	17	48.6	10	58.8
Heart condition	33	8.7	32	97.0	13	40.6
Diabetes	30	7.9	21	70.0	17	81.0
Heart murmur	27	7.1	12	44.4	5	41.7
Poor dietary habits	27	7.1	5	18.5	1	20.0
Smoking	26	6.9	16	61.5	4	25.0
Low potassium	24	6.3	4	16.7	2	50.0
Grief	24	6.3	8	33.3	5	62.5
High cholesterol	22	5.8	8	36.4	5	62.5
Cancer	18	4.8	10	55.6	5	50.0
Athletes foot	16	4.2	6	37.5	2	33.3
Glaucoma	9	2.4	5	55.6	2	40.0
Total reported	1,629	...	899	55.2	414	46.1

ment; whereas 439 (48.8 percent) were first discovered by the participants, and 319 (35.5 percent) were first discovered by the participants' personal physicians. Despite the rather low yield, 52.8 percent of participants reported that the screening assessment and followup meeting were very or extremely helpful, and 11.2 percent thought they were moderately helpful.

Case management. Three hundred and nine of the 357 answering the question (86.6 percent) reported that they were very or extremely satisfied with the overall services provided by their case manager. Only 19 (5.3 percent) indicated slight or no satisfaction with overall services. A large majority of participants thought that they were in contact with their case manager often enough, but 21.6 percent did indicate that contact was not often enough. A majority of the participants (64.6 percent) estimated the number of contacts (phone calls or personal visits) with their case managers had been 2 to 6; 14.4 percent estimated less than 2 contacts; 11.5 percent, 7-10 contacts; and 6.5 percent, 11 or more contacts. Participants discussed 46.1 percent of all identified priority problems with their case managers (table 2). The main reason given for not

discussing problems with case managers was the participants' perceptions that the problems were not remediable.

For all priority problems combined, there was a significant direct relationship between discussing the problem with the case manager and seeking treatment for the problem from a physician ($N=847$, $\chi^2=20.60$, $df=1$, $P<.001$). Although participants sought treatment from a physician for 74.4 percent of their priority problems, project personnel were the first to encourage followup treatment for only 4 percent of the priority problems.

Participants reported continuing to see their physicians for just over 40 percent of the priority problems. The perceived helpfulness of the project in encouraging this continued consultation was also directly related to whether the problems were discussed with the case manager ($N=349$, $X^2=33.32$, $df=2$, $P<.0001$). The perceived helpfulness of the project in encouraging participants to follow their physicians' recommendations regarding priority problems was also significantly related to whether the problem was discussed with the case manager ($N=434$, $X^2=57.07$, $df=2$, $P<.001$). Despite this apparent benefit, the project was rated as

Table 3. Attendance and perceptions of 159 participants in general health education classes

Class	Number attending	Effectiveness in increasing knowledge ¹					
		None or slight		Moderate		Very or extremely	
		Number	Percent	Number	Percent	Number	Percent
Nutrition	115	25	23.1	22	20.5	61	56.5
Physical fitness and exercise	101	19	19.8	10	10.4	67	69.8
Medication safety	94	9	10.5	18	20.9	59	68.6
Retirement years	90	16	22.2	14	19.5	42	58.3
Health promotion	94	6	8.7	20	29.0	43	62.3
Sexuality	78	19	27.5	15	21.8	35	50.7
Community health resources	72	10	17.0	18	30.5	30	52.5
Personal and environmental safety ..	64	8	14.8	12	22.2	34	63.0

¹ "Don't know" category not included in calculation of percentages.

being very or extremely helpful in encouraging participants to continue to see their physicians or to follow their physicians' recommendations for only approximately 25 percent of the priority problems but was rated as slightly or not at all helpful for nearly 65 percent of the priority problems.

The participants reported that about 33 percent of their priority problems were slightly or not at all controlled, approximately 30 percent were moderately controlled, and somewhat greater than 35 percent were well or very well controlled. The perceptions of the extent to which problems were under control were directly related to whether problems were discussed with the case manager ($N=792$, $X^2=6.80$, $df=2$, $P<.05$). About 33 percent of priority problems were reported as having gotten worse during the program, 50 percent had remained the same, and about 16 percent had reportedly improved. Again, an overall positive impact was noted in that greater proportions of problems that had been discussed with the case manager were reportedly improved, and smaller proportions were reported worse than were problems that had not been discussed with the case managers ($N=810$, $X^2=41.73$, $df=2$, $P<.0001$).

Health education. Nearly 43 percent of 373 answering that question attended at least one of the general health education classes. The most commonly reported barriers to attendance were (a) scheduled time (reported by 24.5 percent of nonattendees), (b) transportation (16.5 percent), (c) location (15.9 percent), and (d) disinterest (12.7 percent). Only 2.8 percent reported not being informed of the classes, and only 7.5 percent indicated that they already knew the information. Fully 55 percent offered additional personal reasons for their lack of attendance.

The majority of those attending indicated that the classes were very or extremely effective in increasing their knowledge about the subject (table 3), although 10 to 20 percent noted that they already knew the material. The participants' perceptions of the effectiveness of the classes in improving their attitudes toward growing older were mixed: slightly or not effective (46.9 percent), moderately effective (17.2 percent), and very or extremely effective (35.8 percent). The perceptions of the classes' helpfulness in enabling participants to take better care of their health were similar: slightly or not helpful (37.5 percent), moderately helpful (25.0 percent), and very or extremely helpful (37.5 percent).

Participants with diabetes, arthritis, or hypertension were individually invited to a special class on each of these problems. Thirteen of 30 patients with diabetes (43.3 percent), 22 of 178 with arthritis (12.4 percent), and 27 of 160 with hypertension (16.9 percent) reported attending the special class. The impact of these classes on perceived knowledge was favorable as well, with 9 of 13 attending the diabetes class stating that it was very or extremely effective in increasing knowledge, 15 of the 22 who attended the arthritis class gave the same rating, as did 15 of the 27 who attended the hypertension class.

Overall program satisfaction. The final area investigated was the participants' general perceptions of the overall program (that is, screening assessment, followup visit, case manager services, and health education classes). Of 372 respondents, 79 (21.1 percent) indicated that they were doing things differently as a direct result of the project: improved compliance with treatment recommendations (39 or 49.4 percent of those reporting changes), increased physical activity (23 or 29.1 percent), and increased

social contacts (11 or 13.9 percent). Almost one-third (30.2 percent) of the respondents reported that, compared with before joining the project, they were more likely to seek treatment for health problems, and 35.3 percent noted that they were more able to manage or take care of their health problems themselves. Only 12.0 percent felt that they had a health problem that was not adequately addressed by the project staff. If the project were continued, 85.6 percent of those responding indicated that they would want to participate, and 94.0 percent would recommend the program to their friends or family members.

Cost of services. Table 4 outlines several monthly costs. The service cost includes the case management and health education subcontracts only to reflect the cost of actual services provided. The program cost includes administrative and overhead costs as well as the service cost. All but the average participant's cost (\$15 or \$19 monthly) may be 20 percent overestimated, since only information from interviews with followup respondents (80 percent of study group) was used for the other estimates. Changes in participants' behavior, such as more able to take care of health problems themselves (\$68 per month) or doing things differently as a direct result of the project (\$112 per month), are considerably more expensive to achieve than participant satisfaction (\$25 per month). Attendance at one or more health education class (\$55 per month) was more than twice as expensive as any discussion of a problem with a case manager (\$21 per month). Since the latter action was associated with improvement in problems (\$58 per month), the relative cost-effectiveness of case management services and health education classes seems clear.

Discussion

The results must be interpreted with the study's limitations in mind. The lack of a control group precludes definitive conclusions about the program's impact on the status of health problems but does not invalidate the other results. Validity of participants' self-reports is a question, but using an independent evaluation team should limit biased responses. The results may be tentative, but they do begin to test some of the previous recommendations about health promotion for the elderly.

In this evaluation, there is a distinction between the components of the program (that is, education classes and case management) and the delivery system (that is, independent ambulatory care cen-

Table 4. Monthly project costs per participant and per problem according to selected outcomes

Characteristic	Number of participants or problems	Service cost ¹	Program cost ²
All participants	475	\$ 15	\$ 19
Very or extremely satisfied participants	309	20	25
Attended at least 1 class	159	46	56
Doing things differently	79	91	112
More able to care for health problem	131	55	68
		Monthly costs per priority problem	
All priority problems	899	\$ 8	\$ 10
Priority problem discussed with case manager	414	17	21
Program first encouraged followup	36	200	246
Very or extremely helpful in encouraging continuing followup	229	32	39
Problem improved during project	153	47	58

¹ Service cost includes case management health education subcontracts only.

² Program cost includes case management and health education subcontracts, administration (part-time project director and secretary), and supplies.

ters and community recruitment of participants with only post-assessment referral to private physicians). This distinction is important, because the components themselves had beneficial impacts, but the overall impact of the program was perhaps compromised by the delivery system. For example, a majority of attendees thought that the general and disease-specific classes were very or extremely helpful in increasing knowledge, and one-third thought that the classes were very or extremely helpful in improving attitudes toward growing older or in enabling people to take better care of themselves. Yet only one-third of all participants attended at least one general class. The classes themselves seemed to be effective, which has been observed elsewhere (9,23,25), but their impact on the entire group of participants was attenuated. How the delivery system influenced attendance is uncertain and remains an important question.

The case management services did not have a major overall impact in this target group either. Although discussions with case managers were directly related to seeking and continuing care, following physicians' recommendations, control of problems, and improvement in problems, there are some qualifiers: (a) less than half of the participants' priority problems were discussed with the case managers, (b) case managers were the first to

encourage followup for less than 4 percent of the priority problems, (c) case management services were rated as slightly or not at all helpful in encouraging participants to continue to see their physician or to follow their physician's recommendation for 65 percent of the priority problems, (d) only 33 percent of problems were well or very well controlled, and (e) only 16 percent of problems were improved, and about 33 percent were worse.

Nevertheless, 78 percent of the participants indicated that they were in contact with their case manager often enough, and 87 percent of participants were very or extremely satisfied with their case manager's overall services. The participants appreciated their contacts with their case managers, even if the contacts influenced the participants' behaviors for only a minority of their priority problems.

The impact on the intermediate outcome (that is, control or improvement in problems) is even more attenuated. Only 16 percent of participants' priority problems were improved at followup; whereas 29 percent of participants referred to a program by their personal physicians were improved at followup (13). Although these are not directly comparable results, they raise the possibility that more involvement of personal physicians could lead to greater improvement in participants. How the delivery system may influence the effectiveness of case management remains unknown; this question needs further study.

The cost information is difficult to interpret, since there are no data from other health promotion programs for the elderly with which to compare it. The average monthly service cost per project participant is well below those of the long-term care case management demonstrations (\$15 versus \$40 to \$105 service cost per month, and \$19 versus \$47 to \$134 program cost per month) (36). These cost differentials are not surprising considering the low intensity services provided to participants in this project ("minimal" case management emphasizing self-care) and the high intensity services (intake and screening, assessment and reassessment, care planning, service arrangement, and interim monitoring) provided to clients of the community-oriented long-term care demonstrations (36).

In addition, although both this health promotion program and the long-term care programs used the traditional professional case work model, this health promotion project relied primarily on professionals with registered nurse, bachelor of social work, or bachelor of art degrees and used fewer

advanced professionals with a master's degree or higher than the long-term care projects. Long-term care may require a professional casework model, but even a nonprofessional model may be suitable for screening and health promotion programs. It is possible that the nonprofessional model could produce results comparable to the professional model, yet at lower per capita costs than reported in this paper such that the program becomes practical to implement.

The components of this health promotion program were effective as measured by self-reported knowledge, care-seeking, and problem status, but questions remain about the optimal method of delivering these services. The status quo is unacceptable, since it is well recognized that physicians do not consistently provide recommended screening procedures to their patients (38-41).

A delivery system for this target group that more directly involves primary physicians may be feasible, because 85 percent of persons 65 years of age or older are seen at least once per year on an outpatient basis (42). Since nearly 88 percent of the participants in this project had a personal physician, and more than 85 percent of the priority problems were first identified by the participants or their physicians, directly involving these personal physicians could be critical. If their physicians had been more actively involved in this project, perhaps participants would have discussed more priority problems with their case managers. Since discussing a problem with a case manager was associated with positive outcomes, the overall effectiveness of the program may then have been enhanced. This idea presumes that this type of program has the capability and accepts the responsibility of being integrated with the medical system.

Another alternative is to adopt more widely proven methods for increasing health promotion and disease prevention efforts in the primary care sector without resorting to duplication of health systems (43-49). This strategy presumes that the major barrier of insufficient reimbursement for health promotion services is removed by health policy changes. These and other potential delivery systems need further investigation.

In conclusion, the program described in this paper appears to be feasible, though somewhat expensive, and it appears to have some favorable impacts for self-enrolled persons, but further work needs to be done to address the issues noted previously. One speculative proposal that could be investigated is as follows: a method of providing health promotion and disease prevention services

that draws on the literature's and this study's lessons would be to have participants' primary physicians conduct assessments and have case management services provided by nonprofessional persons, perhaps volunteers, specifically attached to the primary physicians' offices. This model would be most appropriate for those senior citizens who have personal physicians or who visit a physician at least once a year. The independent screening programs could then be focused on those people who cannot be reached through primary care physicians' offices.

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Exploratory Study of the Relationship Between Hypertension and Diet Diversity Among Saba Islanders

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Synopsis

The relationship between diet diversity and hypertension was examined in a cross-sectional exploratory study of 82 randomly selected adult residents of Saba Island, Netherlands Antilles, in the eastern Caribbean Basin. Blood pressure measurements, taken over 4 years, and the appropriate use of antihypertensive medications, were used to identify chronic hypertensives. A 24-hour dietary recall, semi-quantitative food frequency interviews, and ethnographic confirmation techniques were

used to calculate diet diversity, a measure of the overall dietary pattern.

Results suggest hypertension is associated with lack of an overall balance of food groups in the daily diet beyond any imbalance of a particular dietary cation such as sodium, potassium, or calcium. Bivariate analyses found a significant association between a poorly diversified diet and hypertension (odds ratio [OR] = 4.25, 95 percent confidence intervals [CI] = 1.47,12.30). Dietary intake of sodium, potassium, and calcium was also examined and found not to be associated with the presence of hypertension in bivariate analyses. Including these cations individually in logistic regression models, which also included diet diversity, did not diminish the diet diversity-hypertension association. Multiple logistic regression models in which other potential confounding variables were individually entered as a control variable (body fat, skin color, age, sex, perceived stress, alcohol intake, aerobic activity, and socioeconomic status) did not alter this result. Analysis of the presence or absence of individual food groups indicate a lack of legumes in the daily diet is also associated with the diagnosis of hypertension (OR=4.71, 95 percent CI = [1.71,13.01]).