

5. WHAT FACTORS PROMOTE OR INHIBIT ELDERLY PEOPLE'S USE OF PREVENTIVE SERVICES?

Theoretical Approaches

In addition to providing estimates of the percentage of the population receiving preventive services, the literature laid out in appendixes C and D offers insight into factors associated with use. These studies represent at least two theoretical approaches to explaining the use of preventive services: 1) an approach that emphasizes patient behavior, and 2) an approach that emphasizes provider behavior.

Patient Behavior

Underlying this approach is the assumption that the decision to use a preventive health service is made by the recipient. Receipt of these services results from factors that influence the decision to seek preventive care and the patient's ability to carry out that decision. There are two main versions of this approach: 1) a model of medical service utilization first proposed by Andersen and his colleagues (11,12,36), and 2) the Health Belief Model (57,58).

The Andersen Model.--According to this model, three types of factors determine an individual's probability of using medical services as well as the volume of use:

- *Predisposing variables* include demographic factors and the individual's beliefs about the services.
- *Enabling variables* that affect the patient's ability to gain access to services include the individual's financial resources, the availability of the services in the individual's community, and insurance coverage.
- *Need variables* include practitioners' and patients' own perceptions of the patient's health status. Poor health status may indicate a need for better health care, including preventive services. Alternatively, variables that measure health status may actually be proxies for the need for nonpreventive health services.

To the extent that the need for these other services increases contact with the health care system, individuals may be more likely to receive preventive services that require some health care intervention. Hence, health status variables may enable or predispose individuals to receive preventive services by increasing their contact with the health care system.

The Health Belief Model. --This behavioral model arose from an attempt by medical sociologists during the early 1970s to understand patterns of preventive health and health maintenance (48). It is similar to Andersen's model in its focus on the patient. However, it posits that patient beliefs and attitudes are the most direct determinants of the decision to receive preventive care. Sociodemographic factors, characteristics of the health care system, and other exogenous variables (such as public education or illness of a family member) all indirectly affect preventive behavior by influencing the individual's beliefs and attitudes (57,58).

These attitudinal factors include:

- the patient's perceived *susceptibility* to a given disease or condition;
- the perceived potential *severity* of that disease;
- the perceived *benefit of preventive action* in reducing susceptibility or severity;
- *cues* to taking the action such as public education programs, reminders and physician recommendations; and
- the perceived *barriers* to taking the action including cost, inconvenience, and embarrassment.

One major limitation of the Health Belief Model in explaining the use of preventive services is the lack of data measuring individual attitudes and perceptions. Only data sets constructed specifically for Health Belief Model analyses are likely to contain the requisite information (23,31,54).

However, some researchers have used the underlying relationships suggested by the Health Belief Model to design experiments to improve preventive behavior among patients (70).

Provider Behavior

While patient behavior models focus on the consumers of health, provider behavior models focus upon providers of such services (86). They suggest that patients receive preventive services as the result of their providers' decisions to offer, encourage, and enable their uptake. While the patient behavior models see patients as active decision-makers, the provider behavior approach sees patients as more passive, less important than their providers.

Explanatory studies that use the provider behavior approach examine the effects on use of health care organization, patient contact with the health care system, or with different types of health personnel, and providers' knowledge of preventive services (55,92). This approach also underlies experiments and demonstration projects that try to determine how the manner in which services are provided can maximize their use. Mass screening programs or trials that employ physician education are examples of these types of studies (20,24,62,74).

Combining the Patient and Provider Approaches

The patient and provider approaches need not be mutually exclusive. At least three studies have attempted to combine the provider and patient approaches into a single model (21,29,86). Although each approach places emphasis upon different groups of potential determinants of preventive behavior, they may be valid in explaining different parts of the variation in use. In addition, there is some overlap among the two approaches. Andersen's enabling variables represent the same basic ideas that the provider behavior models focus upon. However, in the patient behavior models, characteristics

of the health care system affect individual patient decisionmaking. Provider behavior studies implicitly assume a more passive role for patients who respond largely to actions of health providers.

Evidence on Patient Behavior

This section describes the results of OTA's analysis of the 1982 NHIS data set (see appendix E for detailed discussion of methods) and examines how these results compare with results of studies listed in appendixes C and D. While many of the studies in appendix D are limited in their implications for elderly use of prevention, they provide a general context within which studies of elderly populations can be interpreted.

OTA's Analysis of the 1982 NHIS

Although the 1982 NHIS does not contain all of the variables described in Andersen's approach and in the Health Belief Model, it is the most comprehensive existing source of information about the determinants of preventive behavior among the noninstitutionalized elderly. Table 6 lists potential explanatory variables included in the NHIS data set.

Table 6.--Selected Factors Hypothesized To Affect Use of Preventive Services by the Elderly

<u>Predisposing factors</u>
■ Gender
■ Age
■ Race (white/non-white)
■ Education
<u>Enabling factors</u>
■ Family income
■ Having health insurance in addition to Medicare ^a
■ Receiving health care through a prepaid plan
■ Living alone
■ Living in a metropolitan area
<u>Measures of health status</u>
■ Bed days in the previous 12 months
■ Having some limitation on activity

^aPotential insurance coverage for the elderly in addition to Medicare includes privately purchased health insurance, Veterans Administration or military health insurance, or means tested public assistance health benefits including Medicaid.

SOURCE: Office of Technology Assessment, 1989.

The major category of variables missing from these data are the health belief variables: patient perceptions of disease threat, perceived benefits of preventive services, and perceived barriers to their use.

OTA used weighted logit models to estimate the independent effects of each of

Table 7---Significant Predictors of Use From
OTA Multivariate Logit Analysis of 1982
National Health Interview Survey^a

Variable	Glaucoma screening exam	Eye exam	Blood pressure	Pap smear	Breast exam
<u>Predisposing factors</u>					
1. Sex (male)	N/A	N/A
2. Age		NS	++
3. Race (non-white)	..	NS	NS	NS	NS
4. Education	++	++	+	++	++
<u>Enabling factors</u>					
5. Family income	++	+	NS	++	++
6. Having health insurance in addition to Medi care	++	++	++	++	++
7. Receiving health care through a prepaid plan	NS	NS	NS	NS	NS
8. Living in a metropolitan area	++	++	NS	+	++
9. Living alone	NS	NS	NS	NS	++
<u>Measures of health status</u>					
10. Bed days in the previous 12 months	++	++	++	++	++
11. Having sane limitation on activity	NS		+	NS	NS

Abbreviations: NS = Estimated coefficient on variable not statistically significant; N/A = Not applicable; variable not included in model.

^aUse measured according to standards described in appendix E and in table 8.

Key to symbols:

- + =Difference in proportions using service significant at 0.05 level (2 tailed), variable positively associated with use
- ++ =Difference in proportions using service significant at 0.01 level (2 tailed), variable positively associated with use
- =Difference in proportions using service significant at 0.05 level (2 tailed), variable negatively associated with use
- .. =Difference in proportions using service significant at 0.01 level (2 tailed), variable negatively associated with use

SOURCE: Office of Technology Assessment, 1989.

the variables listed in table 6 on the use of each screening test or examination included in the NHIS. These models posit that the probability that an individual uses a preventive service within a specified period of time is a function of the variables listed in the table. Appendix E describes each model specification in greater detail and presents actual estimates. Table 7 summarizes the statistically significant predictors of use.

Despite the substantial variation that exists across the five services in the percentage of elderly receiving the specified levels of prevention, the estimated models show a great deal of consistency across services in the significant predictors. Only the use of blood pressure checks appears different. The analysis suggests that fewer variables are important in predicting blood pressure checks than in predicting the other services. This is consistent with the relative lack of variation in the use of this service; over 90 percent of the elderly report having had their blood pressure measured within the previous 2-year period. Almost every medical visit includes blood pressure measurement, and individuals can use machines found in many supermarkets and restaurants to screen themselves for hypertension.

As expected, OTA's analysis found that younger age, more education, and higher income are all consistently associated with a higher probability of using the five preventive services measured in the NHIS. For the three services applicable to both genders, men over 65 are less likely than women of similar age to receive them.

More bed days are consistently related to use of the five services, suggesting that sicker individuals have greater contact with the health care system, and hence, a greater opportunity to be offered preventive services. The analysis showed no relationship between limitation in activity and the use of any of the preventive services except for eye exams, where the direction of the association is neg-

ative, and blood pressure measurement, where the direction is positive.¹

For all services except blood pressure measurement, living in one of the Census Bureau's Standard Metropolitan Statistical Areas (SMSAs), which are defined by geography and population density, is positively and significantly related to the use of preventive services. In urban communities with a large number of health facilities and personnel, individuals are likely to live closer and have more ways to get to appropriate health facilities than their rural counterparts.

Having some health insurance in addition to Medicare is also associated with use. Although such "Medigap" coverage (held by 71 percent of the elderly in the NHIS sample) is unlikely to pay for preventive services, it does lower patients' out-of-pocket expenses for medical care, thus making preventive services more affordable. In addition, a patient's willingness to buy such insurance may indicate a certain concern for his or her own health also found in individuals likely to use preventive services.

Among variables *not* associated with the use of preventive services, membership in an HMO or other prepaid health plan is the most unexpected. Published literature indicates that such health care providers are more likely than others to offer preventive services to

their patients in hopes of lowering treatment expenses (46,54). While OTA's analysis suggests that this relationship may not exist, it is also possible that the small number of elderly NHIS respondents enrolled in HMOs did not provide enough statistical power to detect an actual effect of prepaid membership. In 1982 only 2.3 percent (or about 573,000) of the elderly belonged to HMOs,² and the NHIS sample reflects this relatively small number.

The remaining two variables in the logit models are not consistently associated with use: race is positively associated with glaucoma screening; living alone is positively associated with breast examinations.

Summary of Evidence on the Determinants of Use of Preventive Services

Age.--Age has generally been found to be a negative predictor of the elderly's use of preventive services (16,19,69). Studies of younger adult populations have also found such an association (32,44,80,81,81,88). In the OTA analysis, all services except blood pressure followed this pattern.

Two studies have examined the relationship between age and immunization behavior; neither found any strong association between age and swine flu immunization (22,59). Of the other studies that look at age, one found a positive correlation with the likelihood and volume of preventive visits to a single HMO (40). Another study that looked only at fecal occult blood screening within a well-defined trial also found no age effect.

¹ It is possible that bed days and limitations are measuring health status in the same way. If the two variables are measuring the exact same idea, the logit estimation procedure would not be able to distinguish the independent effects of each variable. This could lead to the insignificant coefficients found for the limitation variable. To test for this potential problem (multicollinearity), we examined the correlation between the bed days and limitations variables. We found a correlation coefficient of 0.31 suggesting that while the estimated standard errors of the two logit coefficients may be somewhat biased downward (thus creating potential non-significance), the two variables largely measure different notions of health status.

² Since 1982, the number of Medicare beneficiaries has grown due to risk- and cost-based Medicare demonstration programs. Under contract with the Health Care Financing Administration, each HMO participating in these programs agrees to provide Medicare benefits to eligible enrollees. As of January 1988, over 1.7 million elderly were participating in Medicare/HMO demonstration programs (71).

Despite these exceptions, the bulk of available evidence suggests that use of preventive services falls with age, especially among the elderly. There are at least three explanations for this observation:

- As an individual gets older, he or she may perceive fewer benefits and more barriers to receiving commonly recommended levels of prevention.
- The observed difference may reflect a tendency of individuals who were elderly in the early 1980s not to use prevention -- a tendency that will disappear among future groups of elderly.³ The benefits and availability of most preventive services emphasized today have been known for only the past generation. By the time that these services became widespread, older individuals may already have established patterns of health care that did not include prevention. According to this reasoning, succeeding generations may have more uniform rates of preventive care over the adult age spectrum.
- As individuals age, they are more likely to visit the doctor for diagnostic and therapeutic services. While they still may receive preventive services, they may not remember that the clinician performed these procedures. Prevention becomes obscured by treatment.

Education .- - All studies of use that have examined education as an explanatory variable have found it to be a statistically significant predictor of the use of preventive services (22,40,61,81). The more education a person has, the more likely he or she is to use preventive services. OTA's analysis of the NHIS data set conforms to this observation. There are two possible explanations for the association between education and use:

- Education may affect the decision to use preventive services by altering patients'

perceptions about disease and potential services. It increases their general knowledge and ability to evaluate health risks and the net benefits of prevention. In addition, it may increase their knowledge of specific diseases, recommendations for preventive services, and sources of care.

- Education and prevention are both investments with expected future payoffs (27). Individuals with more education may be more oriented toward the future than less educated people. Hence, these people tend to seek both education and prevention.

Gender. - - The evidence on the effect of gender on the use of preventive health services is conflicting. Several studies, including OTA's analysis, found a strong significant association between being female and engaging in preventive health measures (31,40,41). An analysis of swine flu vaccinations, however, indicates only a weak correlation between being a woman and use (22). On the basis of two services for the elderly (from OTA's analysis) and a few other studies of the whole adult population, one cannot conclude that elderly women have a consistently greater predisposition toward the use of preventive services than do their male counterparts. Even if such a conclusion were empirically justified, no explanation for this finding is readily apparent.

Race .- - The relationship between race and the use of preventive services by the elderly or other adults is ambiguous. OTA's multivariate logit analysis revealed that elderly whites are more likely to receive glaucoma screening than are elderly members of other racial groups. However, race was not a significant predictor of any of the other services studied.

Other studies that have looked at the relationship between race and the use of preventive services by the non-elderly present inconsistent results. Four studies found a statistically significant negative association

³ This is sometimes called a "cohort effect." The trend data presented earlier in this paper are consistent with this hypothesis.

between being black or non-white and using preventive services (60,62,66,82), but three other studies found no significant relationship (15,31,44). In one study, the results varied according to the preventive service (91). In a review of studies of participation in fecal occult blood screening, Blalock and colleagues report similarly inconsistent results of the effect of ethnicity on the use of this one cancer screening test and draw no conclusions (14).

Income---Income is a reflection of the availability of financial resources to purchase health services. Economic theory suggests that the consumption of most goods rises with income. Preventive health services for the elderly may be particularly sensitive to income for two reasons. First, unlike acute illness care and even some types of chronic illness care, preventive care can be put off without short-term consequences. Thus, preventive care may receive a lower priority than other types of health care or other necessary consumption. Second, Medicare, the primary health insurer for the elderly, does not cover most preventive services. Hence, to use such services, the elderly must have private health insurance (discussed below), wealth, or income to pay the out-of-pocket expenses.

Almost all multivariate studies of preventive use, including the OTA analysis, found that income has a significant positive effect in predicting the use of preventive services (17,22,31,32,40,41,44). Studies examining only the bivariate relationship between prevention and income have also consistently found such an association between prevention and income (54,81,91).

Using Michigan survey data, Rundall and Wheeler examined the relationship between income and the use of preventive visits in greater detail. Their analysis indicated that although income has little direct effect on preventive use, it indirectly increases the likelihood of use by altering perceptions about health and susceptibility to illness, and by increasing the probability that individuals have a regular source of care (60).

Insurance and Price---Except for OTA's analysis, which found that insurance coverage beyond Medicare had a consistently positive significant effect on the use of preventive services, the effect of insurance has not been studied in elderly populations. The published literature on adults' use of preventive services generally supports the contention that the out-of-pocket price is a significant negative predictor of use (16,32,47,61,63,86,91). However, no study has examined the relationship between actual cost to the patient and the use of services.

The potential impact of insurance coverage on use has important policy implications for consideration of Medicare coverage of preventive services. In assessing the benefits and costs of such a decision, one would want to know the number of new users of covered services as well as the total number of users. The OTA analysis and other studies (16,45) suggest that while insurance coverage does increase use, a substantial percentage of individuals do not receive recommended levels of preventive care, even in the presence of generous health insurance. A recent study that compared the use of three preventive services--blood pressure measurement, breast exams, and Pap smears--in Canada, where preventive services are covered by national health insurance, and in the United States found little difference in rates of use by elderly individuals in the two countries (76). Only breast exams were used with statistically significantly greater frequency in Canada.

Enrollment in Prepaid Plans.--Except for OTA's analysis, which found no evidence that enrollment in HMOs increases the use of preventive services by the elderly, only one other study has compared preventive care in HMOs with that of traditional insurance plans (66). The researchers in that study found that employed adults in a prepaid group practice had utilization rates for preventive services no different from those of similar individuals in a Blue Cross plan.

Living Arrangements and Logistical Barriers.--In addition to the financial costs of preventive services, these procedures also entail time and transportation costs. One would expect the use of preventive services to decline as the distance between services and an individual's home or job increases. Two analyses of adult demand for preventive care in an HMO found that distance to a source of medical care was negatively (but nonsignificantly) related to the probability of use (40,41). Two other multivariate analyses that included indexes of time, transportation, and perceived difficulties in obtaining preventive procedures also found no significant relationship between these logistical barriers and the likelihood of using preventive services (16,22).

A less perfect measure of logistical barriers to access that may be especially relevant for the elderly is whether or not the individual lives alone. Living with another person could either raise or lower the logistical barriers to preventive services. An additional household member could assist an individual in overcoming immobility or distance; on the other hand, if the additional household member is in some way limited in mobility or function, the effect on the healthy member's use of preventive services may be negative since it may be difficult to leave a dependent partner to receive preventive care. In OTA's analysis of the NHIS data, living alone was a statistically significant, positive predictor of use for breast exams only.

Geographical Location. --The community in which an older person lives may affect his or her access to prevention. In a multivariate analysis of the effect of geographic location on use based on the same data set that OTA used (i.e., the 1982 NHIS), Woolhandler and colleagues found that among middle-aged women, nonrural residence had a negative effect on the likelihood of having a glaucoma test but had no effect on the use of hypertension screening, Pap smears, and clinical breast examinations (91). These results conflict with OTA's analysis which found that

people in urban communities use more preventive care than do those in non-urban communities. The differences between the two studies may be due to several factors:

- Woolhandler, et al., estimated a logit model with fewer explanatory variables and a slightly different distinction between urban and rural residence from that used by OTA;
- Woolhandler, et al., used a less sophisticated method of estimating variances from the complex NHIS sample design than OTA did; living in a rural area may be less of a barrier for middle-aged women than for the elderly population in obtaining preventive services.

Health Status.--The evidence on the effect of health status on preventive health service use is equivocal. Most multivariate analyses have found *no* significant effect of health status on use (19,40,41,44,91).⁴ Except for OTA's analysis, which found a strong positive significant relationship between number of bed disability days and use, only Rundall and Wheeler found that reporting relatively poor health has a direct positive effect on the likelihood of receiving preventive care (60). However, variation in measures of health status, model specifications, and samples make it difficult to draw conclusions from these studies.

A few other researchers have measured health status by the presence of chronic disease. Blalock, et al., reported that having a chronic condition increases the likelihood of receiving fecal occult blood screening for colorectal cancer (14). Warnecke, et al., found a similar association with the probability of a regular check-up in Illinois adults (86).

⁴ In their multi variate models of the use of preventive services by middle-aged women using the 1982 NHIS data, Wool handler, et al., found that being healthy was significantly and positively related only to blood pressure screening.

Limitations of the Patient Behavior Analyses of Preventive Service Use

The literature and analysis reviewed in this section suggest at least two major limitations of the patient behavior approach to understanding the use of preventive services:

- Existing studies do not account for many factors specific to a particular preventive intervention such as patients' perceptions of pain, discomfort, embarrassment, or complexity of administration that may impinge on the willingness to use of a particular procedure. Inclusion of variables that measure these perceptions would be consistent with the Health Belief Model.
- The models of use examined in this section assume that patients themselves decide whether to receive preventive care. OTA's analysis and most of the published patient behavior literature do not directly examine the role of the primary care physician and the health care organization in the decision to use services.

Evidence From Studies of Health Care Provider Behavior

The Physician

Physicians must perform, supervise, or prescribe most preventive services in order for a patient to receive them. In fact, many adults may depend on their primary care physician to tell them what types of prevention they should receive and how often (92). The literature examining the role of physicians in determining the use of preventive services includes three types of analysis:

- comparisons of physicians' knowledge about appropriate prevention with published sets of recommendations;
- analyses of actual physician performance; and
- experiments to increase physician compliance with recommended procedures.

Because almost all of the trials designed to narrow the gap between published recommendations and actual practice focus on changes in health care organization or management rather than just physician behavior, this paper considers studies that fall into the third category in the section on health care organization below. None of the published studies analyzed the elderly as a group separate from the general patient population.

Physician Knowledge and Actual Practice. -- Woo and her colleagues asked 83 physicians in a hospital-based teaching ambulatory care practice about the *frequency* with which they recommend 16 screening procedures to different age groups (92). Across all patient age groups and procedures, physicians with less training recommended with greater frequency. Doctors with a history of cancer in their families recommended more frequent sigmoidoscopies and mammograms. The mean physician recommendation for preventive use was more frequent than the mean of published guidelines in 48 situations and less frequent in 18 situations. The researchers found close agreement among the respondents on Pap smears, blood pressure checks, physical exams, and medical histories, but wide variation in glucose and cholesterol measurement and mammography.

Almost half the physicians reported that they knew they recommended preventive services more frequently than published guidelines and cited as reasons patient desires and the belief that the guidelines are insufficient. Woo suggests that despite recommendations published by the Canadian Task Force and others, the physicians in this study may believe it better to err on the conservative side by recommending services for which the supporting medical evidence of effectiveness is inconclusive.

5 A "situation" is a particular screening service for a particular age group.

An analysis of patient records in the same study found a higher level of physician compliance with recommended guidelines for those services that doctors could order other health personnel to perform, such as laboratory or radiological tests, than with services that require labor by the primary care physician, such as sigmoidoscopy and breast exams. Woo and her colleagues infer that because the patients they surveyed desire screening with appropriate regularity, the gap in performance must be due to doctors failing to offer prevention according to their own or published recommendations. They also suggest that rates of use are partially related to the ease with which physicians can provide them. Other studies support this hypothesis that variation in the use of different preventive services is a function of characteristics of the services themselves (e.g., patients' pain, discomfort, and embarrassment) (57, 63,65).

Another study compared the preventive care recommendations of 31 physicians practicing general internal medicine in North Carolina with three sets of published guidelines (55). The participating doctors listed procedures they considered essential to a periodic examination for three age groups (30-39; ages 40-49; and ages 50-59). Among the procedures recommended in published guidelines but not chosen as essential or routinely recorded in the medical record by at least two-thirds of the sample physicians were hearing exams, vision exams, fecal occult blood tests, lipid profiles, mammography for women over 50, immunizations, and exams for hypothyroidism. The North Carolina physicians also recommended services not recommended in the published guidelines, including thorough examinations of the major organ systems, measurement of blood urea nitrogen, white blood counts, chest x-rays, and microscopic urinalysis.

Examining the records of 334 patients visiting the 31 North Carolina internists for general examinations, the researchers found that, on average, 59 percent of the procedures

recommended by expert groups were found in the record. Compliance was greater for younger patients, a result consistent with the estimates of use of several services reviewed earlier in this paper. The researchers also found that compliance was greater for laboratory and physical examination procedures than for medical history and counseling services and was inversely related to the number of expert groups recommending each procedure.

Noting that the lowest compliance occurred with procedures identified by the Canadian Task Force on the Period Health Examination, one of the recommending bodies, as having strong scientific validity, Romm and colleagues suggest that improving compliance requires physician education. In discussing ways to improve compliance, they did not consider the possibility that physicians may take into account individual patient characteristics and circumstances in deciding not to provide recommended preventive services.

In another study, McPhee, et al., found that discrepancies exist between American Cancer Society (ACS) recommendations for the use of seven preventive services and physician performance and that physicians tend to overestimate their own provision of these procedures (51). The researchers report that physicians cite four reasons most frequently for not providing recommended services: forgetfulness, lack of time, inconvenience or logistical difficulties, and patient discomfort or refusal.

One study suggests that physicians may differ by specialty in their performance of some preventive services. In a study of Pap smear use by physicians in Maryland, Teitelbaum, et al., found that specialists in obstetrics and gynecology (OB/GYN) were more likely than general practitioners and internists to encourage patients to receive Pap smears, to remind patients by mail or telephone to get a Pap smear, and to achieve compliance with their recommendations (69).

Finally, one study currently underway may shed additional light on the role and motivations of the physician in providing preventive services. Schwartz and Lewis in cooperation with the American College of Physicians (ACP) recently surveyed ACP members about preventive practices (64). In addition to examining the frequency with which physicians say they perform a number of services, Schwartz and Lewis will look for relationships between preventive practices for patients and demographic characteristics, the physicians' experience, and the physicians' preventive practices for themselves.

Health Care Organization

Because physicians work within a larger health care system with other practitioners and administrators, it is possible that health personnel and characteristics of the office, hospital, clinic, group practice, or HMO providing patients' care could affect whether or not older individuals receive preventive services. This section considers the relationship between the use of preventive procedures and the health care organizations that provide them.

Health Maintenance Organizations (HMOs) and Other Prepaid Plans. --Some researchers have claimed that HMOs, in general, may promote the use of preventive services (46). To the extent that HMOs stand to gain from potential savings in health care costs resulting from preventive services, these organizations would have an economic incentive to offer more preventive services. In addition, since visits to HMOs are either free or very inexpensive, HMO patients may demand more such visits.

Data from a single HMO that provided OTA with estimates of preventive service use suggests that these health care providers may have the ability to organize themselves to provide more preventive services than is now generally received by patients. As table 3 above indicates, the rates of use in the HMO were at least as high as or higher than com-

parable rates of use reported in other studies. Not only has this HMO made preventive care a stated organizational goal, but it has developed management tools to achieve compliance with some preventive recommendations, including computer-generated reminders to both patients and physicians for immunizations. However, these relatively high rates of use may be achieved by recruiting patients who already have characteristics that make them more likely to use preventive care. If the high levels of use found in the single HMO for which OTA obtained data are related to its organization, it is not clear whether less centralized prepaid health plans such as independent practice associations (IPAs) would be able to do the same.

OTA's multivariate analysis of the 1982 NHIS found that the elderly enrolled in an HMO are no more likely to use prevention than their unenrolled counterparts. Given the small number of elderly in HMOsq, however, the NHIS sample may not have been large enough to detect an actual difference. With respect to preventive services other than screening, Riddiough, et al., reported mixed evidence about the relative likelihood of HMOs to provide immunizations (54).

Organizational Factors Related to Use-- Other characteristics of health providers may also affect the use of preventive procedures. For example, the use of non-physician personnel, cues to compliance such as reminders and media, or health fairs are all organizational strategies that have been employed to increase the use of preventive services.

One potential mechanism for increasing the use of preventive services is the health screening fair in which participants can receive selected procedures at a publicized time and place. In an analysis of the cost-effectiveness of this screening method, Berwick concluded that fairs work best when the target population is clearly defined, the screening tests are appropriately chosen, reliable and accurate, and the fair provides appropriate guidelines for abnormal results,

follow-up, referral, and treatment (13). Although fairs may increase the ability to detect and prevent illness, significant risks may exist if screening in the fair setting is relatively insensitive or unspecific or does not provide adequate follow-up.

Among interventions designed to increase patient compliance with recommended services, Thompson, et al., studied the value of combining talks by physicians and nurses, postcard reminders to patients, and phone calls to comply with a fecal occult blood test (70). While those receiving any one of these interventions had an average compliance rate of 89 percent versus 68 percent among the control group, the reminder postcard was especially cost-effective, raising compliance about 25 percent to an overall rate of 93 percent at a relatively small cost. The talk by health personnel, which was somewhat more labor intensive, increased compliance about 13 percent.

McDonald and colleagues found similar results in another randomized trial. Interns and resident physicians who received computer-generated reminders provided 49 percent of the preventive services suggested to them, while physicians in the control group provided only 29 percent of the services (49). Among physicians who received the reminder intervention, the researchers found that overall attitudes toward the reminder system and whether the physician read and signed the reminder were statistically significant predictors of use, while years of training and faculty assessments of the physicians were not. The researchers conclude that noncompliance with recommendations is an error of omission that can be mitigated by technological aids.

In another study, Satarino and colleagues retrospectively asked patients receiving free breast cancer screening at two clinics in New York City how they learned of the service and their need to be screened (62). Most black screenees with less than a high school education learned of the clinic through television ads followed by word-of-mouth and

private physician referrals. While this paper suggests that television may be a useful cue in promoting use, it does not indicate how one might reach individuals who were *not* screened at one of the two clinics.

Two studies have tested strategies to induce the *provision* of preventive services to patients. In one study, four clinics were randomly assigned either to participate in a program that combined physician education with a checklist of services due each patient on the medical record or to a control group. Over a 4-month period, the researchers measured rates of mammography and influenza and pneumococcal immunizations among eligible patients in each group. The intervention group had significant increases in the use of these services, ranging from 2 to 40 percent over the control group. The researchers also found significant increases in tests of physician knowledge and attitudes about prevention among physicians (20).

In another randomized trial, nurses who already routinely reviewed patient charts in a university-based internal medicine practice reminded physicians when a patient was due for particular screening services and immunizations (24). For patients receiving the nurse-reminder intervention, the researchers found statistically significant increases in rates of use for fecal occult blood screening (32 to 47 percent), breast exams (29 to 46 percent) and influenza immunizations (18 to 40 percent), but not for Pap smears (13 to 14 percent). The study represents the only randomized experiment to analyze the role of non-physician personnel in providing or boosting the use of preventive services.

Physicians believe that such organizational strategies would improve the use of preventive services. In two studies of physician attitudes, researchers conclude that while most physicians see themselves as ineffective in improving patient compliance with their recommendations for preventive care, they believe that they could be much more effective if they had more resources at

their disposal including better training for themselves and their support staff, improved reimbursement for preventive services, and better educational materials for patients (84,87).

Other research currently underway may enhance our understanding of the impact of organization on use. The Health Services Research Center at the University of North Carolina, with funds from the National Center for Health Services Research and Health Care Technology Assessment (NCHSR), has recently surveyed administrators, medical directors, and staff physicians in 150 large medical practices of different types (25). While most of the study seeks to identify organizational characteristics that contribute to physician satisfaction with his or her work environment, it will also focus on the participating organizations' preventive care practices.

Limitations of Evidence About Provider Behavior

Compared to studies of patient behavior, there are relatively few studies of the structure of the health care system or the role of physicians in the use of preventive services (54), and none focuses exclusively on prevention for an elderly population. A new study of preventive practices among physicians currently underway may shed more light on these issues. However, no current or completed studies to date have examined the role of other potentially important factors, including:

- potential revenue obtainable from preventive services,
- potential liability associated with offering or withholding preventive services, and
- the degree of management control within the health care organization.

The evidence about whether or not HMOs provide greater levels of prevention is ambiguous. While HMO enrollees may receive more preventive care than enrollees of other health plans, other predisposing and enabling factors such as gender, education, and income may explain this differential. Controlling for these factors, OTA's analysis of the NHIS data revealed no effect of HMO membership on the probability of using five preventive services. The data gathered by OTA from one closed-panel HMO suggest that prepaid health plans may have the potential to increase the use of preventive services among older adults. No data exist about whether other prepaid plans achieve a level of preventive care comparable to the one OTA examined.

The literature contains several studies of interventions within clinics, ambulatory care practices, and HMOs designed to promote the use of preventive services. They suggest that provider-based strategies can increase the use of preventive strategies. However, the narrowness of these studies indicates the need for more research. In particular, the existing literature does not adequately address:

- the generalizability of particular interventions to other settings,
- the most effective means of informing the public about the need for and availability of screening programs,
- the role of non-physician personnel in affecting patient use of preventive services, and
- the potential of technological advances (e.g., the introduction of computerized medical records and new screening technology for the physicians' offices) in affecting patient use of preventive services.