Informing Decision Makers

Stage of Change for Making an Informed Decision about Medicare Health Plans

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Objective. To assess the applicability of the transtheoretical model of change (TTM) to informed choice in the Medicare population.

Data Sources/Study Setting. Two hundred and thirty-nine new Medicare enrollees randomly selected from the Center for Medicare and Medicaid Services' October 2001 Initial Enrollee File, a repository of data for persons who are going to turn 65 and become entitled to enroll in Medicare in the next 3 months.

Study Design. Study participants completed TTM measures of stage of change, decisional balance, and self-efficacy for informed choice, as well as measures of Medicare knowledge, perceived knowledge, and information seeking. Model testing was conducted to determine whether well-established relationships between stage of change, decisional balance, and self-efficacy replicate for informed choice in the Medicare population, and whether Medicare knowledge and information-seeking increase across the stages.

Data Collection/Extraction Methods. Survey data were collected using mail surveys with telephone follow-up for nonresponders.

Principal Findings. Predicted relationships were established between stage of change for informed choice and decisional balance, self-efficacy, Medicare knowledge, and information seeking. The amount of variance accounted for by stage of change for informed choice was larger than that found for smoking cessation, where the TTM has had its greatest successes.

Conclusions. The methods and findings lay the groundwork for development of TTM-based interventions for Medicare beneficiaries, and provide a prototype for the application of the TTM to informed decision making among other types of consumers who are being asked to take more responsibility for their health care.

Key Words. Medicare, health insurance, consumers, informed decision making, transtheoretical model of change (TTM)

The Balanced Budget Act (BBA) of 1997 authorized a number of new health plan options under the Medicare+Choice program, providing the nation's Medicare beneficiaries with a range of choices that could potentially offer more benefits at a lower cost than traditional fee-for-service Medicare. Individuals could elect to receive benefits through the original Medicare program or through one of the Medicare+Choice coordinated care plans. In order to ensure that beneficiaries were aware of and understood their health plan options, Congress, with the BBA of 1997, mandated that the Centers for Medicare and Medicaid Services (CMS) provide general and comparative information on the new Medicare health plan choices to all beneficiaries. The legislation also specified both the information to be provided (e.g., benefits, costs, doctor choice, quality performance information) and the channels to be used to disseminate the information (e.g., print, a dedicated 1-800 telephone line, the Internet, health fairs). In response to those requirements, CMS implemented a comprehensive campaign, the National Medicare Education Program (NMEP), to raise awareness among Medicare beneficiaries about their health insurance options, educate them about the characteristics of different plan types, and help them assess the advantages and disadvantages each choice holds for them (Goldstein et al. 2001). This shift toward informed choice for Medicare consumers parallels the steady movement in health care toward expanding the patient role in treatment decisions, health care, and chronic disease management through, for example, patient-centered care (Laine and Davidoff 1996; Institute of Medicine 2001), shared decision making (Balint and Shelton 1996), collaborative care (Holman and Lorig 2000; Wagner et al. 2001) and, more recently, consumer-driven health care (Herzlinger 2002).

The Medicare Prescription Drug, Improvement, and Modernization Act (MMA) of 2003, replaces Medicare+Choice with the Medicare Advantage program, adds a prescription drug benefit, expands preventive care benefits, and links part B premiums to income. These changes dramatically increase the complexity of the Medicare program and the decision-making process for beneficiaries. To make a prudent choice, beneficiaries will need to learn about and compare more health plan options and consider their medication needs in light of various cost-sharing requirements and drug formularies of stand-alone

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prescription drug plans and Medicare Advantage plans that offer prescription drug benefits. Given subtle differences between plans and the multidimensional nature of the task, many beneficiaries will find the decision-making process burdensome, confusing, and anxiety-provoking (Biles, Dallek, and Nicholas 2004). Beneficiaries with inadequate literacy and health literacy, who lack the skills required to use comparative information, or who have cognitive and physical impairments are especially likely to have difficulty (Hibbard et al. 2001; Dubow 2004).

To help meet Medicare beneficiaries' need for information and decision support, CMS has focused on information infrastructure, public-private partnerships, its website, and 1-800-Medicare. However, improvements in these areas cannot ensure that beneficiaries will carefully consider the range of health plan options available to them. Even if CMS were able to provide ready access to user-friendly information, counseling, and decision support, a sizeable percentage of beneficiaries would not use them. A recent survey found that although 52 percent of Internet users age 65 and older had heard of the Medicare.gov website, only 11 percent had ever visited it, and although 55 percent of seniors had heard of the toll-free Medicare help line, only 13 percent had ever called it (Kaiser Family Foundation 2005).

THE TRANSTHEORETICAL MODEL OF CHANGE (TTM)

The TTM offers an empirically validated framework and the tools necessary to help beneficiaries change their information seeking behavior and level of involvement in choice. Briefly, the TTM understands change as progress, over time, through a series of stages. Nearly 25 years of research on a variety of health behaviors have identified processes and strategies for change that work best in each stage to facilitate change (Prochaska and DiClemente 1983, 1985; DiClemente et al. 1991; Prochaska, DiClemente, and Norcross 1992). The basic premise underlying stage-matched approaches is that we are more likely to reduce resistance, facilitate progress through the stages and engagement in the change process, and produce behavior change when interventions are individualized and matched to individual readiness to change, rather than one-size-fits-all. Effective outcomes have been found with stage-matched interventions for a variety of health behaviors, including smoking cessation (Prochaska et al. 1993, 2001), exercise adoption (Marcus et al. 1998), sun exposure (Weinstock et al. 2002), mammography screening (Rakowski et al. 1998), diabetes self-care (Jones et al. 2003), and stress management (Evers

et al., in press). This research can serve as a foundation upon which to build stage-matched interventions to increase participation in informed decision making about health insurance, an area to which the TTM has never previously been applied.

Below we describe three core dimensions of the TTM—stage of change, decisional balance, and self-efficacy—and report on a study designed to assess the applicability of the TTM to informed choice in the Medicare population. Specifically, we examine whether well-established relationships between stage of change, decisional balance, and self-efficacy replicate for informed choice in the Medicare population, and whether stage of change is related as predicted to Medicare knowledge and information-seeking.

Stage of Change

Stage of change, the central organizing construct of the TTM, represents the temporal and motivational dimensions of the change process (Prochaska and DiClemente 1983). In the first stage of change, the precontemplation stage, individuals may deny they have a problem and be resistant to change; they may be unaware of the negative consequences of their behavior, believe the consequences are insignificant, or have given up the thought of changing because they are demoralized. They are not intending to change in the next 6 months. Individuals in the contemplation stage are more likely to recognize the benefits of changing. However, they continue to overestimate the costs of changing and, therefore, are ambivalent and not quite ready to change. They are intending to make a change within the next 6 months. Individuals in the preparation stage have decided to make a change in the next 30 days and have already begun to take small steps toward that goal. People in the action stage are overtly engaged in modifying their problem behaviors or acquiring new, healthy behaviors. Individuals in the maintenance stage have been able to sustain change for at least 6 months and are actively striving to prevent relapse. The stage construct has received empirical support across a broad range of health-related behaviors (Prochaska et al. 1994). These include daily behaviors, such as eating a low-fat diet (Greene et al. 1999), and yearly behaviors, such as mammography screening (Rakowski et al. 1996). These behaviors include acquisition behaviors, such as exercise (Marcus et al. 1992) and cessation behaviors, such as quitting smoking (Prochaska and DiClemente 1983).

Stage of change is generally assessed using a staging algorithm, a set of decision rules that place individuals in one of five mutually exclusive stage categories based on their responses to a few questions about their intentions,

past behavior, and present behavior. In a preliminary project conducted for CMS's Office of Strategic Planning (Levesque et al. 2001), measures assessing Medicare beneficiaries' readiness to make informed health plan choices were developed and validated. Three staging algorithms, constructed from data collected in CMS's 1996, 1997, and 1998 Medicare Current Beneficiary Survey (MCBS) administered between 1997 and 1999, assessed (1) readiness to learn about the Medicare program, (2) readiness to learn about Medicare health maintenance organizations (HMO)s, and (3) readiness to review health plan options. As a group, beneficiaries were most prepared to learn about the Medicare program (44 percent of respondents were in the action stage) and least prepared to review different health plan options (12 percent were in action or maintenance). Stage of change based on all three algorithms was related to knowledge about the Medicare program and information seeking. In the current project, we developed and validated a new stage of change measure that captures the complex and multifaceted nature of informed choice.

Decisional Balance

Janis and Mann (1977) posit that sound decision making requires the consideration of specific pros (advantages) and cons (disadvantages) associated with a behavior's consequences. In an integrative report of 12 studies, Prochaska et al. (1994) found that the cons of changing to a health-promoting behavior outweighed the pros in the precontemplation stage, the pros surpassed the cons in the middle stages, and the pros outweighed the cons in the action stage. Progression from precontemplation to action involved approximately a one standard deviation (SD) increase in the pros, and progression from contemplation to action involved a one-half SD decrease in the cons (Prochaska 1994). These findings have been replicated in a more recent meta-analysis involving 25 different health behaviors in 60 studies (Hall and Rossi 2002). Among Medicare beneficiaries, increasing the salience and enhancing the decisional weight—or perceived importance—of the pros of making informed health plan choices, and decreasing the cons, can help increase readiness to seek and consider information in decision making about health care plans.

Self-Efficacy. Self-efficacy, or the degree to which an individual believes he or she has the capacity to attain a desired goal in difficult situations, can influence motivation and persistence (Bandura 1977). Like decisional balance, levels of self-efficacy differ systematically across the stages of change, with participants further along in the stages of change experiencing greater confidence that

they can make and maintain a particular behavior change, and less temptation to relapse (e.g., DiClemente, Prochaska, and Gibertini 1985; Marcus et al. 1994). Among Medicare beneficiaries who are choosing a Medicare health plan, we can increase self-efficacy by identifying situations that are particularly challenging and providing stage-matched strategies for coping with those situations.

Steps in the Application of the TTM to Informed Choice in the Medicare Population

Preliminary steps in the application the TTM to a new behavior include developing measures of the core constructs of the TTM, and conducting model testing to in order to assess: (1) how well the TTM constructs and the established relationships between them characterize the process of change in the target population; and (2) the relationship between stage of change and level of engagement in the change process. In the remainder of this report we describe model testing conducted to determine whether well-established relationships between stage of change, decisional balance, and self-efficacy replicate for informed choice in the Medicare population, and whether Medicare knowledge and information-seeking increase across the stages.

METHOD

Developing an Operational Definition of Informed Choice

While Congress had mandated education about informed choice, it was clear to CMS staff that there was little consensus regarding its definition. Consequently, we conducted a literature review and interviews with nine CMS research and program operations staff to identify patterns in their understanding of what is meant by informed choice. Based on this work, “informed choice” was defined as a two-step process. Step I involves an annual review, much like an annual check-up, to ensure that all is in working order and that the plan still meets one’s needs. Beneficiaries who find their plan does not meet their needs and new enrollees would move to Step II to compare different Medicare health plans. In Step II, comparing different plans is defined as: (1) finding out what your Medicare health plan choices are; (2) gathering information on the different Medicare health plans; (3) comparing the advantages and disadvantages of your choices, such as cost, benefits covered, doctors and hospitals you can use, rules you must follow to get care, and the quality of the health care provided; and (4) using this information to choose the plan that best meets your needs given your health and financial situation. Given the

plan comparison demands of the new MMA, we focus below on stage of change and TTM model testing for comparing plans.

Model Testing

Study participants completed TTM measures of stage of change, decisional balance, and self-efficacy for informed choice, as well as measures of Medicare knowledge, perceived knowledge, and information seeking. To assess the applicability of the TTM to informed choice in the Medicare population, the following six hypotheses were tested: (1) the pros of engaging in informed choice should increase across the stages of change; (2) the cons of engaging in informed choice should decrease across the stages of change; (3) the pros should begin to outweigh the cons before the action stage; (4) self-efficacy should increase across the stages; (5) Medicare knowledge should increase across the stages; and (6) information-seeking should increase across the stages.

Participants and Procedure. Study participants were 239 new enrollees in the Medicare program. Participants were drawn from CMS's October 2001 Initial Enrollee File, a repository of data for persons who were going to turn 65 and become entitled to enroll in Medicare in the next 3 months. CMS first stratified the Initial Enrollee File by month of birth, and then drew 784 names from the subsample having birth dates in December 2001 (i.e., the group furthest away from enrollment, providing the maximum amount of time to complete the survey). A telematch service located telephone numbers for 435 (56 percent) of the 784 initial enrollees. Among initial enrollees with phone numbers, 360 were randomly selected for inclusion in the study.

Survey data were collected from September to December 2001. A prenotification letter signed by the CMS administrator was mailed to explain that the survey was coming, to provide information about the project and how the data would be used, and to ensure confidentiality. The survey packet with a cover letter signed by the CMS administrator, along with a \$2.00 prepaid incentive, was mailed 2 weeks later. Several meta-analyses (Yammarino, Skinner, and Childers 1991; Hopkins and Gullickson 1992; Church 1993) show that small incentives can significantly increase the response rate to mailed surveys. Ten days later, a postcard reminder was sent to nonrespondents. Then, beginning 10 days after the postcard reminder, participants who had not responded by mail were contacted by telephone and asked to complete the survey by phone. It is important to note the unusual social climate of that period—the recent September 11th attacks on

the World Trade Center and public concern over anthrax-contaminated mail found in Florida, New York, and Washington, DC. Despite of this climate, the survey response rate among eligible respondents was 72 percent.¹

Among the 239 new enrollees who completed the survey, 90 percent were white, non-Hispanic, 6 percent were black, non-Hispanic, 1 percent Hispanic, and 4 percent "other." About half of the sample (48 percent) was male, 58 percent reported an annual household income above \$30,000, and 76 percent were married. When asked for the highest grade of school completed, 12 percent reported that they had not completed high school, 39 percent had completed high school or earned a GED, 27 percent had attended some college, and 22 percent had a college degree. Although only a small minority of participants had reached their 65th birthday by the time they completed the survey, 61 percent reported that they had already chosen a Medicare health plan. Among new enrollees who had chosen a plan, 86 percent had chosen Original Medicare, with or without a supplemental insurance policy, 9 percent had chosen a Medicare managed care plan, and 5 percent were not sure what they had chosen. Sixteen percent reported that they were covered by Medicaid, and 66 percent said that they were currently covered by other health insurance through an employer, the military, or some other group. A majority, 81 percent, reported that they received no help completing the survey.

Measures. The survey took approximately 30 minutes to complete. Its reading level, assessed by hand using the Fry method (Fry 1977; Health Care Financing Administration 1999), was grade 6.0. The following measures were included in the survey:

Demographics, Health Status, and Health Plan Choice. (1) Questions in the baseline survey assessed gender, race and ethnicity, marital status, education, income, overall health (excellent, very good, good, fair, poor), and health compared with 1 year ago (much better, somewhat better, about the same, somewhat worse, much worse). Three questions assessed: (a) whether respondents had already chosen a Medicare health plan; (b) if they had chosen, which type of plan they chose (Original Medicare, Medicare Managed Care, Medicare Private Fee-For-Service, not sure); and (c) whether they would be eligible for additional coverage by Medicaid or through an employer, the military, or some other group.

TTM Measures. (2) The following TTM measures were developed for a larger project assessing the applicability of the TTM to informed choice in the Medicare population (Levesque et al. 2002).

Stage of Change Measure for Comparing Plans. New enrollees were presented with the operational definition of “comparing plans” and asked to keep this definition in mind while answering additional yes/no questions: (1) “Have you compared different Medicare health plans in the last 6 months?” (2) “Do you intend to compare different health plans in the next 3 months?” and (3) “Do you intend to compare different plans in the next 30 days?” Individuals who reported that they had not compared plans in the last 6 months and had no intention of doing so in the next 3 months were classified in the precontemplation stage. Those who had not compared plans in the last 6 months but intended to do so in the next 3 months were classified in the contemplation stage; and those who had not compared plans in the last 6 months but intended to do so in the next 30 days were classified in the preparation stage. Individuals who reported that they had compared plans in the last 6 months were classified in the action stage. We reasoned that it was too early for new enrollees to be in the maintenance stage for comparing different Medicare health plans, and thus omitted it from the algorithm.

Decisional Balance. The decisional balance measure for informed choice is composed of two 3-item scales that measure the pros (e.g., “Comparing plans gives me more peace of mind”) and cons (e.g., “Comparing different plans can be difficult”) of comparing different Medicare health plans. Participants were asked to rate the importance of each item in their decision to compare plans. All items used a 5-point Likert-type response format, where 1 = not at all important and 5 = extremely important. Scale scores were calculated by taking the unweighted sum of the three items composing each scale. Cronbach’s α s for the pros and cons scales were 0.84 and 0.81, respectively, in the present sample.

Situational Self-Efficacy. The self-efficacy measure for informed choice is a 4-item scale assessing new enrollee’s confidence (i.e., “How sure are you . . .”) that they could compare plans, even in difficult situations (e.g., “When there is no one to help you,” “When there is too much information”). Response options ranged from 1 = not at all sure to 5 = extremely sure. A scale score was calculated by taking the unweighted sum of the four items composing the scale. Cronbach’s α was 0.83.

Medicare Knowledge. (3) Five questions assessing knowledge of Original Medicare plans and Medicare managed care plans were drawn from the June 1997 AARP Medicare Population’s Understanding of Managed Care Survey,

the Fall 1998 Survey of Beneficiaries in Pilot State Communities, and CMS's Round 18 Medicare Current Beneficiary Survey. Questions include: "If you join an HMO or managed care plan, you have to leave the Medicare program," and "Which type of health insurance option gives you more freedom to choose the doctors or hospitals you want to go to?" One question about plan disenrollment ("If you join an HMO or managed care plan, you are allowed to drop out of the HMO only during certain times of the year") was excluded from analyses because CMS rules changed mid-study. A knowledge quiz score was computed as the total number of correct responses to the remaining four questions.

Information Seeking. (4) To assess the external validity of the TTM measures, we developed a measure of health plan-related information seeking. The 11 items for the measure were identified in focus groups and interviews with beneficiaries, SHIP (State Health Insurance Assistance Program) counselors, and other experts. Participants were asked, "In the last 12 months, which of the following have you done on your own or with the help of others?" Sample items include, "Used your Medicare & You handbook," "Used the Medicare Compare website on the Internet at www.medicare.gov" and "Attended an information seminar on Medicare choices sponsored by a senior center or senior organization." Response options were "Yes" and "No." An information-seeking score was computed as the total number of information-seeking strategies used. Items were also examined individually.

Statistical Analyses. Univariate and multivariate analyses of variance (ANOVAs and MANOVAs) and χ^2 tests were conducted to examine the relationship between stage of change for comparing plans and decisional balance, self-efficacy, Medicare knowledge, and information-seeking behavior. Following Prochaska et al. (1994), to illustrate the relationship between stage of change and the pros and cons of comparing plans (e.g., do the pros and cons intersect before the action stage?), the pros and cons scale scores were converted to standardized *T*-scores and plotted.

RESULTS

Stage of Change for Comparing Plans

Two hundred and thirty-seven survey participants completed the TTM staging algorithm questions and were classified into stages. Thirty-eight percent

were classified in the precontemplation stage, 8 percent in contemplation, 15 percent in preparation, and 39 percent in action. Given the relatively small number of subjects in contemplation ($n = 18$) and preparation ($n = 36$), these groups were combined in analyses below.

Univariate analyses showed that stage of change was unrelated to demographic variables with the exception of race and ethnicity ($\chi^2[2, N = 236] = 6.6, p < .05$): new enrollees who were white, non-Hispanic were most likely to be in the action stage (35 percent precontemplation, 23 percent contemplation/preparation, 42 percent action), whereas individuals belonging to other racial and ethnic groups (all groups were combined) were most likely to be in the precontemplation stage (58 percent precontemplation, 25 percent contemplation/preparation, 17 percent action).

Stage of change for comparing plans was unrelated to current Medicaid coverage and to coverage by other health insurance through an employer, the military, or some other group. However, there was a significant relationship between stage of change and whether or not participants had already chosen a Medicare health plan ($\chi^2[2, N = 224] = 16.9, p < .001$). Among individuals who had not chosen a plan, 36 percent were in the precontemplation stage, 35 percent in contemplation/preparation, and 29 percent in action; among individuals who had chosen a plan, 37 percent were in precontemplation, 14 percent in contemplation/preparation, and 49 percent in action. Given our operational definition of “comparing plans”—identifying health plan choices, gathering information, comparing the advantages and disadvantages of each option, and choosing a plan that best meets your needs—we can infer that individuals in the preaction stages who had already made a health plan choice had done so without being fully informed.

Model Testing

Summary data and results of the following six tests of the model are presented in Table 1.

Model Tests #1 to #3. A MANOVA examined differences in decisional balance scores across the stages of change for comparing plans. The independent variable was stage of change and the dependent variables were the pros and cons of comparing plans. There was a significant difference across the stages (Wilks' $\lambda = .82$, approximate $F[4, 446] = 11.6, p < 0.001, \eta^2 = 0.09$). The results of follow-up ANOVAs and Newman-Keuls multiple comparison tests showed that individuals in contemplation/preparation and

Table 1: Stage of Change for Comparing Plans and Decisional Balance, Self-Efficacy, and Information-Seeking

	Mean (SD)			<i>F</i>	η^2	Post-Hoc Tests
	Precontemplation (<i>n</i> = 90)	Contemplation/ Preparation (<i>n</i> = 54)	Action (<i>n</i> = 93)			
Decisional Balance						
Pros	44.9 (11.1)	52.2 (7.7)	53.6 (7.9)	21.3***	0.160	PC < C/PR, A
Cons	49.0 (10.5)	51.4 (9.9)	49.9 (9.4)	1.0	0.009	
Self-efficacy	10.7 (4.4)	12.1 (4.4)	13.2 (4.1)	7.0***	0.058	PC < A
Knowledge quiz score	2.0 (1.1)	2.1 (1.2)	2.6 (1.1)	6.4***	0.054	PC, C/PR < A
Total information-seeking behaviors	2.2 (1.8)	2.4 (1.6)	3.7 (1.7)	19.0***	0.140	PC, C/PR < A
<hr/>						
			%	χ^2 (<i>df</i> = 2)	<i>h</i>	
Information Seeking						
Used Medicare & You Handbook		44.7	43.4	70.3	15.1***	0.534
Called Medicare hotline		21.2	18.9	32.6	4.5	0.281
Spoke to a SHIP counselor		3.5	7.4	11.0	3.6	0.225
Asked advice from Medicaid Office		8.2	1.9	8.7	2.7	0.117
Spoke with someone at Social Security Office		53.5	24.5	56.5	15.4***	0.283
Used Medicare Compare website		3.5	3.7	18.3	14.0***	0.502
Attended information seminar at senior center		3.5	1.9	6.5	2.0	0.173
Attended information meeting or called HMO		14.3	20.4	27.2	4.4	0.255
Read information from health plan		60.7	61.1	87.0	18.4***	0.613
Talked with family members or friends		51.2	74.1	83.9	23.0***	0.542
Spoke with other professional		19.0	25.9	40.2	9.9***	0.278

***p* < .01

****p* < .001

HMO, health maintenance organization; SHIP, State Health Insurance Assistance Program.

action stages had significantly higher pros than individuals in the precontemplation stage. The cons did not differ across the stages.

Next, the two decisional balance measures were converted to standardized *T*-scores with a mean of 50 and SD of 10, and plotted with stage of change (Figure 1). The cons of comparing plans outweigh the pros in the precontemplation stage, and the pros outweigh the cons in the later stages. The crossover takes place before action. The pros of comparing plans increase by about 1 SD with progression from the precontemplation stage to action. However, the cons of comparing plans do not decrease appreciably with progression from contemplation to action.

Figure 1: Stage of Change and Decisional Balance for Comparing Plans

Model Test #4. An ANOVA found a significant relationship between stage of change and self-efficacy for comparing plans ($F(2, 225) = 7.0$, $p < 0.001$, $\eta^2 = 0.06$). Student–Newman–Keuls post-hoc tests showed that, compared with new enrollees in the precontemplation stage, individuals in the action stage experience significantly more confidence that they will compare plans, even in difficult situations.

Model Test #5. The mean Medicare knowledge quiz score in this sample was 2.3; study participants answered about two of the four Medicare knowledge questions correctly. There was a significant relationship between stage of change and Medicare knowledge ($F(2, 223) = 6.4$, $p < .01$, $\eta^2 = 0.05$). Individuals in the action stage had significantly higher knowledge scores than individuals in the earlier stages.

Model Test #6. On average, study participants had used 2.9 different strategies to seek information about the Medicare program in the last year. There was a significant relationship between stage of change and number of strategies used ($F(2, 234) = 19.0$, $p < .001$, $\eta^2 = 0.14$). Student–Newman–Keuls post-hoc tests showed that individuals in the action stage engaged in significantly more information seeking than individuals in the precontemplation and contemplation/preparation stages.

Individual χ^2 tests found a significant relationship between stage of change and the following six information-seeking behaviors: (1) used

Medicare & You handbook; (2) spoke to someone at a Social Security office; (3) used Medicare Compare website; (4) read information from a health plan; (5) talked with family members or friends; and (6) spoke with other professional. With the exception of speaking to someone at a Social Security office (presumably to enroll in the Medicare program), findings are in the predicted direction. For example, individuals in the action stage were more than four times as likely as individuals in the precontemplation and contemplation/action stages to have used the Medicare Compare website, and were nearly twice as likely to have used their Medicare & You handbook.

CONCLUSION

The applicability of the TTM to informed choice is clear, given the relationship between stage of change for comparing plans and decisional balance, self-efficacy, Medicare knowledge, and behavioral indicators of information seeking. The amount of variance accounted for by stage (e.g., η^2 's and Cohen's k 's are in the medium to large range) are larger than that found for smoking cessation, where the TTM has had its greatest successes. These effect sizes suggest that the impact of TTM-based programs for informed choice can match or exceed the impact of programs developed for smoking cessation.

The need for programs of this type is also clear. Thirty-eight percent of the sample—and 58 percent of minority participants—were in the precontemplation stage; they had not compared plans in the last 6 months and had no intention of doing so in the next 3 months. Among individuals who had already chosen a plan, about 50 percent were still in preaction stages, indicating that they had made their health plan choice without being fully informed. As a group, participants answered only about one-half of the Medicare knowledge questions correctly.

It is important to note that the cons of comparing plans do not decrease from contemplation to action, which is an unusual pattern in TTM research. The high cons in the action stage seem to bespeak the complexity of the Medicare program and the difficulty of comparing plans. The MMA further increases the complexity of the Medicare program, perhaps further increasing the cons and the challenges to achieving and maintaining beneficiaries' commitment to informed choice. The high cons highlight the importance of simplifying plan comparison information, providing support and assistance, and developing new strategies for helping new enrollees and beneficiaries persevere in the face of difficulty.

This study has several limitations. First, the sample included only Medicare enrollees with available telephone numbers. Research has shown that individuals without telephones or who have unlisted numbers tend to have lower incomes and education, and are more likely to be nonwhite (Orden et al. 1992; National Telecommunications and Information Administration 1999). A second, and perhaps related, limitation is that nonwhites are under-represented in the sample. For example, Hispanics comprised approximately 7 percent of the U.S. population of 64-year-olds at the time of the study (U.S. Census Bureau 2000), but comprised only 1 percent of the sample. Given these sampling biases, we suspect that true estimates of Medicare knowledge, information seeking, and percentage of enrollees in the action stage for comparing plans may be more conservative than those reported here. Future research might include alternative recruitment and survey methods (e.g., in-person interviews, not excluding individuals with unlisted phone numbers) and stratified random sampling techniques to generate more reliable conclusions for minority and disadvantaged beneficiaries and for the new enrollee population as a whole. A Spanish-language equivalent of the TTM measures for comparing plans have already been developed to facilitate this effort (Levesque et al. 2002).

Given the encouraging data supporting the applicability of the TTM to informed choice, our research group proceeded on to develop and test a user-friendly TTM-based manual and multimedia expert system program for new enrollees. The manual, which is 30 pages in length, teaches users about the general principles of behavior change, helps them to assess their level of readiness to compare plans, and offers stage-matched information and exercises designed to facilitate progress to the next stage. The guide can be used alone or in conjunction with the multimedia expert system. The expert system, disseminated over the Internet with multimedia components residing on individual CD-ROMs, administers a TTM assessment and provides immediate feedback during a 20-minute interactive session. At the end of the session, participants have the option of printing a feedback report that they can keep. Both the manual and expert system provide, in a stage-appropriate fashion, the kinds of information found in CMS educational materials and encourage use of CMS materials and services (e.g., the expert system provides links to the Medicare.gov website).

The intervention materials were found effective in a randomized clinical trial involving 1,351 new enrollees. At 6 months postintervention, compared with individuals in the control group, individuals receiving the manual+expert system intervention or the manual alone exhibited significantly greater

increases in Medicare knowledge and perceived knowledge. TTM intervention also increased use of and satisfaction with traditional Medicare education materials among most enrollees; among less educated and advantaged enrollees, the manual alone did not increase use of and satisfaction with traditional Medicare materials, but generated significant increases in knowledge nonetheless, perhaps by filling a critical information void (Levesque et al. 2005).

The conceptual definition of informed choice, TTM measures, and intervention materials are currently being revised to incorporate recent changes to the Medicare program and the increased complexity of the decisions beneficiaries will need to make under the MMA. The methods, measures and interventions developed for CMS can also be applied to other areas of health-related decision making (e.g., in consumer-driven health care) to help consumers improve their health and adapt to the growing complexity of the health care system.

But can the TTM principles and interventions described here be practicably implemented in the real world? We have found a number of ways to disseminate TTM interventions for health behavior change to at-risk populations (e.g., computerized smoking cessation, stress management, and exercise programs are being offered via Internet by employers and insurers), and think a number of options exist for disseminating interventions for informed choice in the Medicare population as well. First, stage-based messages could be integrated into traditional informational Medicare materials, such as the Medicare & You handbook, or a cover letter or pamphlet that accompanies the handbook. Second, the stage-based manual could be posted on the Medicare.gov website. Third, the stage-based manual and expert system intervention could be provided by employers, who are reducing retiree benefits and thus may be motivated to help retirees optimize, through good decision making, any benefits that they do receive. Fourth, nonprofit senior advocacy groups could promote the TTM materials to their members, or offer them on their websites.

The major barrier to implementation is that CMS has the enormous responsibility of educating the nation's 42 million Medicare beneficiaries about their health plan options, and traditionally has sought to meet its demands by presenting primarily factual information. We can begin to address that barrier by increasing CMS decision-makers' awareness of the TTM and the benefits of using innovative, empirically-based strategies for addressing beneficiaries' readiness to make informed decisions about Medicare health plans.

ACKNOWLEDGMENTS

This project was funded under CMS Contract 500-97-0040, Subcontract 20036-3.1. We gratefully acknowledge the contributions and support of our CMS program officers David Miranda, Ph.D., and Amy Heller, Ph.D., both of the Center for Beneficiary Choices, and Beth Kosiak, Ph.D., now at the Agency for Healthcare Research and Quality. We also want to thank two anonymous reviewers for their helpful comments.

The views expressed in this manuscript are those of the authors and do not necessarily reflect the views of the Centers for Medicare and Medicaid Services.

NOTE

1. Twenty-eight participants were deemed ineligible for the study and excluded from response rate calculations. Reasons for ineligibility included cognitive problems ($n = 2$), personal health problems ($n = 5$), family health problems ($n = 2$), unspecified personal problems ($n = 5$), and language barriers ($n = 4$). Some participants stated that the survey did not apply to them because only a single health plan choice was available ($n = 4$) or because they had employer- or retiree-sponsored coverage or military or veterans' benefits ($n = 6$).

REFERENCES

- Balint, J., and W. Shelton. 1996. "Regaining the Initiative. Forging a New Model of the Patient-Physician Relationship." *Journal of the American Medical Association* 275: 887-91.
- Bandura, A. 1977. "Self-Efficacy: Toward a Unifying Theory of Behavior Change." *Psychological Review* 84: 191-215.
- Biles, B., G. Dallek, and L. H. Nicholas. 2004. "Medicare Advantage: Deja vu All Over Again? Health Affairs" [On-line web exclusive], December 15, W4-586-597. Available at: <http://content.healthaffairs.org/cgi/reprint/hlthaff.w4.586v1.pdf>
- Church, A. H. 1993. "Estimating the Effects of Incentives on Mail Survey Response Rates: A Meta-Analysis." *Public Opinion Quarterly* 57: 62-79.
- DiClemente, C. C., J. O. Prochaska, S. K. Fairhurst, W. F. Velicer, M. M. Velasquez, and J. S. Rossi. 1991. "The Process of Smoking Cessation: An Analysis of Precontemplation, Contemplation, and Preparation Stages of Change." *Journal of Consulting and Clinical Psychology* 59: 295-304.
- DiClemente, C. C., J. O. Prochaska, and M. Gibertini. 1985. "Self-Efficacy and the Stages of Self-Change of Smoking." *Cognitive Therapy and Research* 9: 181-200.

- Dubow, J. 2004. "Adequate Literacy and Health Literacy: Prerequisites for Informed Health Care Decision Making." Issue Brief (Public Policy Institute, American Association of Retired Persons), June (IB70), 1-11.
- Evers, K. E., J. O. Prochaska, J. L. Johnson, L. M. Mauriello, J. A. Padula, and J. M. Prochaska. In press. "A Randomized Clinical Trial of a Population and Trans-theoretical Model-Based Stress Management Intervention." *Health Psychology*.
- Fry, E. 1977. *Elementary Reading Instructions*. New York: McGraw-Hill.
- Goldstein, E., L. Teichman, B. Crawley, G. Gaumer, C. Joseph, and L. Reardon. 2001. "Lessons Learned from the National Medicare & You Education Program." *Health Care Financing Review* 23: 5-20.
- Greene, G. W., S. R. Rossi, J. S. Rossi, W. F. Velicer, J. S. Rossi, J. L. Fava, and J. O. Prochaska. 1999. "Dietary Applications of the Stages of Change Model." *Journal of the American Dietetic Association* 99: 673-8.
- Hall, K. L., and J. S. Rossi. 2002. "Meta-Analysis of the Structure, Function, and Effect Size of Decisional Balance across the Stages of Change for 25 Health Behaviors." *Annals of Behavioral Medicine* 24: S51.
- Health Care Financing Administration. 1999. *Writing and Designing Print Materials for Beneficiaries: A Guide for State Medicaid Agencies (HCFA Publication. No. 10145)*. Baltimore, MD: Health Care Financing Administration.
- Herzlinger, R. E. 2002. "Let's Put Consumers in Charge of Health Care." *Harvard Business Review* 80: 44-50.
- Hibbard, J. H., P. Slovic, E. Peters, M. L. Finucane, and M. Tusler. 2001. "Is the Informed-Choice Policy Approach Appropriate for Medicare Beneficiaries?" *Health Affairs* 20: 199-203.
- Holman, H., and K. Lorig. 2000. "Patients as Partners in Managing Chronic Disease. Partnership Is a Prerequisite for Effective and Efficient Health Care." *British Medical Journal* 320: 526-7.
- Hopkins, K. D., and A. R. Gullickson. 1992. "Response Rates in Survey Research: A Meta-Analysis of the Effects of Monetary Gratuities." *Journal of Experimental Education* 61: 52-62.
- Institute of Medicine Committee on Health Care in America. 2001. *Crossing the Quality Chasm: A New Health System for the 21st Century*. Washington, DC: National Academy Press.
- Janis, I. L., and L. Mann. 1977. *Decision Making: A Psychological Analysis of Conflict, Choice and Commitment*. New York: Free Press.
- Jones, H., L. Edwards, T. M. Vallis, L. Ruggiero, S.R Rossi, J. S. Rossi, G. Greene, J. O. Prochaska, and B. Zinman. 2003. "Changes in Diabetes Self-Care Behaviors make a Difference in Glycemic Control: The Diabetes Stages of Change (DiSC) Study." *Diabetes Care* 26: 732-7.
- Kaiser Family Foundation 2005. "Selected Findings on the Medicare Drug Law. Health Poll Report Survey" (conducted December 2-5, 2004) [On-line]. Available at <http://www.kff.org/kaiserpolls/loader.cfm?url=/commonspot/security/getfile.cfm&PageID=50510>
- Laine, C., and F. Davidoff. 1996. "Patient-Centered Medicine. A Professional Evolution." *Journal of the American Medical Association* 10: 152-6.

- Levesque, D. A., C. O. Cummins, J. O. Prochaska, J. L. Johnson, and J. M. Prochaska. 2002. *Application of the Transtheoretical Model to Informed Choice in the Medicare Population* (Final Project Report to CMS, Contract No. 500-97-004, Subcontract No. 20036-3.1). Kingston, RI: Pro-Change Behavior Systems.
- Levesque, D. A., C. O. Cummins, J. M. Prochaska, J. O. Prochaska, D. Miranda, and A. Heller. 2005. "Results of a Randomized Trial of Stage-Based Interventions for Informed Choice in the Medicare Population." Manuscript under review.
- Levesque, D. A., J. O. Prochaska, C. O. Cummins, S. Terrell, and D. Miranda. 2001. "Assessing Medicare Beneficiaries' Readiness to Make Informed Health Plan Choices." *Health Care Financing Review* 23: 87-104.
- Marcus, B. H., C. A. Eaton, J. S. Rossi, and L. L. Harlow. 1994. "Self-Efficacy Decision-Making and Stages of Change: An Integrative Model of Physical Exercise." *Journal of Applied Social Psychology* 24: 489-506.
- Marcus, B. H., K. M. Emmons, L. R. Simkin-Silverman, L. A. Linnan, E. R. Taylor, B. C. Bock, M. B. Roberts, J. S. Rossi, and D. B. Abrams. 1998. "Evaluation of Motivationally Tailored vs. Standard Self-Help Physical Activity Interventions at the Workplace." *American Journal of Health Promotion* 12: 246-53.
- Marcus, B. H., J. S. Rossi, V. C. Selby, R. S. Niaura, and D. B. Abrams. 1992. "The Stages and Processes of Exercise Adoption and Maintenance in a Worksite Sample." *Health Psychology* 11: 386-95.
- National Telecommunications and Information Administration. 1999. "Falling through the Net: Defining the Digital Divide" [On-line], Available at <http://www.ntia.doc.gov/ntiahome/fttn99/contents.html>
- Orden, S. R., A. R. Dyer, K. Liu, L. Perkins, K. J. Ruth, G. Burke, and T. A. Manolio. 1992. "Random Digit Dialing in Chicago CARDIA: Comparison of Individuals with Unlisted and Listed Telephone Numbers." *American Journal of Epidemiology* 135: 697-709.
- Prochaska, J. O. 1994. "Strong and Weak Principles for Progressing from Precontemplation to Action on the Basis of 12 Problem Behaviors." *Health Psychology* 13: 47-51.
- Prochaska, J. O., and C. C. DiClemente. 1983. "Stages and Processes of Self-Change of Smoking: Toward an Integrative Model of Change." *Journal of Consulting and Clinical Psychology* 51: 390-5.
- . 1985. "Common Processes of Change in Smoking, Weight Control, and Psychological Distress." In *Coping and Substance Use: A Conceptual Framework*, edited by S. Shiffman and T. Wills, pp. 345-63. San Diego, CA: Academic Press.
- Prochaska, J. O., C. C. DiClemente, and J. C. Norcross. 1992. "In Search of How People Change: Applications to Addictive Behaviors." *American Psychologist* 47: 1102-14.
- Prochaska, J. O., C. C. DiClemente, W. F. Velicer, and J. S. Rossi. 1993. "Standardized, Individualized, Interactive, and Personalized Self-Help Programs for Smoking Cessation." *Health Psychology* 12: 399-405.

- Prochaska, J. O., W. F. Velicer, J. L. Fava, J. S. Rossi, and J. Y. Tsoh. 2001. "Evaluating a Population-Based Recruitment Approach and a Stage-Based Expert System Intervention for Smoking Cessation." *Addictive Behaviors* 26: 583-602.
- Prochaska, J. O., W. F. Velicer, J. S. Rossi, M. G. Goldstein, B. H. Marcus, W. Rakowski, C. Fiori, L. L. Harlow, C. A. Redding, D. Rosenbloom, and S. R. Rossi. 1994. "Stages of Change and Decisional Balance for Twelve Problem Behaviors." *Health Psychology* 13: 39-46.
- Rakowski, W., B. Ehrich, C. E. Dube, D. N. Pearlman, M. G. Goldstein, K. K. Peterson, B. K. Rimer, and H. Woolverton. 1996. "Screening Mammography and Constructs from the Transtheoretical Model: Associations Using Two Definitions of the Stages-of-Adoption." *Annals of Behavioral Medicine* 18: 91-100.
- Rakowski, W., B. Ehrich, M. G. Goldstein, B. K. Rimer, D. N. Pearlman, M. A. Clark, W. F. Velicer, and H. Woolverton. 1998. "Increasing Mammography among Women Aged 40-74 by Use of a Stage-Matched, Tailored Intervention." *Preventive Medicine* 27: 748-56.
- U.S. Census Bureau. 2000. "(NP-D1-A) Projections of the Resident Population by Age, Sex, Race, and Hispanic Origin: 1999 to 2100" [On-line]. Available at http://www.census.gov/population/projections/nation/detail/d2001_10.pdf
- Wagner, E. H., R. E. Glasgow, C. Davis, A. E. Bonomi, L. Provost, D. McCulloch, P. Carver, and C. Sixta. 2001. "Quality Improvement in Chronic Illness Care: A Collaborative Approach." *Joint Commission Journal on Quality Improvement* 27 (2): 63-80.
- Weinstock, M. A., J. S. Rossi, C. A. Redding, and J. E. Maddock. 2002. "Randomized Controlled Community Trial of the Efficacy of a Multicomponent Stage-Matched Intervention to Increase Sun Protection among Beachgoers." *Preventive Medicine* 35: 584-92.
- Yammarino, F. J., S. J. Skinner, and T. L. Childers. 1991. "Understanding Mail Survey Response Behavior." *Public Opinion Quarterly* 59: 78-92.